

## 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 (~~Modified~~ 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 ~~33~~ (built environment), Chapter ~~44~~ (natural environment), ~~and~~ Chapter 5 (cultural environment).

The IBR program's Modified LPA is a modification of the ~~Locally Preferred Alternative~~ 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 ~~SDEIS~~ [Draft Supplemental Environmental Impact Statement \(SEIS\)](#) is evaluating the effects of changes in design since the CRC ~~Record of Decision (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~~ [program description](#) will be inserted into the final version of this ~~Technical Report~~ [technical report](#).*

## 2. METHODS

### 2.1 Introduction

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

The ~~National Environmental Policy Act (NEPA)~~ scoping process helped to inform the extent and level of analysis that were required for each environmental resource analyzed for the IBR program. Consultations with cooperating agencies, participating agencies, and the public contributed to defining the scope and scale of the cumulative effects analysis.

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

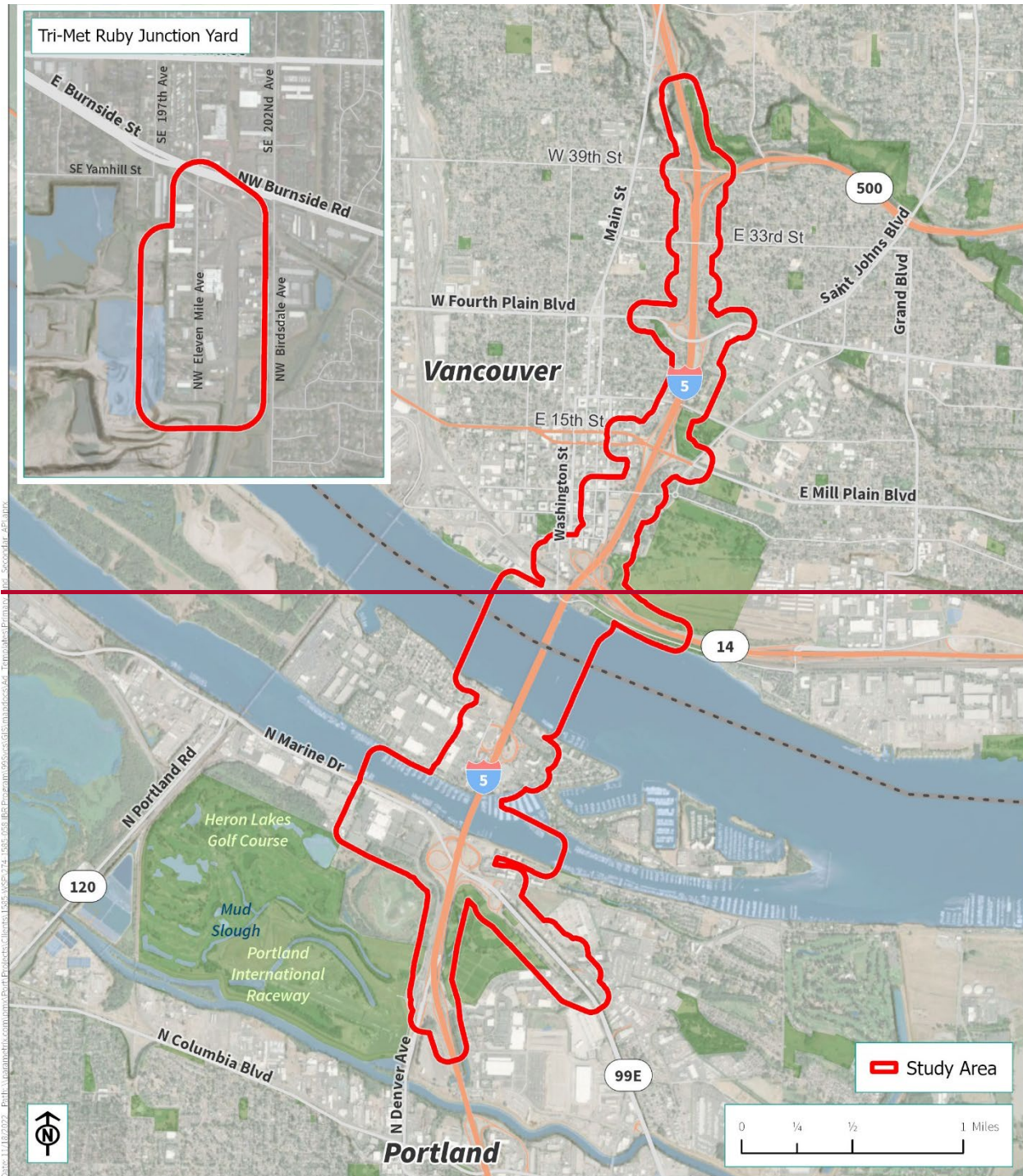
### 2.2 Study Areas

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

Several technical reports identified a common study area that runs along a 5-mile segment of ~~Interstate 5 (I-5),~~ between approximately State Route (SR) 500 in Washington and Columbia Boulevard in Oregon, as well as in downtown Vancouver west and east of I-5. ~~This study area~~ This area (Figure 2-1) is where most physical changes associated with the program would occur (although mitigation could still occur outside of it). ~~See Figure 2-1 for a map of this study area. The study area for each resource can be found in their respective technical reports~~ Other resources, such as air quality, economics, and equity, use much larger study areas.

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



2





1

## 2 2.3 Relevant Laws and Regulations

3 The NEPA regulations issued in 1978 defined cumulative effects as the “impact on the environment  
4 which results from the incremental impact of the action when added to other past, present, and  
5 reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person

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1 undertakes such other actions. ~~Cumulative effects can result from individually minor but collectively~~  
 2 ~~significant actions taking place over a period of time” (40 Code of Federal Regulations, 1508.7, 1978).~~  
 3 ~~This definition was removed as a result of revisions to the NEPA regulations by CEQ in 2020. However,~~  
 4 ~~because the FHWA implementing regulations for this change are not promulgated, this analysis~~  
 5 ~~continues to use definitions for cumulative effects, and the Final EIS and ROD that were issued for the~~  
 6 ~~CRC project included an analysis of cumulative effects, the IBR program will assess whether the~~  
 7 ~~current project will create a new or greater cumulative effect than that identified in the CRC ROD. The~~  
 8 ~~combination of effects, and resulting environmental conditions, are the focus of the cumulative~~  
 9 ~~effects analysis.”~~ The following is a list of federal laws and guidance were used to guide or inform the  
 10 assessment of cumulative effects:

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

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

## 18 2.4 General Analytical Approach

19 The IBR program team assessed which environmental and community resources would be affected by  
 20 the program and how other past, present, or reasonably foreseeable future actions may affect the  
 21 same resources. ~~These actions and their cumulative effects were compared to the potential effects~~  
 22 ~~resulting from the Modified LPA. In accordance with Council on Environmental Quality~~ In accordance  
 23 with CEQ guidance, the cumulative effects analysis concentrates on resources that the IBR program is  
 24 anticipated to affect and focuses on important issues of national, regional, or local significance.

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

32 The analysis of cumulative effects for the IBR program first employed quantitative methods where  
 33 applicable. The analysis is also qualitative, ~~with emphasis on comparing the relative cumulative~~  
 34 ~~effects of the Modified LPA to the cumulative effects of the No-Build Alternative. This~~ which allows the  
 35 appropriate context to be used in considering and comparing the two alternatives, based on available  
 36 data.

37 The cumulative effects analysis evaluates the change in conditions since the ~~Columbia River Crossing~~  
 38 ~~(CRC) Record of Decision (ROD)~~ CRC ROD and updates the analysis to incorporate new or greater  
 39 cumulative effects. The analysis followed an eight-step process, listed below, which is consistent with



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1 the Oregon Department of Transportation’s (ODOT’s) National Environmental Policy Act  
2 Environmental Impact Statement Template (ODOT 2010) ~~and~~, [chapter 12 of the American Association](#)  
3 [of State Highway and Transportation Officials Practitioners Handbook \(AASHTO 2016\)](#), and [chapter](#)  
4 [412 of the Washington Department of Transportation’s \(WSDOT’s\) ~~Guidance on Preparing Cumulative~~](#)  
5 [Impact Analyses ~~Environmental Manual~~](#) (WSDOT ~~2008~~2022).

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

## 17 2.5 Past, Present, and Reasonably Foreseeable Future Projects

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

- 20 • The relevant timeframe for considering past actions varies by general discipline.
  - 21 ➤ The natural environment analysis [timeframe](#) looks at broad changes beginning in the  
22 1800s.
  - 23 ➤ The cultural environment ~~starts with precontact.~~ [analysis timeframe begins in 15,000](#)  
24 [before present.](#)
  - 25 ➤ The ~~relevant past actions for evaluating~~ built environment ~~cumulative effects started~~  
26 [analysis timeframe starts](#) in the early 1950s with the construction ~~and opening~~ of I-5.
- 27 • The “present” is 2022.
- 28 • The “future” is 2045, the design year of the IBR program.

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

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



1 2.5.1 Past Projects and Actions

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

10 ~~For the built environment, the “past” will run from 1950 (prior to the opening of I-5) to the present~~  
 11 ~~day. For the natural environment, an earlier base year is evaluated to capture a longer history of the~~  
 12 ~~effects of development on natural resources in the area. To determine base thresholds for cultural~~  
 13 ~~resources (referred to as “precontact”), the cultural environment team solicited input during the CRC~~  
 14 ~~Project phase from the Cultural Resources/Section 4(f) Workgroup, which was composed of local and~~  
 15 ~~state agency representatives, the Washington Department of Archaeology and Historic Preservation~~  
 16 ~~(DAHP), and the Oregon State Historic Preservation Office (SHPO).~~

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

26 Native Americans have occupied [and/or](#) traveled through the study area for thousands of years.  
 27 ~~Their~~[These](#) activities ~~had little effect~~[are no longer easily identifiable](#) on [the](#) current natural and built  
 28 ~~environmental conditions~~[environment](#) in the ~~project~~[study](#) area; however, there are numerous cultural  
 29 resources in the study area associated with this time period. In the 1800s ~~European~~[Euro](#)-American  
 30 settlement began and expanded, and the Portland and Vancouver area population began to  
 31 dramatically increase. The following key historic events provide a basis for analysis of past actions  
 32 that have helped shape current environmental conditions; more detailed descriptions of actions that  
 33 have affected a particular resource are ~~found~~[presented](#) in Chapters ~~33~~, ~~44~~, and 5.

34 Table 2-1. Past Actions

Time Period	Action
Pre-1800s	Native <del>American villages</del> <a href="#">Americans thrived for centuries</a> on the shores of the lower Columbia River <del>thrived for centuries</del> until the 19th century, when settlers brought disease and ultimately removed Indigenous peoples to reservations.



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Time Period	Action
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.
<a href="#">1855–1885</a>	<a href="#">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.</a>
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	Pearson Field became a dirigible landing area. It was officially dedicated as Pearson Field in 1925.  <a href="#">U.S. v Winans affirms treaty fishing rights.</a>
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.





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Time Period	Action
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). <a href="#">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).</a>
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, <del>to</del> <a href="#">to control flooding and</a> 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 <del>economic</del> 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.
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 detainment 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.
<a href="#">1953 to 1954</a>	<a href="#">The Western Oregon Indian Termination Act terminated federal recognition of 60+ tribes in Oregon, including the reservations at Grand Ronde and Siletz.</a>



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Time Period	Action
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).
<a href="#">1969 to 1974</a>	<a href="#">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.</a>
1973 to 1990s	A shopping mall <del>opens</del> <a href="#">opened</a> 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.
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.
<a href="#">1977</a>	<a href="#">Confederated Tribes of Siletz Indians were restored to federal recognition.</a>
<a href="#">1983</a>	<a href="#">Confederated Tribes of Grand Ronde were restored to federal recognition.</a>
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 <a href="#">has</a> 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 <del>present</del> <a href="#">2020</a>	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).

Time Period	Action
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 <del>2021</del> 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. ~~They~~  
 5 ~~will create additional travel demand and generally will increase the density of housing, commercial,~~  
 6 ~~and retail enterprises in the study area.~~

7 **2.5.2.1 Recent Transportation Projects**

- 8 • [Port of Vancouver’s West Vancouver Freight Access Project \(Vancouver, west of I-5\).](#)
- 9 • [Vancouver Waterfront Renaissance Trail \(Vancouver\), east of I-5\).](#)
- 10 • [Interstate Bridge northbound trunnion replacement \(Vancouver/Portland\).](#)
- 11 • [Interstate Bridge northbound active traffic management \(Vancouver\).](#)
- 12 • [Clark County Public Transit Benefit Area Authority \(C-TRAN’s\) Bus on Shoulder service](#)
- 13 [\(Vancouver\), I-5, and Interstate 205 \[I-205\]\).](#)
- 14 • [New metering on southbound I-5 at the 39th Street/SR 500 off ramp \(Vancouver\).](#)

15 **2.5.2.2 Recent Development**

- 16 • [Multifamily residential buildings along Marine Drive and N Anchor Way \(Portland\), east of I-5\).](#)
- 17 • [Vanport wetlands restoration \(Portland\), west of I-5\).](#)
- 18 • [Portland Meadows redevelopment \(Portland\), east of I-5\).](#)
- 19 • [Jantzen Beach Center redevelopment \(Portland, Hayden Island\), west of I-5\).](#)
- 20 • [Floor and Décor+Decor \(Portland, Hayden Island\), east of I-5\).](#)
- 21 • [Vancouver Waterfront \(Vancouver\), west of I-5\).](#)
- 22 • [Hurley Building condominium \(Vancouver\), west of I-5\).](#)
- 23 • [New Seasons \(Vancouver\), west of I-5\).](#)
- 24 • [West Barracks renovation \(Vancouver\), east of I-5\).](#)



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- 1 • Vancouver Community Library (Vancouver), [west of I-5](#).
- 2 • The Academy Phase 1 (Vancouver), [west of I-5](#).
- 3 • Block 10 (Vancouver), [west of I-5](#).
- 4 • Office buildings at 210 W 4th Street and 101 E 6th Street (Vancouver), [west of I-5](#).
- 5 • Vancouver Center Condo (Vancouver), [west of I-5](#).
- 6 • Vancouver Innovation, Technology and Arts Elementary School (Vancouver), [east of I-5](#).

### 7 2.5.3 Reasonably Foreseeable Future Projects

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

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

18 The ~~No-Build Alternative~~ [following three sections identify the list of future actions included in the](#)  
 19 [cumulative effects analysis, which have been organized into three categories: \(1\) future transportation](#)  
 20 [projects, \(2\) other future projects \(non-transportation\), and \(3\) anticipated growth and land use](#)  
 21 [changes in the region as identified in adopted state, regional, and local plans.](#)

#### 22 [2.5.3.1 Future Transportation Projects](#)

23 [The list of future transportation projects included in the cumulative effects analysis is based on the](#)  
 24 [transportation modeling conducted for the program \(for details on the regional modeling, see](#)  
 25 [Appendix A of the Transportation Technical Report \(IBR 2023p\). This includes a ~~list~~ variety of projects](#)  
 26 [that are ~~anticipated to occur through 2045, including present projects and planned improvements for~~](#)  
 27 [which need, commitment, financing, and public and political support are identified and reasonably](#)  
 28 [expected](#) ~~assumed~~ [to be implemented. These projects meet the criteria of being “reasonably](#)  
 29 [foreseeable.” All transportation improvements associated with the No-Build Alternative are included](#)  
 30 [in either built and in place before 2045. The sources for developing the project list include Oregon](#)  
 31 [Metro’s \(Metro’s\) 2040 Metro \(Metro\) Regional Transportation Plan \(RTP\) \(Metro 2018\) \(including](#)  
 32 [amendments\) ~~or and the~~ Southwest Washington Regional Transportation Commission \(RTC’s\)](#)  
 33 [2040 RTC\) RTP; \(RTC 2019\).](#)

34 ~~Transportation infrastructure projects underway or planned through 2045 are listed in Appendix A,~~  
 35 ~~which includes highway and transit projects on both sides of the Columbia River. Transportation~~  
 36 ~~projects from the RTPs include the Regional Mobility Pricing Project that would initiate congestion~~  
 37 ~~pricing, using variable rate tolls, for the entire I-5 and Interstate 205 (I-205) corridor in the~~

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1 metropolitan area. ODOT completed the NEPA scoping phase for the Regional Mobility Pricing Project  
2 in January 2023 and is now conducting NEPA analysis.

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

11 ~~Projects more specific to the immediate area include local transportation improvements,~~  
12 ~~infrastructure associated with higher density residential communities along Marine Drive in Portland,~~  
13 ~~ongoing revitalization of downtown Vancouver and the Vancouver Waterfront, and general~~  
14 ~~infrastructure improvements, such as sewer and water facility expansions, that further enable~~  
15 ~~development.~~

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

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

### 30 [2.5.3.2 Other Future Projects](#)

31 [Other](#) anticipated projects near the IBR program are listed below and identified on ~~Figure 2-2.~~ [Figure](#)  
32 [2-2.](#) When identifying non-transportation projects that could contribute to cumulative effects, a  
33 project’s proximity to the IBR program was considered (using the area shown on ~~Figure 2-1~~ [Figure 2-1](#),  
34 where most physical changes associated with the program would occur). The list of projects was  
35 confirmed with local and regional partner agencies ~~in summer 2022.~~ [The, and the](#) project list will  
36 continue to be refined as individual projects progress and additional information is obtained about  
37 other reasonably foreseeable projects.

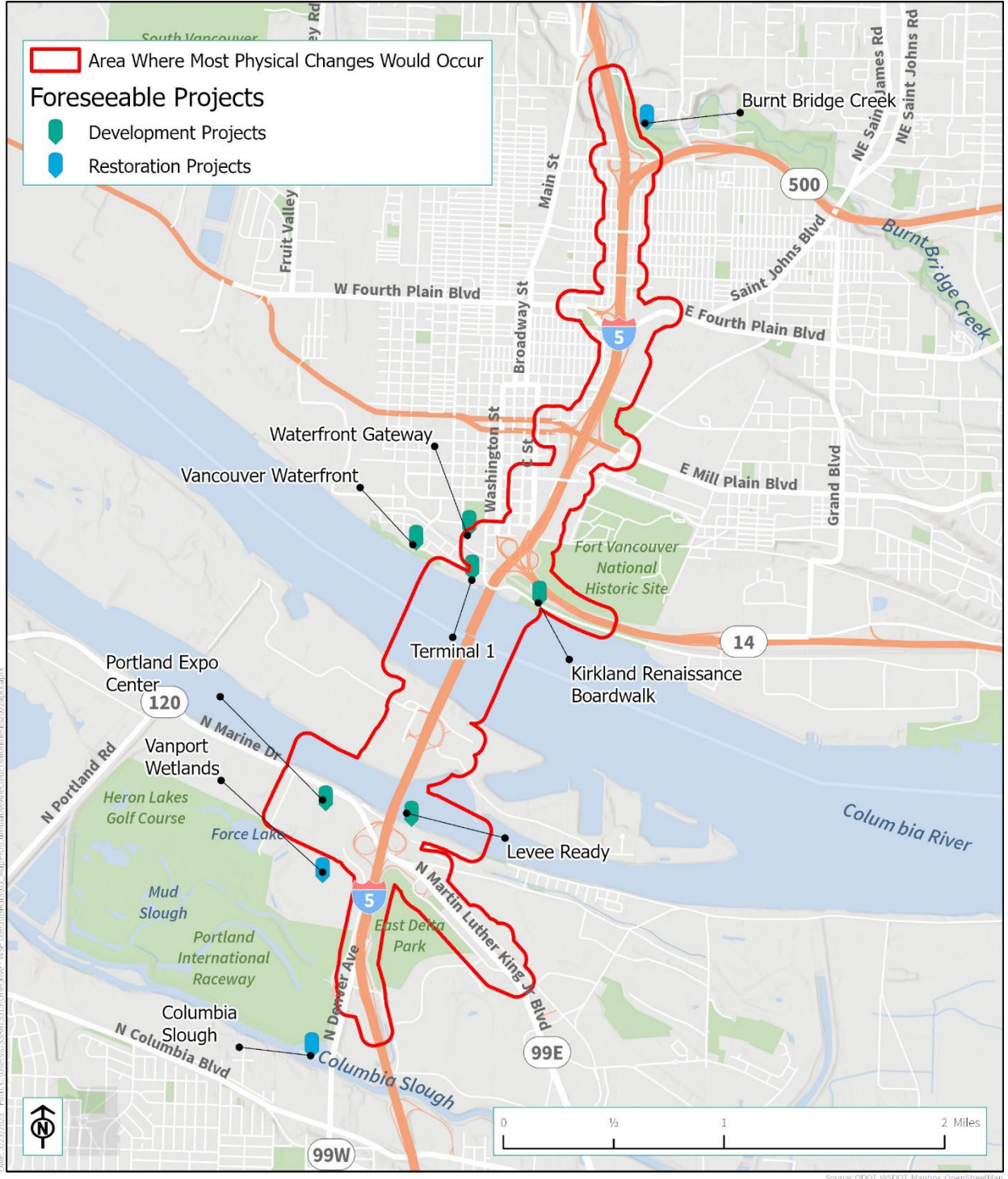
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<sup>2</sup> [One transportation project \(the Fourth Plain Safety and Mobility project\) that is not listed on the financially constrained list in the RTC’s RTP was incorporated into the modeling at the request of partner agencies.](#)

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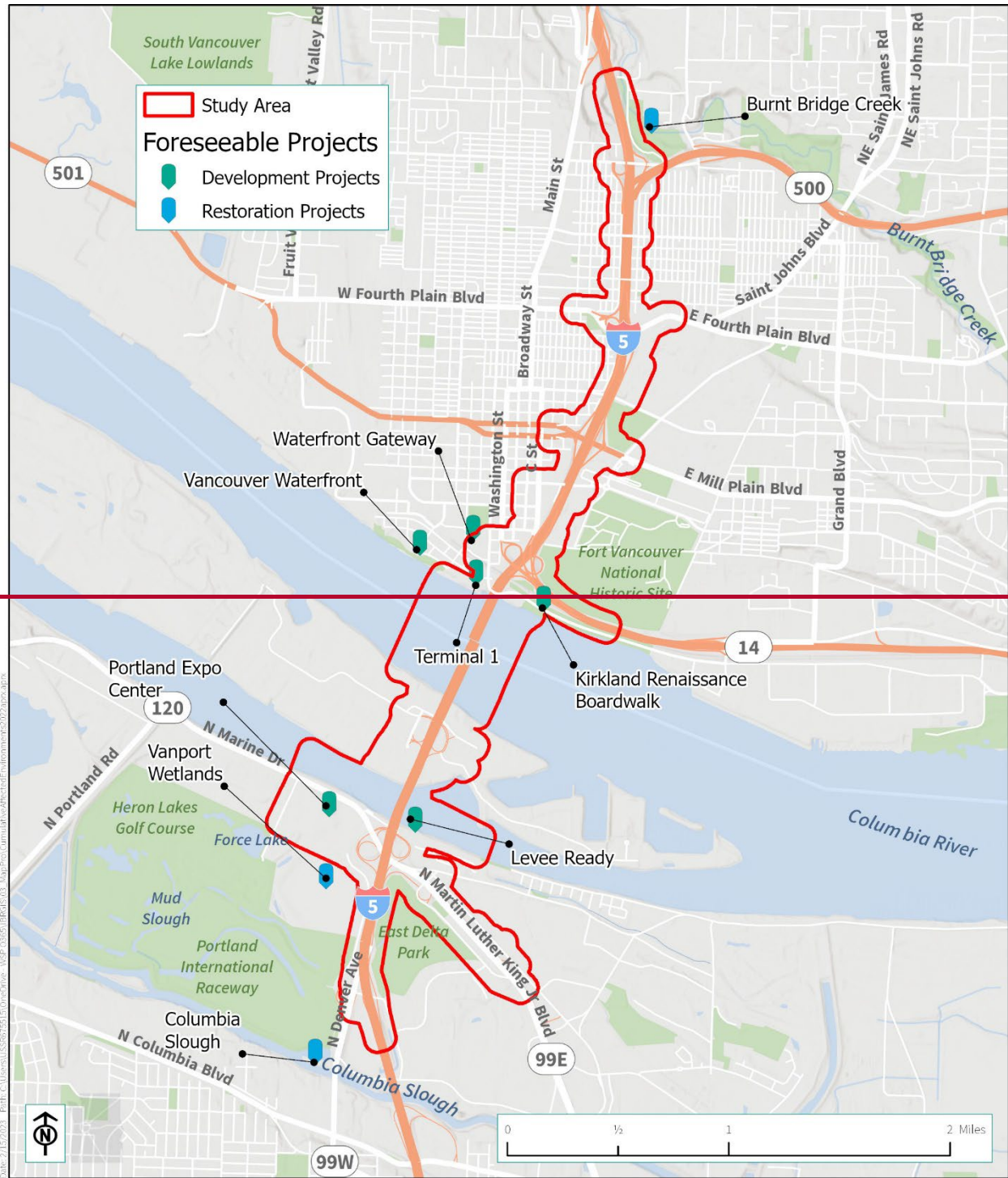
1 Figure 2-2. Reasonably Other (Non-transportation) Foreseeable Projects in the Program Vicinity

2 Note: All transportation projects listed in the adopted RTPs are included on the list of reasonably foreseeable projects (see  
3 Appendix A). No future



4 Note: No foreseeable non-transportation projects were identified near the Ruby Junction Maintenance Facility that  
5 are anticipated to contribute to cumulative effects.  
6





- 1
- 2 **Vancouver Waterfront:** This ongoing project is a large-scale mixed-use development led by the City
- 3 of Vancouver. The City completed a master plan for the 20-block, 32-acre site, which included new
- 4 office and residential space, in addition to a public park and multi-use trail. The first phase of
- 5 construction began in 2015, and the first buildings opened in 2018. While the City's improvements are

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1 largely complete, private properties at the waterfront continue to be developed, including Hotel  
2 Indigo and Kirkland Tower. Temporary traffic impacts may occur during project construction, but  
3 these should conclude before the IBR program begins construction.

4 **Terminal 1:** The Port of Vancouver USA is developing a 10-acre property known as Terminal 1, which  
5 is located between the Vancouver Waterfront (described above) and the existing ~~I-5 bridges~~[Interstate](#)  
6 [Bridge](#). Terminal 1 would be a mixed-use development with a hotel, office and retail space, outdoor  
7 gathering areas, and a public marketplace. Terminal 1 would also complete a missing segment of the  
8 Vancouver Waterfront Renaissance Trail, connecting the existing trail at the Vancouver Waterfront to  
9 the existing trail east of Terminal 1. The Terminal 1 master plan is certified as Leadership in Energy  
10 and Environmental Design (LEED) Neighborhood (ND) Gold by the U.S. Green Building Council, and the  
11 Port's design standards call for all new buildings to be constructed to achieve a LEED Gold  
12 Certification or higher. Vancouver Landing, Terminal 1's first completed project, opened in June 2022  
13 and consists of a boardwalk with green space and public seating, Renaissance Trail connections, and  
14 signage displaying historical significance of the site. Full completion of Terminal 1 construction is  
15 anticipated by 2027.

16 **Renaissance Boardwalk:** The Renaissance Boardwalk project is a public-private partnership between  
17 Kirkland Development and the City of Vancouver to develop a 2.3-acre plot of land directly to the east  
18 of the ~~I-5 bridges~~[Interstate Bridge](#). The development plans include two new buildings and  
19 underground parking, with 230 apartments and retail space for 30 tenants. A public walkway along  
20 the water's edge would be included in the development and connect to existing trails. The project  
21 would also demolish a City-owned pier (built in 1991). The development will include several efforts to  
22 meet the City's climate goals, including meeting LEED Gold standards, using electric power for the  
23 residential units (no natural gas), and 100 charging stations for electric vehicles (Campbell 2021a,  
24 2021b).

25 **Waterfront Gateway Project:** This project, run by the Vancouver City Center Redevelopment  
26 Authority (CCRA), would redevelop a 6.4-acre City-owned site in downtown Vancouver near City Hall.  
27 The CCRA selected a development team to move forward with efforts to turn the site into a mixed-use  
28 destination including office, commercial, retail, and housing uses. This project is eligible for the  
29 Affordable Housing Fund and would include 100 apartment units reserved for residents making 60%  
30 or less of the area's median income. Initial plans call for 545 parking spaces to be located  
31 underground or at the podium levels of the buildings. The City is currently working with the developer  
32 to create a comprehensive development plan for the site.

33 **Portland Metro Levee System Project (Levee Ready):** The U.S. Army Corps of Engineers (USACE), in  
34 partnership with the Multnomah County Drainage District (MCDD), is planning improvements to the  
35 existing levee along the south side of the harbor (Levee Ready Columbia n.d.). In 2021, the USACE  
36 released a final feasibility report and environmental assessment that identified a recommended plan  
37 to fix the levee system. The report will be used to make a recommendation to Congress for funding.  
38 The IBR program is coordinating with the USACE and MCDD as the levee system project progresses.

39 **Restoration and Habitat Projects:** There are several planned restoration projects within the study  
40 area, as well as along habitat corridors or waterways that pass through the study area. Within the  
41 study area, restoration activities are planned along Burnt Bridge Creek in Vancouver and the  
42 Columbia Slough in Portland (Ecology 2021; Lee and Stamberger 2018). These projects are led by

1 various agencies and organizations, including the Cities of Vancouver and Portland and the Columbia  
2 Slough Watershed Council.

3 **Portland Expo Center:** Metro ~~is working on a development opportunity study for~~owns the Portland  
4 Expo Center. ~~The study will assess the value of the , which is a 53-acre property~~employment and  
5 ~~identify development options~~exhibition site located west of I-5. ~~Following a development opportunity~~  
6 ~~study, Metro recommended~~ that ~~could complement, support, or replace the current event center's~~  
7 ~~operations. The current project timeline calls for Metro's review and evaluation of proposals in winter~~  
8 ~~2022/spring 2023. Because of the uncertainty around what will be proposed at the Expo Center, the~~  
9 ~~potential~~ be redeveloped into a sports and cultural complex (Metro 2023). ~~While a future use has been~~  
10 ~~recommended, project effects (and their contribution to cumulative effects)~~ cannot be ~~accurately~~  
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 ~~2.5.3.1~~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~~  
34 ~~OTP 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 ~~greenhouse gas (GHG)~~  
39 emissions.



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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 ~~2015~~2023. The OHP identifies I-5 as a  
4 major truck freight route. The OHP grants alternative standards to the Portland metropolitan area due  
5 to its 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 ~~Clark County Public Transit Benefit Area Authority's (C-TRAN's)~~C-TRAN's Service Preservation Plan  
11 requires equitable service hours for local urban service, paratransit services, commuter services to  
12 Portland, and service to smaller Clark County cities. The plan includes high-capacity transit planning  
13 and its integration with other services, as well as both light rail transit and bus rapid transit  
14 improvements.

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

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

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

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

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

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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. ~~The~~ There are a variety of  
11 Comprehensive Plan ~~designates future growth~~ designations within the study area ~~north of Marine~~  
12 ~~Drive as General, Central, and Urban Commercial; and south of Marine Drive as, including Open Space,~~  
13 Industrial Sanctuary, General Industrial, Mixed-Use – Neighborhood, and Open Space Commercial  
14 Employment. Most of the areas within the study area are developed; however, further redevelopment  
15 on Hayden Island is anticipated.

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

23 In early 2009, the City of Portland Bureau of Planning and Sustainability published the Hayden Island  
24 Plan. The plan includes goals, objectives, proposed comprehensive plan and zoning changes, an  
25 implementation strategy, a street plan, development standards, a conservation strategy, and an  
26 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~~[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.](#)



## 3.1 Acquisitions

### ~~3.1.11.1.1 Project Effects~~

[Please see the Acquisitions Technical Report for additional information \(IBR 2023a\).](#)

### 3.1.1 Project Effects

Under the No-Build Alternative, no [program-related](#) acquisition or displacement of businesses or residences would occur.

[The following estimates for acquisitions and displacements are based on the current design of the Modified LPA, and estimates may vary depending on the preferred design alternative.](#) Under the Modified LPA, approximately 33 acres of property would have to be permanently acquired for the construction, [including construction staging locations](#), and long-term operation and maintenance of the program, including approximately 4.3 acres in permanent easements. ~~An estimated~~ total of ~~176175~~ parcels would be permanently affected by the Modified LPA, with 47 full acquisitions and ~~129128~~ partial acquisitions. Up to 76 residences, including 35 floating homes, would need to be relocated, along with approximately 38 commercial uses and two public facilities.

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

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

[Acquisitions and displacements have the potential to affect resources such as neighborhoods and populations \(section 3.11\), the economy \(section 3.5\), and equity and environmental justice \(section 3.8\).](#)

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

### 1 3.1.2 Effects from Other Actions (Past, Present, Future)

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

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

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

### 15 3.1.3 Conclusions

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

24 ~~The Modified LPA would require the displacement of up to 15 businesses on Hayden Island, which~~  
25 ~~accounts for more than a quarter of all commercial displacements. This is a notable reduction from~~  
26 ~~what was anticipated during the CRC Project phase, which estimated the displacement of up to 40~~  
27 ~~businesses on Hayden Island. This reduction is due to the closure of many businesses in the area, as~~  
28 ~~well as a reduction in the proposed footprint on Hayden Island. Future actions, such as the planned~~  
29 ~~redevelopment associated with the Hayden Island Plan, would likely require the additional~~  
30 ~~displacement of existing businesses on the island, while providing commercial space for the~~  
31 ~~relocation of others. See the Land Use Technical Report for more discussion of this topic.~~

32 Cumulative effects on the floating home community would not be much greater than the effects of the  
33 Modified LPA on the floating home community. [as no future projects are anticipated to require](#)  
34 [acquisitions from this community.](#) According to historic aerial photos, it appears that the floating  
35 home moorages were developed following the original construction of I-5, so they would not have  
36 been affected by past I-5 construction. No known future projects would require additional floating  
37 home displacements. However, state and federal regulations that make it difficult to permit new  
38 moorage space would tend to reduce opportunities for relocating displaced floating homes.

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1 ~~Compared to past, present, and foreseeable future actions, the Modified LPA would have a negligible~~  
2 ~~effect on property.~~

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

## 10 3.2 Air Quality

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

### 12 3.2.1 Project Effects

#### 13 ~~3.2.1 Project Effects~~

14 The air quality analysis for the IBR program is cumulative in nature as it incorporates projected  
15 increases in traffic ~~and~~ regional growth, and ~~reasonable~~ foreseeable ~~actions.~~ ~~Analysis from the Air~~  
16 ~~Quality Technical Report~~ future transportation projects. The analysis indicates that future regional air  
17 pollutant emissions from I-5 traffic exhaust would be lower than the existing conditions with or  
18 without the program. ~~On a regional scale, the Air pollutant~~ emissions ~~resulting from the Modified LPA~~  
19 ~~would be expected to be~~ substantially lower in the future than ~~the No-Build Alternative. On a regional~~  
20 ~~basis, the difference between the future 2045 emissions under existing conditions for project~~  
21 ~~alternatives—i.e., the No-Build Alternative and the Modified LPA—is 1 percent or less~~ all pollutants  
22 evaluated except for volatile organic compounds, which is not a substantial difference. ~~will be higher,~~  
23 and total particulate matter less than or equal to 10 microns in diameter (PM<sub>10</sub>), which would only be  
24 about 1% lower.

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

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

### 1 3.2.2 Effects from Other Actions (Past, Present, Future)

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

9 Traffic data used in the air quality analysis are based on projected land use and employment  
10 information and include expected overall growth in the region and the study area, as well as the  
11 transportation projects identified as reasonably foreseeable future actions. Non-transportation  
12 projects may increase emissions, such as general commercial and residential development in the  
13 area. ~~The Regional Mobility Pricing Project~~ The RMPP may reduce emissions through a mode shift  
14 away from single-occupancy vehicles to carpooling, public transit, or active transportation, as well as  
15 a reduction in emissions associated with congestion. This project may also contribute to cumulative  
16 effects from the expansion of public transit and active transportation networks or other projects such  
17 as the IBR program, which may result in changes to emissions and impacts to air quality.

18 Background concentrations representing the cumulative emissions of other sources in the area are  
19 included in the predicted local concentrations for carbon monoxide at intersections. Long-term  
20 monitoring has shown that air quality has improved over the years. Current and new regulations will  
21 continue to reduce pollutant emissions from mobile sources and other sources in the future, and air  
22 quality should continue to improve (DEQ 2021; FHWA 2016).

### 23 3.2.3 Conclusions

24 The air quality analysis incorporates reasonably foreseeable changes in the region's future land use,  
25 population, employment, and travel behavior, including the effects of the IBR program. For all  
26 pollutants analyzed, future 2045 emissions are projected to be lower than existing conditions under  
27 both the Modified LPA and No-Build Alternative. Regional improvements to transportation supply  
28 through increased roadway and transit capacity, active transportation networks, measures such as  
29 regulations on other source types, and the ~~Regional Mobility Pricing Project~~ RMPP would also reduce  
30 additional future emissions and have a positive effect on air quality. ~~Therefore~~ Based on the emissions  
31 analysis, the cumulative effects of ~~air quality~~ the Modified LPA and past, present, and foreseeable  
32 future actions would improve ~~with time despite the increase of traffic on I-5 and projected growth~~ air  
33 quality over existing conditions. Air quality in the region ~~would continue to be monitored by the~~  
34 Oregon Department of Environmental Quality (DEQ) and Washington State Department of Ecology  
35 (Ecology); this monitoring would track whether future conditions are consistent with the air emissions  
36 analysis.

## 37 3.3 Aviation and Navigation

38 Please see the IBR program's Navigation Impact Report and Aviation Technical Report for additional  
39 information (IBR 2022, 2023c).



### 1 3.3.1 Project Effects

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

11 The Modified LPA would have no long-term effects on aviation activities at ~~Portland International~~  
12 ~~Airport~~ [PDX](#) but would have some benefits on operations at Pearson Field. ~~To maintain clearance over~~  
13 ~~the existing BNSF railroad lines before beginning their descent, the SR 14 ramps transitioning to and~~  
14 ~~from the I-5 bridge structures would penetrate restricted airspace for Pearson Field under the~~  
15 ~~Modified LPA.~~ The Modified LPA would improve conditions for aviation at Pearson Field compared to  
16 existing conditions and the No-Build Alternative, due to the removal of the lift towers.

17 River navigation safety and security for both the main channel of the Columbia River and North  
18 Portland Harbor would be improved by the Modified LPA due to the elimination of the “S” curve  
19 maneuver, a reduction in the number of piers, elimination of river traffic delays associated with bridge  
20 lifts, and improved seismic resiliency. The Navigation Impact Report prepared for the program found  
21 that construction of the Modified LPA (with 116 feet of vertical clearance) ~~[Columbia River Datum]~~  
22 would result in impacts to eight vessels/users, which could be reduced to four vessels/users through  
23 modifications of vessel operations. The IBR program would engage affected vessel owners to identify  
24 appropriate measures to reduce or avoid impacts, and these measures would be subject to future  
25 decisions and agreements between the program and affected vessel owners. These would be finalized  
26 prior to issuance of the U.S. Coast Guard bridge permit and/or construction of the Modified LPA.

27 [There are some changes in impacts and/or benefits associated with the various design options.](#)  
28 [Notably, the movable span bridge would remove the vertical clearance limits for navigation](#)  
29 [associated with the Modified LPA, but would include lift span towers that would permanently](#)  
30 [penetrate the Part 77 airspace at Pearson Airfield. While there are some changes in impacts and/or](#)  
31 [benefits associated with the various design options, these differences would not affect the conclusion](#)  
32 [\(below\) regarding the program’s contribution to cumulative effects.](#)

### 33 3.3.2 Effects from Other Actions (Past, Present, Future)

34 Past actions that affected aviation include development in the region that penetrates the airspace of  
35 aircraft landing or departing at Pearson Field. The towers of the existing ~~I-5 bridges~~ [Interstate Bridge](#)

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<sup>3</sup> The primary navigation channel under the ~~I-5 bridges~~ [Interstate Bridge](#) lines up with the opening in the BNSF bridge, while the alternate channels under the ~~I-5 bridges~~ [Interstate Bridge](#) are located toward the center and south bank of the river, thus requiring vessels to make an S-curve maneuver between the ~~I-5 bridges~~ [Interstate Bridge](#) and the BNSF bridge opening.

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1 and several buildings in downtown Vancouver currently penetrate the Pearson Field Part 77 airspace.  
2 There are no known planned projects in the area that would contribute to cumulative effects on  
3 airspace.

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

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

### 26 3.3.3 Conclusions

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

32 While the Modified LPA would contribute to both adverse [and beneficial cumulative](#) effects ~~and~~  
33 ~~benefits for river~~on navigation [due to past projects](#), none of the identified [present or](#) future actions  
34 would affect navigation, and ~~therefore~~[as such](#) the Modified LPA would not contribute to [future](#)  
35 cumulative effects.

## 36 3.4 Climate Change

37 [Please see the Climate Technical Report for additional information \(IBR 2023d\).](#)

### 1 3.4.1 Project Effects

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

11 In addition to activities designed to minimize emissions, the Modified LPA includes features that  
12 would improve ~~the~~ local and regional resiliency to the anticipated effects of climate change. These  
13 [features](#) include avoiding fragmentation and degradation of floodplain hydrology by sensitively  
14 locating new and modified transportation and utility project components; maximizing management  
15 of stormwater by restoring existing unused impervious paved areas to natural, permeable, and  
16 vegetated conditions during the design phase to the maximum extent practical; and ensuring that the  
17 bridge design will accommodate potential climate-change-induced effects such as larger water  
18 volumes from winter storms and more frequent snow and ice storms.

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

### 22 3.4.2 Effects from Other Actions (Past, Present, Future)

23 Globally, GHG concentrations have risen substantially because of human activities, and they have  
24 been a primary driver of warming. Both [Ecology and the Oregon Global Warming Commission](#) ~~and the~~  
25 ~~Washington State Department of Ecology (Ecology)~~ publish reports every two years measuring their  
26 states' GHG emissions and progress toward state and federal goals to reduce GHG emissions. Per the  
27 most recent reports, transportation (including highway, rail, and air transport) is the greatest  
28 contributor to GHG emissions in Oregon and Washington.

29 [In an effort to address the current trends in GHG emissions, particularly in the transportation sector,  
30 multiple federal, state, regional, and local regulations and policies have been enacted to guide the  
31 development and evaluation of transportation projects and local communities' management of GHG  
32 emissions. At the state level, both Oregon and Washington have enacted policies aimed at reducing  
33 GHG emissions in the transportation sector. Examples of these policies include Ecology's zero-  
34 emission vehicles policy, Oregon's Climate Protection Program, and Washington's Clean Energy  
35 Transition Act. At the local level, local jurisdictions such as the City of Portland and City of Vancouver  
36 have implemented Climate Action Plans outlining programs and strategies aimed at meeting climate  
37 goals and emissions reductions targets. The local transit agencies in the region, TriMet and C-TRAN,  
38 have also identified climate goals. Two examples are C-Trans's use of electric buses, and wind  
39 turbines serving as the primary source of energy for TriMet's trains.](#)

1 [Future actions related to the policies and plans from state, regional, and local jurisdictions have the](#)  
2 [potential to contribute to future projects that may influence the decrease in GHG emissions in the](#)  
3 [transportation and land use sectors. Policies that directly regulate the emissions of vehicles, such as a](#)  
4 [clean fuels standard, have the greatest potential to reduce GHG emissions. Additional ancillary](#)  
5 [benefits may also come from transitions to renewable energy sources in the energy sector.](#)

### 6 3.4.3 Conclusions

7 The IBR program and agency partners considered climate change during the development and  
8 selection of design modifications for the Modified LPA. As part of its standard design, the Modified LPA  
9 has incorporated features that will provide greater resilience and function under the potential effects  
10 brought on by climate change. Compared to existing conditions, GHG emissions associated with the  
11 transportation sector are expected to decline in future years due to improvements in vehicle fuel  
12 technologies and the transition away from using gasoline and diesel fuels to power vehicles. As more  
13 and more of the vehicle fleet is composed of electric cars, the decarbonization of the electric grid in  
14 Washington and Oregon will further decrease GHG emissions associated with vehicle travel. Thus,  
15 although the annual VMT in the study area would increase by 37% under the No-Build Alternative ~~as~~  
16 ~~compared to~~ over existing conditions, ~~the~~ associated GHG emissions would decrease. The Modified  
17 LPA, when combined with other past, present, and foreseeable future actions, would ~~result~~ have a  
18 beneficial contribution to cumulative climate effects through a reduction in ~~marginally fewer~~ GHG  
19 emissions ~~than the No-Build Alternative and would improve~~ and improvements in the climate  
20 resiliency of the corridor and region.

## 21 3.5 Economics

22 [Please see the Economics Technical Report for additional information \(IBR 2023e\).](#)

### 23 3.5.1 Project Effects

24 Under the No-Build Alternative, no businesses would be displaced and there would be no resulting  
25 decrease in property or sales tax revenues or jobs lost. Conversely, there would be no additional  
26 employment or added sales tax associated with project construction. Economic development planned  
27 for this area may occur more slowly than under the Modified LPA because business owners may be  
28 reluctant to locate in an area with poor access and mobility for employees and customers. Freight  
29 reliability decreases as congestion spreads beyond the peak hour, into times when trucks tend to  
30 travel. Customers may elect to shop in other areas with easier access and improved mobility. It is  
31 ~~likely~~ anticipated that congestion pricing would be implemented on this section of the I-5 corridor  
32 under the No-Build Alternative, as a result of the ~~Regional Mobility Pricing Project~~ RMPP.

33 The Modified LPA would have both adverse and beneficial impacts, and the overall long-term  
34 economic effects after ~~project~~ construction are expected to be positive. This is due to the Modified  
35 LPA's suite of highway, active transportation, and transit improvements that effectively and efficiently  
36 move people and commerce through this corridor, which serves a variety of interstate, regional, and  
37 local needs. The Modified LPA also ~~improves~~ would improve the movement of marine traffic along the



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1 Columbia River, as noted in Section ~~3.3.3.3~~. The bulk of potential negative economic impacts would  
2 result from business displacements, losses in parking, or changes in access to businesses.

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

8 Enhanced vehicular and transit access to downtown Vancouver and across the Columbia River is  
9 expected to positively affect employers and businesses in the area. The Modified LPA could increase  
10 the attractiveness of commercial and industrial properties located in the vicinity of the ~~project~~  
11 interchanges by improving highway and transit access. This in turn may attract new businesses and  
12 make the location more attractive to employees. ~~Tolls may temper these benefits, but potential~~  
13 ~~benefits~~ Variable tolls are likely to benefit freight-dependent businesses are expected and businesses  
14 that rely on just-in-time deliveries because the predictability of travel would also increase. This  
15 benefit is somewhat offset by the fact that truck movements during peak periods would incur higher  
16 toll charges; however, peak freight travel times tend to outweigh potential tolling costs fall outside the  
17 current peak periods for general-purpose traffic.

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

### 21 3.5.2 Effects from Other Actions (Past, Present, Future)

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

27 The Ports of Portland and Vancouver are critical to the economic growth and prosperity of the region.  
28 In order for the ports to remain competitive with other West Coast ports, efficient and cost-effective  
29 multimodal transportation systems must be available. The total annual tonnage moving through the  
30 two ports is expected to double from approximately 300 million tons in 2007 to almost 600 million  
31 tons in 2040 (Cambridge Systematics 2015). This growth has implications for the transportation  
32 network as products move to, from, and within the region.

33 Similarly, economic growth in the region would increase demands along the I-5 corridor, as Metro  
34 forecasts that the number of jobs in the Portland-Vancouver Standard Metropolitan Statistical Area  
35 would increase by approximately ~~50 percent from 2015 to 2045 (Metro 2021)~~ 1.6% per year. This is  
36 slightly higher than the Oregon-area growth rate of 1.1% per year and the Washington state area  
37 growth rate of 1.0% per year (IBR 2023e).

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1 Both the Metro RTP and [the](#) RTC RTP include several capacity and safety projects west of I-5 that are  
2 designed to improve safety and flow for commercial trucks traveling between I-5 and industrial areas  
3 to the west.

4 Planned improvements along Columbia Boulevard, Lombard Street, and Marine Drive would generally  
5 improve conditions for commercial trucks. Travel times for commercial trucks traveling along I-5 are  
6 expected to improve ~~due to capacity~~ [as a result of capacity projects associated with the 2015](#)  
7 [Connecting Washington funding package, as well as additional](#) projects north of Vancouver and south  
8 of the Expo Center, but gains would be offset by projected growth in population and employment.

### 9 3.5.3 Conclusions

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

15 The Modified LPA would enhance vehicular and transit access to and from downtown Vancouver, SR  
16 14, Evergreen Boulevard, and Mill Plain Boulevard, which would benefit employers, businesses, and  
17 economic activity. The Modified LPA ~~supports~~ [would support](#) the VCCV and the Hayden Island Plan by  
18 providing greater access and transit service.

19 Without the Modified LPA, economic development planned for the area may occur, albeit more slowly,  
20 as business owners may be more reluctant to locate in an area with restricted access caused by  
21 mobility constraints. Customers may elect to shop in other areas with lower levels of congestion and  
22 easier access. ~~Compared to~~ [In combination with](#) past, present, and ~~reasonably~~ foreseeable future  
23 actions, the Modified LPA would have a positive effect on economics.

## 24 3.6 Electromagnetic Fields

25 [Please see the Electromagnetic Fields Technical Report for additional information \(IBR 2023f\).](#)

### 26 3.6.1 Project Effects

27 [Electromagnetic fields \(EMF\) are produced by power lines, electric wiring, and electric equipment and](#)  
28 [appliances, and other sources.](#) The No-Build Alternative would not create any new sources of  
29 ~~electromagnetic fields (EMF);~~ [EMF](#), and future EMF exposure would likely remain similar to existing  
30 conditions.

31 The extension of the light rail line ~~with~~ [under](#) the Modified LPA would result in the generation of  
32 additional EMF within the study area (there would be no EMF-related impacts related to the highway  
33 components). Future levels of EMF along the extended light rail transit line would be identical to those  
34 produced in the current light rail system, since the proposed elements of the system such as power  
35 levels, substation ratings, and facility and system design would be the same as the existing  
36 Metropolitan Area Express (MAX) system. Based on EMF measurements and available data, operation

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1 of proposed segments of the MAX light rail would not generate sufficiently intense levels of EMF to  
2 cause significant exposure risks to human health.

3 Light-rail-generated EMF would be just one of many sources of EMF that make up the cumulative  
4 personal EMF field exposure. Because field strength decreases rapidly with distance from the source,  
5 cumulative EMF effects would only occur if other sources are co-located with ~~project~~[the Modified LPA](#)  
6 electrical infrastructure.

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

### 10 3.6.2 Effects from Other Actions (Past, Present, Future)

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

### 22 3.6.3 Conclusions

23 EMF is widespread throughout the general environment, and EMF levels from Portland's light rail  
24 system are well below the International Commission on Non-Ionizing Radiation Protection and  
25 American Conference of Governmental Industrial Hygienists exposure standards. Under the Modified  
26 LPA, there would be slightly increased cumulative exposure for persons riding or working on the light  
27 rail system. ~~While there is concern about the potential health effects of EMF exposure, there~~[There](#) is  
28 no evidence to indicate that light-rail-generated EMF would change the human health risk associated  
29 with cumulative EMF exposure. ~~Compared to~~[Combined with](#) past, present, and ~~reasonably~~  
30 foreseeable future actions, the Modified LPA would have a negligible effect on EMF exposure.

## 31 3.7 Energy

32 [Please see the Energy Technical Report for additional information \(IBR 2023g\).](#)

### 33 3.7.1 Project Effects

34 The energy analysis for the IBR program is cumulative in nature as it incorporates projected increases  
35 in traffic and regional growth and ~~reasonable~~ foreseeable ~~actions.~~[Analysis for future transportation](#)  
36 [projects. The results of the Energy Technical Report analysis](#) showed that ~~for future in 2045~~ conditions

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1 (under both the No-Build Alternative and the Modified LPA), energy consumption and GHG emissions  
2 are expected to be substantially lower than existing values for the region, which is consistent with  
3 national trends. Although the annual VMT in the study area would increase ~~by 37% under the No-Build~~  
4 ~~Alternative as compared to existing conditions~~, GHG emissions would decrease substantially ~~as~~  
5 compared to ~~existing~~ baseline conditions (2015) due to the implementation of fuel and engine  
6 regulations. On a regional basis, future emissions would be similar under the No-Build Alternative and  
7 Modified LPA.

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

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

20 ~~Most of the reasonably foreseeable future projects would increase the demand for energy, either~~  
21 ~~through fuel for vehicles or through energy needs to support new development. However, the~~ The  
22 future demand for energy will depend on trends in population, economic activity, energy prices, and  
23 adoption and implementation of technology. ~~The Regional Mobility Pricing Project~~ As noted above, the  
24 energy analysis is cumulative and concluded that energy consumption and GHG emissions are  
25 expected to be substantially lower than existing values for the region. The RMPP may reduce energy  
26 use through a reduction in the number of single-occupancy vehicles on the road caused by a mode  
27 shift to carpooling, public transit, and active transportation. Other planned developments—namely,  
28 Terminal 1 and the Renaissance Boardwalk development—will be designed and constructed to meet  
29 LEED Gold standards, which 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. ~~Compared to~~ When combined with past, present, and foreseeable future actions, the  
39 Modified LPA will have a negligible beneficial effect on energy.



## 3.8 Equity and Environmental Justice

[Please see the Equity Technical Report and Environmental Justice Technical Report for additional information \(IBR 2023h, 2023i\).](#)

### 3.8.1 Project Effects

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

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

The Modified LPA would acquire right of way from residences and businesses along I-5 and the light rail transit alignment (see Section 3.1). It would displace households throughout the study area, and most of the displacements would occur in neighborhoods that have similar or lower proportions of minority and low-income populations relative to the region. ~~The anticipated displacements are not anticipated to be disproportionate, as low-income or minority census tracts would not be impacted more than other census tracts. However,~~ [Findings from the program’s EJ analysis identified property impacts in two EJ areas \(Esther Short/Downtown Vancouver and Delta Park/North Portland\), suggesting that these impacts are not anticipated to affect EJ populations disproportionately compared to the general population. However, the Equity Technical Report identified high concentrations of multiple equity priority communities in each area where displacements would occur. This does not necessarily mean that equity priority communities would be affected disproportionately;](#) the characteristics of individual households will need to be assessed before this can be determined definitively. In accordance with the Uniform Act,<sup>4</sup> potentially displaced residents

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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.

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1 and businesses would be contacted and surveyed, and any displacements would be mitigated with a  
2 dedicated relocation plan.

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

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

17 *Please note: The discussion and conclusions regarding equity and ~~environmental justice~~[EJ](#) will be*  
18 *updated as additional conversations occur and decisions are made regarding a low-income toll*  
19 *program.*

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

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

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.](#)

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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.

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

EJ populations and equity priority communities in the study area have been affected by past actions that generate noise and air pollution (see Sections [3.23.2](#) and [3.113.11](#)) that have displaced residents and businesses (see Section [3.13.1](#)) and that have had socioeconomic impacts on these populations (see Sections [3.4 and 3.10](#), [3.4 and 3.10](#)). The Vanport Flood and subsequent displacements, in particular, had a disproportionate impact on EJ populations.

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

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

One socioeconomic impact attributed to the cumulative effect of population growth and development is an increase in the cost of living. Between 2000 and 2021, median gross rent increased 52% in Portland, 48% in Multnomah County, 40% in Vancouver, and 41% in Clark County (adjusted for inflation) (U.S. Census Bureau 2000, [2017-2021 ACS](#)). In the same time period, median household income increased just 15% in Portland and 11% in Multnomah County, and median household income decreased 4% in Vancouver and 7% in Clark County (U.S. Census Bureau 2021). As the cost of living increases, low-income households often move farther from jobs and services to find affordable housing. This can result in longer commute times and higher transportation costs for low-income households.

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

### 1 3.8.3 Conclusions

2 Past projects directly affected equity priority communities, including EJ populations, in the I-5  
3 corridor (such as the displacements associated with the 1960 construction of I-5 through North  
4 Portland). Construction of the Modified LPA would not generate a disproportionately high and  
5 adverse human health or environmental effect on an equity priority community. In addition, the  
6 benefits of the Modified LPA are expected to accrue to equity priority communities as well as the  
7 general population. Some people, including minority and low-income individuals, would be adversely  
8 affected by the program (i.e., by displacement of businesses and residents, and noise and traffic  
9 during construction). But in general, the Modified LPA would be likely to improve conditions (such as  
10 noise, air pollution, poor access, and poor transit service) for populations and neighborhoods that  
11 have historically been adversely affected by other past actions.

12 Finally, potential mitigation, as discussed in the Equity and Environmental Justice Technical Reports  
13 (e.g., transportation assistance for tolling impacts and enhanced communications), could minimize  
14 impacts and increase benefits to equity priority communities, including EJ populations. ~~Compared~~  
15 ~~to~~ Combined with past, present, and ~~reasonably~~ foreseeable future actions, the Modified LPA will have  
16 ~~a negligible effect~~ both beneficial and adverse effects on equity priority communities, including EJ  
17 populations.

## 18 3.9 Hazardous Materials

19 [Please see the Hazardous Materials Technical Report for additional information \(IBR 2023j\).](#)

### 20 3.9.1 Project Effects

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

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

35 ~~Compared to the No-Build Alternative, long~~ Construction of the Modified LPA would include updated  
36 road and bridge designs, and these updates would include controls associated with the stormwater  
37 system to contain and/or better manage releases on roadways and bridges. Additional updates



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1 [include improvements in roadway access and traffic safety, thereby benefitting emergency response](#)  
2 [vehicles.](#)

3 [Long-term](#) adverse effects on human health and the environment from hazardous materials would  
4 likely be reduced because the Modified LPA would involve:

- 5 • Upgrades or enhancements to the current stormwater conveyance and treatment system,  
6 which would reduce the spread of existing residual contaminants to soil, surface water, and  
7 groundwater from stormwater runoff and infiltration.
- 8 • Likely placement of surficial caps or barriers at any sites identified with existing  
9 contamination, which would decrease likelihood of direct exposure to potential receptors.
- 10 • Increases and enhancements of roadway and transit system capacities. This could lower the  
11 frequency of incidental spills or releases of hazardous substances associated with trucking  
12 and automotive transit.

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

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

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

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

### 28 3.9.3 Conclusions

29 Construction of the Modified LPA would involve cleanup of some contamination associated with past  
30 releases of hazardous materials (by cleaning up existing contaminated sites that would be acquired  
31 for the program) and would reduce the risk of future contamination from highway crashes (by  
32 improving highway safety and by capturing, conveying, and treating stormwater runoff). Because any  
33 hazardous material discovered during construction would be remediated, development of the  
34 Modified LPA could result in reduced hazardous material exposure for the general public. ~~Because the~~  
35 ~~Modified LPA is unlikely to introduce new hazardous material sites, and may identify or remediate~~  
36 ~~existing hazardous material sites, it may contribute to a cumulative beneficial impact to groundwater,~~  
37 ~~human, and ecological receptors in the study area. Compared to~~ [In combination with](#) past, present,  
38 and ~~reasonably~~ foreseeable future actions, the Modified LPA would [have](#) [make](#) a positive

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1 ~~effect~~[contribution to cumulative effects](#) on hazardous materials ~~in the area~~. Furthermore, these  
2 [improvements are anticipated to have a cumulative beneficial impact to groundwater, human, and](#)  
3 [ecological receptors in the study area.](#)

## 4 3.10 Land Use

5 [Please see the Land Use Technical Report for additional information \(IBR 2023k\).](#)

### 6 3.10.1 Project Effects

7 The No-Build Alternative would ~~fail to~~[not](#) support the principal elements of adopted growth  
8 management and community plans for the area, including goals pertaining to accepted levels of  
9 service; improved freight mobility; multimodal transportation; focused, compact development; and  
10 safety.

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

27 ~~Adding~~[The addition of](#) light rail stations in Hayden Island and downtown Vancouver is expected to  
28 contribute to economic development with vibrant mixed-use urban nodes. There is a moderate to  
29 high potential for transit-oriented development on Hayden Island and in the city of Vancouver  
30 (particularly the Mill Plain district). Plans adopted by the City of Portland and Metro call for the  
31 extension of light rail to Hayden Island. The Modified LPA is not expected to lead to different future  
32 land uses than would occur without the program.

#### 33 ~~3.10.21.1.1 Effects from Other Actions (Past, Present, Future)~~

34 ~~Historic~~[While there are some changes in direct and indirect impacts and/or benefits associated with](#)  
35 [the design options, these differences would not affect the conclusion \(below\) regarding the program's](#)  
36 [contribution to cumulative effects.](#)

### 1 3.10.2 Effects from Other Actions (Past, Present, Future)

2 Past development in the area transformed land use over time from ~~frontier~~ wilderness to ~~agriculture~~  
3 ~~and settlement, followed by~~ ever-increasing urbanization. Since the 1950s, actions affecting land use  
4 have included the construction of I-5 and other transportation projects, increasing urbanization, and  
5 new growth management regulations. Modeling also suggests that regional land use plans that  
6 channeled growth and transportation development to other parts of the region may have reduced  
7 employment growth and housing demand in the North Portland and Vancouver portions of the I-5  
8 corridor. The lack of any major improvements to I-5 highway operations in this location since the  
9 1960s has also allowed gradual deterioration of highway operations and safety and reliability, which  
10 in turn could further contribute to the distribution of some portion of population and employment  
11 growth to other parts of the region.

12 Land use on Hayden Island has been defined by residential development and commercial  
13 development, including the Jantzen Beach Center (a regional large-format retail shopping center) and  
14 surrounding retailers. Residential uses in the area include manufactured homes and floating homes  
15 associated with small marinas, as well as other low- to medium-density developments. The City of  
16 Portland completed a planning project for Hayden Island in 2009, which calls for redevelopment of  
17 the commercial core—transitioning from the current large-scale retail land use pattern to a more  
18 urban form with more mixed uses, pedestrian-scale design, and transit orientation. The plan identifies  
19 a replacement I-5 bridge over the Columbia River as one element of future development on the island.

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

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

### 30 3.10.3 Conclusions

31 The Modified LPA would generally support the land use policies listed in Section ~~2.5.4~~2.5.4, above, and  
32 be generally consistent with expected development trends. Under the Modified LPA, subsequent  
33 development would potentially be more urban in nature and focused near light rail facilities. The  
34 Modified LPA would support the intensification and mixing of land uses both on Hayden Island and in  
35 Vancouver. These changes in land use have been planned for and are consistent with adopted  
36 policies. Large transportation projects can have far-reaching effects on regional travel and land use  
37 patterns, and decreased highway travel times could have an indirect influence on land development  
38 demand near the current urban fringe. However, Portland and Vancouver have accounted for future  
39 anticipated growth in their planning documents and provide strategies, visions, and goals to guide  
40 growth and development within the area. Additionally, both Oregon and Washington have adopted

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1 statewide land use and growth management planning mechanisms to guide and control land use and  
2 development patterns. As a result, the Modified LPA is not expected to have indirect growth-inducing  
3 impacts that are contrary to the goals of applicable land use plans or ~~to change~~ [create unplanned](#)  
4 [changes in](#) existing land use patterns. See the Land Use Technical Report for additional details.

5 The Modified LPA would continue the trend of roadway development, and the more recent trend of  
6 transit development, and would balance that development with the improvement of bicycle and  
7 pedestrian infrastructure. ~~Compared to~~ [The addition of the Community Connector at Evergreen](#)  
8 [Boulevard would further balance roadway and transit development with improved bicycle and](#)  
9 [pedestrian facilities to address existing gaps in connectivity and neighborhood cohesion created by](#)  
10 [the past construction and presence of I-5. Combined with](#) past, present, and foreseeable future  
11 actions, the Modified LPA would have a slightly positive [cumulative](#) effect on land uses in the area.

## 12 3.11 Neighborhoods and Population

13 [Please see the Draft Neighborhoods and Population Technical Report for additional information \(IBR](#)  
14 [2023I\).](#)

### 15 3.11.1 Project Effects

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

20 The largest neighborhood-related adverse impact from the Modified LPA would occur on Hayden  
21 Island, where the program would ~~require the displacement of~~ [displace](#) 32 floating homes in North  
22 Portland Harbor. [\(see section 3.1\).](#)

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

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

36 The Modified LPA would improve circulation on Hayden Island and reduce the hours of congestion in  
37 this area along I-5. Additionally, the bike and pedestrian connection to the existing ~~I-5 bridge~~ [Interstate](#)  
38 [Bridge](#), which is currently substandard and difficult to navigate, would be replaced by a new shared-



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1 use path, and a light rail transit station would serve the island. Other neighborhoods would also be  
2 affected by the Modified LPA. In the Kenton neighborhood, the Modified LPA would displace several  
3 structures around the Marine Drive interchange, including three floating homes and one single-family  
4 home on land. Three businesses would also be displaced in this area.

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

### 8 3.11.2 Effects from Other Actions (Past, Present, Future)

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

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

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

### 25 3.11.3 Conclusions

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

36 One major difference, however, between these impacts and the impacts of past actions, is that past  
37 projects were not always planned and implemented with meaningful input [from](#) and communication  
38 with the public. Involving communities and understanding impacts has become an essential part of

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1 project planning. This allows projects to reduce impacts more successfully where possible or mitigate  
2 impacts where they cannot be reduced. Providing overall benefits to Hayden Island neighborhoods  
3 would require successfully relocating displaced floating home residents, and successfully relocating  
4 or reestablishing the neighborhood-serving businesses that would be displaced during construction.  
5 ~~Compared to~~[When combined with](#) past, present, and foreseeable future actions, the Modified LPA will  
6 have a slightly positive effect on neighborhoods.

## 7 3.12 Noise and Vibration

8 [Please see the Noise and Vibration Technical Report for additional information \(IBR 2023m\).](#)

### 9 3.12.1 Project Effects

10 The noise modeling prepared for the IBR program incorporates anticipated regional growth and  
11 ~~reasonably~~foreseeable ~~future actions~~[transportation projects](#). As such, the results of the modeling  
12 reflect cumulative effects on noise and vibration conditions in the study area. As documented in the  
13 Noise and Vibration Technical Report, the Modified LPA would contribute to existing and projected  
14 levels of noise and vibration. Design features associated with the Modified LPA, such as noise walls  
15 and the Community Connector south of East Evergreen Boulevard, may mitigate traffic noise levels  
16 that are projected.

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

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

27 In the future, projected growth in both air traffic and freight rail traffic ~~are~~[is](#) expected to increase noise  
28 levels in the study area. If the land use plans for the City of Vancouver and Hayden Island are realized,  
29 then residential and commercial construction activities could be a substantial, intermittent source of  
30 noise over the next couple decades. Highway noise would also be expected to increase over time as  
31 population and employment growth lead to increased single-occupancy and freight vehicle trips. This  
32 projected highway noise increase is reflected in the IBR program traffic noise analysis, which is based  
33 on the region's projected increase in population and employment through 2045. Similarly, noise and  
34 vibration effects from the light rail corridor will continue to increase as rail volumes increase.

35 In the study area, there are currently an estimated 164 traffic noise impacts to noise sensitive land  
36 uses along I-5, and that number is expected to increase to 235 (under the future No-Build Alternative).

1 Under the No-Build Alternative, no new noise walls would be constructed. Background traffic growth  
2 would cause a general increase in traffic noise levels throughout the study area.

### 3 3.12.3 Conclusions

4 Many residences and other uses in the study area, including those adjacent to I-5 and the proposed  
5 light rail transit guideway, have experienced increasing noise levels over time, resulting from steady  
6 growth in vehicle traffic, air traffic, and other urban noise sources. These receivers are expected to  
7 experience continually increasing noise levels in the future as population, employment, highway  
8 traffic, air traffic, freight rail traffic, and other sources grow. To mitigate potential program-related  
9 noise effects, mitigation measures that meet ODOT's and WSDOT's feasibility and reasonableness  
10 criteria may be recommended for inclusion in the program. Mitigation measures will consider criteria  
11 for impacts related to the program, as well as the cumulative effects of traffic noise from prior actions.  
12 [When combined with past, present, and foreseeable future actions, the Modified LPA would](#)  
13 [contribute to increasing noise and vibration levels.](#)

## 14 3.13 Public Services and Utilities

15 [Please see the Public Services Technical Report and Utilities Technical Report for additional](#)  
16 [information \(IBR 2023n, 2023o\).](#)

### 17 3.13.1 Project Effects

18 The No-Build Alternative would not change existing utility connections and public services, such as  
19 emergency response; however, over time both would be adversely impacted by safety issues and/or  
20 worsening congestion. The North Portland Harbor and ~~I-5~~ [Interstate](#) bridges are not designed to  
21 current seismic standards and could fail and possibly collapse in the event of a catastrophic  
22 earthquake, which would disrupt both utility connections and public services. In addition, public  
23 services such as schools and libraries would continue to be hindered by limited public transit and  
24 substandard bicycle and pedestrian facilities.

25 Overall, the direct physical impacts to public services from the Modified LPA would be minor. The  
26 Modified LPA would directly impact six public service facilities: one medical center property, two  
27 school-related sites, and three "other" (non-categorized) facilities. Of these facilities, the medical  
28 facility, schools, and two of the "other" facilities would undergo limited impacts that would not affect  
29 their operations or services. The remaining facility (the ~~Federal Highway Administration's~~ [FHWA's](#)  
30 Western Federal Lands office property) would lose some parking, landscaping, and signage under  
31 Design Option A, but, with the exception of the loss of some parking and potentially altered access  
32 routes, the operations would not be adversely affected. The Modified LPA would impact several major  
33 utilities, including water, power, gas, and communications infrastructure in Vancouver, as well as on  
34 or near the North Portland Harbor bridge. Proposed mitigation would generally consist of either  
35 protecting a utility in situ or relocating it. The goal would be to ensure that program-related changes  
36 do not impair existing overall levels of service.

37 Projected traffic congestion on local streets under the No-Build Alternative and the Modified LPA  
38 would include some intersections performing at unacceptable levels of service. Intersections with

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1 unacceptable levels of service negatively impact the mobile services of public service providers and  
2 cause delays in response times for emergency vehicles. Mitigation is proposed under the Modified LPA  
3 to reduce the number of failing intersections, which would lessen the impact to public services.

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

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

### 14 3.13.3 Conclusions

15 Adopted land use plans and projected population growth are expected to create an increased  
16 demand for public services and utilities. However, since those increases are planned, it is reasonable  
17 to assume that the public service sector and utility providers would have adequate time to plan and  
18 adjust for future conditions. The adverse effects of increased demand could be slightly exacerbated by  
19 the proposed light rail operations [and express buses on the shoulders](#) as they would decrease auto  
20 capacity on some local streets and prohibit some turning movements. Beneficial impacts from the  
21 Modified LPA would include fewer accidents on I-5 due to safety improvements and improved  
22 emergency response times on I-5 and other roadways where congestion would be decreased.  
23 ~~Compared to~~ [When considered in combination with](#) past, present, and ~~reasonably~~-foreseeable future  
24 actions, the Modified LPA would have a ~~positive~~ [beneficial](#) effect on public services and little to no  
25 effect on utilities.

## 26 3.14 Transportation

27 [Please see the Transportation Technical Report for additional information \(IBR 2023p\).](#)

### 28 [3.14.1 Project Effects](#)

#### 29 ~~3.14.11.1.1 Project Effects~~

30 The traffic and transit modeling prepared for the IBR program incorporates anticipated regional  
31 growth and ~~reasonably~~-foreseeable future ~~actions~~ [transportation projects](#). As such, the results of the  
32 modeling reflect cumulative effects on transportation conditions in the study area. The  
33 Transportation Technical Report documents that the Modified LPA would reduce freight and vehicle  
34 congestion, improve safety, and improve the reliability and connectivity of active transportation and  
35 transit networks. The highway, transit, and active transportation network improvements [would](#) make



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1 the I-5 corridor more attractive to users, and the shift in traffic patterns would result in increased  
2 traffic volumes on some local roads.

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

7 Past and present actions affecting transportation in the study area (and region) include population  
8 growth and accompanying development, which have subsequently led to an increase in the number  
9 of single-occupancy and freight vehicles on roads, as well as the expansion of public transit and active  
10 transportation networks. The increase in congestion and vehicle collisions can largely be attributed to  
11 this growth. Past transportation improvements in the area include expansion and increase in service  
12 of TriMet’s bus and light rail system (including the extension of light rail to the Expo Center), as well as  
13 C-TRAN’s bus service (including the introduction of bus rapid transit). **See Appendix A for a full list of**  
14 **transportation projects in the area.**

15 The **Regional Mobility Pricing Project** **RMPP** (currently under assessment) is anticipated to have  
16 notable effects on transportation conditions on the I-5 and I-205 corridors, with spillover effects onto  
17 other roads in the region. The introduction of congestion pricing would likely contribute to the  
18 cumulative effects of several future projects, including the IBR program, that will reduce congestion  
19 and increase the use of public transit and active transportation.

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

### 25 3.14.3 Conclusions

26 When the Modified LPA is considered alongside other future actions, the key drivers of transportation  
27 demand—population growth and accompanying development patterns—will continue to affect the  
28 mobility of all transportation modes (single-occupancy and freight vehicles, transit, and active  
29 transportation) in the study area and region. Improvements to transportation supply through  
30 increased roadway and transit capacity, travel demand management programs, and improved active  
31 transportation network connections will mitigate the forecasted increase in congestion and vehicle  
32 collisions. [When combined with past, present, and foreseeable future actions, the Modified LPA would](#)  
33 [have a beneficial effect on transportation.](#)

## 34 3.15 Visual Quality and Aesthetics

35 [Please see the Visual Quality and Aesthetics Technical Report for additional information \(IBR 2023q\).](#)

### 1 3.15.1 Project Effects

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

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

- 13 • The removal of the existing bridges, including the lift towers.
- 14 • Additional of the new structures across the Columbia River.
- 15 • The widened or higher ramps for reconfigured interchanges at Marine Drive, Hayden Island, SR  
16 14, Mill Plain, and SR 500.
- 17 • The effective widening of I-5 corridor due to the addition of auxiliary lanes and safety  
18 shoulders along I-5.

19 Existing roadside vegetation serves to soften the effect of the built environment within the  
20 transportation corridor. Elimination of roadside vegetation without restoration of such would reduce  
21 natural elements within the corridor.

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

### 26 3.15.2 Effects from Other Actions (Past, Present, Future)

27 In the Columbia River, Portland, and Vancouver areas, visual character has steadily evolved from  
28 ~~frontier~~ [a more natural character](#), through rural and agriculture, to suburban and urban. The I-5  
29 corridor has steadily grown in development intensity and in use as a major transportation route.

30 The continued intensification of the corridor has led to a decline in the quality of many views due to  
31 obstruction of scenic or natural landscapes by buildings, walls, signage, berms and ramps, pilings,  
32 columns, bridges, and loss of vegetation. Continued decline is not inevitable if cities and the region  
33 implement well-designed, visually coherent urban design that protects scenic or important views.  
34 Existing regulations include City of Vancouver, City of Portland, Clark County, Multnomah County, and  
35 other local, regional, state, and federal agency plans ~~that include~~ [containing](#) policies that protect  
36 views and aesthetic resources.

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

- 5 • Interchange improvements such as constructing or rebuilding highway ramps.
- 6 • Bridge upgrades, replacement, or construction.
- 7 • Local street network and regional access route improvements.
- 8 • New traffic signals, wider sidewalks, curb extensions, bike lanes, on-street parking and street  
9 trees, pedestrian crossings, and pavement reconstruction.
- 10 • Intersection realignment.
- 11 • Various urban development projects throughout downtown Vancouver.
- 12 • The redevelopment of the central Hayden Island commercial area.

### 13 3.15.3 Conclusions

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

21 Overall, impacts from the Modified LPA would continue and reinforce that urban transportation  
22 corridor character. In some cases, such as a light rail station, the intensification would implement  
23 adopted goals for urban vibrancy and activity centers. In other cases, such as the higher and more  
24 visually complex SR 14 interchange, visual impacts would represent a continuation of changes that  
25 are less supportive of downtown livability, human scale, and historic preservation. Lighting elements  
26 would be unified throughout the project using similar lines, colors, and styles; furthermore, light and  
27 glare impacts from fixed light sources are expected to be less than under the No-Build Alternative, as  
28 replacement lights would be designed with modern fixtures and materials that limit light spill and  
29 glare and reduce ambient light levels.

30 ~~Compared to~~ When combined with past, present, and ~~reasonably~~ foreseeable future actions, the  
31 Modified LPA would have a 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 has 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. ~~If a catastrophic event occurred, such as a major earthquake, it could affect~~  
12 fish and wildlife species in both the immediate vicinity of the bridges and downstream. Fish and  
13 wildlife in the immediate vicinity of the bridge at the time of the event could be directly affected by  
14 falling debris and injured or killed if struck, and fallen debris would diminish habitat suitability at the  
15 site by displacing benthic habitat. Fallen debris from the bridge could also contribute chemical  
16 contaminants to the water and result in reductions in water quality that could affect aquatic species  
17 and habitats downstream of the bridge.

18 ~~Effects~~ [Construction of the Modified LPA would result in temporary impacts to sensitive aquatic](#)  
19 [species and their habitats, including species of significance to consulting tribes. Long-term effects](#) on  
20 ecosystem resources ~~associated with the Modified LPA~~ would include impacts [and benefits](#) to both  
21 aquatic and terrestrial resources. The piers associated with the new bridges would displace benthic  
22 habitats and introduce new overwater shading; however, the ~~net area affected would be similar to the~~  
23 ~~area affected by the existing I-5 bridge piers. Construction of the Modified LPA would also result in~~  
24 ~~temporary impacts to sensitive aquatic species and their habitats, including species of significance to~~  
25 ~~consulting tribes.~~ [Modified LPA would result in a net restoration of benthic habitat due to the removal](#)  
26 [of the existing piers.](#) The Modified LPA would create new impervious surfaces, which would generate  
27 stormwater but would also provide water quality treatment for both new and existing impervious  
28 surfaces, and would result in a significantly improved water quality condition in area waterways  
29 compared to the No-Build Alternative.

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

34 The Modified LPA would remove an existing peregrine falcon nest in the steel structure of the existing  
35 ~~I-5 bridges.~~ [Interstate Bridge.](#) Whether this would result in temporary effects, with peregrine falcons  
36 reestablishing themselves on new bridge structures, or permanent, long-term adverse effects on the  
37 overall viability of the species cannot be determined in advance. Bird nests on the bridge structures  
38 could pose aviation hazards due to bird strikes (which also adversely affect bird species). All structure

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1 types currently under consideration for the Modified LPA would reduce the areas on which birds can  
2 land and roost when compared to the existing bridges. The Modified LPA would also improve the  
3 seismic resiliency of the ~~1-5 bridges~~ existing Interstate Bridge, thus reducing the likelihood of impacts  
4 to species and habitat associated with a bridge collapse.

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

10 While there are ~~ongoing to identify the specific compensatory mitigation and conservation measures~~  
11 ~~that would be implemented as part of some changes in direct and indirect impacts and/or benefits~~  
12 associated with the Modified LPA design options, these differences would not affect the conclusion  
13 (below) regarding the program's contribution to cumulative effects.

#### 14 4.1.2 Effects from Other Actions (Past, Present, Future)

15 Native Americans lived in the region for ~~11~~ more than 10,000 years before the arrival of Euro-American  
16 settlers. However, human populations were ~~very~~ low in the region ~~prior~~ compared to Euro-American  
17 settlement (~~Hulse~~ Aikens and Melvin 2006; Ames et al. 2002-1998). Since approximately the mid-1800s,  
18 human population growth and development have gradually displaced and reduced the quality and  
19 quantity of wildlife habitat. As noted above, natural habitats in the area are generally small and  
20 fragmented compared to their historic conditions. Nevertheless, these areas do provide habitat for a  
21 variety of plants, terrestrial wildlife, birds, and fish, including both common species and species with  
22 special regulatory status.

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

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

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

36 ~~For protected fish species, the impacts of Modified LPA construction would contribute to, and be~~  
37 ~~overshadowed by, conditions in the larger Columbia River Basin.~~ Federal agencies have developed a  
38 Basinwide Salmon Recovery Strategy aimed at recovering the threatened and endangered salmon  
39 and steelhead species in the Columbia River Basin, most of which travel through the study area. The

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1 recovery strategy includes changes in habitat, hydropower, hatcheries, and harvest—all factors that  
2 will have the greatest impact on species survival.

3 Recent research has also indicated that climate change has affected and will continue to affect  
4 species and to modify fish and wildlife habitat in the Pacific Northwest in multiple ways, [including](#)  
5 [increased temperatures and decreases in snowpack](#) (May et al. 2018). In August 2021, the U.S.  
6 Environmental Protection Agency issued a draft Total Maximum Daily Load (TMDL) for addressing  
7 exceedances of various state and tribal criteria for temperature in the Columbia River and lower Snake  
8 River (EPA 2021). This TMDL documented that water temperature impairments are widespread,  
9 primarily due to the cumulative effects of climate change and dam impoundments. Changes include  
10 less snowfall due to warmer temperatures that, in turn, decreases snowpack and changes the flow  
11 timing, including peak flow levels, of streams and rivers, as well as an overall increase in water  
12 temperatures. It is important to note that river dams on the Columbia and Snake Rivers would  
13 manage flows in the study area, such that the flow extremes in the Columbia River would be  
14 moderated where the river flows through the study area. See Section [3.43.4](#) of this technical report for  
15 more discussion related to fish habitat impacts related to climate change.

### 16 4.1.3 Conclusions

17 The impacts to ecosystem resources that would result from the Modified LPA are relatively small and  
18 would be fully offset through avoidance, minimization, and mitigation, but historic development and  
19 expected growth throughout the region are likely to continue to impact ecosystems. The mitigation  
20 measures that are likely to occur under the Modified LPA would serve to reduce harmful effects and  
21 even improve parts of the local ecosystem relative to existing conditions. ~~Compared to~~ [When](#)  
22 [combined with](#) past, present, and ~~reasonably~~ foreseeable future actions, the Modified LPA would have  
23 a net ~~positive~~ [beneficial](#) effect on ecosystem resources.

## 24 4.2 Geology and Groundwater

25 [Please see the Geology and Groundwater Technical Report for additional information \(IBR 2023s\).](#)

### 26 4.2.1 Project Effects

27 The study area consists of soils with high relative earthquake hazard rating, susceptible to severe  
28 ground shaking and liquefaction during a major seismic event. The primary difference between the  
29 No-Build Alternative and the Modified LPA is that the No-Build Alternative would not include upgrades  
30 to or retrofitting of the existing bridge, whereas new infrastructure related to the Modified LPA would  
31 be built to modern seismic safety standards. As such, [it is likely that](#) the Modified LPA would ~~likely~~  
32 better withstand a major seismic event.

33 Sensitive groundwater resources have been identified in the study area that supply municipal,  
34 commercial, and irrigation water to surrounding communities. The distribution and occurrence of  
35 groundwater resources are not anticipated to be adversely impacted by ~~project~~ [program-related](#)  
36 activities. Compared to the No-Build Alternative, the Modified LPA would have beneficial effects on  
37 groundwater resources, due to an improvement in the management of stormwater volume and flow  
38 rates and stormwater treatment facilities. This would likely result in improved local groundwater

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1 quality for the Troutdale Sole Source Aquifer and surface water quality for drainage areas around the  
2 Columbia River and Burnt Bridge Creek.

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

6 Concrete construction may require more aggregate than is available through local suppliers. The  
7 construction contractor may need to transport construction material to the ~~project~~ site from several  
8 suitable source areas throughout the region.

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

12 ~~4.2.21.1.1 Effects from Other Actions (Past, Present, Future)~~

13 4.2.2 Effects from Other Actions (Past, Present, Future)

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

26 **4.2.3 Conclusions**

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

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

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1 Construction of the Modified LPA would require aggregate for concrete, adding to the cumulative  
2 demand of past, present, and other future construction projects. This would further decrease local  
3 supplies and lead to either this or other future projects seeking aggregate from sources outside the  
4 area. ~~Compared to~~When combined with past, present, and foreseeable future actions, the Modified  
5 LPA will have a ~~positive~~beneficial effect on geology and groundwater.

## 6 4.3 Water Quality and Hydrology

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

### 8 4.3.1 Project Effects

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

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

23 Improvements to stormwater treatment on new and resurfaced impervious surfaces, including the ~~+~~  
24 5 new Columbia River and North Portland Harbor bridges, would result in a net improvement for water  
25 quality in the Columbia Slough, Columbia River, North Portland Harbor, Burnt Bridge Creek, and  
26 Fairview Creek, with the exception of an increase in dissolved copper levels at the Columbia Slough.  
27 Most of the runoff generated by the existing highway corridor is not treated before being discharged.

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

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

### 34 4.3.2 Effects from Other Actions (Past, Present, Future)

35 Historic land use changes and increasing urbanization have decreased the amount of natural areas  
36 and natural flow regimes in the study area. Flood-control measures have been implemented that



1 affect the entire lower Columbia River environment. Levees and river embankments were constructed  
2 in the early 1900s on both sides of the river, which isolated the majority of the floodplain from all but  
3 the highest flows. Projected population and employment growth will continue to increase  
4 urbanization and the geographic extent of development. Most of the immediate study area is already  
5 developed, so future projects would mostly consist of redevelopment and would be subject to current  
6 regulations, which are more stringent and generally result in a reduction in stormwater runoff and  
7 associated pollutants. The Levee Ready project would temporarily affect water quality due to  
8 construction activities, as well as an increase in impervious surface in the Columbia Slough  
9 watershed; however, the USACE [has](#) determined that these effects would be minor due to  
10 minimization measures and the limited area of impervious surface (approximately 0.5 acres) (USACE  
11 and CCDD 2021).

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

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

### 26 4.3.3 Conclusions

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

## 37 4.4 Wetlands and Waters

38 [Please see the Wetlands and Waters Technical Report for additional information \(IBR 2023u\).](#)

1 **4.4.1 Project Effects**

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

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

10 The Modified LPA would impact approximately ~~0.06 acres of a wetland in the Burnt Bridge Creek~~  
11 ~~watershed and approximately 0.58 acres of five wetlands in the Columbia Slough watershed.~~ The  
12 Modified LPA would impact the buffers of eight wetlands in the study area, totaling 7.39 acres. ~~These~~  
13 ~~impacts, which~~ could have an indirect effect on the wetland functions. In addition, the Modified LPA  
14 would increase the area of impervious surface in the vicinity of wetlands and decrease the distance  
15 between wetlands and roadway traffic, which could have an indirect effect on wetlands through the  
16 potential for increased stormwater flow and pollutants from stormwater.

17 The Modified LPA would include permanent bridge piers in the Columbia River and North Portland  
18 Harbor to support the replacement bridges. While the replacement bridges have a smaller in-water  
19 footprint than the existing bridges, the Modified LPA would temporarily increase the area of piers by  
20 0.29 acres over existing conditions, as the original bridges would remain in place until the  
21 replacement bridges are functional. Demolition of the existing bridge piers would remove 0.66 acres  
22 from the in-water footprint, resulting in a net restoration of approximately 0.37 acres of benthic  
23 habitat.

24 [The IBR program’s Habitat Mitigation Working Group has been tasked with determining appropriate](#)  
25 [mitigation sites to meet the program’s regulatory and conservation commitment. To meet the](#)  
26 [regulatory requirement, at least one site or mitigation bank must be selected in Oregon and one in](#)  
27 [Washington. The conservation site \(or sites\) is not limited to one state or geographic location. The](#)  
28 [mitigation/conservation approach and/or sites will be selected with input from the working group and](#)  
29 [all other stakeholders involved and will be presented to the IBR program executive leadership for final](#)  
30 [approval.](#)

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

34 **4.4.2 Effects from Other Actions (Past, Present, Future)**

35 Urbanization and land use changes have led to a decrease in the acreage of wetlands in the study area  
36 since the 1800s, which is consistent with state and national trends (Morlan et al. 2010). Oregon and  
37 Washington lost an estimated 38-percent% and 31-percent% (respectively) of their wetlands between  
38 the 1780s and 1980s (Dahl 1990). The advent of stricter federal and state protections in the 1970s–

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1 1990s led to a reduction in annual wetland loss in the Willamette Valley, but they did not stop the loss  
2 of wetlands (Morlan et al. 2010).

3 Since 1958 (the base year of I-5 construction), improvements have occurred to some wetlands near  
4 the southern portion of the study area. The Port of Portland completed a wetland restoration project  
5 at the 90-acre Vanport wetlands parcel, located immediately west of the existing highway and light  
6 rail line (maintenance of the site is ongoing). Other historic wetlands east of the highway, in the Delta  
7 Park area and on Hayden Island, have undergone increased development, draining, or filling since  
8 1964. Located just south of the study area, the Lombard to Delta Park project affected a relatively  
9 small area of wetland habitat and natural areas.

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

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

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

### 19 4.4.3 Conclusions

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

25 In the context of widespread urban development in the study area, the potential impacts to wetlands  
26 buffers resulting from the Modified LPA are minor. Although the affected wetlands perform important  
27 functions and are valuable due to their relative rarity, they are not of high quality.

28 Mitigation of these impacts would replace or improve the functions to the extent possible, as close to  
29 the project as is feasible.

30 Based on the volume of flow and the existing conditions in the Columbia River, the removal and fill  
31 associated with the Modified LPA is not likely to have measurable effects on the function of the river.

32 ~~Compared to~~ When combined with past, present, and ~~reasonably~~ foreseeable future actions, the  
33 Modified LPA would have ~~a negligible effect~~ both adverse and beneficial effects on wetlands ~~and a~~  
34 ~~small benefit associated with the reduction the in-water footprint.~~

## 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 ~~project~~program vicinity include Fort Vancouver, recorded and anticipated archaeological (~~historic and precontact~~) 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 ~~precontact~~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 ~~DAHP, SHPO~~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~~Technical Reports will be available in mid-2023, at which time they will be incorporated into the Cumulative Effects ~~technical report~~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).*

1 ~~5.1.21.1.1~~ Extensive development has occurred on both ~~Effects from~~  
2 ~~Other Actions (Past, Present, Future)~~

3 ~~Both~~ shores of the Columbia River ~~have been the location of extensive development~~ in the past 200  
4 years. Several types of historic-era development occurred within or immediately adjacent to the  
5 present I-5 transportation corridor, and there are indications of Native American settlements  
6 associated with those developments, ~~as well as precontact use of the area.~~

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

17 The earliest Euro-American settlement and development in the city of Vancouver occurred in the  
18 ~~1850s~~ mid 1800s in the area immediately west of modern-day I-5. Historic Sanborn insurance maps  
19 indicate that the city of Vancouver had begun to spread north of 20th Street by 1907 and had reached  
20 41st Street by 1949, indicating a moderate to high likelihood of encountering buried historical  
21 archaeological deposits associated with residences and businesses dating to the early 20th-century  
22 settlement of Clark County. While the development of Vancouver formed the historic part of the  
23 archaeological record, the construction of each road, house, and trash pit potentially destroyed or  
24 disturbed evidence of ~~precontact~~ Native American sites in the area.

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

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

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



1 5.1.3 Conclusions

2 ~~5.1.31.1.1~~ Note: This section will be provided in a future draft. Conclusions

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 Historic Resources

7 5.2.1 Potential Effects

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

11 ~~5.21.1~~ Historic Resources

12 ~~5.2.11.1.1~~ Potential Effects

13 5.2.2 ~~Note: This section will be provided in a future draft.~~ Effects from  
14 Other Actions (Past, Present, Future)

15 ~~The~~ Note: This section will be updated, as appropriate, based on analysis and information from the  
16 Archaeology and Historic Built Environment ~~technical reports will be available in mid-~~ Technical Reports  
17 (anticipated in Summer 2023, at which time they will be incorporated into the Cumulative Effects  
18 technical report.)

19 ~~5.2.21.1.1~~ Effects from Other Actions (Past, Present, Future)

20 The historic resources analysis considers cumulative effects of actions beginning in ~~1950, which was~~  
21 ~~prior to~~ 1950s, with the construction of I-5. This time period captures the substantial change in land  
22 use and historic context in the study area that occurred with I-5 construction. Construction of the  
23 highway involved the removal of several buildings that had been constructed during the early history  
24 of Vancouver, and the highway created a substantial barrier between eastern and western portions of  
25 the historic community. The 1917 bridge is designated as a historic resource on the National Register  
26 of Historic Places in both Oregon and Washington.

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

- 29 • Significant population growth from 1950 to the present in Portland, Vancouver, and  
30 surrounding areas, which has put a high demand on housing in historic neighborhoods,

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1 causing new development both adjoining and within the historic sections of town, and  
2 ultimately diminishing the integrity of historic neighborhoods.

- 3 • Significant population growth from 1950 to present in Portland, Vancouver, and the  
4 surrounding areas, which has attracted urban and industrial development in the study area,  
5 changing the use and nature of the open space along the river and causing the displacement  
6 and alteration of some historic buildings.
- 7 • The completion of I-5 through Vancouver in 1954, which resulted in the demolition of large  
8 sections of the city's historic neighborhoods to access the 1917 bridge to Portland.
- 9 • Construction of the parallel bridge in 1958 (southbound), which accommodated increased  
10 traffic flow on the new highway, resulting in increased interstate traffic and commerce.
- 11 • In 1961, an urban renewal project that covered 28 blocks in downtown Vancouver and  
12 removed or altered many 19th- and early-20th-century buildings and substantially altered the  
13 setting of those remaining.
- 14 • The loss of businesses in downtown Vancouver from competition with shopping malls built at  
15 Jantzen Beach in Portland and the Vancouver Mall in the 1970s.

16 Unrelated present and future development would likely affect historic properties in the study area.  
17 For example, the Providence Academy redevelopment project, under construction at Evergreen  
18 Boulevard and C Street, involves the removal of several derelict historic structures and the  
19 introduction of contemporary architecture directly adjacent to the Academy (House of Providence),  
20 which is listed on the National Register of Historic Places.

21 In addition, historic resources that are currently vacant or underutilized may be lost through  
22 deterioration because of their current state of disrepair and the high cost of adapting them for reuse.

23 ~~5.2.31.1.1 Conclusions~~

24 ~~5.2.3 Note: This section will be provided in a future draft. Conclusions~~

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

28 **5.3 Parks and Recreation Areas**

29 ~~5.3.1 Project Effects~~

30 [Please see the Parks and Recreation Technical Report for additional information \(IBR 2023v\).](#)

31 ~~5.3.1 Project Effects~~

32 [The parks and recreation resources analysis considers cumulative effects of actions beginning in the](#)  
33 [1950s, with the construction of I-5.](#) The No-Build Alternative would not affect parks and recreation  
34 resources, or access to these resources, compared to existing conditions. Access to these resources

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1 would continue to be hindered by limited public transit service and substandard active transportation  
2 facilities.

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

9 The Modified LPA would not result in long-term direct effects to Waterfront Park, beyond the changes  
10 in eastern and southern views from the new ~~I-5~~ [Columbia River](#) bridges. ~~While, while~~ the Columbia  
11 River Renaissance Trail, Discovery Historic Loop Trail, and ~~the~~ Marine Drive Multi-use Trail would be  
12 realigned beneath the existing and new ~~I-5~~ [Columbia River](#) bridges.

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

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

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

22 ~~5.3.21.1.1 Effects from Other Actions (Past, Present, Future)~~

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

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

32 Planned park and trail development at the Portland waterfront, Hayden Island, the Vancouver  
33 Waterfront, Terminal 1, the Vancouver National Historic Reserve, and Kiggins Bowl would expand the  
34 provision of park and recreation facilities to the public. Other development could result in loss of  
35 parkland, but no reasonably foreseeable projects have been identified that are anticipated to reduce  
36 park or recreation facilities, and the extent of a potential loss is currently not known. Parks in the

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1 study area that received Land and Water Conservation Fund grant dollars are regulated by Section 6(f)  
2 protections and may only be converted out of parkland use with replacement.

### 3 5.3.3 Conclusions

4 Effects on parks resulting from the Modified LPA, considered in context of the past and planned  
5 projects (including park expansions), ~~are~~would be relatively minor and ~~do~~would not constitute a  
6 negative cumulative effect for the region. Additionally, the Modified LPA would improve access to the  
7 Vancouver Waterfront and connect parks on both the east and west sides of the bridges. This would  
8 essentially restore the once-connected waterfront that was bifurcated by the existing bridges.  
9 Because the Modified LPA would provide mitigation for any adverse effects ~~to~~on parks and recreation  
10 areas, it is not anticipated to contribute to cumulative adverse effects on park and recreation areas,  
11 but would contribute to beneficial cumulative effects.

## 6. TEMPORARY EFFECTS – CONSTRUCTION

Cumulative effects during construction ~~can~~ 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.



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- 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 ~~may not create notable impacts.~~ [would be minimal.](#) Other projects in the area, [such as the Levee](#)  
27 [Ready project and Renaissance Boardwalk](#), could directly impact the same waters or wetlands or  
28 regulated habitats that the Modified LPA would affect, ~~such as the Levee Ready project and~~  
29 ~~Renaissance Boardwalk.~~ [Temporary.](#) [Potential temporary](#) water quality impacts include turbidity due  
30 to sediment disturbance associated with in-water work, toxic contamination due to disturbance of  
31 hazardous sediments during in-water work, and toxic contamination due to accidental equipment  
32 leaks or spills in the vicinity of waterways in the study area. Additional short-term effects on aquatic  
33 resources [could](#) include harassment and non-lethal disturbance from in-water work; ~~potential sub-~~  
34 ~~lethal~~ [injury or disturbance](#) due to hydroacoustic impacts associated with pile driving and fish  
35 handling; increased risk of predation due to in-water shading during construction; and potential  
36 mortality associated with hydroacoustic impacts and fish handling.

37

38 [However, cumulative effects related to construction activities \(such as underwater noise from pile](#)  
39 [driving conducted for other projects\) would only be expected to occur if such activities were being](#)  
40 [conducted simultaneously and in close proximity to construction being conducted for the Modified](#)  
41 [LPA. While there are no projects that are currently known or expected to occur that would require](#)



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

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