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2 The No-Build Alternative would continue to degrade water quality through stormwater runoff from roadways,  
3 as most of the existing impervious roadway surfaces within the study area are, and would remain, untreated.

### 4 **Modified LPA**

5 The Modified LPA would result in an increase in impervious surfaces within the study area, which could result  
6 in increased stormwater runoff rates and volumes. Under the Modified LPA, CIA would increase to  
7 approximately 200 acres; however, all of this CIA would be treated, and the area of untreated CIA would be  
8 reduced by 150 acres. However, the Modified LPA includes stormwater treatment facilities on new and  
9 resurfaced existing roadways, including the new Columbia River bridges, which would remove pollutants from  
10 stormwater runoff and improve water quality in the Columbia Slough, Columbia River, North Portland Harbor,  
11 Burnt Bridge Creek, and Fairview Creek.

12 Preliminary hydraulic calculations show that the Modified LPA would not result in floodplain impacts.  
13 Modeling studies conducted for permit applications would identify additional commitments needed to meet  
14 floodplain requirements.

15 With new stormwater treatment and infiltration, the Modified LPA would improve surface water quality,  
16 increase groundwater recharge, and help restore natural flow regimes, thus reducing the impacts associated  
17 with past actions. When combined with past, present, and foreseeable future actions, the Modified LPA would  
18 have a positive cumulative effect on water quality and hydrology.

### 19 **Wetlands and Jurisdictional Waters**

20 Urbanization and land use changes have reduced the acreage of wetlands in the study area since the 1800s  
21 (Morlan et al. 2010). Between the 1780s and 1980s, Oregon and Washington lost an estimated 38% and 31% of  
22 their wetlands, respectively (Dahl 1990). In the 1970s through the 1990s, stricter federal and state protections  
23 led to a reduction in annual wetland loss in the Willamette Valley, but they did not stop the loss of wetlands  
24 (Morlan et al. 2010).

25 Since 1958 (the base year of I-5 construction), improvements have occurred to some wetlands near the  
26 southern portion of the study area. The Port of Portland completed a wetland restoration project at the 90-  
27 acre Vanport wetlands parcel, located immediately west of the existing highway and light-rail line. Other  
28 historic wetlands east of the highway, in the Delta Park area and on Hayden Island, have undergone increased  
29 development, draining, or filling since 1964. Identified future actions in the study area contributing to  
30 cumulative effects on wetlands and waters include:

- 31 • Planned restoration activities near the Columbia Slough and the Smith and Bybee Wetlands Natural Area.
- 32 • The Levee Ready Columbia project is estimated to result in the loss of approximately 0.5 acres of wetlands  
33 that would be mitigated through compensatory mitigation (e.g., the purchase of credits from a wetland  
34 mitigation bank) (USACE and CCDD 2021).
- 35 • Future dredging projects, such as the potential deepening of the navigation channel by the USACE, that  
36 would disturb sediment in the Columbia River waterway.

### 37 **No-Build Alternative**

38 The No-Build Alternative would not result in further filling of wetlands or the fill or reduction of wetland  
39 buffers within the study area. Untreated stormwater within the study area would continue to be discharged  
40 into wetlands and jurisdictional waters.

### 1 **Modified LPA**

2 The Modified LPA would require the fill of relatively small area of wetlands and wetland buffers  
3 (approximately 0.6 acres and 7.4 acres, respectively), which could have an indirect effect on the wetland  
4 functions. In addition, the Modified LPA would increase the impervious surface area in the vicinity of wetlands  
5 and decrease the distance between wetlands and roadway traffic, which could increase stormwater flow and  
6 pollutants. However, the Modified LPA would also provide stormwater facilities that would treat stormwater  
7 runoff for both new and existing impervious surfaces created by the original construction of I-5, which would  
8 improve water quality flowing into wetlands.

9 Mitigation for wetland fill is regulated by federal, state, and local jurisdictions and would typically require  
10 purchasing credits from an agency-approved mitigation site or completing on-site or off-site mitigation to  
11 compensate for functions lost or degraded by those impacts. Fill of the Vanport wetland would require  
12 increased mitigation ratios because it is an existing wetland mitigation site. Unavoidable wetland and  
13 waterway impacts would be offset through one or more compensatory mitigation projects, which are  
14 currently being developed in coordination with federal, state, and local regulatory agencies, tribes, and  
15 community members. With mitigation, it is anticipated that the Modified LPA would result in a net beneficial  
16 effect on quality and ecological function of wetlands and waters.

17 In the context of widespread urban development in the study area, the potential impacts to wetlands buffers  
18 resulting from the Modified LPA are minor. Mitigation of wetland fill would replace or improve the functions to  
19 the extent possible, and is anticipated to help mitigate past actions. When combined with past, present, and  
20 foreseeable future actions, the Modified LPA would have both adverse and beneficial cumulative effects on  
21 wetlands.

### 22 **Ecosystems**

23 Native Americans lived in the study area for more than 10,000 years before the arrival of Euro-American  
24 settlers. Since the Euro-American settlement in the mid-1800s, human population growth and land  
25 development have gradually displaced and reduced the quality and quantity of wildlife habitat. Historically,  
26 many activities, including deforestation, urbanization, dams for hydroelectricity, irrigation and flood control,  
27 hatchery operations, and overfishing have contributed to the loss of habitat and reduction in fish and wildlife  
28 species. Compared to their historic conditions natural habitats in the area are generally small and  
29 fragmented. The areas remaining provide habitat for a variety of plants, terrestrial wildlife, birds, and fish,  
30 including common species and species with special regulatory status. These past actions have made  
31 significant changes to the region's ecosystems.

32 General growth and development in the region will continue to affect species and habitats in the study area.  
33 Current and future projects, such as Levee Ready Columbia, Port of Vancouver Terminal 1, dredging, and  
34 maintenance of existing waterfront structures could include construction activities that would affect aquatic  
35 or terrestrial species and their habitats. Increases in impervious surface area could increase the quantity of  
36 stormwater runoff, affecting aquatic habitat function. Of the identified future actions, only the Levee Ready  
37 Columbia project is identified as increasing impervious surfaces (by less than 1 acre); the remaining projects  
38 (including the Renaissance Boardwalk) are located on areas that currently consist primarily of impervious  
39 surfaces.

40 Projects involving these types of activities are subject to federal, state, and/or local permits that require a  
41 mitigation sequencing process consisting of avoidance, minimization, and mitigation to achieve no net loss of  
42 function. Future projects would be required to provide stormwater quality treatment consistent with  
43 applicable stormwater regulations to reduce the risk of potential effects on water quality. Because  
44 requirements typically include treatment for existing untreated impervious surfaces, future projects may lead  
45 to a net beneficial effect on water quality. Future projects constructed over time would also be legally

1 required to avoid, minimize, and mitigate impacts to fish and wildlife to achieve no net loss in habitat  
2 function. Planned restoration in the study area includes projects along Burnt Bridge Creek in Vancouver and  
3 the Columbia River Slough in Portland (Ecology 2021; Lee and Stamberger 2018).

#### 4 ***No-Build Alternative***

5 The No-Build Alternative would not change the existing ecosystem conditions unless a catastrophic seismic  
6 event were to occur, causing the existing bridge structures to collapse. The No-Build would continue to  
7 contribute to an adverse cumulative effect on ecosystem resources from untreated stormwater runoff from I-5  
8 and disturbance of wildlife during intermittent bridge and highway maintenance activities.

#### 9 ***Modified LPA***

10 Construction of the Modified LPA would result in temporary impacts (e.g., increased noise, turbidity,  
11 overwater shading) to sensitive aquatic and terrestrial species and their habitats, including species of  
12 significance to consulting tribes. The Modified LPA would result in both permanent and short-term  
13 disturbance to sensitive terrestrial habitats, including riparian buffers, trees, wetlands, and wetland buffers.

14 Long-term effects on aquatic ecosystem resources would include displacement of benthic habitat from the  
15 bridge piers and new overwater shading. However, the Modified LPA would include a small net restoration of  
16 benthic habitat due to the removal of the existing Interstate Bridge piers. The Modified LPA would create new  
17 impervious surfaces, which would generate stormwater but would also provide water quality treatment for  
18 new and existing impervious surfaces created by the original construction of I-5 that did not include  
19 stormwater treatment. The Modified LPA would reduce pollutants (including dissolved copper) associated  
20 with highway runoff, improving aquatic habitat. Impacts to fish and wildlife species would be avoided,  
21 minimized, and offset through mitigation sequencing to the extent practicable, as required by compliance  
22 with federal, state, and local regulatory requirements. These conservation and mitigation measures would  
23 result in no net loss of habitat function. A compensatory mitigation approach is currently in development with  
24 federal, state, and local regulatory agencies; tribes; and community members.

25 Mitigation measures under the Modified LPA would reduce harmful effects and even improve parts of the local  
26 ecosystem relative to existing conditions. The Modified LPA would have a net beneficial effect on aquatic  
27 species and habitat, considering the small net improvement in benthic habitat as well as a reduction in  
28 pollutants entering the Columbia River and North Portland Harbor. While the Modified LPA's impacts to  
29 ecosystem resources would be mitigated, historic development and expected growth throughout the region  
30 are likely to continue to impact ecosystems. When combined with past, present, and foreseeable future  
31 actions, the Modified LPA would contribute to both beneficial and adverse cumulative effects on ecosystem  
32 resources.

#### 33 ***Geology and Groundwater***

34 Past activities in the study area include settlement and development of the region, filling of lowland areas,  
35 grading of slopes, and construction in earthquake-prone areas. The study area consists of soils with high  
36 relative earthquake hazard rating that are susceptible to severe ground shaking and liquefaction during a  
37 major seismic event. The steep slopes and soils susceptible to erosion in the Burnt Bridge Creek area have  
38 been disturbed in the past from the construction of I-5 and SR 500. Current infrastructure, including roads,  
39 bridges, and buildings, was constructed under seismic codes applicable at the time of construction. The  
40 existing bridges and other I-5 structures, such as overpasses and retaining walls, were built before design  
41 standards addressed the impacts associated with subduction zone earthquakes, including severe  
42 liquefaction.

43 Past actions such as the Vanport Flood and the siting of the Hayden Island Landfill resulted in contamination  
44 of groundwater through the spillage or leakage of gasoline and other petroleum products stored at

1 commercial sites or industrial facilities. Contaminants from historical commercial and industrial activities in  
2 both Vancouver and Portland have diminished groundwater quality. Future actions, such as the Waterfront  
3 Gateway and the Renaissance Boardwalk, may include development and regrading that could lead to soil  
4 erosion, even with erosion control best practices in place. These actions may also continue to sustain existing  
5 impacts to degradation of the groundwater quality from stormwater runoff in the study area.

### 6 ***No-Build Alternative***

7 The No-Build Alternative would not include the construction of new Columbia River bridges and other  
8 structures built to current seismic safety standards. Therefore, the No-Build Alternative would leave I-5  
9 vulnerable to earthquakes and other geologic hazards that would have an adverse cumulative effect. In  
10 addition, the No-Build Alternative would continue to leave stormwater runoff untreated that could have an  
11 adverse cumulative effect on groundwater.

### 12 ***Modified LPA***

13 The Modified LPA would construct new Columbia River bridges and other I-5 structures to current, seismic  
14 design standards that would substantially improve the region's seismic resiliency to withstand a major  
15 seismic event. The Modified LPA would expose approximately 415 acres of near-surface soils to potential  
16 erosion from excavation, fill, clearing, and grading during construction.

17 The Modified LPA would have beneficial effects on groundwater quality, including for the Troutdale Sole  
18 Source Aquifer, through stormwater facilities that would manage stormwater volume and flow rates and treat  
19 stormwater runoff to reduce pollutants. The Modified LPA could also improve groundwater quality by  
20 remediating some existing contamination. When combined with past, present, and foreseeable future actions,  
21 the Modified LPA would have a beneficial cumulative effect on geology and groundwater.

### 22 ***Hazardous Materials***

23 Past actions in the study area, including spills and releases of hazardous materials from commercial and  
24 industrial land uses, have caused soil and groundwater contamination and pose a risk to human health. There  
25 are 579 sites that could contain hazardous materials within the study area, and the Ruby Junction  
26 Maintenance Facility is a small-quantity generator for hazardous wastes, including solvents, batteries, and  
27 paints. High-priority hazardous materials sites include the U.S. Army Vancouver Barracks, Hayden Island  
28 landfill, and Jantzen Beach car wash, among others. Many of these contaminated areas have been  
29 documented, and in some cases cleanup actions have been initiated or completed. There may also be  
30 unknown contamination caused by past land uses and actions in the study area that poses additional risks.

31 Development in the study area may involve the management of legacy sites, which are hazardous materials  
32 sites where the owner is or should be undertaking long-term cleanup actions. Sites for which the responsible  
33 party has not yet complied may require additional investigation and cleanup. These sites may also be  
34 considered "orphan" sites, which are being managed by regulatory agencies. Future development in the study  
35 area could add exposure risks but also provide cleanup and remediation benefits. The discovery of new legacy  
36 sites would be the responsibility of the property owners, who would need to comply with all applicable  
37 federal, state, and local requirements for managing and mitigating contamination. In addition, population  
38 and employment growth could cause increased traffic that may result in slightly more incidents of hazardous  
39 material spills.

### 40 ***No-Build Alternative***

41 Under the No-Build Alternative, there would be no acquisitions or displacements, no potential for property  
42 acquisition liability, and no cleanup of previously contaminated locations. The No-Build Alternative would not  
43 have a cumulative effect related to hazardous materials.

### 1 **Modified LPA**

2 Construction activities for the Modified LPA would involve cleanup of contamination associated with past  
3 releases of hazardous materials, which would reduce the risk of future contamination and risks to human  
4 health. Construction of the Modified LPA, or other future construction actions, creates a potential for the  
5 release of hazardous substances or petroleum products into the environment from the improper transfer of  
6 fuel or spills from construction equipment. Other pollutants, such as paints, acids for cleaning masonry,  
7 solvents, raw concrete, paving, striping products, and concrete-curing compounds, are often present at  
8 construction sites and may enter the environment if not managed correctly.

9 The Modified LPA would improve safety and operations on I-5, which could reduce hazardous material spills  
10 as a result of highway crashes. In combination with past, present, and foreseeable future actions, the Modified  
11 LPA would have a beneficial cumulative effect on the environment and human health through the reduction  
12 and clean up of hazardous materials.

### 13 **Climate**

14 Substantially rising GHG concentrations from human activities have been a primary driver of global warming.  
15 Both the Washington State Department of Ecology and the Oregon Global Warming Commission publish  
16 reports every two years measuring their states' GHG emissions and progress toward state and federal goals to  
17 reduce these emissions. Transportation (including highway, rail, and air transport) is the greatest contributor  
18 to GHG emissions in Oregon and Washington. Multiple federal, state, regional, and local regulations and  
19 policies have been enacted to guide the development and evaluation of transportation projects and local  
20 communities' management of GHG emissions.

21 Future actions related to the policies and plans of state, regional, and local jurisdictions have the potential to  
22 influence the decrease in GHG emissions in the transportation and land use sectors. Policies that directly  
23 regulate the emissions of vehicles, such as a clean fuels standard, have the greatest potential to reduce GHG  
24 emissions. Additional ancillary benefits may also come from transitions to renewable energy sources in the  
25 energy sector. Compared to existing conditions, GHG emissions associated with the transportation sector are  
26 expected to decline in future years due to improvements in vehicle fuel technologies and the transition away  
27 from using gasoline and diesel fuels to power vehicles. As more of the vehicle fleet is composed of electric  
28 cars, the decarbonization of the electric grid in Washington and Oregon will further decrease GHG emissions  
29 associated with vehicle travel.

30 Because the effects of regional growth and reasonably foreseeable future actions are incorporated into the  
31 transportation modeling the results of the GHG emissions modeling reflect cumulative effects on annual GHG  
32 emissions in the study area.

### 33 **No-Build Alternative**

34 Although VMT would increase in the study area by 2045 under the No-Build Alternative, GHG emissions are  
35 expected to decline substantially over this period due to the implementation of fuel and engine regulations.  
36 However, the No-Build Alternative would not contribute to a cumulative reduction in GHG emissions.

### 37 **Modified LPA**

38 The Modified LPA would result in fewer GHG emissions than the No-Build Alternative because of a mode shift  
39 to public transit and active transportation as well as decreases in VMT, congestion, and vehicle idling. GHG  
40 emissions from construction activities would be mitigated and reduced by following current standard  
41 specifications and regulatory guidance from ODOT and WSDOT to conserve the use of construction materials  
42 and fuels and implementing best management practices.



1 The Modified LPA includes features that would improve local and regional resiliency to the anticipated effects  
2 of climate change. These features would help to avoid fragmentation and degradation of floodplain hydrology  
3 by sensitively locating new and modified transportation and utility project components; maximizing  
4 management of stormwater by restoring existing unused impervious paved areas to natural, permeable, and  
5 vegetated conditions during the design phase; and ensuring that the bridge design would accommodate  
6 potential climate-change-induced effects, such as larger water volumes from winter storms and more  
7 frequent snow and ice storms. The Modified LPA, when combined with other past, present, and foreseeable  
8 future actions, would have an incremental beneficial contribution to cumulative climate effects through a  
9 reduction in GHG emissions and improvements in the climate resiliency of the corridor and region.

### 10 **Environmental Justice**

11 The original construction of I-5 and I-205 through Portland had significant effects on the populations in and  
12 adjacent to the highway's path, including environmental justice (EJ) populations.<sup>6</sup> ODOT cleared entire blocks  
13 for development of the roadway, dividing neighborhoods, displacing residences, and affecting businesses in  
14 the historic center of Portland's Black community. The construction of I-5 through Vancouver changed the city  
15 by closing 5th Street (the route heading east) and encouraging development of housing to the north of  
16 downtown. Fewer displacements occurred in Vancouver than Portland because the area was less densely  
17 developed than Portland at that time.

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

26 Future transportation actions would follow federal and state guidelines, such as the Uniform Relocation Act,  
27 to provide replacement housing and relocation benefit packages. Other currently planned transportation  
28 projects, such as the RMPP and the I-205 tolling program, may implement low-income or equitable tolling  
29 policies to subsidize or offset the economic burden of tolling on low-income and minority populations. The  
30 Oregon Toll Program is investigating a low-income program that would address the cumulative effects of  
31 tolling and congestion pricing projects on low-income drivers.

### 32 **No-Build Alternative**

33 The No-Build Alternative would not change the existing conditions that affect EJ populations. It would not  
34 acquire or displace residences or businesses or provide an extension of light-rail, improvements to active  
35 transportation facilities, and improved bus service in the corridor. Therefore, the No-Build Alternative would  
36 not contribute to beneficial or adverse cumulative effects on EJ populations.

### 37 **Modified LPA**

38 The Modified LPA would have both beneficial and adverse effects on EJ populations. Some populations,  
39 including minority and low-income individuals, would be adversely affected by displacement of businesses  
40 and residents and by noise and traffic during construction. However, in general, the Modified LPA would likely  
41 improve conditions (such as air pollution, poor access, and poor transit service) for populations and

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<sup>6</sup> Environmental justice populations include low-income and minority groups.

1 neighborhoods that have historically been adversely affected by other past actions. See Section 3.20,  
2 Environmental Justice, for additional details on direct and indirect impacts to EJ populations.

3 For low-income populations, among which BIPOC communities are overrepresented, the impacts of tolling  
4 and congestion pricing associated with the Modified LPA, such as the share of total household income spent  
5 on transportation costs, may be disproportionate. The IBR Program is coordinating with the Oregon Toll  
6 Program to address these impacts.

7 EJ populations would benefit from the Modified LPA through the construction of light-rail transit; increased  
8 transit frequencies; improved travel times on I-5; significantly improved bicycle and pedestrian facilities; and  
9 safer vehicle, bicycle, and pedestrian travel. The construction of light-rail transit would provide a lower cost  
10 option than single-occupancy vehicles, which would be subject to tolls and future congestion pricing under  
11 the RMPP. Combined with past, present, and foreseeable future actions, the Modified LPA would have both  
12 beneficial and adverse cumulative effects on EJ populations.

### 13 3.21.4 Temporary Construction Effects

14 Construction of the Modified LPA would likely overlap with the construction of many of the projects listed in  
15 Section 3.21.2 (above), the Transportation Technical Report, and future private development. Cumulative  
16 impacts during construction may result when simultaneous or sequential construction projects have an  
17 additive effect on the temporary effects of constructing the Modified LPA. For example, bridge construction  
18 activity would need to be coordinated with other in-water work that could occur simultaneously.  
19 Simultaneous or sequential construction projects can increase congestion, create more employment  
20 opportunities, impact community and natural resources, and require additional public and private spending.

21 Other projects would have their own traffic control plans, but some may influence the travel routes of  
22 commuters and freight and could place more traffic in the study area. Likewise, some projects are on planned  
23 haul routes and could influence the delivery of supplies and materials to the job sites for the Modified LPA. As  
24 more detailed plans are developed, traffic control plans would need to be coordinated with these projects  
25 and their timelines. Temporary cumulative effects on the community may result from local traffic congestion  
26 and rerouting, as well as noise and air quality impacts, if construction under the Modified LPA overlaps with  
27 the construction of other projects in the area.

28 Construction of the Modified LPA could also result in increased employment and spending in the study area  
29 during construction. The extent of these effects depends on the funding sources and the makeup of work  
30 crews used during construction. This could affect the ability of other projects to obtain skilled workers.

31 Construction of the Modified LPA is likely to affect marine commerce, including disruptions and delays for  
32 vessels during the in-water work (projected to be periodic over four years), which may overlap with other in-  
33 water work associated with other projects. The temporary effects from the Modified LPA, in combination with  
34 other planned projects, would cause delays and disruptions to local residents and businesses. Mitigation  
35 plans, including coordinated traffic control plans and business assistance, would reduce the negative  
36 consequences of construction, while the employment demands would result in positive economic outcomes  
37 for the region.

38 Most construction-related natural environment impacts would be localized in extent and magnitude such that  
39 cumulative effects from other projects would be minimal. Other projects in the area, such as Levee Ready  
40 Columbia and Renaissance Boardwalk, could directly impact the same waters or wetlands or regulated  
41 habitats that the Modified LPA would affect. Cumulative effects related to construction activities (such as  
42 underwater noise from pile driving conducted for other projects) would only occur if such activities were  
43 being conducted simultaneously and in close proximity to construction being conducted for the Modified LPA.  
44 No projects are currently identified that would require substantial in-water construction activity in the  
45 immediate vicinity of the construction for the Modified LPA; however, it is possible that such a project could

1 be proposed. Any such project would require federal approvals for work within the river and would therefore  
2 undergo Section 7 Endangered Species Act consultation.

3 To minimize temporary cumulative effects, ODOT and other agencies should coordinate construction  
4 schedules to minimize overlapping impacts. These impacts would involve general construction procedures  
5 such as detours, lane closures, entering/exiting of construction vehicles and equipment, travel delays, noise,  
6 etc. For these reasons, it is unlikely that a project conducted concurrently with IBR Program-related  
7 construction would result in adverse cumulative construction effects.

### 8 3.21.5 Irreversible and Irrecoverable Commitments of Resources

9 NEPA regulations from the Council on Environmental Quality require the environmental analysis to identify  
10 "...any irreversible and irretrievable commitments of resources that would be involved in the proposed action  
11 should it be implemented" (CFR 1502.16). Council on Environmental Quality guidelines describe primary  
12 irreversible and irretrievable resource commitments as uses of nonrenewable resources throughout a project  
13 that may be irreversible if removal of the resources occurs and cannot be replaced within a reasonable  
14 timeframe (for example, extinction of a threatened or endangered species) or if obstruction of the use of  
15 resources occurs after construction. Implementing the Modified LPA would involve committing natural,  
16 physical, human, and fiscal resources.

17 The proposed improvements would involve a long-term conversion of land to provide right of way for the  
18 Modified LPA. Although these transportation facilities could revert to urban land and open space, that is  
19 unlikely and would require resources to make happen. Fossil fuels used to power construction, operate  
20 vehicles, and manufacture materials are the major nonrenewable resources that would be consumed by  
21 construction of the Modified LPA and the resulting daily vehicle operations.

22 Considerable amounts of labor and material, including cement, aggregate, asphalt, sand, fill materials, lime,  
23 and steel, would be used for construction. Equipment emissions from on-site fuels are an additional  
24 contributor to the carbon footprint of construction. The Program will investigate and consider construction  
25 materials, equipment, and practices to reduce embedded carbon in construction (e.g., the carbon emitted  
26 during the production, transport, and installation of the materials required for construction), maximize  
27 recycling, and reduce GHG emissions from construction. For demolition of the existing infrastructure, reuse  
28 options are relatively limited, but many materials can be recycled. As construction packages and plans are  
29 developed, construction bid document specifications or performance requirements could include measures  
30 such as maximizing the inclusion of recycled material to reduce new material production and inclusion by  
31 recycling existing concrete and asphalt pavements to be used as aggregate base, subbase, backfill materials,  
32 etc. The use of these construction materials would not have an adverse impact upon continued availability of  
33 these resources. Construction would also require a substantial one-time expenditure of both state and federal  
34 funds that may not be retrievable. Retrievability is possible if the improved transportation facilities spur  
35 economic growth and toll revenues are bonded to provide capital funding for bridge construction.