Interstate BRIDGE Replacement Program

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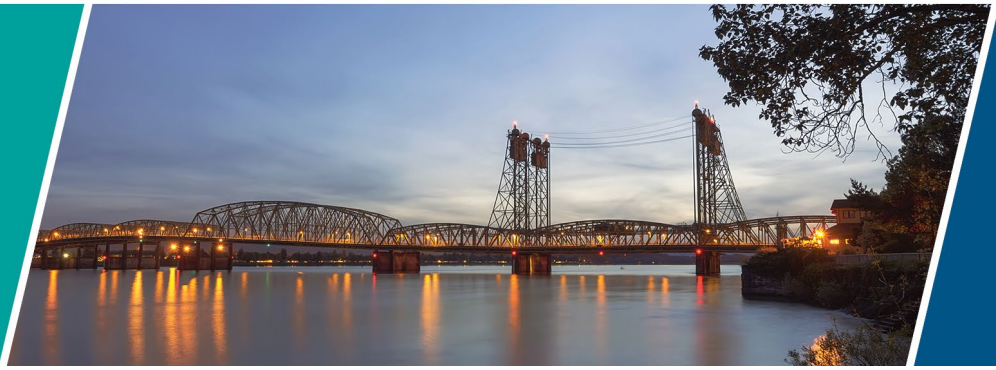

Visual Quality Technical Report

September 2024

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Visual Quality Technical Report

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CONTENTS

FIGURES

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
ADA	Americans with Disabilities Act
AVE	area of visual effect
BPA	Bonneville Power Administration
BRT	bus rapid transit
CAD	computer-aided design
CPTED	crime prevention through environmental design
CRC	Columbia River Crossing
CTR	Commute Trip Reduction
C-TRAN	Clark County Public Transit Benefit Area Authority
FHWA	Federal Highway Administration
FSCR	Flood Safe Columbia River
GIS	geographic information system
I-5	Interstate 5
IBR	Interstate Bridge Replacement
KVP	key viewpoint
LPA	Locally Preferred Alternative
LRT	light-rail transit
LRV	light-rail vehicle
LU	landscape unit
MAX	Metropolitan Area Express

Acronym/Abbreviation	Definition
mph	miles per hour
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act of 1969
ODOT	Oregon Department of Transportation
OTC	Oregon Transportation Commission
PMLS	Portland Metro Levee System
PNCD	Preliminary Navigation Clearance Determination
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
SOV	single-occupancy vehicle
SR	State Route
TriMet	Tri-County Metropolitan Transportation District of Oregon
UDAG	Urban Design Advisory Group
UFSWQD	Urban Flood Safety and Water Quality District
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
VIA	Visual Impact Assessment
WSDOT	Washington Department of Transportation
WSTC	Washington State Transportation Commission

1. PROGRAM OVERVIEW

This technical report identifies, describes, and evaluates the existing visual character and visual quality within the study area and the long-term and temporary effects from the Interstate Bridge Replacement (IBR) Program's Modified Locally Preferred Alternative (LPA). This report also provides mitigation measures for potential effects on visual quality when avoidance is not feasible.

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

The objectives of this report are to:

- Define the study area (area of visual effect [AVE]) and the methods of data collection and evaluation (Chapter 2).
- Describe the existing visual character and visual quality within the AVE (Chapter 3).
- Discuss potential long-term, temporary, and indirect effects to the visual character and quality within the AVE resulting from the construction and operation of the Modified LPA compared to the No-Build Alternative (Chapters 4, 5, and 6).
- Provide proposed avoidance and mitigation measures to help prevent, eliminate, or minimize long-term and temporary effects from the Modified LPA (Chapter 7).
- Identify federal, state, and local permits that would be required (Chapter 8).

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

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

Figure 1-1. IBR Program Location Overview

1.1 Components of the Modified LPA

The basic components of the Modified LPA include:

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

- Associated bus transit service improvements would include three additional bus bays for eight new electric double-decker buses at the Clark County Public Transit Benefit Area Authority (C-TRAN) operations and maintenance facility (see Section 1.1.7, Transit Operating Characteristics, for more information about this service).
- Improvements to seven I-5 interchanges and I-5 mainline improvements between Interstate Avenue/ Victory Boulevard in Portland and SR 500/39th Street in Vancouver. Some adjacent local streets would be reconfigured to complement the new interchange designs, and improve local east-west connections.
    a. An option that shifts the I-5 mainline up to 40 feet westward in downtown Vancouver between the SR 14 interchange and Mill Plain Boulevard interchange is being evaluated.
    b. An option that eliminates the existing C Street ramps in downtown Vancouver is being evaluated.
- Six new adjacent bridges across North Portland Harbor: one on the east side of the existing I-5 North Portland Harbor bridge and five on the west side or overlapping with the existing bridge (which would be removed). The bridges would carry (from west to east) LRT tracks, southbound I-5 off-ramp to Marine Drive, southbound I-5 mainline, northbound I-5 mainline, northbound I-5 on-ramp from Marine Drive, and an arterial bridge for local traffic with a shared-use path for pedestrians and bicyclists.
- A variety of improvements for people who walk, bike, and roll throughout the study area, including a system of shared-use paths, bicycle lanes, sidewalks, enhanced wayfinding, and facility improvements to comply with the Americans with Disabilities Act. These are referred to in this document as *active transportation* improvements.
- Variable-rate tolling for motorists using the river crossing as a demand-management and financing tool.

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

Figure 1-2. Modified LPA Components

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

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

Figure 1-3. Modified LPA – Geographic Subareas

Table 1-1. Modified LPA and Design Options

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

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

1.1.1 Interstate 5 Mainline

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

The Modified LPA would include three 12-foot through lanes from Interstate Avenue/Victory Boulevard to SR 500/39th Street and a 12-foot auxiliary lane from the Marine Drive interchange to the Mill Plain Boulevard interchange in each direction. Many of the existing auxiliary lanes on I-5 between the SR 14 and Main Street interchanges in Vancouver would remain, although they would be reconfigured. The existing auxiliary lanes between the Victory Boulevard and Hayden Island interchanges would be replaced with changes to on- and off-ramps and interchange reconfigurations. The Modified LPA would also include wider shoulders (12-foot inside shoulders and 10- to 12-foot outside shoulders) to be consistent with ODOT and WSDOT design standards. The wider inside shoulder would be used by express bus service to bypass mainline congestion, known as “bus on shoulder” (refer to Section 1.1.7, Transit Operating Characteristics). The shoulder would be available for express bus service when general-purpose speeds are below 35 miles per hour (mph).

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

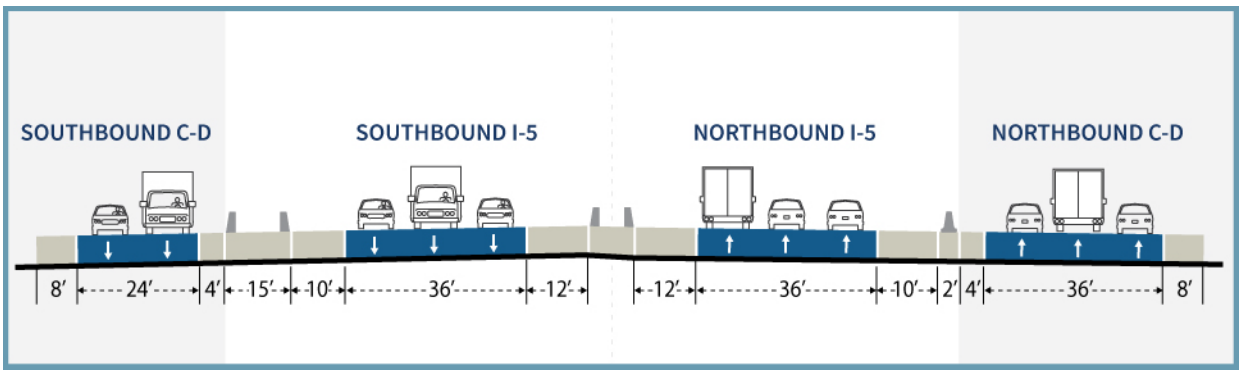
On I-5 northbound, the auxiliary lane that would begin at the on-ramp from Marine Drive would continue across the Columbia River bridge and end at the off-ramp to the C-D roadway, north of SR 14 (see Figure 1-5). The on-ramp from SR 14 westbound would join the off-ramp to the C-D roadway, forming the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

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

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

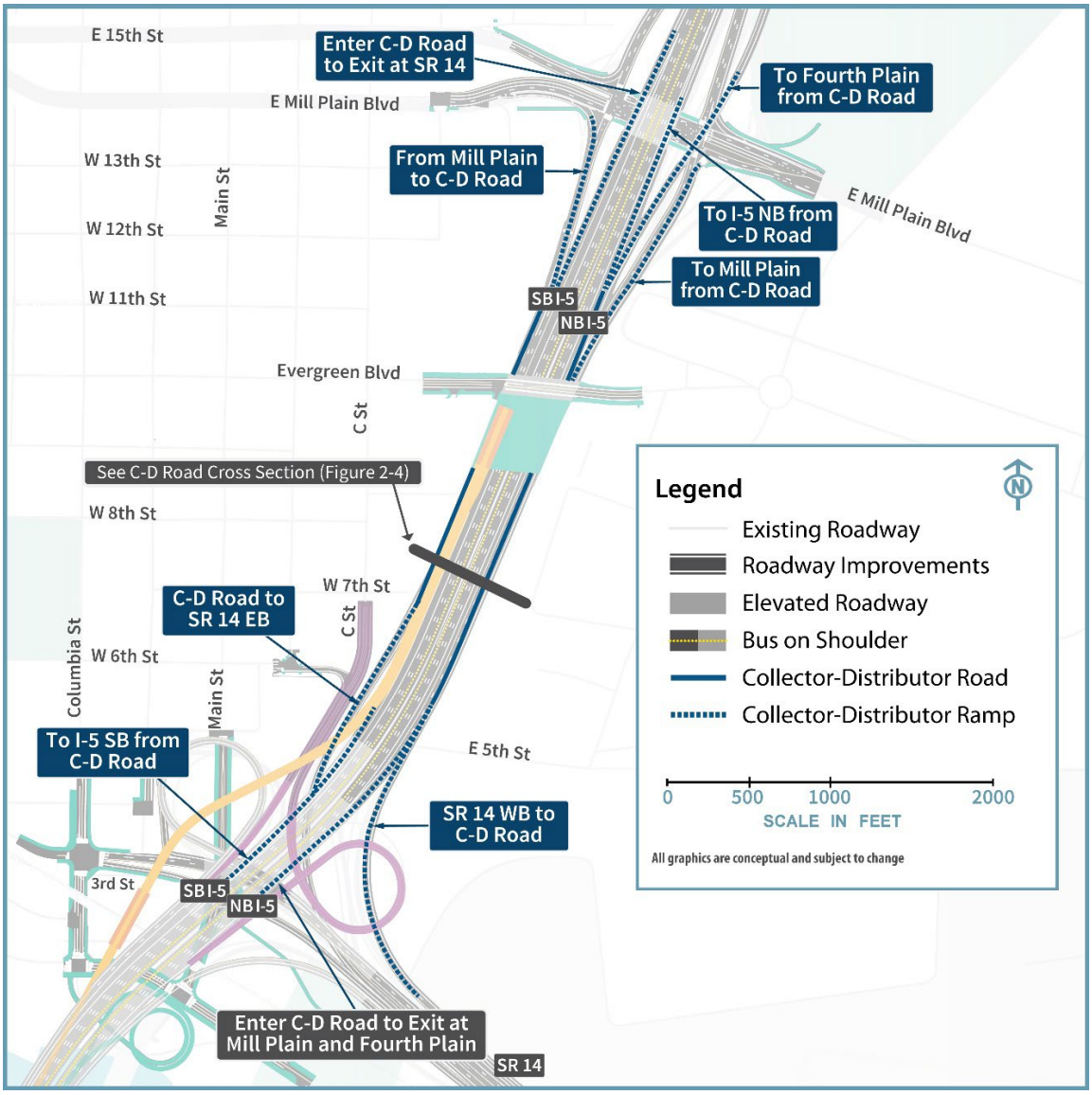
On I-5 southbound, an auxiliary lane would begin at the on-ramp from the C-D roadway and would continue across the southbound Columbia River bridge and end at the off-ramp to Marine Drive. The combined on-ramp from SR 14 westbound and C Street would merge into this auxiliary lane.

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



[1] A collector-distributer roadway parallels and connects the main travel lanes of a highway and frontage roads or entrance ramps.

Figure 1-5. Collector-Distributor Roadways



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

1.1.1.1 Two Auxiliary Lane Design Option

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

On I-5 northbound, one auxiliary lane would begin at the combined on-ramp from Interstate Avenue and Victory Boulevard, and a second auxiliary lane would begin at the on-ramp from Marine Drive. Both auxiliary lanes would continue across the northbound Columbia River bridge, and the on-ramp from Hayden Island would merge into the second auxiliary lane on the northbound Columbia River bridge. At the off-ramp to the C-D roadway, the second auxiliary lane would end but the first auxiliary

lane would continue. A second auxiliary lane would begin again at the on-ramp from Mill Plain Boulevard. The second auxiliary lane would end at the off-ramp to SR 500, and the first auxiliary lane would connect to an existing auxiliary lane at 39th Street to the off-ramp at Main Street.

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

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

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

Figure 1-6. Comparison of Auxiliary Lane Configurations

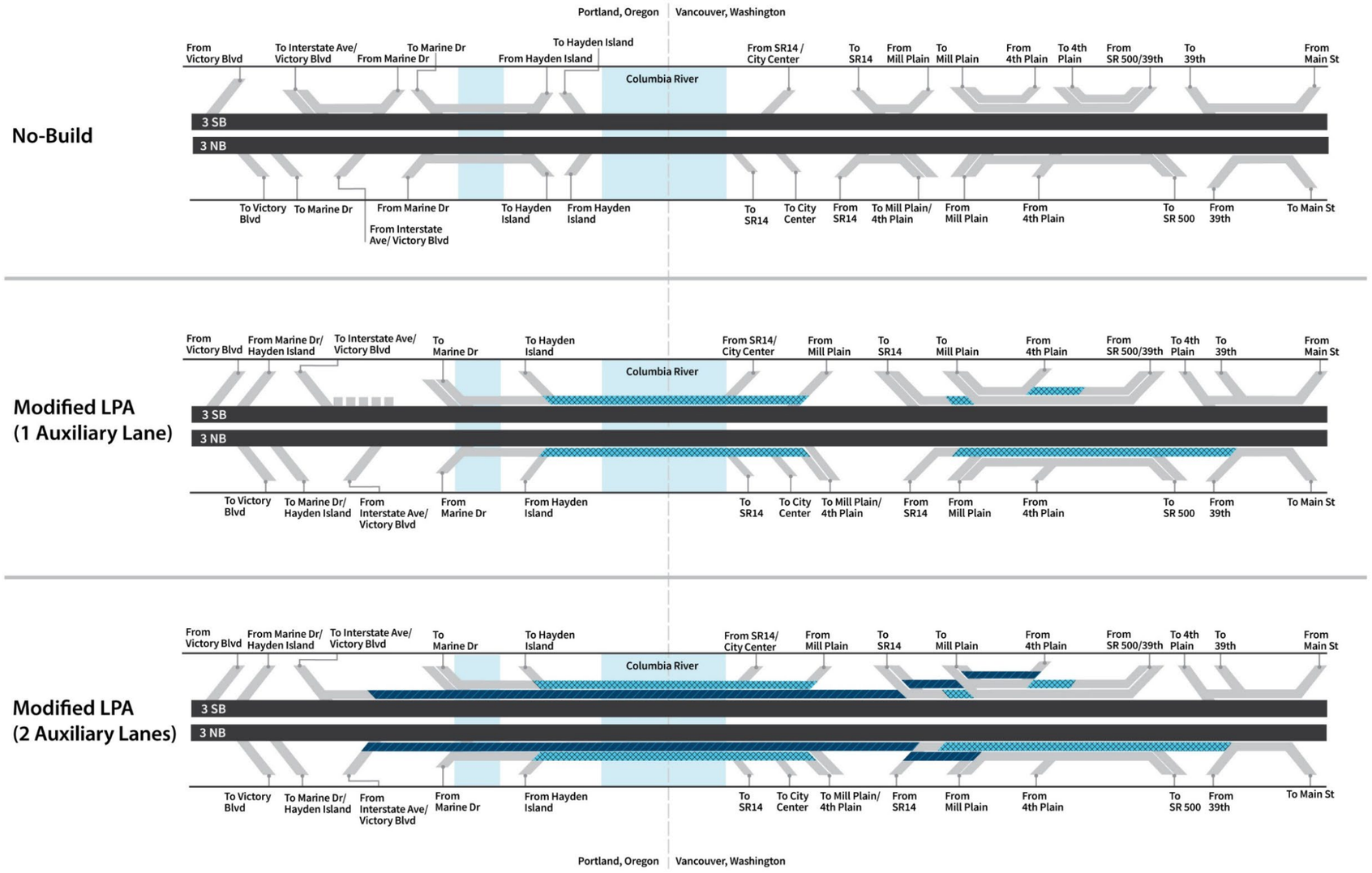
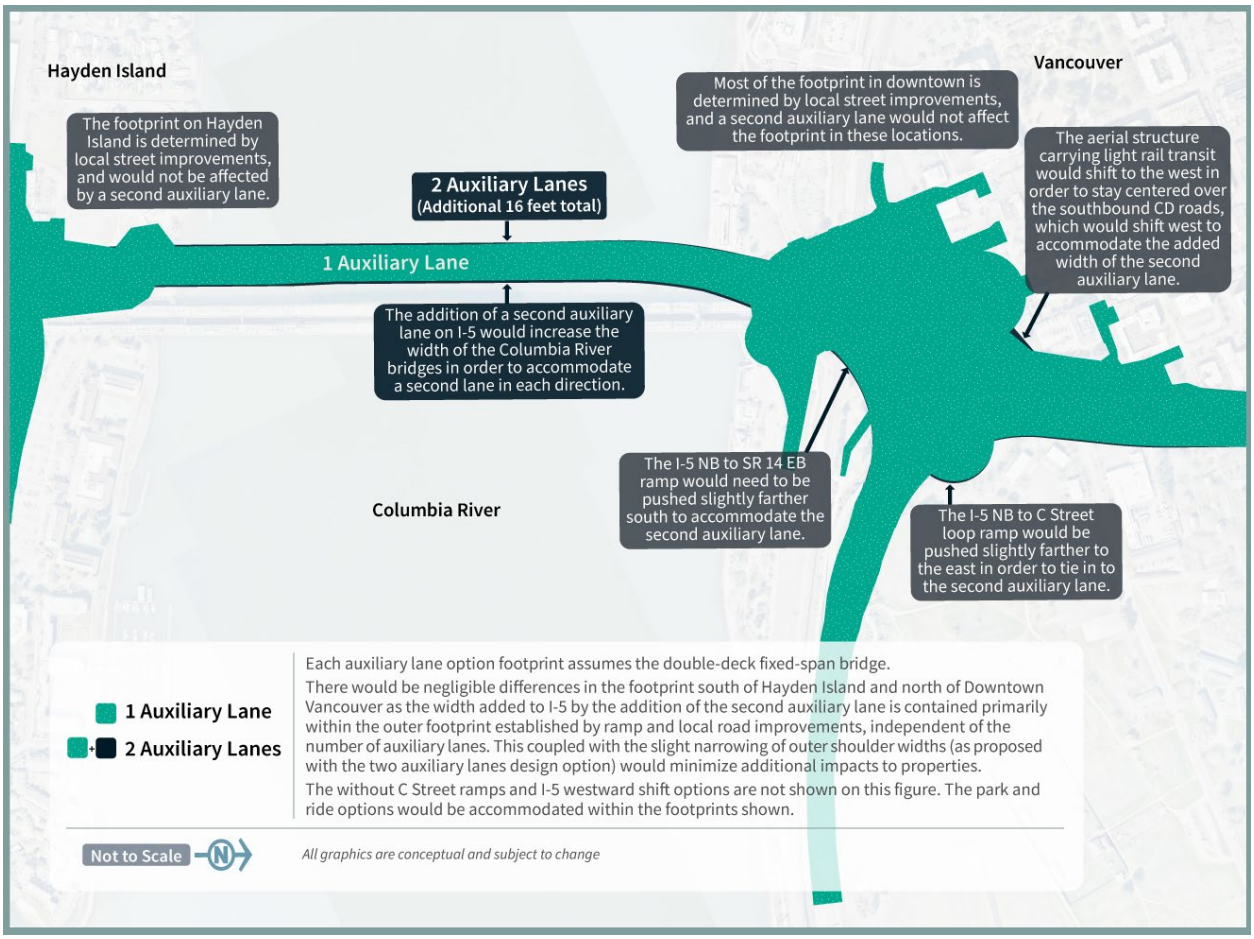


Figure 1-7. Auxiliary Lane Configuration Footprint Differences



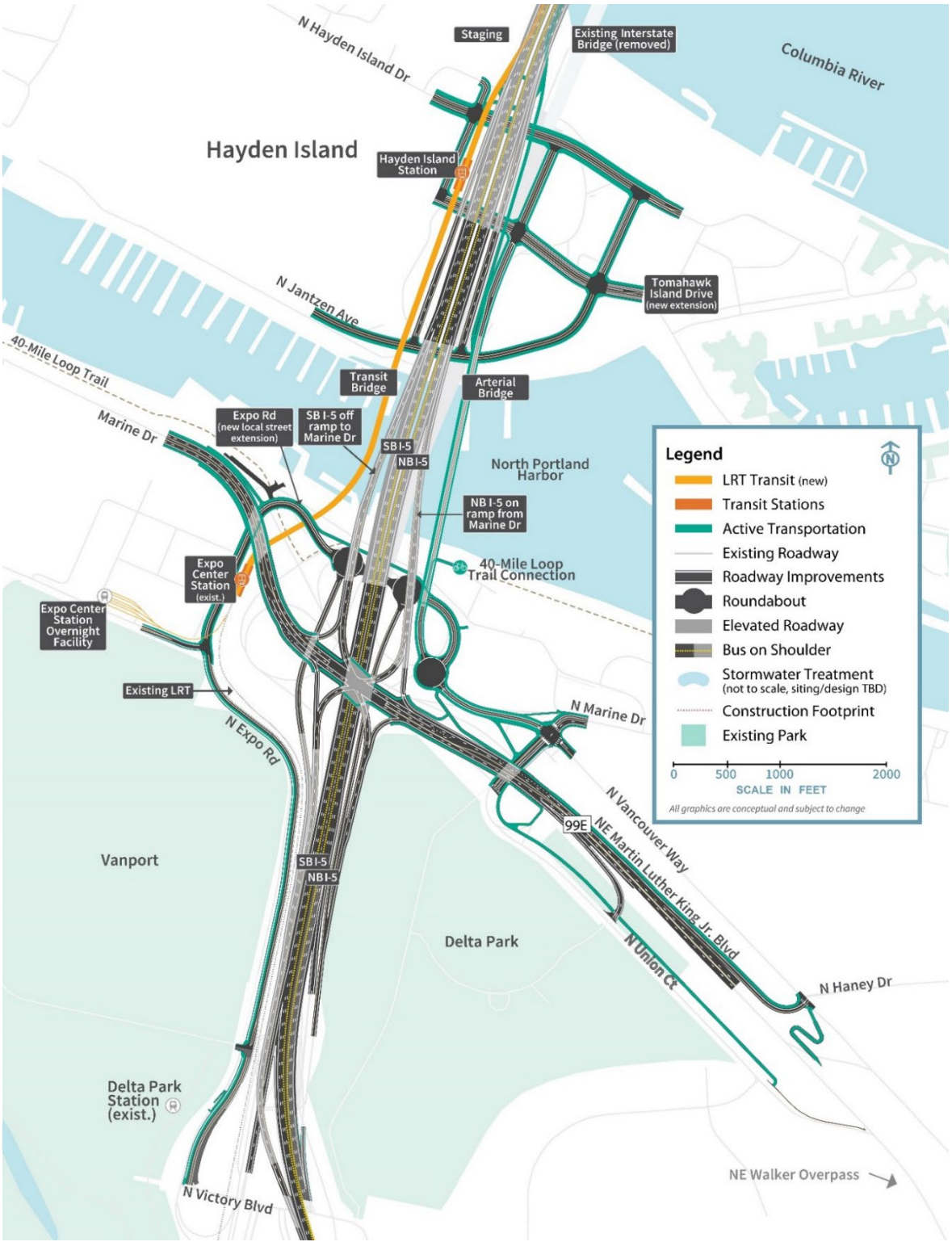
1.1.2 Portland Mainland and Hayden Island (Subarea A)

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

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

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

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



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

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

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

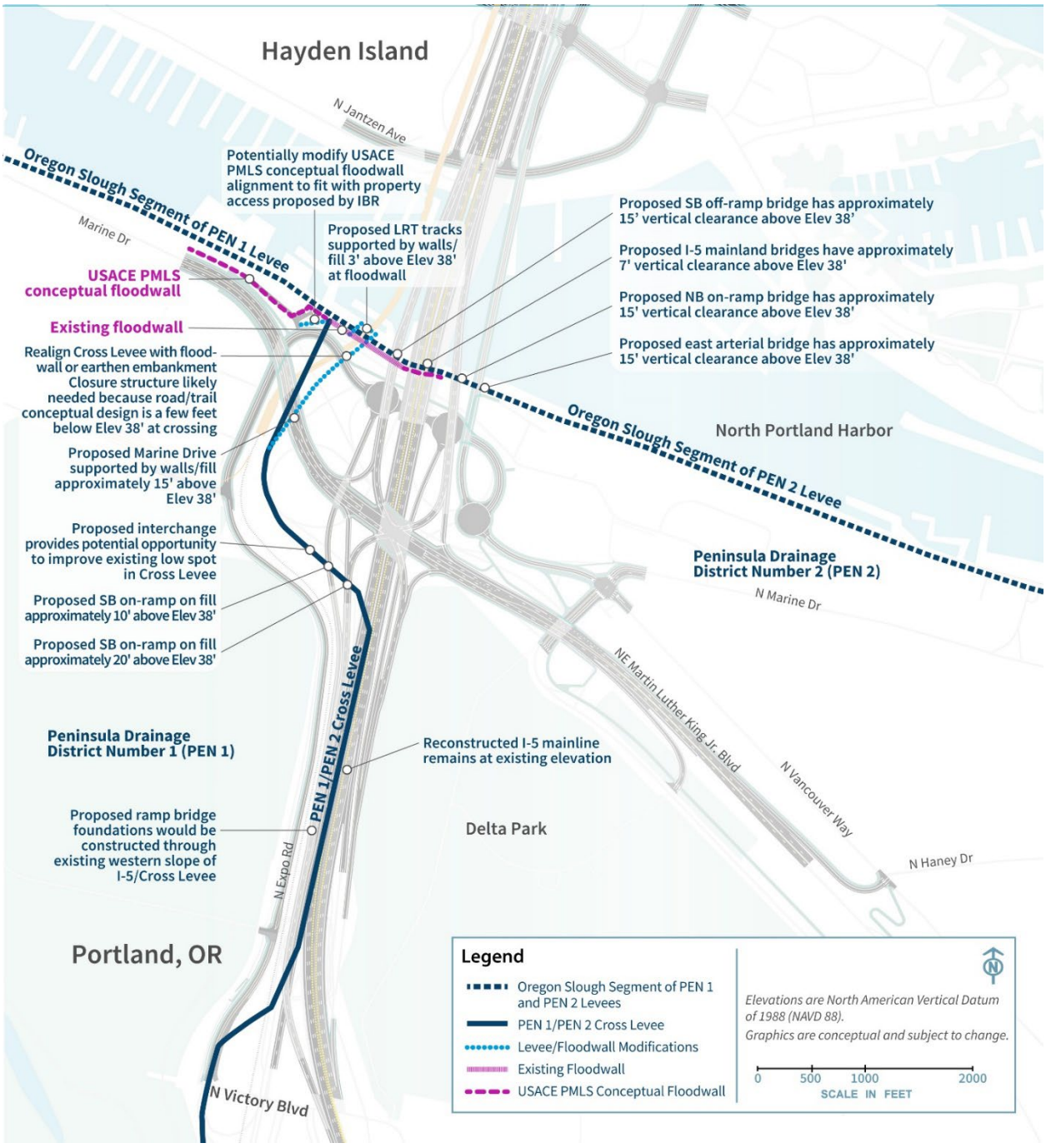
- The U.S. Army Corps of Engineers (USACE) Portland Metro Levee System (PMLS) project.
- The Flood Safe Columbia River (FSCR) program (also known as "Levee Ready Columbia").

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

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

[3] The portion of the original Denver Avenue levee alignment within the Marine Drive interchange area is no longer considered part of the levee system by UFSWQD.
[4] UFSWQD includes PEN 1 and PEN 2, Urban Flood Safety and Water Quality District No. 1, and the Sandy Drainage Improvement Company.
[5] NAVD 88 is a vertical control datum (reference point) used by federal agencies for surveying.

Figure 1-9. Levee Systems in Subarea A



1.1.2.1 Highways, Interchanges, and Local Roadways

VICTORY BOULEVARD/INTERSTATE AVENUE INTERCHANGE AREA

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

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

MARINE DRIVE INTERCHANGE AREA

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

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

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

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

To access Hayden Island using the arterial bridge from the east on Martin Luther King Jr. Boulevard, motorists would exit Martin Luther King Jr. Boulevard at the existing off-ramp to Vancouver Way just

west of the Walker Street overpass. Then motorists would travel west on Vancouver Way, through the intersection with Marine Drive and straight through the roundabout to the arterial bridge.

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

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

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

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

NORTH PORTLAND HARBOR BRIDGES

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

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

- The LRT tracks.
- The southbound I-5 off-ramp to Marine Drive.
- The southbound I-5 mainline.
- The northbound I-5 mainline.
- The northbound I-5 on-ramp from Marine Drive.

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

- An arterial bridge between the Portland mainland and Hayden Island for local traffic; this bridge would also include a shared-use path for pedestrians and bicyclists.

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

Compared to the existing bridge, the two new I-5 mainline bridges would have a similar vertical clearance of approximately 7 feet above the proposed height of the improved levees (elevation 38 feet NAVD 88). The two ramp bridges and the arterial bridge would have approximately 15 feet of vertical clearance above the proposed height of the levees. The foundation locations for the five roadway bridges have not been determined at this stage of design, but some foundations could be constructed through landward or riverward levee slopes.

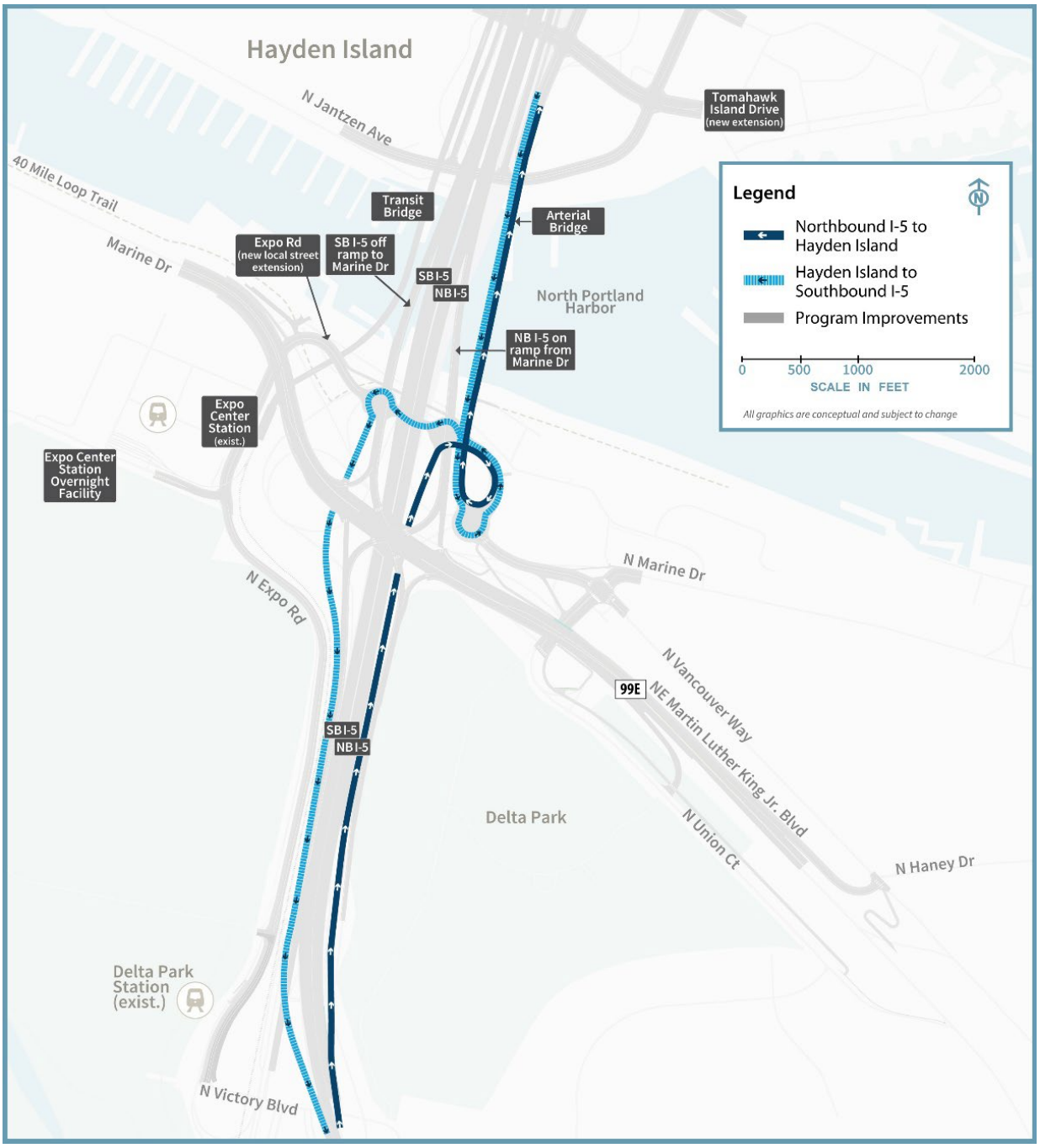
HAYDEN ISLAND INTERCHANGE AREA

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

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

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

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



NB = northbound; SB = southbound

1.1.2.2 Transit

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

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

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

1.1.2.3 Active Transportation

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

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

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

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

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

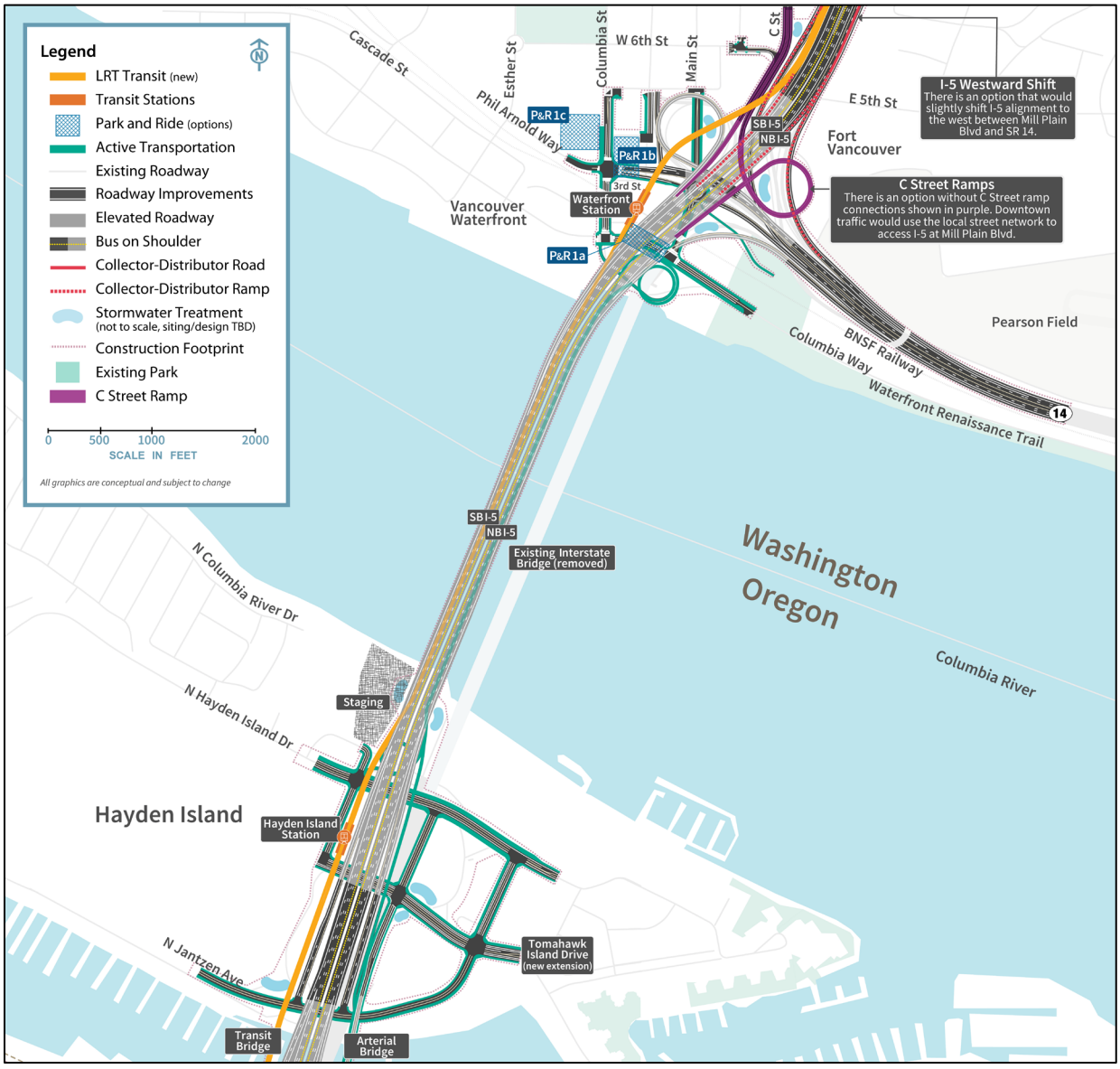
1.1.3 Columbia River Bridges (Subarea B)

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

1.1.3.1 Highways, Interchanges, and Local Roadways

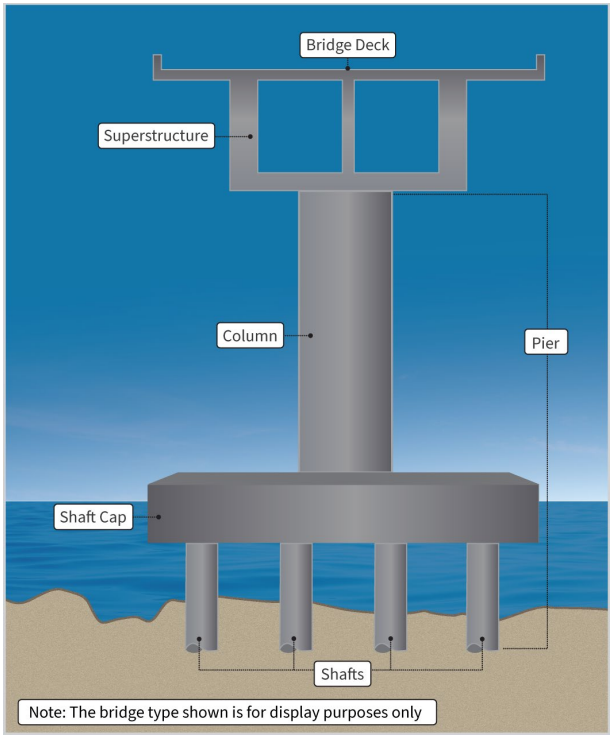
The two existing parallel I-5 bridges that cross the Columbia River would be replaced by two new parallel bridges, located west of the existing bridges (see Figure 1-11). The new eastern bridge would accommodate northbound highway traffic and a shared-use path. The new western bridge would carry southbound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

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



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

Figure 1-12. Bridge Foundation Concept



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

BRIDGE CONFIGURATIONS

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

[7] A pier set consists of the pier supporting the northbound bridge and the pier supporting the southbound bridge at a given location.

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

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

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

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

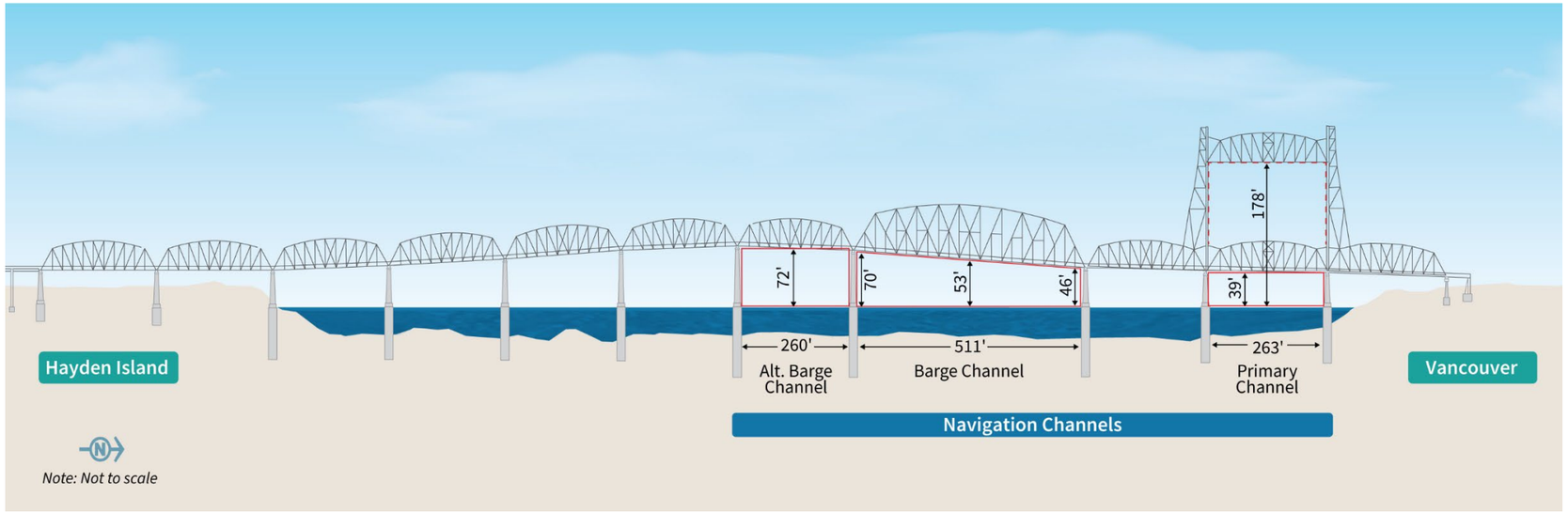
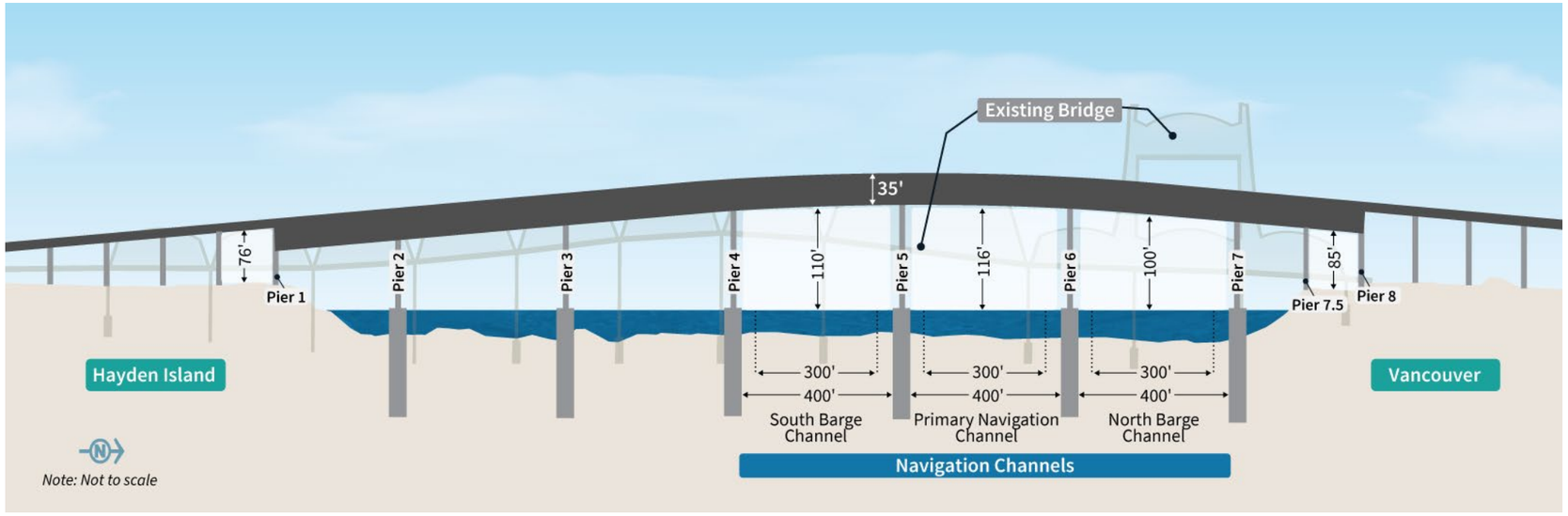


Figure 1-14. Profile and Navigation Clearances of the Proposed Modified LPA Columbia River Bridges with a Double-Deck Fixed-Span Configuration



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

Double-Deck Fixed-Span Configuration

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

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

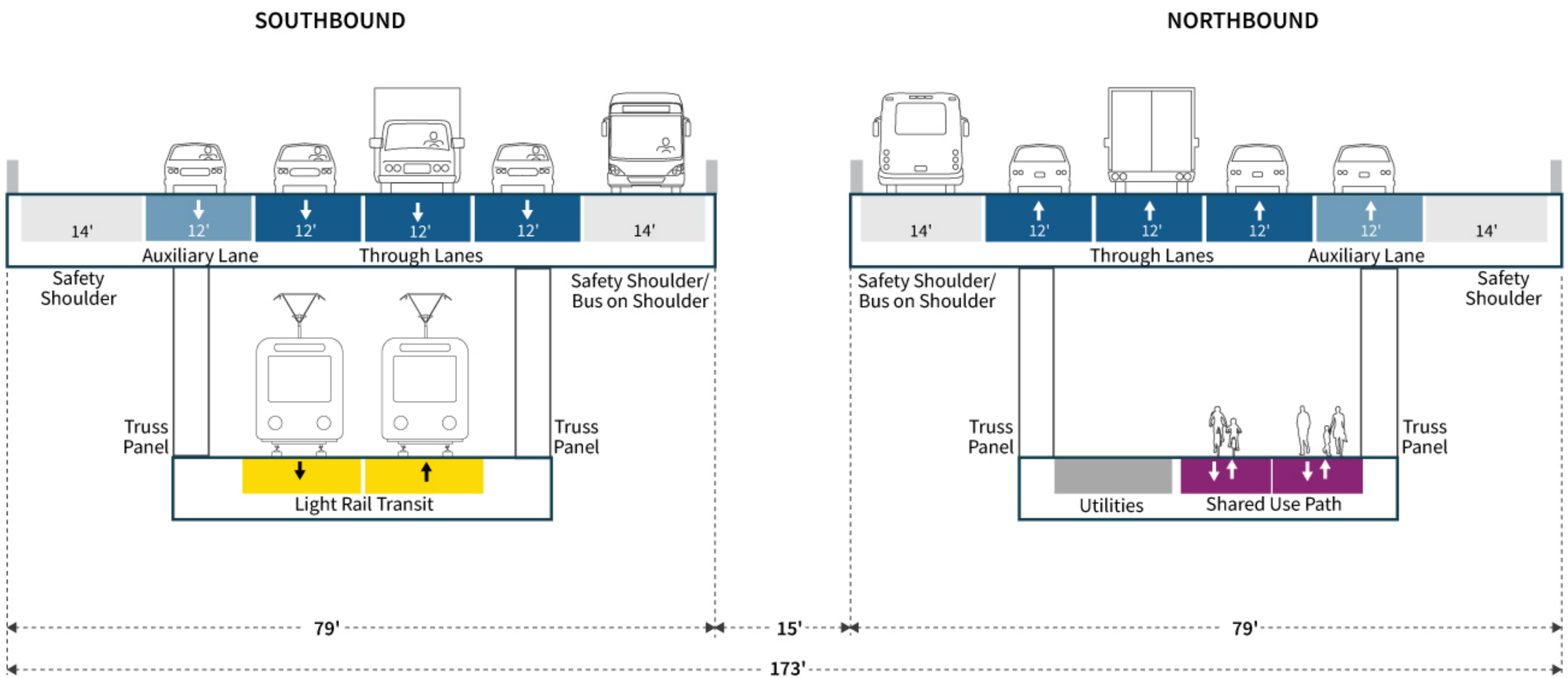
Figure 1-15. Conceptual Drawing of a Double-Deck Fixed-Span Configuration

Note: Visualization is looking southwest from Vancouver.

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

[8] "Out-to-out width" is the measurement between the outside edges of the bridge across its width at the widest point.

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



Single-Level Fixed-Span Configuration

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

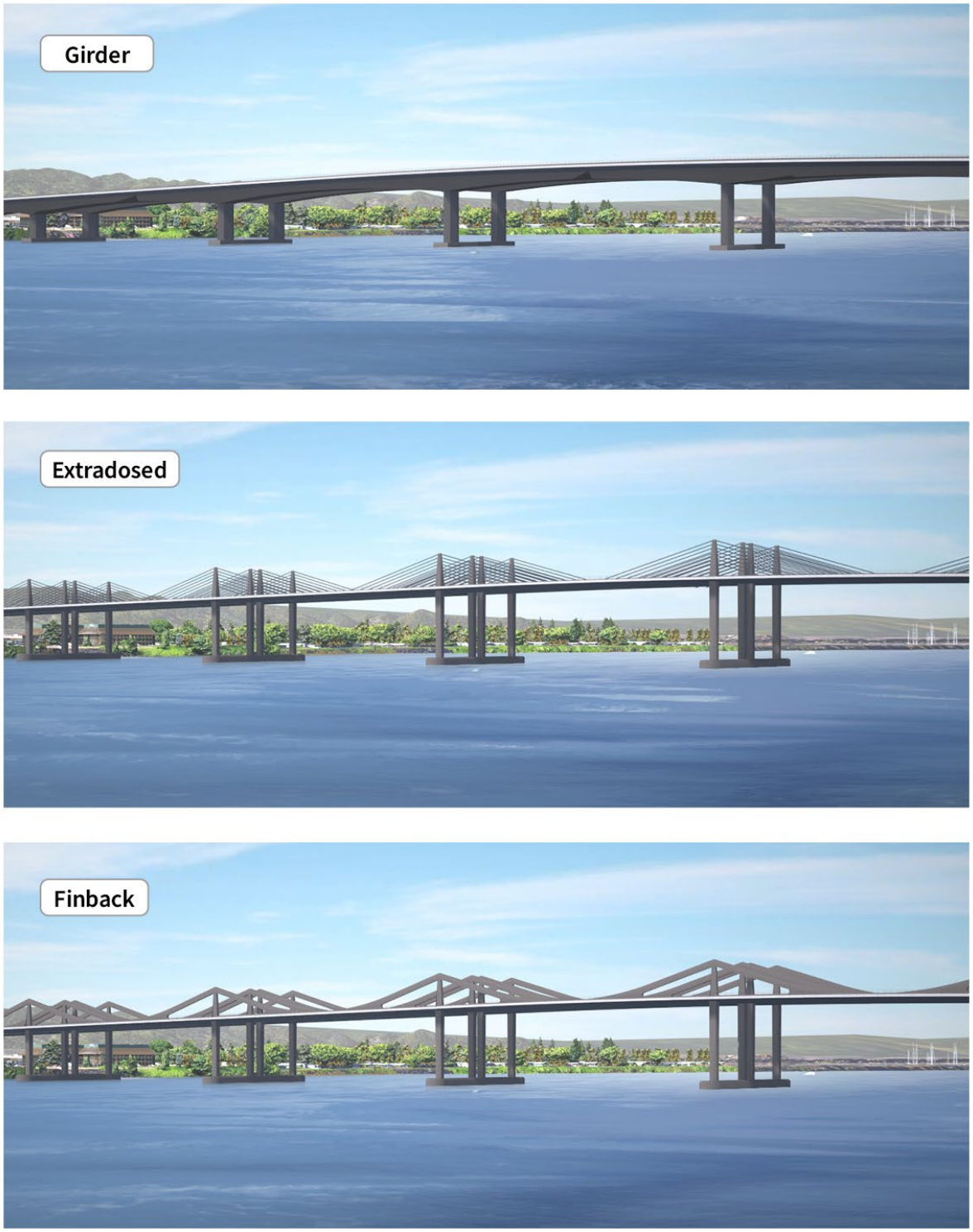
This configuration would provide 116 feet of vertical navigation clearance for river traffic using the primary navigation channel and 400 feet of horizontal navigation clearance at the primary navigation channel, as well as barge channels. This bridge height would not impede takeoffs and landings by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

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

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

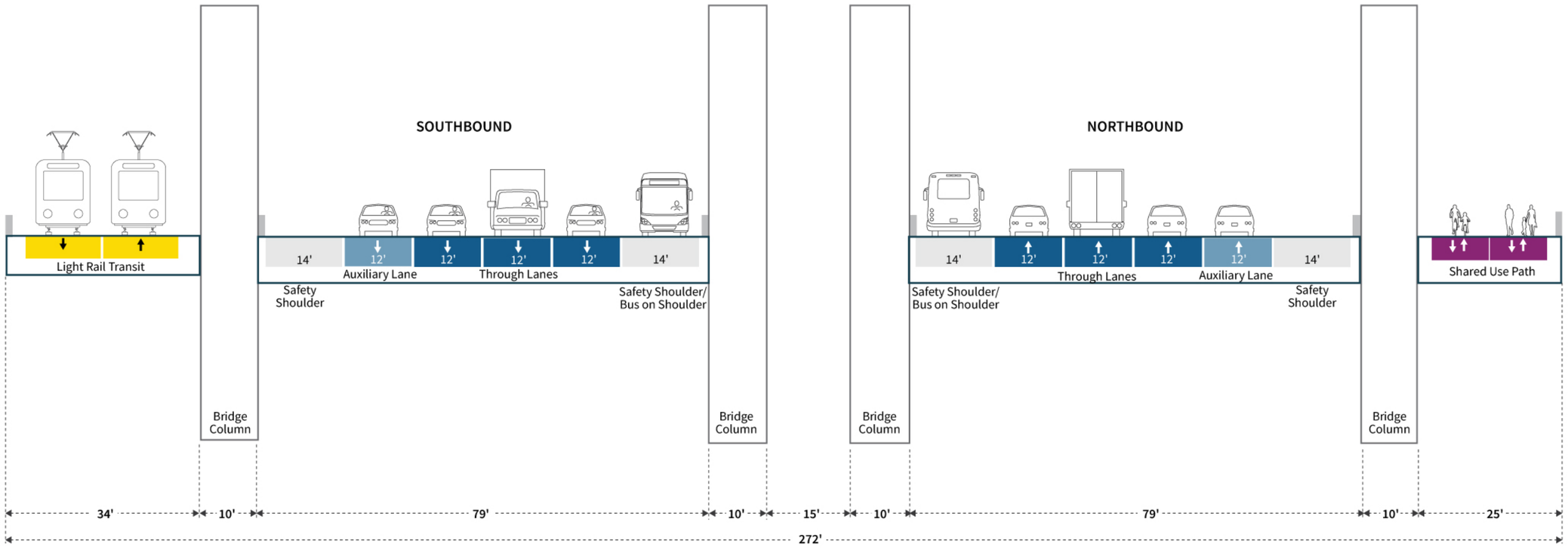
This bridge configuration would have a 3% maximum grade on both the Oregon and Washington sides of the bridge.

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



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

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



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

Single-Level Movable-Span Configuration

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

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

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

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

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

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

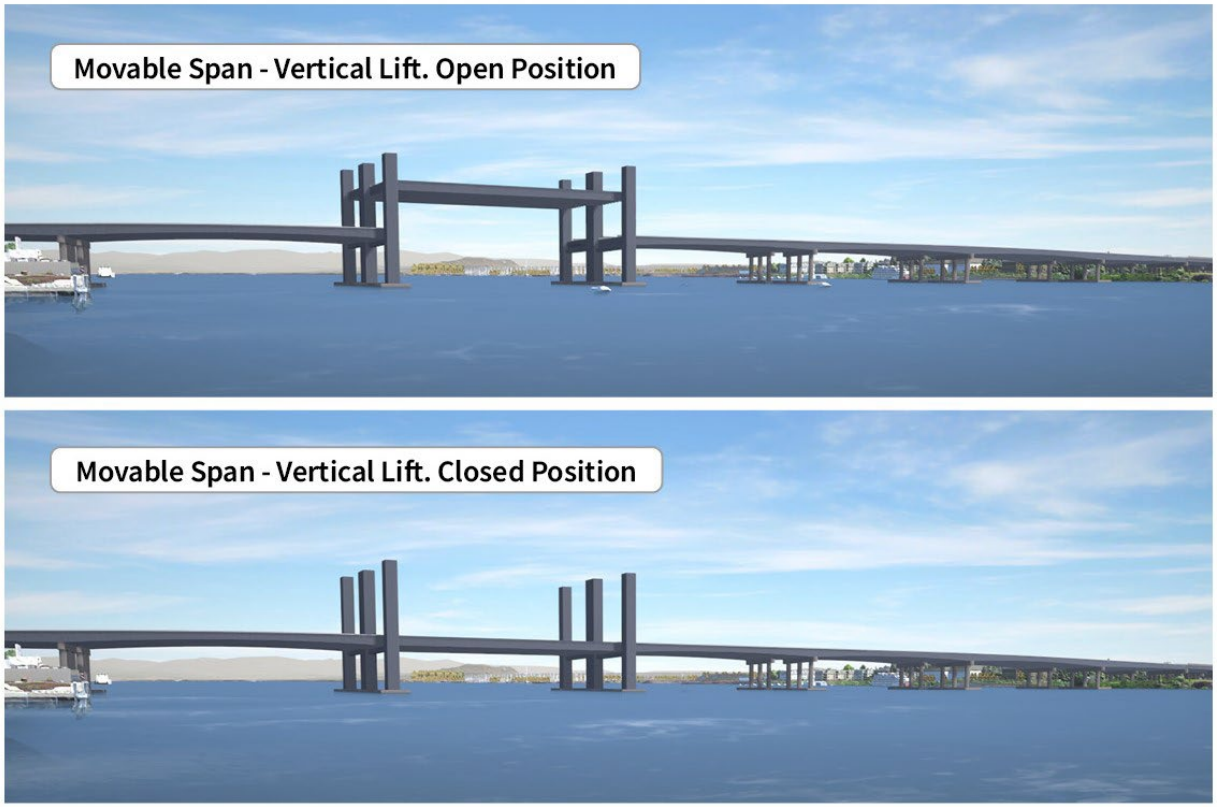
Similar to the single-level fixed-span configuration, the eastern bridge would accommodate northbound highway traffic and the shared-use path, and the western bridge would carry southbound traffic and two-way light-rail tracks. The I-5 highway, light-rail tracks, and shared-use path would be on the same level across the bridges instead of on two levels as with the double-deck configuration. Cross sections of the single-level movable-span configuration are shown in Figure 1-20; the top cross section depicts the vertical lift spans (Piers 5 and 6), and the bottom cross section depicts the fixed

spans (Piers 2, 3, 4, and 7). The movable and fixed cross sections are slightly different because the movable span requires lift towers, which are not required for the other fixed spans of the bridges.

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

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

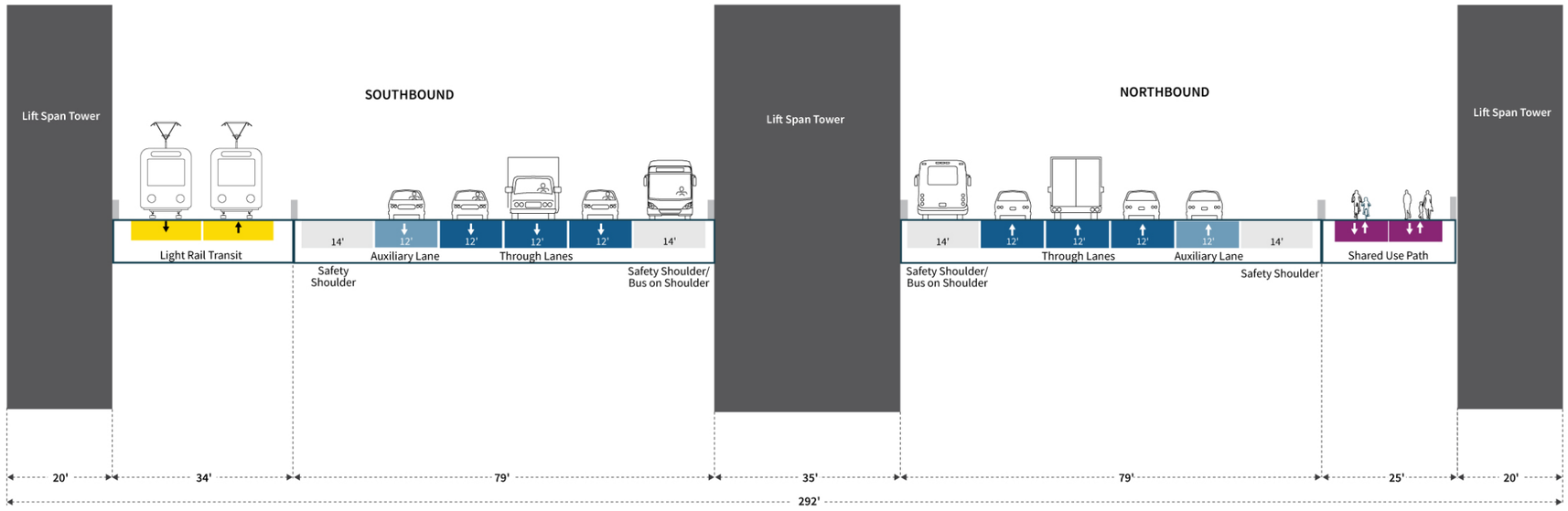
Figure 1-19. Conceptual Drawings of Single-Level Movable-Span Configurations in the Closed and Open Positions



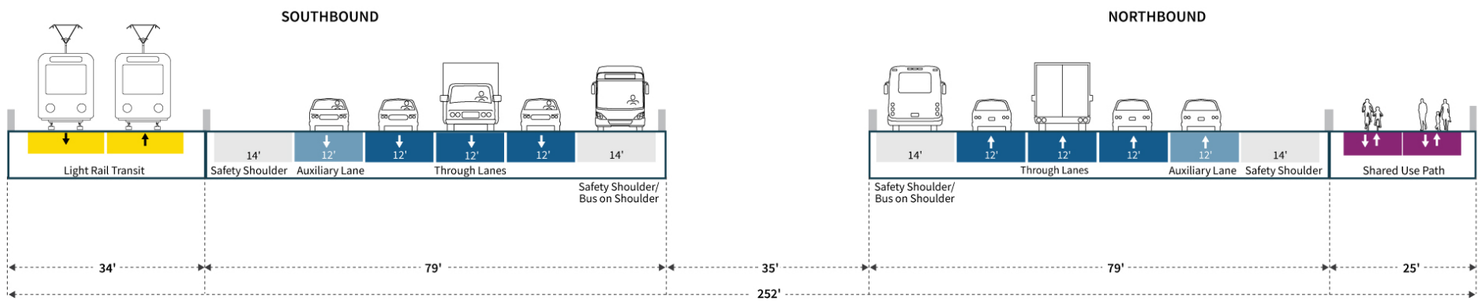
Note: Visualizations are for illustrative purposes only. They do not reflect property impacts or represent final design. Visualization is looking southeast (upstream) from Vancouver.

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

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



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



Summary of Bridge Configurations

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

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

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

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

Figure 1-21. Bridge Configuration Footprint Comparison

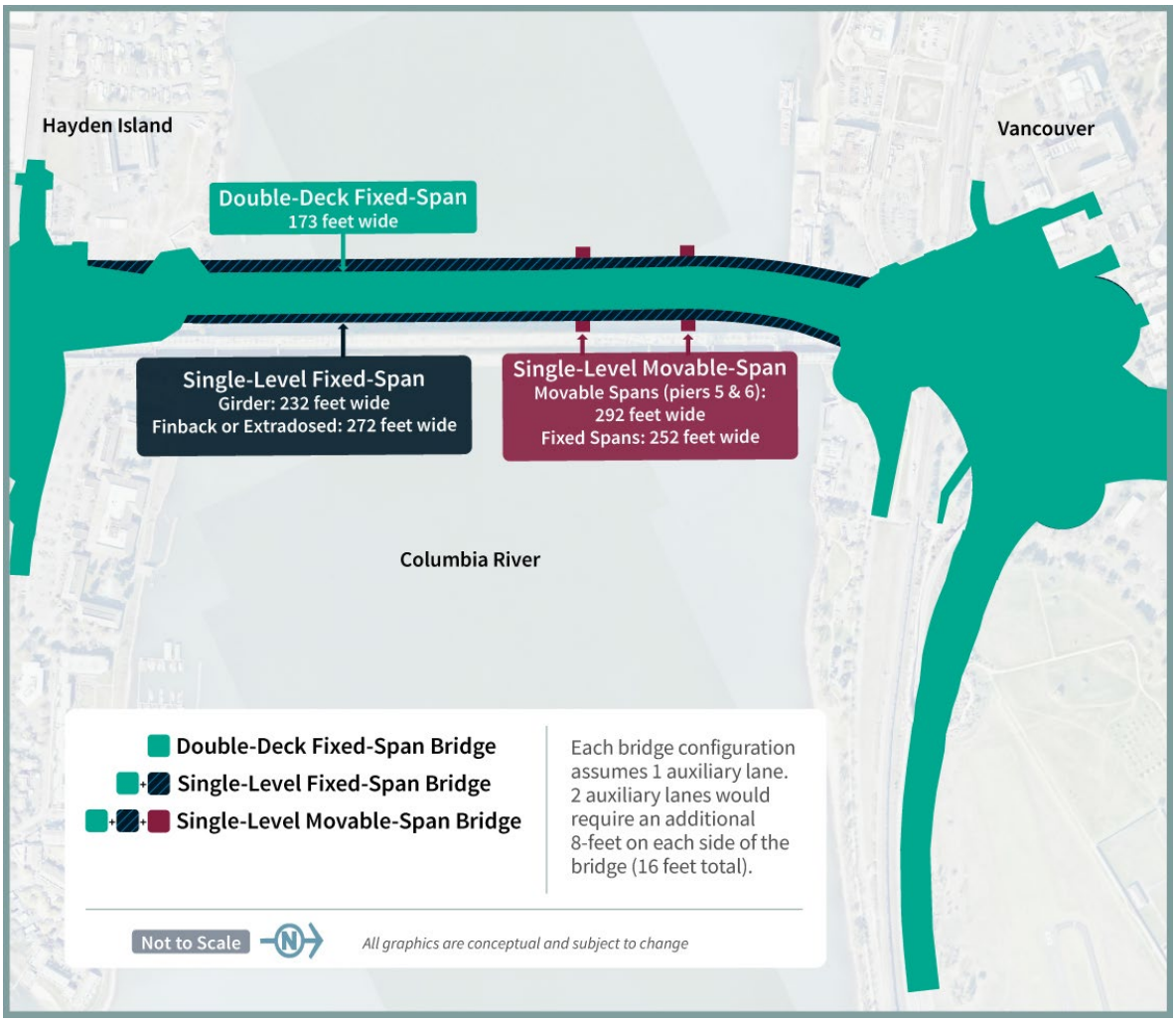


Figure 1-22. Bridge Configuration Profile Comparison

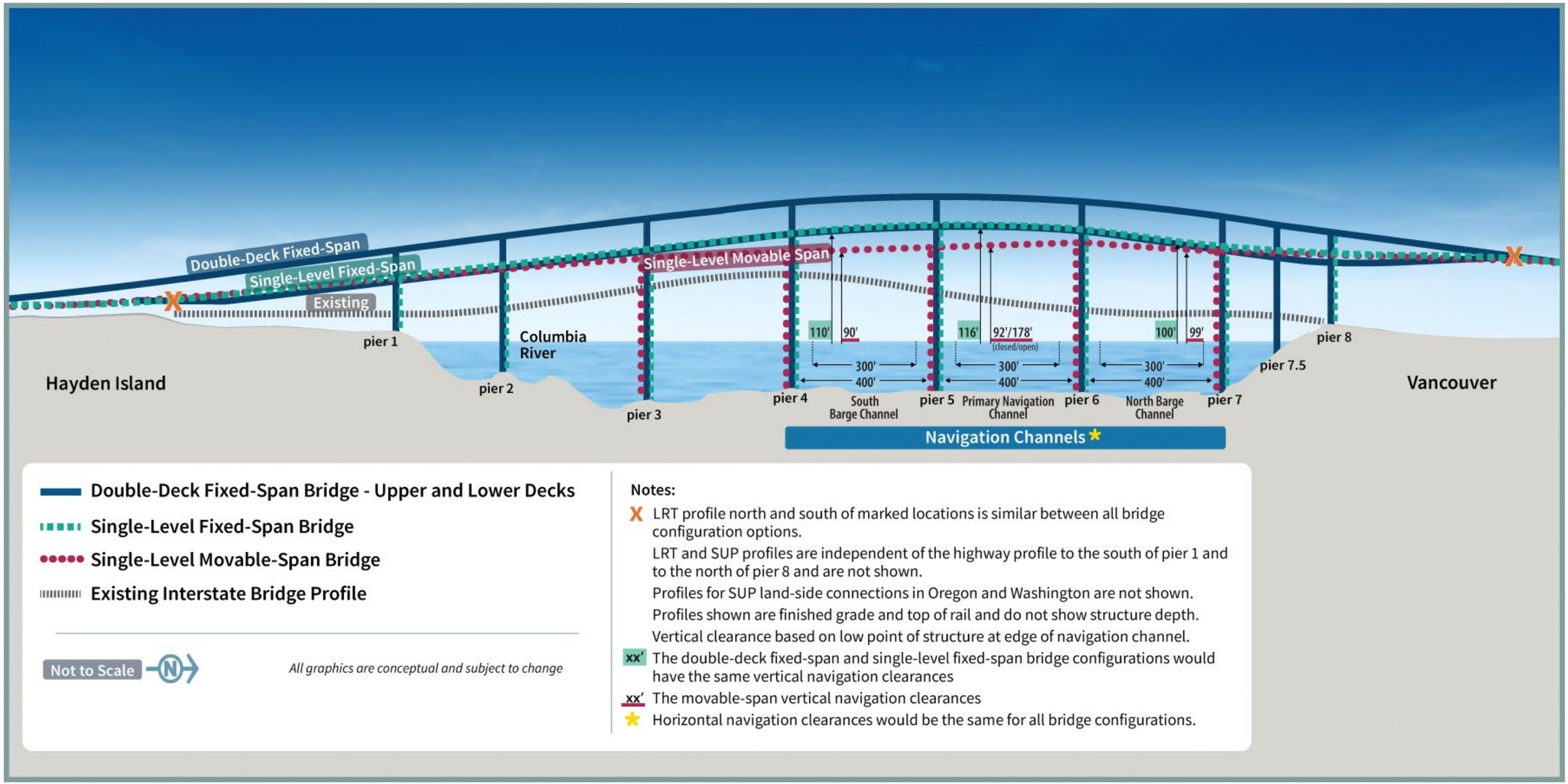


Table 1-2. Summary of Bridge Configurations

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

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration [a]	Modified LPA with Single-Level Movable-Span Configuration
Out-to-out width [d]	138 feet total width.	173 feet total width.	Girder: 232 feet total width. Extradosed/Finback: 272 feet total width.	• 292 feet at the movable span. • 252 feet at the fixed spans.
Deck widths	52 feet (SB) 52 feet (NB)	79 feet (SB) 79 feet (NB)	Girder: • 113 feet (SB) • 104 feet (NB) Extradosed/Finback: • 133 feet (SB) • 124 feet (NB)	113 feet SB fixed span. 104 feet NB fixed span.
Vertical navigation clearance	Primary navigation channel: • 39 feet when closed. • 178 feet when open. Barge channel: • 46 feet to 70 feet. Alternate barge channel: • 72 feet (maximum clearance without opening).	Primary navigation channel: • 116 feet maximum. North barge channel: • 100 feet maximum. South barge channel: • 110 feet maximum.	Primary navigation channel: • 116 feet maximum. North barge channel: • 100 feet maximum. South barge channel: • 110 feet maximum.	Primary navigation channel: • Closed position: 92 feet. • Open position: 178 feet. North barge channel: • 99 feet maximum. South barge channel: • 90 feet maximum.

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration [a]	Modified LPA with Single-Level Movable-Span Configuration
Horizontal navigation clearance	263 feet for primary navigation channel. 511 feet for barge channel. 260 feet for alternate barge channel.	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).
Maximum elevation of bridge component (NAVD 88)[e]	247 feet at top of lift tower.	166 feet.	Girder: 137 feet. Extradosed/Finback: 179 feet at top of pylons.	243 feet at top of lift tower.
Movable span length (from center of pier to center of pier)	278 feet.	N/A	N/A	450 feet.
Number of in-water pier sets	Nine	Six	Six	Six
Number of in-water drilled shafts	N/A	72	96	108
Shaft cap sizes	N/A	50 feet by 85 feet.	50 feet by 230 feet.	Piers 2, 3, 4, and 7: 50 feet by 230 feet. Piers 5 and 6: 50 feet by 312 feet (one combined footing at each location to house tower/equipment for the lift span).

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration [a]	Modified LPA with Single-Level Movable-Span Configuration
Maximum grade	5%	4% on the Washington side. 3.8% on the Oregon side.	3% on the Washington side. 3% on the Oregon side.	1.5% on the Washington side. 3% on the Oregon side.
Light-rail transit location	N/A	Below highway on SB bridge.	West of highway on SB bridge.	West of highway on SB bridge.
Express bus	Shared roadway lanes.	Inside shoulder of NB and SB (upper) bridges.	Inside shoulder of NB and SB bridges.	Inside shoulder of NB and SB bridges.
Shared-use path location	Sidewalk adjacent to roadway in both directions.	Below highway on NB bridge.	East of highway on NB bridge.	East of highway on NB bridge.

a When different bridge types are not mentioned, data applies to all bridge types under the specified bridge configuration.

b The No-Build Alternative assumes existing conditions that restrict bridge openings during weekday peak periods (Monday through Friday 6:30 a.m. to 9 a.m.; 2:30 p.m. to 6 p.m., excluding federal holidays). This analysis estimates the potential frequency for bridge openings for vessels requiring more than 99 feet of clearance.

c For the purposes of the transportation analysis (see the Transportation Technical Report), the movable-span opening time is assumed to be an average of 12 minutes.

d "Out-to-out width" is the measurement between the outside edges of the bridge across its width at the widest point.

e NAVD 88 (North American Vertical Datum of 1988) is a vertical control datum (reference point) used by federal agencies for surveying.

NB = northbound; SB = southbound; USCG = U.S. Coast Guard

1.1.4 Downtown Vancouver (Subarea C)

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

1.1.4.1 Highways, Interchanges, and Local Roadways

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

SR 14 INTERCHANGE

The new Columbia River bridges would touch down just north of the SR 14 interchange (Figure 1-23). The function of the SR 14 interchange would remain essentially the same as it is now, although the interchange would be elevated. Direct connections between I-5 and SR 14 would be rebuilt. Access to and from downtown Vancouver would be provided as it is today, but the connection points would be relocated. Downtown Vancouver I-5 access to and from the south would be at C Street as it is today, while downtown connections to and from SR 14 would be from Columbia Street at 3rd Street.

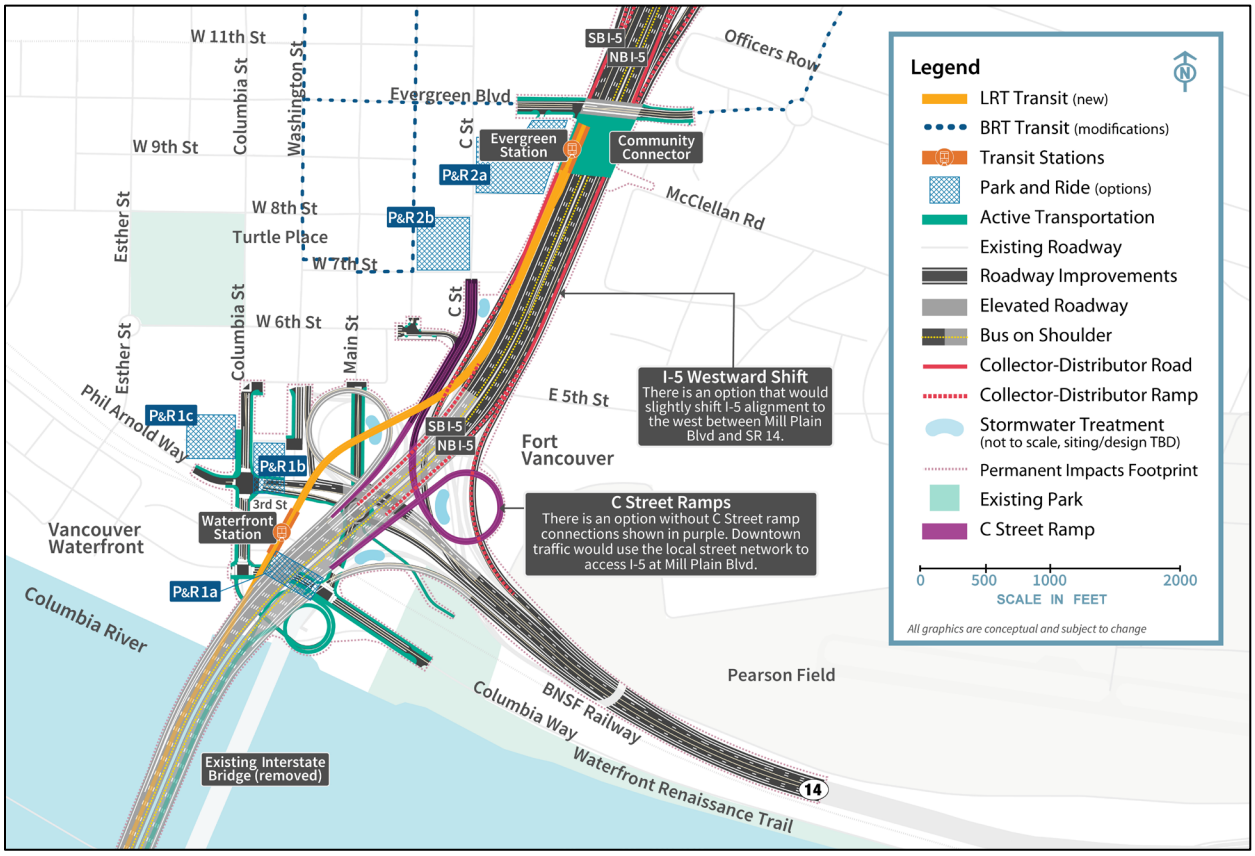
Main Street would be extended between 5th Street and Columbia Way. Vehicles traveling from downtown Vancouver to access SR 14 eastbound would use the new extension of Main Street to the roundabout underneath I-5. If coming from the west or south (waterfront) in downtown Vancouver, vehicles would use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

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

Design Option Without C Street Ramps

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

Figure 1-23. Downtown Vancouver (Subarea C)



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

Design Option to Shift I-5 Westward

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

1.1.4.2 Transit

LIGHT-RAIL ALIGNMENT AND STATIONS

Under the Modified LPA, the light-rail tracks would exit the highway bridge and be on their own bridge along the west side of the I-5 mainline after crossing the Columbia River (see Figure 1-23). The light-rail bridge would cross approximately 35 feet over the BNSF Railway tracks. An elevated light-rail station near the Vancouver waterfront (Waterfront Station) would be situated near the overcrossing of the BNSF tracks between Columbia Way and 3rd Street. Access to the elevated station would be primarily by elevator as the station is situated approximately 75 feet above existing ground level. A stairwell(s) would be provided for emergency egress. The number of elevators and stairwells provided

would be based on the ultimate platform configuration, station location relative to the BNSF trackway, projected ridership, and fire and life safety requirements. Passenger drop-off facilities would be located at ground level and would be coordinated with the C-TRAN bus service at this location. The elevated light-rail tracks would continue north, cross over the westbound SR 14 on-ramp and the C Street/6th Street on-ramp to southbound I-5, and then straddle the southbound I-5 C-D roadway. Transit components in the downtown Vancouver area are similar between the two SR 14 interchange area design options discussed above.

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

PARK AND RIDES

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

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

Waterfront Station Park-and-Ride Options

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

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

Evergreen Station Park-and-Ride Options

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

1. Library Square. This park-and-ride site would be located along the east side of C Street and south of Evergreen Boulevard. It would accommodate up to 700 parking spaces in a multilevel belowground structure according to a future agreement on City-owned property associated with Library Square. Current design concepts suggest the park and ride most likely would be a joint-use parking facility for park-and-ride users and patrons of other uses on the ground or upper levels as negotiated as part of future decisions.
2. Columbia Credit Union. This park-and-ride site is an existing multistory garage that is located below the Columbia Credit Union office tower along the west side of C Street between 7th Street and 8th Street. The existing parking structure currently serves the office tower above it and the Regal City Center across the street. This would be a joint-use parking facility, not for the exclusive use of park-and-ride users, that could serve as additional or overflow parking if the 700 required parking spaces cannot be accommodated elsewhere.

1.1.4.3 Active Transportation

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

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

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

1.1.5 Upper Vancouver (Subarea D)

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

1.1.5.1 Highways, Interchanges, and Local Roadways

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

MILL PLAIN BOULEVARD INTERCHANGE

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

FOURTH PLAIN BOULEVARD INTERCHANGE

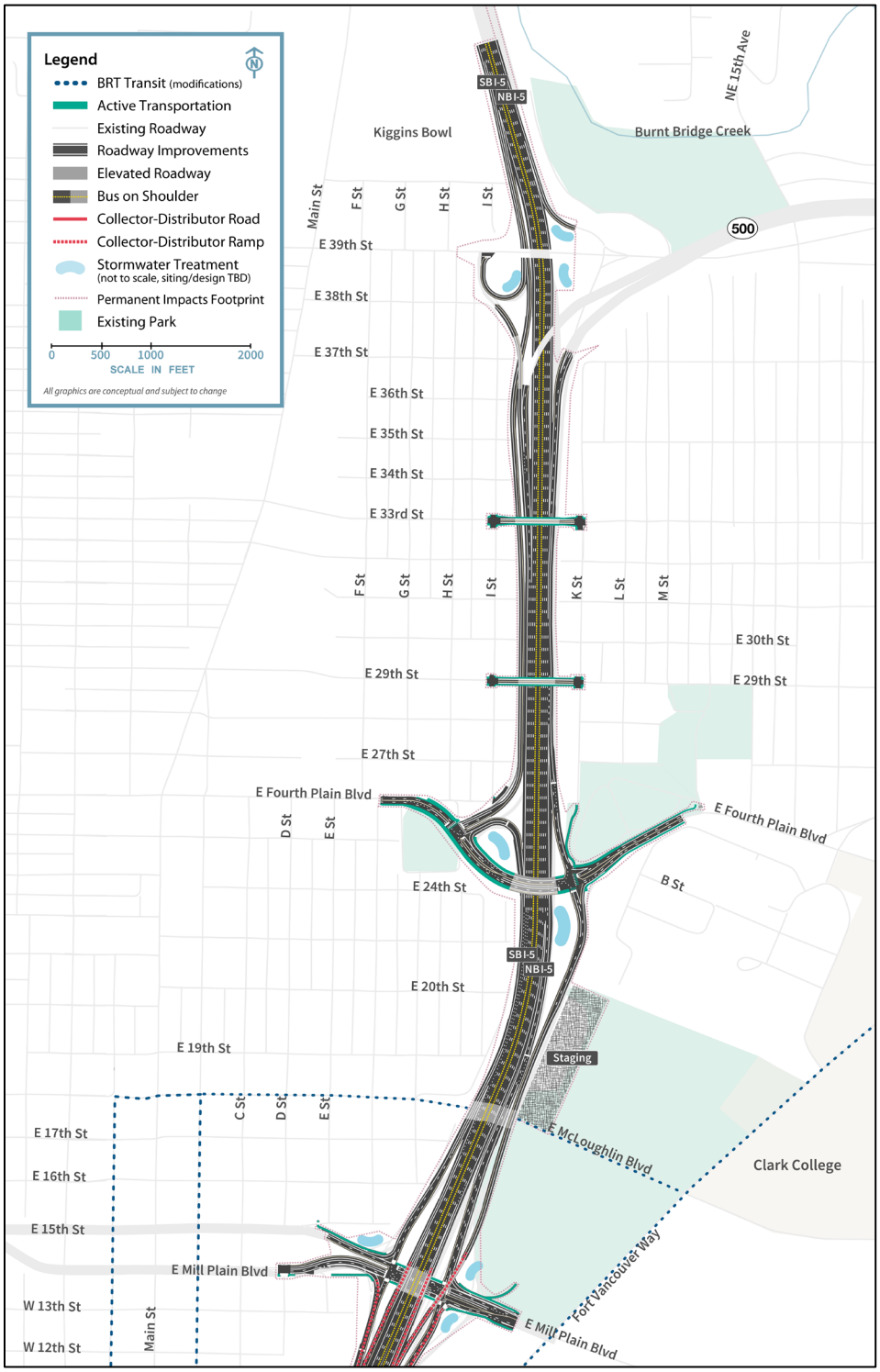
At the Fourth Plain Boulevard interchange (Figure 1-24), improvements would include reconstruction of the overpass of I-5 and the ramp terminal intersections. Northbound I-5 traffic exiting to Fourth Plain Boulevard would first exit to the northbound C-D roadway which provides off-ramp access to Fourth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

SR 500 INTERCHANGE

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

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

Figure 1-24. Upper Vancouver (Subarea D)



BRT = bus rapid transit; TBD = to be determined

1.1.5.2 Transit

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

1.1.5.3 Active Transportation

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

1.1.6 Transit Support Facilities

1.1.6.1 Ruby Junction Maintenance Facility Expansion

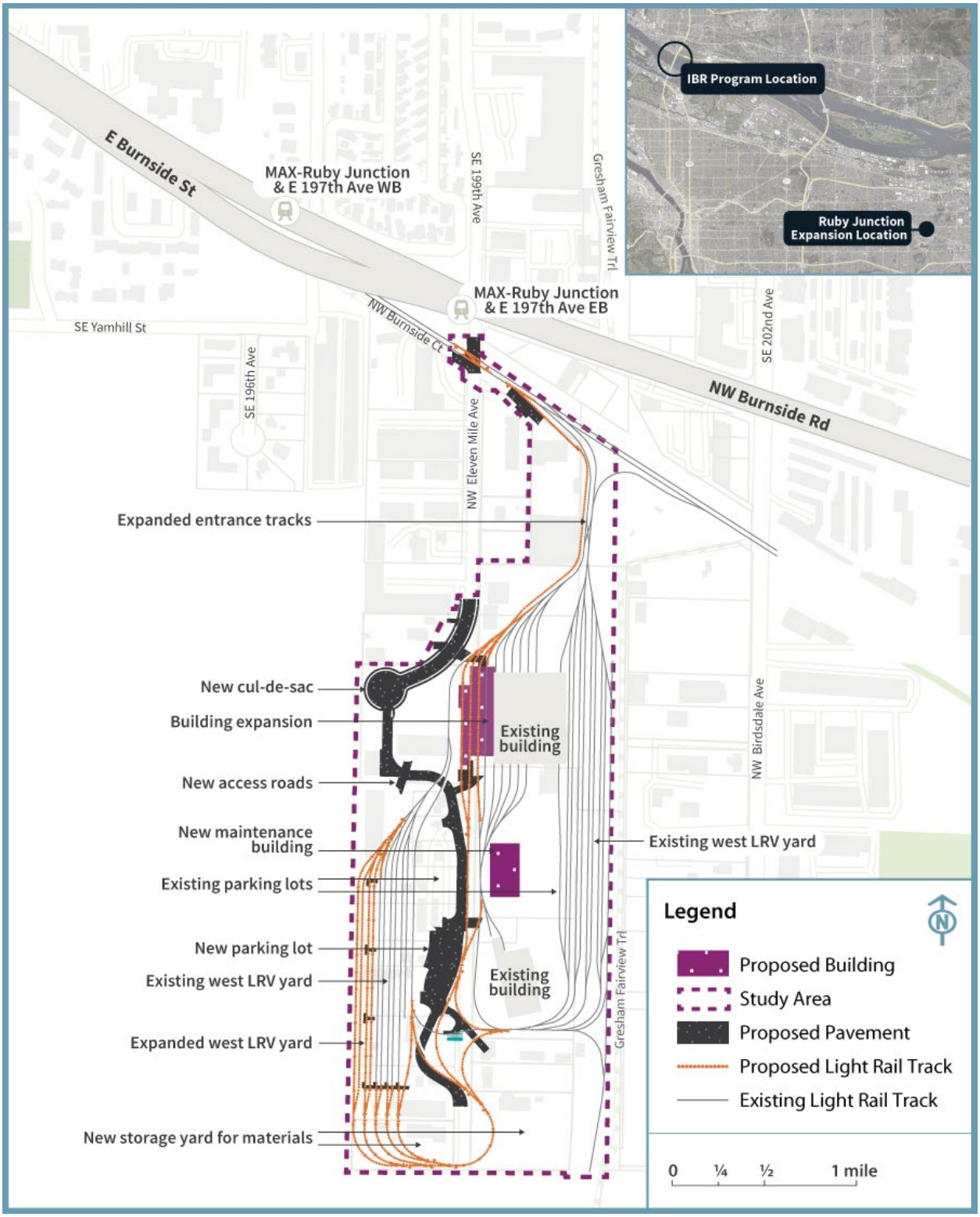
The TriMet Ruby Junction Maintenance Facility in Gresham, Oregon, would be expanded to accommodate the additional LRVs associated with the Modified LPA's LRT service (the Ruby Junction location relative to the study area is shown in Figure 1-25). Improvements would include additional storage for LRVs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

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

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

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

Figure 1-25. Ruby Junction Maintenance Facility Study Area



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

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

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

1.1.6.2 Expo Center Overnight LRV Facility

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

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

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

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

1.1.7 Transit Operating Characteristics

1.1.7.1 LRT Operations

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

before beginning service each day. A third track at this northern terminus would accommodate layovers.

1.1.7.2 Express Bus Service and Bus on Shoulder

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

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

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

C-TRAN express bus Routes 105 and 190 are currently permitted to use the existing southbound inside shoulder of I-5 from 99th Street to the Interstate Bridge in Vancouver. However, the existing shoulders are too narrow for bus-on-shoulder use in the rest of the I-5 corridor in the study area. The Modified LPA would include inside shoulders on I-5 that would be wide enough (14 feet on the Columbia River bridges and 11.5 to 12 feet elsewhere on I-5) to allow northbound and southbound buses to operate on the shoulder, except where I-5 would have to taper to match existing inside shoulder widths at the north and south ends of the corridor. Figure 1-8, Figure 1-16, Figure 1-23, and Figure 1-24 show the potential bus-on-shoulder use over the Columbia River bridges. Bus on shoulder could operate on any of the Modified LPA bridge configurations and bridge types. Additional approvals (including a continuing control agreement), in coordination with ODOT, may be needed for buses to operate on the shoulder on the Oregon portion of I-5.

After completion of the Modified LPA, two C-TRAN express bus routes operating on I-5 through the study area would be able to use bus-on-shoulder operations to bypass congestion in the general-purpose lanes. C-TRAN Route 105 would operate on the shoulder for the full length of the study area. C-TRAN Route 190 would operate on the shoulder for the full length of the corridor except for the distance required to merge into and out of the shoulder as the route exits from and to SR 500. These

two express bus routes (105 and 190) would have a combined frequency of every 3 minutes during the 2045 AM and PM peak periods. To support the increased frequency of express bus service, eight electric double-decker or articulated buses would be purchased.

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

1.1.7.3 Local Bus Route Changes

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

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

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

Bus Route	Existing Route	Changes with Modified LPA
TriMet Line 6	Connects Goose Hollow, Portland City Center, N/NE Portland, Jantzen Beach and Hayden Island. Within the study area, service currently runs between Delta Park MAX Station and Hayden Island via I-5.	Route would be revised to terminate at the Expo Center MAX Station. Route is anticipated to travel from Martin Luther King Jr. Boulevard through the newly configured Marine Drive area, then continue west to connect via facilities on the west side of I-5 with the Expo Center MAX Station.

Bus Route	Existing Route	Changes with Modified LPA
C-TRAN Fourth Plain and Mill Plain bus rapid transit (The Vine)	Runs between downtown Vancouver and the Vancouver Mall Transit Center via Fourth Plain Boulevard, with a second line along Mill Plain Boulevard. In the study area, service currently runs along Washington and Broadway Streets through downtown Vancouver.	Route would be revised to begin/end near the Evergreen Station in downtown Vancouver and provide service along Evergreen Boulevard to Fort Vancouver Way, where it would travel to or from Mill Plain Boulevard or Fourth Plain Boulevard depending on clockwise/counterclockwise operations. The Fourth Plain Boulevard route would continue to serve existing Vine stations beyond Evergreen Boulevard.
C-TRAN #2 Lincoln	Connects the 99th Street Transit Center to downtown Vancouver via Lincoln and Kaufman Avenues. Within the study area, service currently runs along Washington and Broadway Streets between 7th and 15th Streets in downtown Vancouver.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #25 St. Johns	Connects the 99th Street Transit Center to downtown Vancouver via St. Johns Boulevard and Fort Vancouver Way. Within the study area, service currently runs along Evergreen Boulevard, Jefferson Street/Kaufman Avenue, 15th Street, and Franklin Street in downtown Vancouver.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #30 Burton	Connects the Fisher's Landing Transit Center with downtown Vancouver via 164th/162nd Avenues and 18th, 25th, 28th, and 39th Streets. Within the study area, service currently runs along McLoughlin Boulevard and on Washington and Broadway Streets between 8th and 15th Streets.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #60 Delta Park Regional	Connects the Delta Park MAX station in Portland with downtown Vancouver via I-5. Within the study area, service currently runs along I-5, Mill Plain Boulevard, and Broadway Street.	Route would be discontinued.

1.1.8 Tolling

Tolling cars and trucks that would use the new Columbia River bridges is proposed as a method to help fund the bridge construction and future maintenance, as well as to encourage alternative mode choices for trips across the Columbia River. Federal and state laws set the authority to toll the I-5 crossing. The IBR Program plans to toll the I-5 river bridge under the federal tolling authorization

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

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

The analysis assumes that tolling would commence on the existing Interstate Bridge—referred to as pre-completion tolling—starting April 1, 2026. The actual date pre-completion tolling begins would depend on when construction would begin. The traffic and tolling operations on the new Columbia River bridges were assumed to commence by July 1, 2033. The actual date that traffic and tolling operations on the new bridges begin would depend on the actual construction completion date. During the construction period, the two commissions may consider toll-free travel overnight on the existing Interstate Bridge, as was analyzed in the Level 2 Toll Traffic and Revenue Study, for the hours between 11 p.m. and 5 a.m. This toll-free period could help avoid situations where users would be charged during lane or partial bridge closures where construction delays may apply. Once the new I-5 Columbia River bridges open, twenty-four-hour tolling would begin.

Tolls would be collected using an all-electronic toll collection system using transponder tag readers and license plate cameras mounted to structures over the roadway. Toll collection booths would not be required. Instead, motorists could obtain a transponder tag and set up a payment account that would automatically bill the account holder associated with the transponder each time the vehicle crossed the bridge. Customers without transponders, including out-of-area vehicles, would be tolled by a license plate recognition system that would bill the address of the owner registered to that

vehicle's license plate. The toll system would be designed to be nationally interoperable. Transponders for tolling systems elsewhere in the country could be used to collect tolls on I-5, and drivers with an account and transponder tag associated with the Interstate Bridge could use them to pay tolls in other states for which reciprocity agreements had been developed. There would be new signage, including gantries, to inform drivers of the bridge toll. These signs would be on local roads, I-5 on-ramps, and on I-5, including locations north and south of the bridges where drivers make route decisions (e.g., I-5/I-205 junction and I-5/I-84 junction).

1.1.9 Transportation System- and Demand-Management Measures

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

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

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

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

State Laws to Reduce Commute Trips

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

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

1.2 Modified LPA Construction

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

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

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

1.2.1 Construction Components and Duration

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

Portland Harbor would be restricted to minimize impacts to species listed under the Endangered Species Act and their designated critical habitat.

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

Table 1-4. Construction Activities and Estimated Duration

Component	Estimated Duration	Notes
Columbia River bridges	4 to 7 years	• Construction is likely to begin with the main river bridges. • General sequence would include initial preparation and installation of foundation piles, shaft caps, pier columns, superstructure, and deck.
North Portland Harbor bridges	4 to 10 years	• Construction duration for North Portland Harbor bridges is estimated to be similar to the duration for Hayden Island interchange construction. The existing North Portland Harbor bridge would be demolished in phases to accommodate traffic during construction of the new bridges.
Hayden Island interchange	4 to 10 years	• Interchange construction duration would not necessarily entail continuous active construction. Hayden Island work could be broken into several contracts, which could spread work over a longer duration.
Marine Drive interchange	4 to 6 years	• Construction would need to be coordinated with construction of the North Portland Harbor bridges.
SR 14 interchange	4 to 6 years	• Interchange would be partially constructed before any traffic could be transferred to the new Columbia River bridges.
Demolition of the existing Interstate Bridge	1.5 to 2 years	• Demolition of the existing Interstate Bridge could begin only after traffic is rerouted to the new Columbia River bridges.

Component	Estimated Duration	Notes
Three interchanges north of SR 14	3 to 4 years for all three	• Construction of these interchanges could be independent from each other and from construction of the Program components to the south. • More aggressive and costly staging could shorten this timeframe.
Light-rail	4 to 6 years	• The light-rail crossing would be built with the Columbia River bridges. Light-rail construction includes all of the infrastructure associated with light-rail transit (e.g., overhead catenary system, tracks, stations, park and rides).
Total construction timeline	9 to 15 years	• Funding, as well as contractor schedules, regulatory restrictions on in-water work and river navigation considerations, permits and approvals, weather, materials, and equipment, could all influence construction duration.

1.2.2 Potential Staging Sites and Casting Yards

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

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

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

A casting or staging yard could also be required for construction of the overwater bridges if a precast concrete segmental bridge design is used. A casting yard would require access to the river for barges, a slip or a dock capable of handling heavy equipment and material, a large area suitable for a concrete batch plant and associated heavy machinery and equipment, and access to a highway or railway for

delivery of materials. As with the staging sites, casting or staging yard sites may be identified as the design progresses or by the contractor and would be evaluated via a NEPA re-evaluation or supplemental NEPA document for potential environmental impacts at that time.

1.3 No-Build Alternative

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

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

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

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

In addition to population and employment growth and the implementation of local and regional plans and projects, the No-Build Alternative assumes that the existing Interstate Bridge would continue to operate as it does today. As the bridge ages, needs for repair and maintenance would potentially increase, and the bridge would continue to be at risk of mechanical failure or damage from a seismic event.

2. METHODS

This section describes the methods used to prepare this visual quality technical report to:

- Identify the study area, or AVE, and relevant laws and regulations.
- Collect data, assess impacts, and evaluate possible mitigation measures.

The methods and analysis comply with NEPA and relevant federal, state, and local laws and follow the Federal Highway Administration's (FHWA's) current (2015) Guidelines for the Visual Impact Assessment of Highway Projects.

The CRC Final Environmental Impact Statement and ROD were completed in 2011, with design refinements addressed in subsequent NEPA re-evaluations in 2012 and 2013. Since then, the following changes and new information have affected the potential impacts to visual quality:

- Updated FHWA methodology for evaluating visual quality in their Guidelines for the Visual Impact Assessment of Highway Projects (2015).
- Updated locations of some key viewpoints and landscape units (LUs) to reflect the Modified LPA.
- Changes in viewsheds, based on the location and extent of the Modified LPA.
- Changes to the design of the CRC project's LPA to develop a Modified LPA, including design options.
- Modifications in the highway and structure form, scale, and materials.

2.1 Study Area

Following FHWA's guidelines, the study area for this visual quality analysis is referred to as AVE (FHWA 2015). The AVE is the area in which visual elements of the Modified LPA would be visible, including considerations such as the presence or absence of intervening topography, vegetation, and structures. For this analysis, the AVE was identified as the foreground visual distance zone from the Modified LPA's construction limits, which includes a 5-mile segment of I-5, approximately between the SR 500 interchange in Vancouver and the I-5/Columbia Boulevard interchange in Portland, and the area where the Ruby Junction Maintenance Facility in Gresham, Oregon, would be expanded.

Figure 2-1 shows the Modified LPA's construction limits for the project within the I-5 and SR 14 corridors. The graphic shows the AVE and the distance zones. Because the Ruby Junction Maintenance Facility is located approximately 13 miles southwest of the I-5 project area, a separate figure, Figure 2-2, shows the project area, AVE, and distance zones associated with that facility. Figure 2-1 and Figure 2-2 also show the middleground and background visual distance zones from the project area.

Figure 2-1. I-5 Project Area, Area of Visual Effect, and Visual Distance Zones

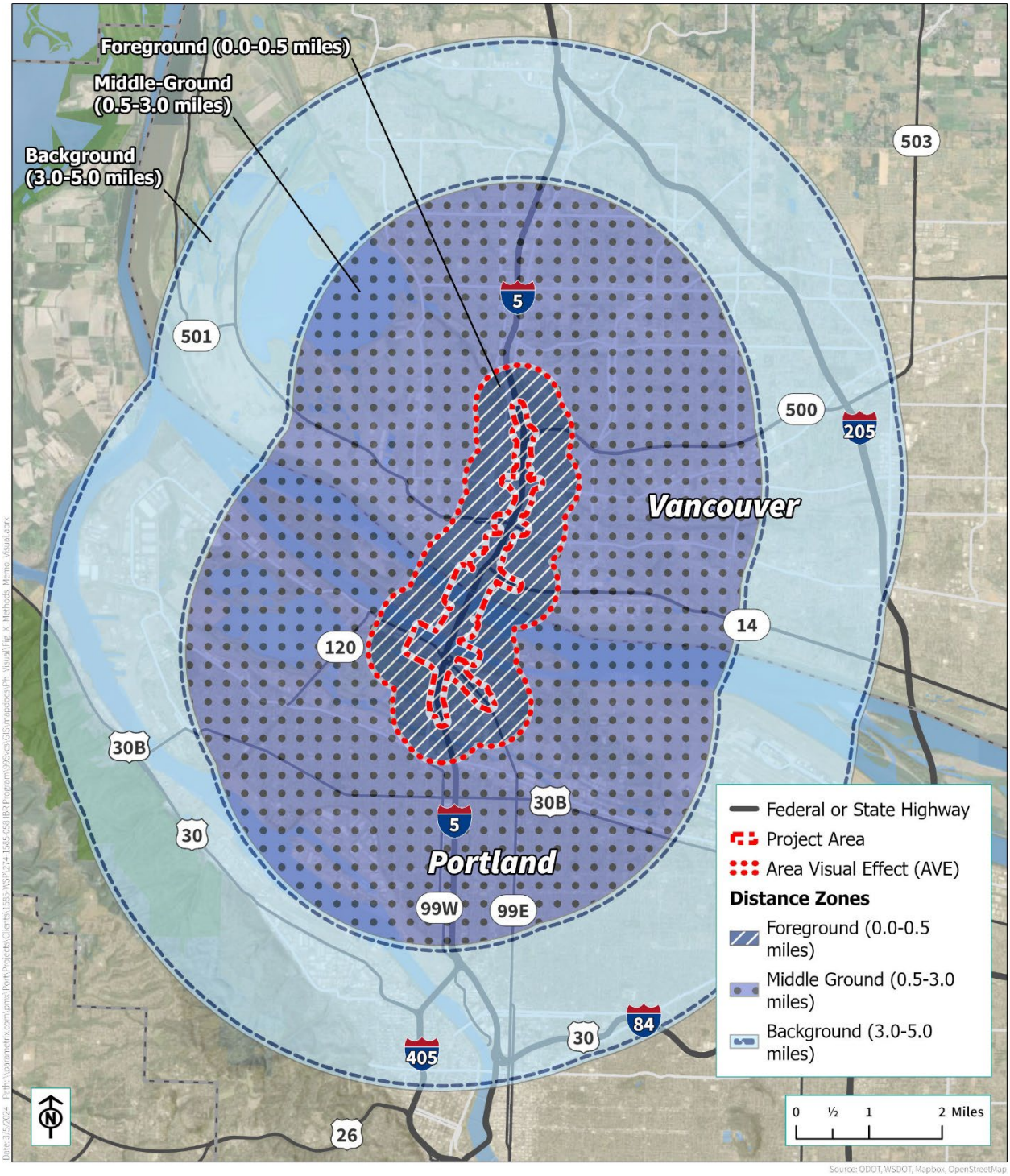
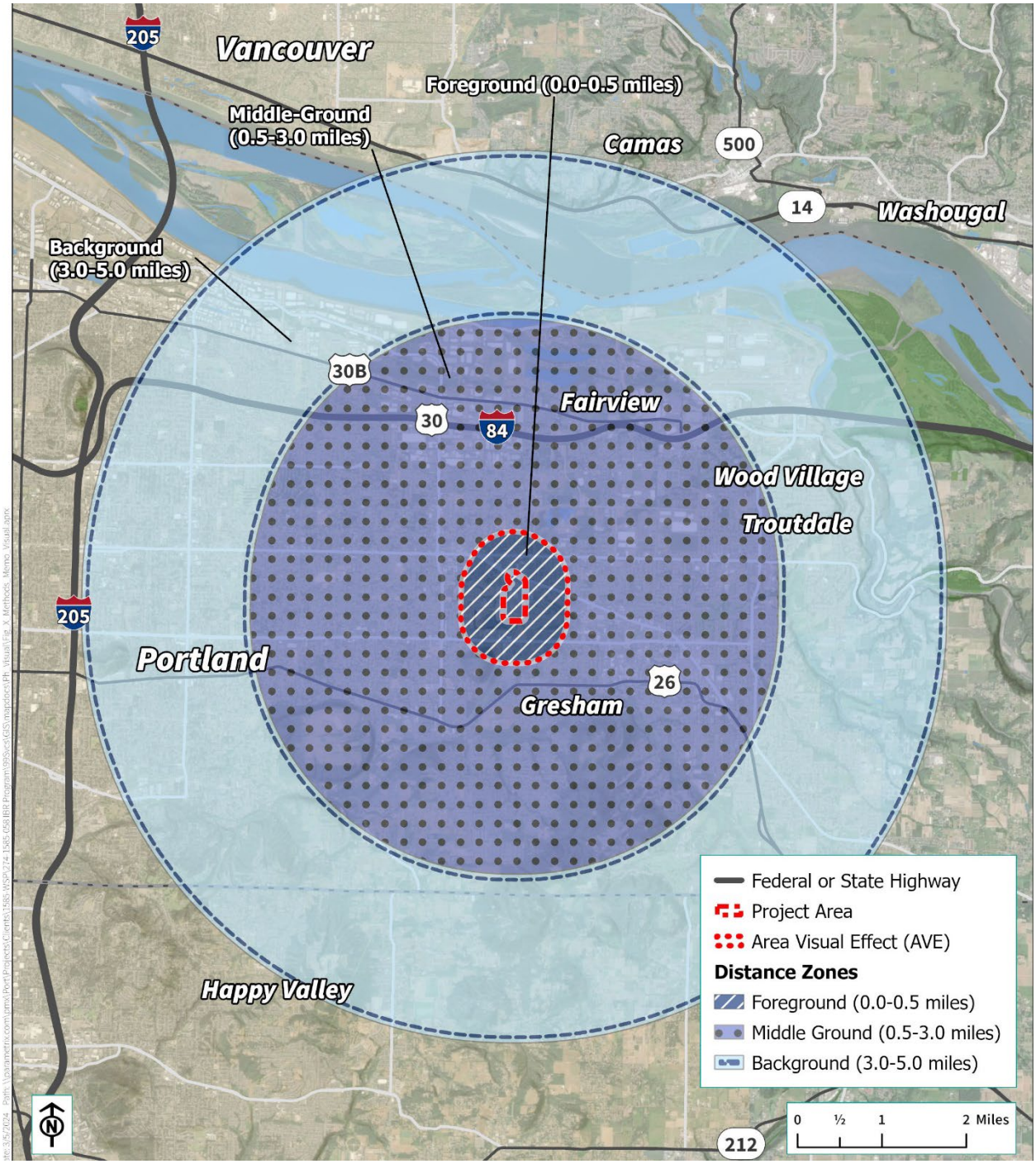


Figure 2-2. Ruby Junction Project Area, Area of Visual Effect, and Visual Distance Zones



2.2 Relevant Laws and Regulations

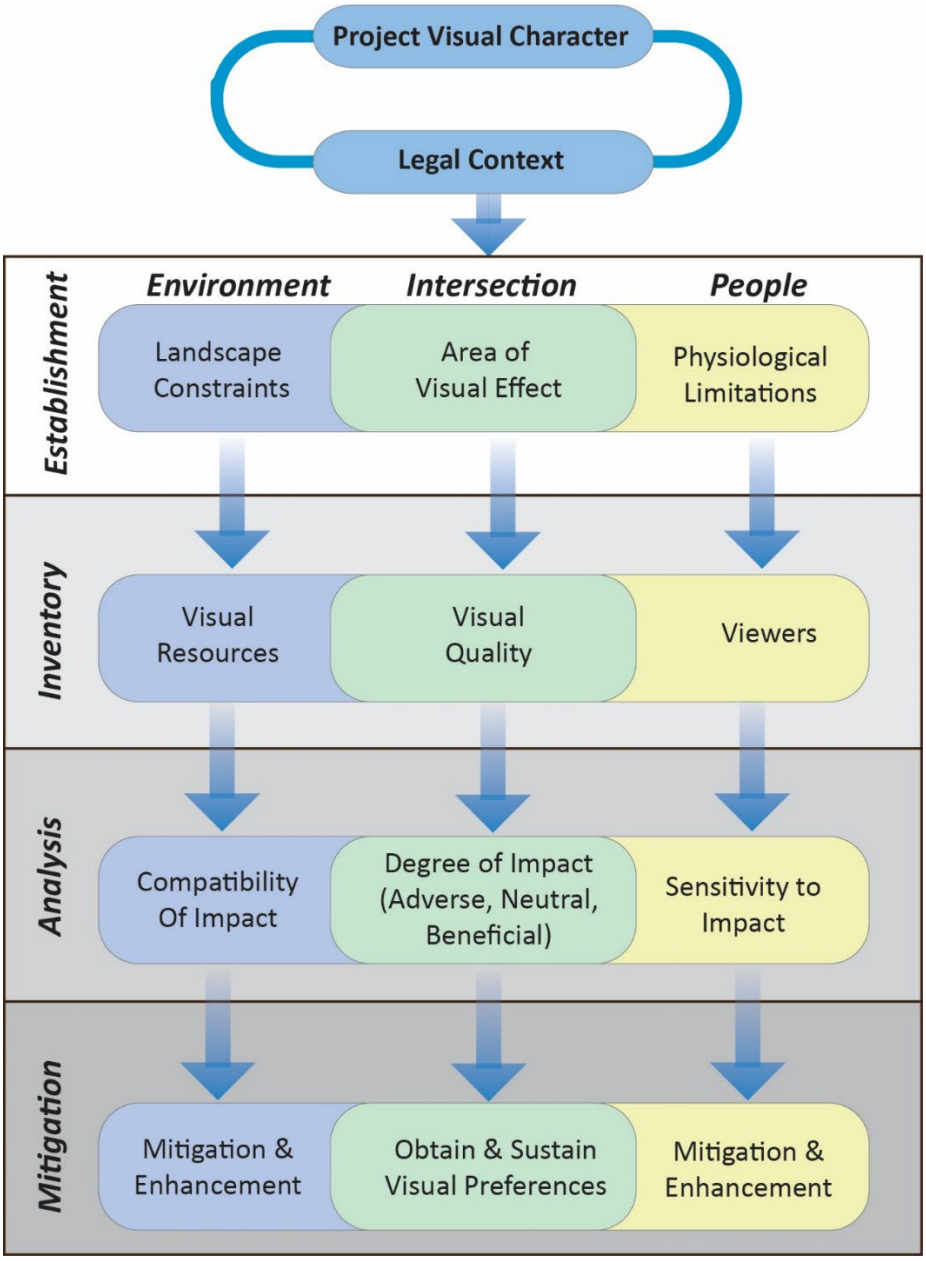
The following sections identify federal, state, regional, and local laws, regulations, plans, policies, and guidance that provide the regulatory context for the assessment of visual quality.

2.2.1 Federal

The FHWA's Guidelines for the Visual Impact Assessment of Highway Projects, referred to herein as the Visual Impact Assessment (VIA) guidelines, are a widely accepted approach to analyzing the visual impacts of transportation projects (FHWA 2015). The VIA Guidelines use the scientific concept of transactional perception. This is the idea that perception (and, therefore, visual quality) is the result of an interaction between people and the environment and can be described as a relationship between the viewer and the environment (FHWA 2015). The VIA Guidelines follow four phases, shown in Figure 2-3 and described in Sections 2.3 through 2.6: (1) establishment, (2) inventory, (3) analysis, and (4) mitigation.

The VIA Guidelines provide direction to determine the appropriate level of visual impact analysis, from no analysis for projects with no noticeable physical changes to expanded VIAs for projects with highly adverse physical impacts. Based on the VIA scoping questionnaire for the IBR Program, originally completed in 2021 and updated in 2022 (included as Appendix A to this report), the Modified LPA was identified as likely to include substantial physical changes that may have adverse visual impacts, and the appropriate level of analysis would be a standard VIA. Therefore, this technical report follows a standard VIA approach that describes project features, impacts, and recommended mitigation (see Figure 2-3); however, additional key viewpoints, simulations, and alternative project alignments associated with an expanded VIA have been included.

Figure 2-3. Visual Impact Assessment Process



Source: FHWA 2015

2.2.2 State

The following is the state regulatory context for this analysis:

- Oregon Statewide Transportation Strategy, 2013 (ODOT 2013).
- Oregon Highway Plan updates through 2015 (ODOT 2015).
- Washington Transportation Plan - Phase 2 Implementation 2017–2040, Replacing 2007–2026 long-range transportation plan, 2040 and Beyond (WSDOT 2018).

2.2.3 Regional

The following is the regional regulatory context for this analysis:

- C-TRAN 2030 Transit Development Plan, 2016 updates (C-TRAN 2016).
- Metro 2040: Regional Framework Plan Chapter 2 (Transportation) 2011 update (Oregon Metro 2011).
- Oregon Metro's Regional Transportation Plan, 2018 updates (Oregon Metro 2018).
  - Including Climate Smart Strategy plans.
- Regional Transportation Plan for Clark County, 2019 updates (SWRTC 2019).

2.2.4 Local

The following is the local regulatory context for this analysis:

- Multnomah County Comprehensive Plan, 2016 updates (Multnomah County 2016).
- City of Portland 2035 Comprehensive Plan, last amended March 2020 (City of Portland 2021).
- City of Portland Transportation System Plan, 2016 updates (City of Portland 2020).
- City of Portland Central City 2035 Concept Plan, Readopted on July 8, 2020 (City of Portland 2012a).
- Central City 2035 – N/NE Quadrant Plan, Lloyd Center 2012 updates (City of Portland 2012b).
- Portland Development Commission Interstate Corridor Urban Renewal Plan, Amended and Restated through July 27, 2011, Portland Development Commission 2011 (Portland Development Commission 2011).
- City of Portland Scenic Resources Protection Plan (City of Portland 1991).
- City of Portland, Portland City Code 33.532 Hayden Island Plan District.
- Clark County Comprehensive Growth Management Plan (2015–2035), 2016 updates (Clark County 2016).
- City of Vancouver Comprehensive Plan – 2011 updates (City of Vancouver 2011a).
- Vancouver Moves – Update to Vancouver 2004 Transportation Plan in process, completion anticipated end of 2022 (Vancouver Moves 2021).

- City of Vancouver Strategic Plan (2016–2021), 2014 updates (City of Vancouver 2018).
- City of Vancouver's Heritage Tree Program, (City of Vancouver 2011b).
- City of Vancouver Shoreline Master Program, 2017 and 2019 updates (City of Vancouver 2021).

2.3 Establishment Phase

The VIA process began with the establishment phase, which is separated into three tasks:

1. Understand the Modified LPA's visual character.
2. Determine the regulatory context.
3. Define the AVE.

The establishment phase tasks, along with those included in the inventory phase, generate the baseline conditions for this analysis, described in Chapter 3 (FHWA 2015).

2.3.1 Modified LPA Visual Character

The first task of the establishment phase built an understanding of the visual attributes and character (the massing, form, and location) of the Modified LPA's elements, which included reviewing the description, conceptual design plans and models, and discussions with the IBR Program's design team. Visual mass refers to the perceived weight or prominence of an object or element. Visual mass is not directly related to the actual physical weight of an object, but rather its visual appearance. It is determined by various factors, such as size, shape, color, texture, contrast, and placement. Objects or elements that are larger, darker, more detailed, or placed in a prominent position tend to have more visual mass and attract greater attention from the viewer. The basic nature of the highway, major structures, and other associated design elements was documented.

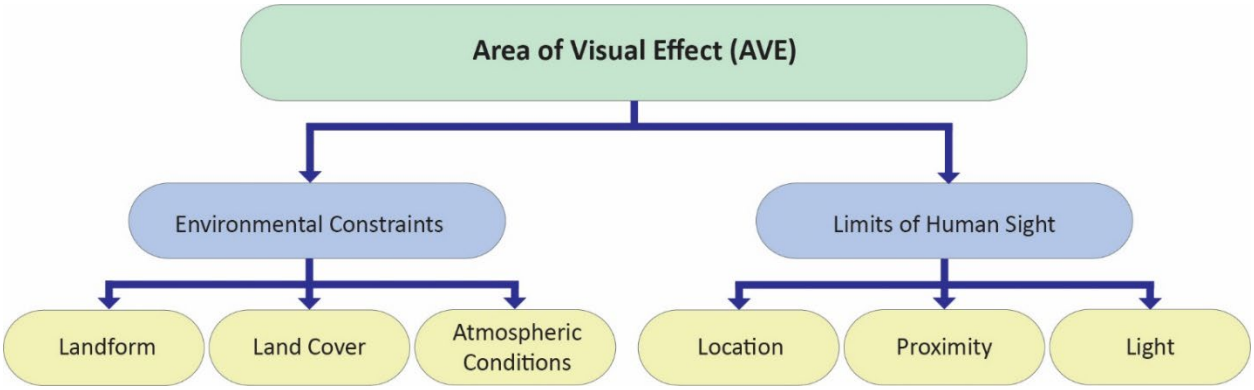
2.3.2 Determine the Regulatory Context

The second task identified and documented the federal, state, regional, and local plans, policies, and regulations related to visual resources, views, or visual quality within the AVE. These documents are described in Section 2.2, above.

2.3.3 Area of Visual Effect

The third task of the establishment phase determined the AVE, which is the area where people would be able to see elements of the Modified LPA. It was determined by the physical constraints of the environment and the physiological limits of human sight. These concepts are described below and illustrated in Figure 2-4.

Figure 2-4. Determining the Area of Visual Effect



2.3.3.1 Environmental Constraints

The AVE was identified using the environmental constraints of landform, land cover, and atmospheric conditions, which are defined in the VIA Guidelines (FHWA 2015) as follows:

- Landform: Landform refers to the physical topography of a given area, including features such as mountains, hills, valleys, and plains, and is the primary environmental physical constraint in establishing an AVE. Some landform features provide enhanced perspective for viewers, while others obscure views. Landform is the visual element least likely to change with the addition of a project.
- Land cover: Land cover refers to vegetation and human-made structures on the landform. Land cover often determines the physical constraints of the visual environment. It can either obscure views (fences, walls, and trees) or enhance them (decks or viewing platforms). Land cover is the visual element most likely to change with the development of a project.
- Atmospheric conditions: Atmospheric conditions can obscure or reduce a project's visibility. Atmospheric conditions typical of the Pacific Northwest include precipitation, low clouds, fog, filtered light, and haze (dust or smoke), all of which can obscure visual elements; however, atmospheric conditions generally affect distant objects the most.

2.3.3.2 Limits of Human Sight

What viewers can see is subject to the physiological limits of location, proximity, and light, defined in the VIA Guidelines (FHWA 2015) as follows:

- Location is defined as the topographic position selected as a key view. A key view is selected because it is either critical or representative of the visual character of the environment or the project.
- Proximity of the viewer to an object is defined using three distinct distance zones: foreground, middle ground, and background.
- Light is essential to seeing, but light is not uniform and the quantity and quality of light can substantially alter perception. The largest shift is between day and night. During the day, people see color; at night, without artificial light, they don't. The delineation of objects also

becomes blurred—during the day, fine details on separate objects are visible; and at night, those objects become a single dark mass devoid of nuance. A similar shift occurs over distance. Color and individual forms fade as distance increases and elements merge into a single impression.

2.3.3.3 Viewsheds and Distance Zones

Viewsheds are what viewers see as they interact with the physical constraints (landform, land cover, and atmospheric conditions) in the environment and the limits of human sight (FHWA 2015). There are two types of viewsheds from which viewers may experience changes to the visual environment:

1. **Static:** Static viewsheds are seen from a single viewpoint and can be observed over time. Static viewsheds typically only consider landform; however, land cover and/or atmospheric conditions frequently restrict static views. Digital mapping, aerial photographs, virtual and live field observations, and existing conditions photography are important in determining accurate static viewsheds.
2. **Dynamic:** Dynamic viewsheds are experienced as a viewer travels through a landscape. The viewshed continually changes and may depend on the direction of travel.

Distance (or proximity) also defines what a viewer can see. In general, there are three distance zones:

1. **Foreground:** Views from 0 to 0.5 miles. Changes to the visual environment are mostly discernible in this zone. Foreground views tend to be the most affected by changes in visual quality, and views are generally not limited by atmospheric conditions. Specific foreground views were identified in the establishment phase.
2. **Middleground:** Views from 0.5 to 3.0 miles. In the middleground, changes in visual details may be discernible, but most views are generally restricted by landform (hills and mountains), land cover (buildings, structures, fences, signs, and other physical objects), and existing vegetation that limits the line of sight for viewers. Some views may be available from elevated locations but may be obscured or restricted by atmospheric conditions.
3. **Background:** Views beyond 3.0 miles. Details and changes to visual quality are generally difficult to discern from this distance, and atmospheric conditions can easily affect or obscure views.

The views and distances seen are different for each viewer and specific location. Although views from the background zone are considered in this analysis, bare-earth landforms such as hills and mountains would limit most views from large portions of the background distance zone. Vegetation and land cover, such as buildings, fences, signs, and other human-made elements, would further limit views from the background distance zones. Similarly, while areas in the middleground distance zone are considered and would have views of the Modified LPA's physical features (such as a view from Hayden Island across the Columbia River to downtown Vancouver), most areas of the middleground distance zone would be limited by landform and land cover. Therefore, the AVE comprises the area within the foreground distance zone within which viewers would likely have clear views of the Modified LPA elements (i.e., bridges, ramps, etc.) and would potentially be close enough to visually distinguish material types, colors, and shapes, and architectural components such as light fixtures and signs.

2.3.4 Landscape Units

An LU is a geographic area within the AVE defined by a particular visual identity (e.g., a distinctive "outdoor room") and upon which impacts on visual character, viewers, and visual quality are assessed. Each LU has a similar visual character based on landform and land cover. The AVE was divided into LUs, each with a homogenous visual identity, based on the following visual attributes and resources:

- Existing development, including building scale and massing, development texture, and land use patterns.
- Topography (landform), vegetation, open space, and water patterns.
- Street grid patterns.
- Parks, trails, and other recreation areas.
- Areas of special visual or aesthetic character.
- Buildings, landmarks, or development clusters that are important in defining the visual character and uses of an area.

Existing geographic, ecological, social, and visual settings were described for each LU using the following data sources:

- Google and Bing maps, including street views, satellite mapping, and transportation data.
- Field visits and photography to capture existing landscape characteristics and document key views.
- Computer-aided design (CAD) and geographic information system (GIS) files and graphics and analysis produced, including plan and profile drawings of the Modified LPA (vertical and horizontal relationships) to determine location and relationship to visual resources.
- Bentley iTwin digital infrastructure open platform models were used to combine Modified LPA roadways, bridges, ramps, and other infrastructure information into a digital 3D model used to evaluate scale, form, extent, and impacts in the visual environment. Digital files from the Bentley iTwin model were also used to produce visual simulations in the Rhinoceros (Rhino) rendering program.

2.4 Inventory Phase

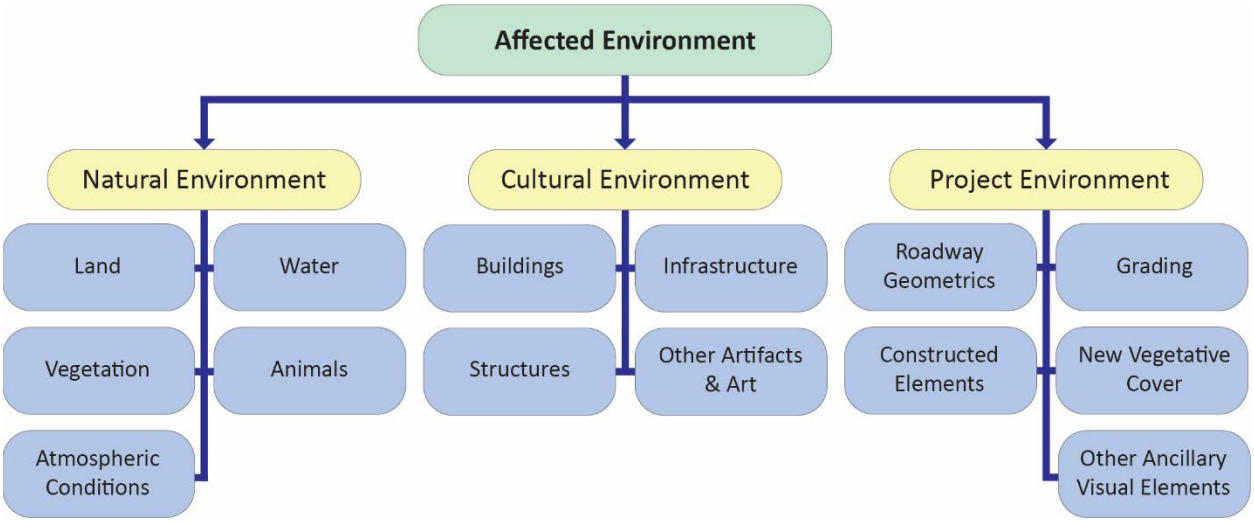
Visual quality is the relationship between viewers and their environment. The purpose of the inventory phase is to identify the existing visual character of the AVE, whose views would be affected, and what people like or dislike seeing in the AVE.

2.4.1 Baseline Conditions

As shown in Figure 2-5, data sources identified in Section 2.3.1 were used to establish the natural, cultural, and project environments. These visual environments include the following elements:

- **Natural Environment:** Land, water, vegetation, animals, and atmospheric conditions (devoid of the built environment) compose the natural environment.
- **Cultural Environment:** Buildings, infrastructure, structures, artifacts, and art determine the cultural environment.
- **Project Environment:** Constructed elements, highway geometrics, grading, vegetation, and ancillary visual elements associated with project development are included in the project environment.

Figure 2-5. Components of the Affected Environment



2.4.2 Affected Population

The affected population within the AVE was identified in the inventory phase. Generally, there are two distinct groups of viewers: neighbors (with views of the road) and travelers (with views from the road). Both travelers and neighbors are further subdivided to establish viewer preference and their sensitivity to changes in visual resources (FHWA 2015). Although each viewer has individual preferences and sensitivities, there are three basic responses to visual environments:

- **Natural Harmony:** When viewing the natural environment, viewers evaluate the natural harmony of the existing scene, determining if the composition is harmonious or inharmonious.
- **Cultural Order:** When viewing the cultural environment, viewers evaluate cultural order, determining if the composition is orderly or disorderly.
- **Project Coherence:** When viewing the project environment, viewers evaluate how the visual character of all of the elements of the project logically fit together and how the visual character of the project integrates with the visual character of the existing environment to form a complete whole. Viewers determine if the project's composition is coherent (forms a logical whole) or incoherent (does not form a logical whole).

2.4.2.1 Types of Neighbors

The AVE includes the following types of neighbors (FHWA 2015):

- **Residential:** Residential neighbors include single-family, multi-family, and other household types within the AVE. Their visual preference tends toward maintaining the existing landscape character; they generally do not prefer changes to the visual environment. Depending on the location, residential viewers prefer natural harmony and cultural order.
- **Recreational:** Recreational neighbors visit the AVE to participate in recreation and tend to be transitory. Their visual preference tends to be the status quo, and they are leery of changes that may cause adverse impacts on their activity, though they may be willing to entertain changes if they improve or enhance their recreational experience. Recreational viewers prefer natural harmony with some project coherence.
- **Institutional:** Institutional neighbors provide and receive services from a variety of institutions, such as schools and hospitals, within view of the Modified LPA. Workers and employees can be considered permanent, while visitors and those who receive services are transitory. Views toward and from the institution may be critical to the impression they desire, and they often prefer to maintain or improve visual conditions. Institutional viewers strongly prefer cultural order but may also be interested in project coherence.
- **Civic:** Civic neighbors provide or receive services from a governmental organization, such as a local, state, or federal agency or the military. Workers and employees can be considered permanent, while visitors and those who receive services are transitory. Depending on the agency's mission, views of and from the institution may or may not be desirable. If agencies have substantial public interactions, views may be important, and their visual preferences tend to be similar to those of institutional neighbors. Civic viewers strongly prefer cultural order but may also be interested in project coherence and natural harmony, depending on civic agency and Modified LPA location.
- **Retail:** Retail neighbors are merchants or shoppers that sell goods or services to the public. Merchants tend to be permanent, while shoppers are transitory, though shoppers may frequent the same location. Shoppers tend to focus on the shopping experience, with few distractions. Retail viewers' preference is for good project coherence and natural harmony.
- **Commercial:** Commercial neighbors occupy commercial property and use office buildings, warehouses, and other commercial structures. Their visual preferences vary depending on the business, but those with many visitors mimic retail customers. Commercial viewers' preferences are for cultural order and good project coherence.
- **Industrial:** Industrial neighbors mine or harvest raw materials, manufacture products, and/or transport goods and services. Workers tend to be permanent but focus primarily on their activities. Industrial areas generally have few visitors. They often require large tracts of land, but limit space and activities exposed to public view. Industrial neighbors are generally workers who prefer to be left alone unless presenting a public face, indicating that they care about their neighbors' views of their facility. Visitors have short-duration transitory views but tend to be low in number. Industrial neighbors may benefit from good cultural order, natural harmony, and project coherence, but may not depend on these attributes.

- **Agricultural:** Agricultural neighbors are farmers of crops or herd animals. They often work in fields and pastures. They may be permanent, but workers may also be transitory. They tend to be less interested in public visual attributes. Agricultural viewers' preferences are for natural harmony and cultural order.

2.4.2.2 Types of Travelers

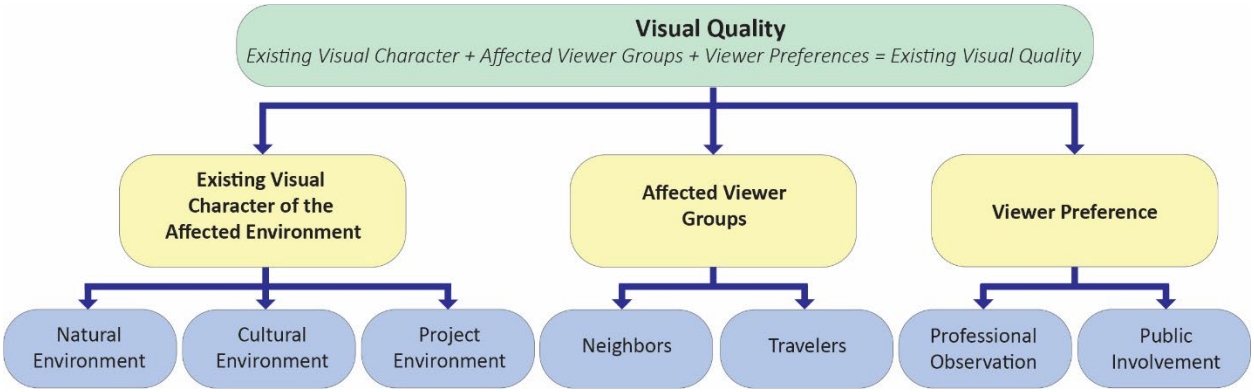
The AVE includes the following types of travelers (FHWA 2015):

- **Motoring:** Motorists travel in vehicles propelled by engines, such as cars, motorcycles, buses, and trucks of varying sizes. A variety of engine types, sizes, and fuel sources help propel travelers at higher speeds in comparison to non-engine modes. Motoring travelers also include commuting travelers on mass-transit vehicles such as buses and light-rail trains. Drivers primarily focus on activities associated with driving and prefer project coherence. Passengers are typically less engaged with driving tasks and prefer natural harmony and cultural order.
- **Bicycling:** Bicycling and bicyclists as discussed in this report include traditional bicycles, electric bicycles, electric scooters, and other non-auto wheeled and self-propelled devices that would have similar visual preferences and sensitivities. Bicycles travel through a site at a higher speed than pedestrians but much slower than motorized vehicles. Bicyclists also have a slight preference for project coherence.
- **Pedestrian:** Pedestrians use self-propelled means (walking, wheelchair, or other mobility aid) to move through a site on roadways, sidewalks, or trails. Pedestrians have a slight preference for cultural order over natural harmony and project coherence.

2.4.3 Existing Visual Quality

Finally, during the inventory phase, the existing visual quality (what visual character people like or dislike) of the AVE was determined following the approach shown in Figure 2-6. The FHWA considers visual quality to be a result of the interactive experience between viewers and their environment. Site and context analysis studies established existing baseline conditions relative to the urban public realm, including visual resources (immediate and distant), multimodal transportation access, and public open spaces both publicly and privately owned.

Figure 2-6. Components of Existing Visual Quality



Within each LU, affected views were described and documented and key views were identified to be used in the analysis (see Appendix B). The existing landscape composition was synthesized to describe the existing visual quality (considering natural harmony, cultural order, and project coherence). For each viewer group, standard viewer preferences were identified using a combination of professional observation and the viewer preference assumptions listed in the VIA Guidelines.

2.5 Analysis Phase

The purpose of the analysis phase is to assess how changes to the environment associated with the Modified LPA impact visual quality. This phase includes qualitative and quantitative assessments of the change in the degree of visual quality; how compatible those changes are and whether they are beneficial, adverse, or neutral to the viewer; and how they impact the relationship that viewers have with the visual environment. Impacts on visual quality were identified by the following:

- **Compatibility:** Compatibility is defined as the ability of the environment to absorb the Modified LPA's visual character and was considered either compatible or incompatible. Planning documents were reviewed to define scenic goals and objectives. The compatibility of the Modified LPA was assessed throughout the AVE.
- **Sensitivity:** Viewer sensitivity to impacts is defined as the ability to see and care about changes in the visual environment. Viewer sensitivity was assessed and documented to establish a baseline for analyzing visual impacts. As identified in Figure 2-7, the sensitivity of each viewer type was determined by the viewer's exposure (proximity, extent, duration); awareness (attention, focus, protection); and activity or movement (dynamic views). Generally, the closer a resource is to a viewer, the more dominant it is in the viewer's perception and the greater its importance to the viewer (FHWA 2015). Viewsheds were divided into distance zones (foreground, middleground, and background) to discuss the proximity of viewers.

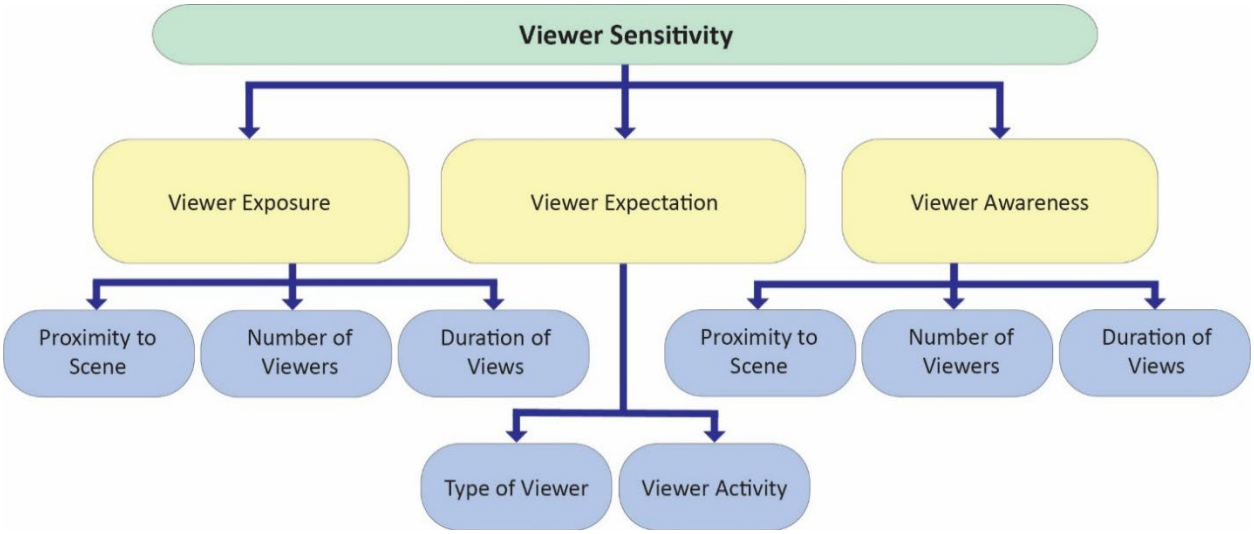
  Viewer sensitivity can also be affected by the speed of movement of the viewer. The proposed Modified LPA infrastructure is multimodal, with a variety of viewers traveling at different speeds. Movement creates dynamic views. The faster a viewer moves, the smaller the area on

which they can focus their attention, substantially reducing what they can see. In addition to viewers moving quickly in a vehicle, the slower a viewer moves, such as a pedestrian at walking speed, the speed of someone riding a bicycle, or the speed of someone rolling with the help of a device, the longer they can focus their attention on the surrounding visual environment increasing the details they are able to see. A map of the viewsheds and distance zones is provided. Viewers were categorized as either sensitive or insensitive.

- **Degree of Visual Quality Impact**: The Modified LPA's impact on visual quality was defined as beneficial, adverse, or neutral. For each LU, a narrative discussing visual quality (assessing viewer sensitivity and visual compatibility) under the Modified LPA was provided (FHWA 2015). Along with a qualitative narrative discussion, a quantitative (numeric) rating was included to assess and measure the degree of change.

The degree of impact on the resulting visual quality was evaluated based on the compatibility of the Modified LPA with the existing visual character of the cultural, natural, and project environments and viewer sensitivity. Narratives and tables document the visual quality analysis of the Modified LPA. Photographs characterize the existing visual conditions throughout the AVE. Photographic simulations have been prepared for select key viewpoints (KVPs) to illustrate visual conditions (what viewers would see) under the Modified LPA. The existing conditions photographs and photographic simulations provide before and after images for the select KVPs.

Figure 2-7. Components of Viewer Sensitivity



2.6 Mitigation Phase

The final phase of the VIA is mitigation, which identifies opportunities to reduce the overall visual quality impact. The Modified LPA was assessed for ways to maintain or enhance visual resources of the natural, cultural, or project environments or the viewer experience (FHWA 2015). The Washington State Department of Transportation's (WSDOT's) Roadside Manual and Oregon Department of Transportation's (ODOT's) Roadside Development Manual provide guidelines for vegetation and

functional restoration efforts that may lessen potentially negative visual impacts (ODOT 2020; WSDOT 2022a). Other visual impacts not addressed through these requirements may be mitigated.

The VIA Guidelines (FHWA 2015) state that mitigation may be achieved through:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Mitigation would not fully eliminate all adverse visual quality impacts identified for the Modified LPA. To arrive at a final visual quality rating, the existing visual quality, degree of visual quality impact, and a post-mitigation quantitative assessment of visual quality are provided.

3. AFFECTED ENVIRONMENT

To ensure that visual impacts and communities' reactions to the impacts are adequately addressed, existing visual resources and the existing visual context must be objectively evaluated. This chapter presents the results of the existing visual character and quality assessment of the AVE and identifies viewer groups and their visual sensitivity.

3.1 Establishment Phase

As required for the establishment phase of a VIA, this section identifies the visual character of the Modified LPA, discusses the regulatory context, and defines the AVE.

3.1.1 Visual Character of the Modified LPA

The proposed physical elements of the Modified LPA that form its visual character are described in the Description of Alternatives document.

3.1.2 Regulatory Context

For each relevant law and regulation that was identified in Section 2.2, Table 3-1 summarizes its applicability to this visual quality assessment.

Table 3-1. Summary of Federal, State, Regional, and Local Regulatory Context for Visual Quality

	Relevant Law and Regulation	Summary of Applicability to Visual Quality
Federal	Federal Highway Administration Guidelines for the Visual Impact Assessment of Highway Projects (VIA Guidelines) (FHWA 2015).	The VIA Guidelines provide direction on how to determine the appropriate level of visual analysis (from no analysis for projects with no noticeable physical changes to expanded VIAs for projects with highly adverse physical impacts) and how to determine the degree of impact to visual quality.
State	Oregon State Department of Transportation - Roadside Development Manual: Guidelines for Planning, Design, Construction, and Maintenance for Landscape, Hardscape, and Visual Resources (ODOT 2020).	This document describes roadside visual resource management requirements and guidance to balance safety, economy, ecology, aesthetics, sustainability, and compatibility with the needs of maintenance and operations. It states that the VIA methodology should follow the VIA Guidelines.
	Washington State Department of Transportation – Environmental Manual (WSDOT 2022b).	This document describes the negative and positive visual impacts associated with transportation projects and how to assess them. It states that the VIA methodology should follow either the FHWA 1988 Visual Impact Assessment for Highway Projects or the 2015 Guidelines for the Visual Impact Assessment of Highway Projects.

	Relevant Law and Regulation	Summary of Applicability to Visual Quality
Regional	Metro 2040: Regional Framework Plan Chapter 2 (Transportation) 2011 update (Oregon Metro 2011).	Goal 6: Includes minimization of light pollution.
	Regional Transportation Plan for Clark County, 2019 updates (SWRTC 2019).	No specific language is included regarding visual or aesthetic resources, but the plan includes goals of protecting and enhancing the environment and quality of life by providing access to the Mount St. Helens and Columbia River Gorge scenic areas and enabling access to the Vancouver waterfront development.
Local	Multnomah County Comprehensive Plan, 2016 updates (Multnomah County 2016).	The Natural Resources section list several goals, policies, and strategies to address visual conditions: • 5.38 Conserve scenic resources and protect their aesthetic appearances. • 5.39 Balance protection of scenic views with the flexibility of use.
	City of Portland 2035 Comprehensive Plan, 2020 updates (City of Portland 2021).	The comprehensive plan lists the Willamette and Columbia Rivers as important scenic, recreational, and transportation amenities for Portlanders. Policy 3.63 also includes the policy to use design options such as distinctive street design, motor vehicle diversion, landscaping, tree planting, scenic views, and other appropriate design options to create City Greenways. In addition, Policies 4.2 Community Identity, 4.33 Off-Site Impacts, 4.38 Light Pollution, 4.41 Scenic Resources, 4.42 Scenic Resource Protection, 4.45 Future Development, and 4.78 Access to Nature, are also relevant to visual quality.
	City of Portland Transportation System Plan, 2016 updates (City of Portland 2020).	The Transportation System Plan references the City Comprehensive Plan Policy 3.63 noted above.
	City of Portland Scenic Views, Sites and Corridors Scenic Resource Protection Plan (City of Portland 1991).	This plan consists of policy language, zoning regulations, and maps that direct and regulate actions to protect and enhance scenic resources.
	Hayden Island Plan (City of Portland 2009).	The Hayden Island Plan contains community preferences, specifically about a future replacement bridge project on I- 5 and the future light-rail alignment and station on Hayden Island.
	City of Portland, Portland City Code 33.532 Hayden Island Plan District.	This regulation aims to preserve and enhance of both the character and opportunities of Hayden Island, as well as to preserve and restore the unique and valuable natural resources of the island.

	Relevant Law and Regulation	Summary of Applicability to Visual Quality
	Portland Development Commission Interstate Corridor Urban Renewal Plan, Amended and Restated through July 27, 2011 (Portland Development Commission 2011).	Policy & Objectives section 2.6 aims to provide visual relief by preserving Portland's parks, golf courses, trails, parkways, and cemeteries. It assumes that the preservation of trees and vegetation would block and/or soften human-made elements such as buildings, parking lots, signage, lighting, etc.
	Clark County 20 Year Comprehensive Growth Management Plan (2015–2035), 2016 updates (Clark County 2016).	• This plan includes the following applicable goals and policies: • Neighborhood Character and Vitality: Infill development should occur with a visual and service character compatible with existing development. • County 20-Year Planning Policies Goal: Development in urban areas and rural centers should incorporate design standards and aesthetically visually attractive developments. • Public Access and Recreation Policies: Provide, protect, and enhance a public access system that is both physical and visual. • Views and Aesthetics Goal: Encourage development within the shoreline area that provides visual and physical linkage to the shoreline and enhances the waterfront.
	City of Vancouver Comprehensive Plan – 2011 updates (City of Vancouver 2011).	Community Development Policies, Design: Facilitate development and create standards to achieve increased visual interest.
	City of Vancouver Shoreline Master Program, 2017 and 2019 updates (City of Vancouver 2021).	Vancouver's Shoreline Management Master Program includes several goals regarding visual access to the shoreline.

FHWA = Federal Highway Administration; VIA = Visual Impact Analysis

3.1.3 Area of Visual Effect

The AVE is the area where viewers have clear views of the Modified LPA and would be close enough to visually distinguish the physiological elements (i.e., the material types, colors and shapes, and architectural components) of the Program improvements.

Bare-earth landforms, such as hills and mountains, would limit most views from large portions of the middle and background distance zones. Landform and land cover, such as vegetation, buildings, fences, signs, and other human-made elements, would further limit views. Therefore, the AVE for the Modified LPA would comprise areas within the foreground distance zone; however, background and middle ground distance zones are considered for areas within which viewers would likely have clear

views of elements of the Modified LPA (i.e., bridges, ramps, etc.). The AVE for the Modified LPA is shown in Figure 3-1.

3.1.3.1 Landscape Units

The AVE has been divided into the following six LUs (see Figure 3-1):

1. Columbia Slough
2. Columbia River
3. Vancouver Downtown
4. Greater Central Park
5. Burnt Bridge Creek
6. Ruby Junction

3.1.3.2 Key Viewpoints

Since it is not possible to assess every view within an LU, a set of KVPs were identified and used to generally define the existing visual character and visual quality. These KVPs form the basis for evaluating visual impacts. KVPs were selected because they either represent a common or typical view from within an LU or because they are a view of a defining feature of the LU, such as a notable natural feature or important structure. The locations of KVPs are numbered in Figure 3-2 with the arrow depicting the direction of the view being assessed. At least one KVP was selected for each LU to represent typical existing visual conditions and viewers. Table 3-2 provides descriptions of the KVPs, along with the viewer types that are represented and the visual preferences of the viewer types. KVP 21 and KVP 25 are both outside of the 0.5-mile foreground distance zone that defines the AVE (see Figure 3-1); however, they represent similar views within the AVE, such as from the Grand Central Retail Center and along SR 14.

Photographs of the existing conditions at each KVP were taken and are provided in the discussion of each LU. In the summer, the views of the project area in photos taken from many of the KVPs will be obstructed by leaves. To represent the highest visual impacts, these existing condition photographs were taken on a clear winter day when visibility of the project environment was at its greatest, not obstructed by leaves on trees.

Figure 3-1. Area of Visual Effect and Landscape Units

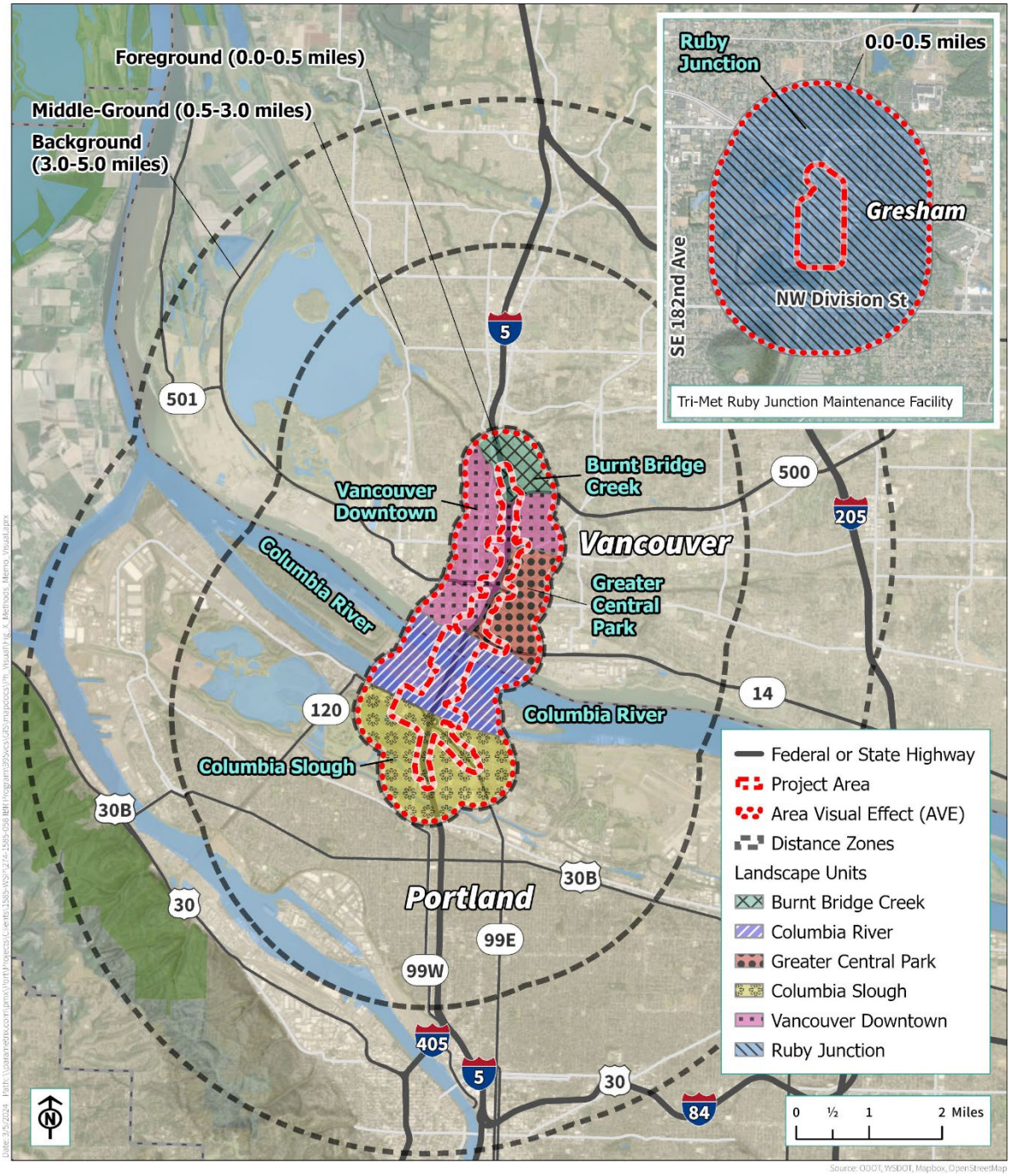


Figure 3-2. Key Viewpoints Used in the Visual Quality Analysis

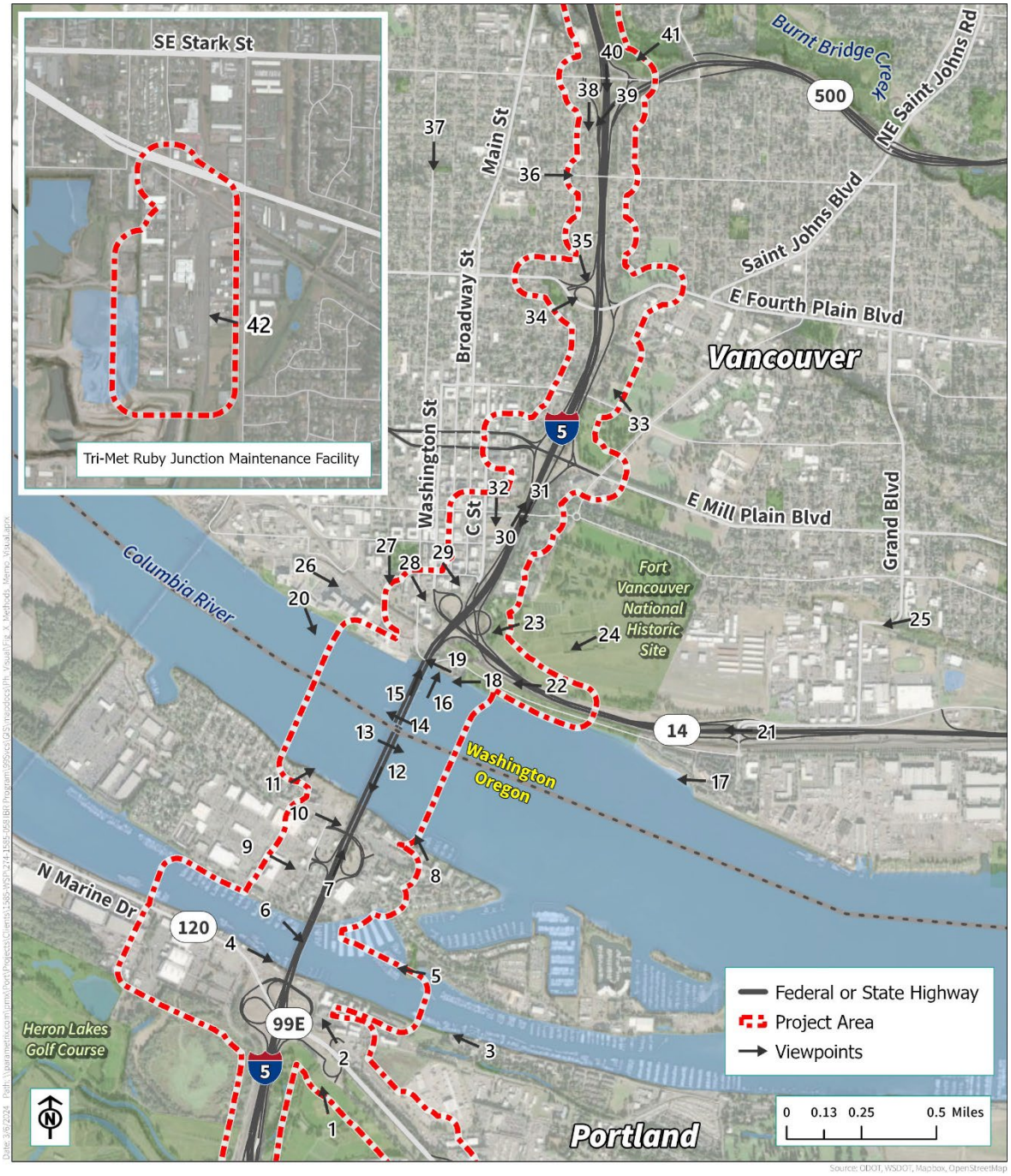


Table 3-2. Key Viewpoint Location, Viewer Type, and Visual Preference

Key View	Description	Landscape Unit	Viewer Type	Visual Preference[a]
1	From Delta Park, looking northwest	Columbia Slough	Recreational	Natural Harmony, Cultural Order
2	Marine Drive interchange from the pedestrian trail, looking northwest	Columbia Slough	Recreational	Natural Harmony, Cultural Order
3	From the Bridgeton Trail area, looking west	Columbia Slough	Residential, Recreational	Natural Harmony, Cultural Order
4	Marine Drive at Pier 99 Street, looking southeast	Columbia Slough	Motorist	Project Coherence
5	From Lotus Isle Park, looking west	Columbia River	Residential, Recreational	Natural Harmony, Cultural Order
6	From Jantzen Beach Moorage, Inc., Floating Homes, looking southeast	Columbia River	Residential	Cultural Order, Natural Harmony
7	View of commuter on I-5 at Hayden Island, looking north	Columbia River	Motorist	Project Coherence
8	Holiday Inn Portland-Columbia Riverfront, looking northwest	Columbia River	Retail, Commercial	Project Coherence, Cultural Order
9	Hayden Island interchange, looking east at Tomahawk Drive	Columbia River	Retail, Commercial	Project Coherence Cultural Order
10	Hayden Island Drive and N Center Avenue, looking east	Columbia River	Retail, Commercial	Project Coherence Cultural Order
11	N River Drive, looking northeast	Columbia River	Residential	Cultural Order, Natural Harmony
12	View of commuter on I-5, looking south	Columbia River	Motorist	Project Coherence
13	View of commuter on I-5, looking east	Columbia River	Bicycle/Pedestrian, Recreational	Natural Harmony, Cultural Order
14	View of commuter on I-5, looking west	Columbia River	Bicycle/Pedestrian, Recreational	Natural Harmony, Cultural Order
15	View of commuter on I-5, looking north	Columbia River	Motorist	Project Coherence
16	View from I-5 Bicycle/pedestrian facility, looking north	Columbia River	Bicycle/Pedestrian, Recreational	Natural Harmony, Cultural Order

Key View	Description	Landscape Unit	Viewer Type	Visual Preference[a]
17	From Ilchee Statue, looking west	Columbia River	Recreational	Natural Harmony, Cultural Order
18	Waterfront Park, looking southwest	Columbia River	Recreational	Natural Harmony, Cultural Order
19	View from the Vancouver waterfront, looking west	Columbia River	Recreational	Project Coherence Cultural Order
20	Grant Street Pier, looking southeast	Columbia River	Recreational	Natural Harmony, Cultural Order
21	SR 14 west of Grand Blvd. interchange, looking west	Greater Central Park	Motorist	Project Coherence
22	Vancouver Land Bridge overlook, looking west	Greater Central Park	Bicycle/Pedestrian, Recreational	Natural Harmony, Cultural Order
23	From the Fort Vancouver National Historic Site and Kanaka Village area, looking southwest	Greater Central Park	Recreational	Natural Harmony, Cultural Order
24	Central field within Fort Vancouver, looking southwest	Greater Central Park	Recreational	Natural Harmony, Cultural Order
25	N Grand Blvd., looking southwest	Greater Central Park	Retail, Commercial	Project Coherence Cultural Order
26	West Columbia Way, looking east	Vancouver Downtown	Retail, Commercial	Project Coherence, Cultural Order
27	Esther Street, looking south at the Vancouver Gateway area	Vancouver Downtown	Retail, Commercial	Project Coherence Cultural Order
28	On Columbia Street at Esther Short Park, looking southeast	Vancouver Downtown	Retail, Commercial	Project Coherence, Cultural Order
29	SR 14 at I-5, looking southeast	Vancouver Downtown	Motorist	Project Coherence
30	Commuter experience on the Evergreen Bridge, looking north	Vancouver Downtown	Motorist	Project Coherence
31	Motorist/pedestrian experience on the Evergreen Bridge looking south	Vancouver Downtown	Motorist / Pedestrian	Project Coherence
32	On C Street, looking south	Vancouver Downtown	Retail, Commercial	Project Coherence, Cultural Order

Key View	Description	Landscape Unit	Viewer Type	Visual Preference[a]
33	Clark College ballfields, looking northwest	Greater Central Park	Recreational	Natural Harmony, Cultural Order
34	From Arnada Park, near Fourth Plain Blvd. and I-5, looking northeast	Vancouver Downtown	Recreational	Natural Harmony, Cultural Order
35	Fourth Plain Blvd. at I-5, looking southeast	Vancouver Downtown	Motorist	Project Coherence
36	33rd Street, looking east	Vancouver Downtown	Residential	Cultural Order, Natural Harmony
37	Upper Columbia Street, distant view of the Interstate Bridge, looking south	Vancouver Downtown	Residential	Cultural Order, Natural Harmony
38	I Street and 37th Street, looking south	Vancouver Downtown	Residential	Cultural Order, Natural Harmony
39	SR 500 merge with I-5, looking southwest	Burnt Bridge Creek	Motorist	Project Coherence
40	I-5 just north of SR 500 (39th Street bridge over I-5), looking south	Burnt Bridge Creek	Motorist	Project Coherence
41	SR 500 at I-5 from Leverich Park, looking southeast	Burnt Bridge Creek	Recreational	Natural Harmony, Cultural Order
42	SE 202nd Avenue looking west toward the Ruby Junction Maintenance Facility	Ruby Junction	Industrial, Commercial, Retail, Residential, Civic	Project Coherence

Blvd. = Boulevard; I-5 = Interstate 5; LPA = Locally Preferred Alternative; SR = State Route

3.2 Inventory Phase

The purpose of the inventory phase is to identify the existing visual character of the AVE, the viewer groups present, and the existing visual quality. For each LU, the character of the natural, cultural, and project environments is described and representative photographs are provided; the affected populations (types, neighbors, and travelers) are identified; and the existing visual quality is assessed.

3.2.1 Columbia Slough Landscape Unit

The Columbia Slough LU includes the portion of the lower Columbia Slough watershed that lies between Marine Drive on the north and N Columbia Boulevard/NE Lombard Street on the south. It extends east and west of I-5 to the limits of the AVE. I-5, Martin Luther King Jr. Boulevard, Marine Drive, and other major roads bisect the LU and create physical and visual barriers. The Columbia Slough, a

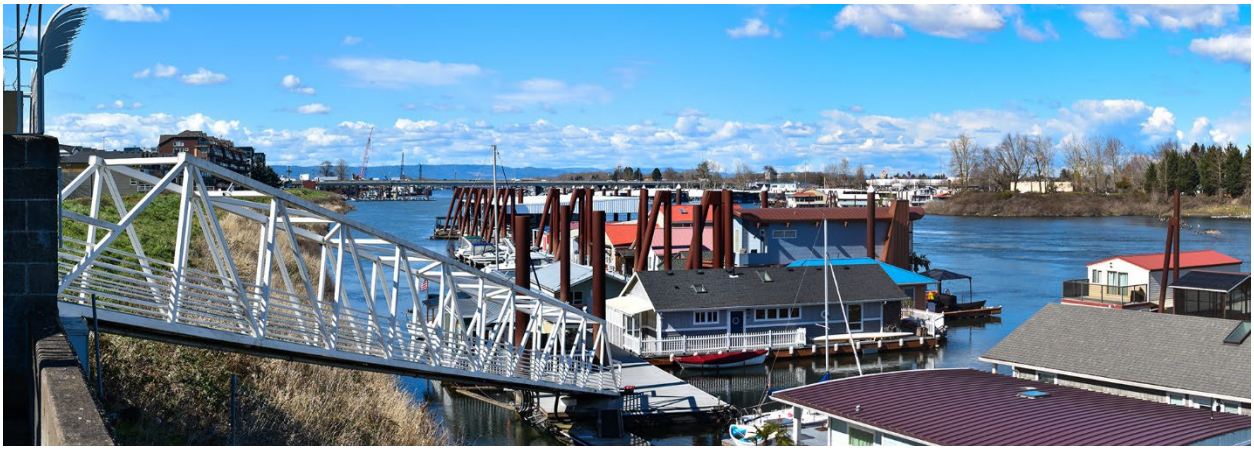
segment of which is in the southern portion of this LU, is included in the City of Portland's Scenic Views, Sites, and Corridors Scenic Resources Protection Plan as a scenic corridor (SD 11-03), and noted that the scenic character of the corridor is protected through environmental zoning regulations (City of Portland 1991). Current Environmental Zoning regulations (Portland Municipal Code 33.430.033) refer to relevant development standards of 33.480, which establishes Scenic Resource zones. The Scenic Resource zones are intended to protect Portland's significant scenic resources and enhance the appearance of Portland to make it a better place to live and work. Standards are listed to limit blank building facades, street setbacks, screening, fences and hedges, and signs and to preserve trees; however, Goal 11, Public Facilities, provides for orderly and efficient public facilities, which would include the I-5 corridor.

3.2.1.1 Visual Character

The visual character of the Columbia Slough LU is defined by views of North Portland Harbor and several sloughs (Figure 3-3 and Figure 3-4) and large wetlands; level, open fields, and recreation areas; and large tracts of open space interrupted by large parking lots and industrial, recreational, and transit developments. Development and open space both have coarse scale and texture because of the very large-footprint buildings, large parking lots, sports field complexes, and large lot sizes.

Figure 3-3. Columbia Slough – Delta Park: Northeast toward I-5 On-Ramp (KVP 1)

Figure 3-4. North Portland Harbor: West toward the Existing Interstate Bridge (KVP 3)



VISUAL CHARACTER OF THE NATURAL ENVIRONMENT

The natural environment in the Columbia Slough LU comprises the wetlands and riparian areas in the historic Vanport and Portland International Raceway areas and along the Columbia Slough. There are also trees, open lawns, and other natural elements associated with Delta Park, Heron Lakes Golf Club, and the Columbia Children's Arboretum. Trees and shrubs are sparse and tend to be in clusters or along streets. Street trees line Martin Luther King Jr. Boulevard and occur intermittently along other roads. Delta Park has large sequoias and poplars along its western boundary that dominate the visual foreground on the east side of I-5 and obscure views of the Expo Center.

North Portland Harbor has been reshaped by development, including the construction of levees decades ago along the south side of the slough. These levees are character-defining elements in the slough landscape and are on the National Register of Historic Places. Ditches or creeks and the southern shore of the Columbia Slough are lined with nearly continuous bands of trees and shrubs.

Although the slough has several unconnected segments and secondary sloughs, it is valuable wildlife habitat and is protected under a special management plan. The views are primarily inward-looking but are an important part of the recreation and aesthetic experience. The Scenic Views, Sites, and Corridors Scenic Resources Protection Plan (City of Portland 1991) identifies the entire Columbia Slough as a scenic drive (SD 11-03) and specifically lists the following scenic locations within the AVE:

1. Marine Drive, which is considered to be a scenic drive (SD 12-04), with an emphasis on views eastward to Mount Hood. There are no protection measures for the viewpoint or the scenic drive.
2. Panoramic view VP 06-01, close to the position of KVP 8. As the view is a panorama, the existing Interstate Bridge is approximately one-third of this view.

The natural environment in this LU also includes expanses of turf associated with sports fields and trees, shrubs, and vegetation associated with undeveloped areas that are stormwater-holding ponds or riparian lands, but areas around I-5, the Marine Drive, and Victory Boulevard interchanges can be dominated by pavement, ramps, and commercial, retail, and industrial visual elements. Overall, the Columbia Slough LU has a moderate degree of natural harmony.

VISUAL CHARACTER OF THE CULTURAL ENVIRONMENT

The cultural environment of this LU exhibits a large range in size, scale, and uses from large industrial development and big-box retail development to residential. Large paved parking areas are associated with the retail areas, Portland Expo Center, industrial operations, and sports complexes. Industrial, recreational, and transit developments are scattered throughout the area. Along NE Bridgeton Road there is some private development in the form of moderate-scale apartments and condominiums and moderate- to small-scale private marinas. Development and open space both have coarse scale and texture because of the very large-footprint buildings, large parking lots, sports field complexes, and large lot sizes. Electrical and non-electrical signage, storage yards, fencing, overhead utilities, and other visible infrastructure are common throughout the LU.

Some cultural elements are associated with the Delta Park/Vanport transit station, such as pedestrian amenities, signage, transit structures, and other ornamental elements. Cultural elements are also associated with the historic Vanport area, Portland International Raceway, and Portland Expo Center; however, the large range of sizes, scales, land uses, and land cover give the LU a low degree of cultural order.

VISUAL CHARACTER OF THE PROJECT ENVIRONMENT

I-5 consists of three lanes in each direction, the existing North Portland Harbor bridge over the Columbia Slough, an interchange at Victory Boulevard and Martin Luther King Jr. Boulevard/Marine Drive, and medians, with a posted speed limit of 50 miles per hour (mph). Traffic conditions can be very heavy with bumper-to-bumper conditions, particularly during morning and evening rush hours and bridge lifts. Vehicular movement is common, and human-made materials, lights, bright colors, and reflective surfaces are abundant. The I-5 corridor includes light-rail tracks west of southbound lanes with a station near the Expo Center off-ramps.

Travelers include commuters in vehicles and on transit buses on I-5 and on the existing MAX light-rail lines directly west of I-5. Existing MAX light-rail stations and parking facilities are located at Delta Park and the Expo Center. These areas are characterized by large parking areas, rail lines, transit structures (i.e., overhead canopies), signage, and overhead utilities.

This area is heavily crisscrossed and partitioned by roads. I-5 separates the less-developed land on the east side from the developed areas on the west. Martin Luther King Jr. Boulevard roughly separates the sporting uses from the light industry. Major roads and streets in this area generally curve to follow lot boundaries. Unpaved and small roads crisscross the interiors of parks and wetlands.

Despite the height of the raised I-5 roadway, the highway facility is only intermittently visible from the east side (Figure 3-5) due to buildings, walls, and tree canopies. Views from the west side of I-5 include the I-5 berm and roadway. Views outward from I-5 are dominated, obscured, or blocked by power lines, loading cranes, highway and commercial signage, and highway structures (ramps, overpasses). A traveler could see rooftops and bands of trees, see glimpses of Delta Park to the east, Mount St. Helens, and the slough and tall stacks of shipping containers in the railroad storage yard to the west. The network of I-5, ramps, Marine Drive and Victory Boulevard interchanges, light-rail, local roads, and regional roadways that converge in the Columbia Slough LU gives the overall project environment a low degree of project coherence.

Figure 3-6 provides additional photographs of the Columbia Slough LU showing the existing natural, cultural, and project environments.

Figure 3-5. Columbia Slough: Northeast toward the Marine Drive Interchange (KVP 4)

Figure 3-6. Representative Photographs of the Columbia Slough Landscape Unit

Natural Environment

Photo 1: Typical view of natural elements associated with Delta Park (see KVP 1)

Photo 2: Typical view of wetlands west of I-5 (Vanport area)

Cultural Environment

Photo 3: Typical view of large parking areas and open lots

Photo 4: View of historic marker for Vanport area

Project Environment

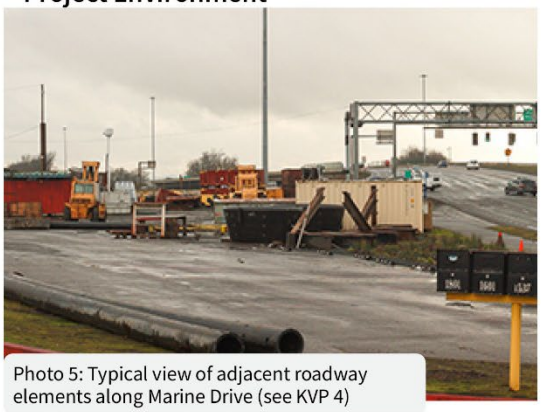


Photo 5: Typical view of adjacent roadway elements along Marine Drive (see KVP 4)

Photo 6: Typical view of adjacent transit center with I-5 signage in the background

Photos were taken in March and June 2022

3.2.1.2 Viewer Groups and Visual Quality

Recreational neighbors, such as park users, cyclists, and pedestrians on the non-motorized trails, have short-duration views but expect to see park-like, open landscapes. The Columbia Slough and the openness of large sports fields on the east side of I-5 and wetlands on the west side give viewers on I-5 natural visual elements in the Columbia Slough LU. Recreational neighbors typically perceive a high degree of natural harmony.

Commercial, retail, and industrial neighbors have views of a mix of land uses, developed and undeveloped areas, freeway interchanges, large parking lots, storage, and other visual elements associated with these areas. The result is a visual environment that lacks natural harmony and a low degree of cultural order for these viewers.

Traveler viewers in this area are a diverse mix of motorists and transit users on I-5, Marine Drive, and Martin Luther King Jr. Boulevard. No pedestrian facilities are provided with I-5 in this area. Drivers are focused on traffic conditions, and there are limited views outward from the highway corridor. Passengers, or other travelers, are more likely than drivers to observe the surrounding visual character of the interstate highway corridor. In contrast with the natural and cultural environments, traffic conditions along I-5 and the extent of project environment elements in this LU create a low degree of project coherence.

3.2.2 Columbia River Landscape Unit

The Columbia River LU includes North Portland Harbor, Hayden Island, and the Columbia River and its shoreline and recreational areas. It contains several destination points, including the Jantzen Beach Center and other retail centers, Waterfront Park, Waterfront Renaissance Trail, the Grant Street Pier in Washington, and Lotus Isle Park in Oregon. Nearness to and views of the Columbia River are the primary attractions for the hotels, parks, and trails. The Columbia River is also included in the City of Portland's Scenic Views, Sites, and Corridors Scenic Resources Protection Plan as a scenic corridor (SD 02-01). Similar to the Columbia Slough, the scenic character of the Columbia River corridor is protected through environmental zoning regulations (City of Portland 1991) and Scenic Resource Zones. Similar to the Columbia Slough LU, standards for scenic resources, such as tree preservation, maximum height of structures, and lighting are listed in the Plan; however, public facilities are allowed in Goal 11 in the plan.

3.2.2.1 Visual Character

The landform of the Columbia River LU is generally flat, and the Columbia River creates an open-view corridor to the east toward Mount Hood (Figure 3-7) and west to the Tualatin Hills. The overall character of the Columbia River LU is defined by the near-continuous development along, and use of, the Columbia River, which includes the existing Interstate Bridge and North Portland Harbor.

Figure 3-7. Columbia River: From the Existing Northbound Interstate Bridge looking east toward Mount Hood (KVP 13)

VISUAL CHARACTER OF THE NATURAL ENVIRONMENT

The Columbia River is a scenic resource, particularly to the east of the existing Interstate Bridge, where vegetation lines much of the northern shore (Portland Bureau of Planning 1989). The natural environment in the Columbia River LU is primarily composed of the river and riparian and ornamental vegetation along its banks; natural elements in the residential areas include ornamental trees, shrubs, and lawns. The river channel is broad and flanked by short, steep bluffs and flat beaches. Hayden Island is nearly level and is separated from the Oregon mainland by North Portland Harbor.

Open space consists of expanses of open water, shorelines, parks, and two small landscaped areas within ODOT right of way on both sides of I-5 between N Hayden Island Drive and N Tomahawk Island Drive. West of the railroad tracks, Hayden Island includes 826 acres of bottomland hardwood forest, wetlands, and meadows. Lotus Isle Park includes some cultural elements but primarily offers natural visual elements.

The Columbia River provides a strong sense of natural character and a high level of natural harmony; however, it is offset somewhat by the forms, materials, textures, and scale of visual elements associated with the retail and commercial areas on Hayden Island that have few natural visual elements and lack natural harmony. Overall, the LU provides a moderate to high level of natural harmony.

VISUAL CHARACTER OF THE CULTURAL ENVIRONMENT

The Columbia River LU also consists of large retail and commercial developments and residential areas on Hayden Island. Development along the Columbia River is water-oriented with an emphasis on access to and views of the river. Human-made structures are generally one or two stories but also include residential, commercial, and industrial structures up to four stories high. Continuous development along the North Portland Harbor and Columbia River shorelines consists of:

- Moderate-scale, low-rise hotels, and restaurants.
- Floating homes, apartments, manufactured homes, and condominiums.
- Small to moderate-scale private marinas, primarily in North Portland Harbor.

Heavy and light industries are located on both sides of the Columbia River. Hayden Island contains a large commercial/retail area (Jantzen Beach Center; Figure 3-8), as well as industrial and other large-

scale, low-rise, retail box buildings, which are surrounded by large, paved parking lots, storage yards, and marinas. The texture of this area is a mix of very fine (residential and marinas) and coarse scales (large-footprint buildings and large lot sizes). Near I-5, development is coarse (large commercial buildings).

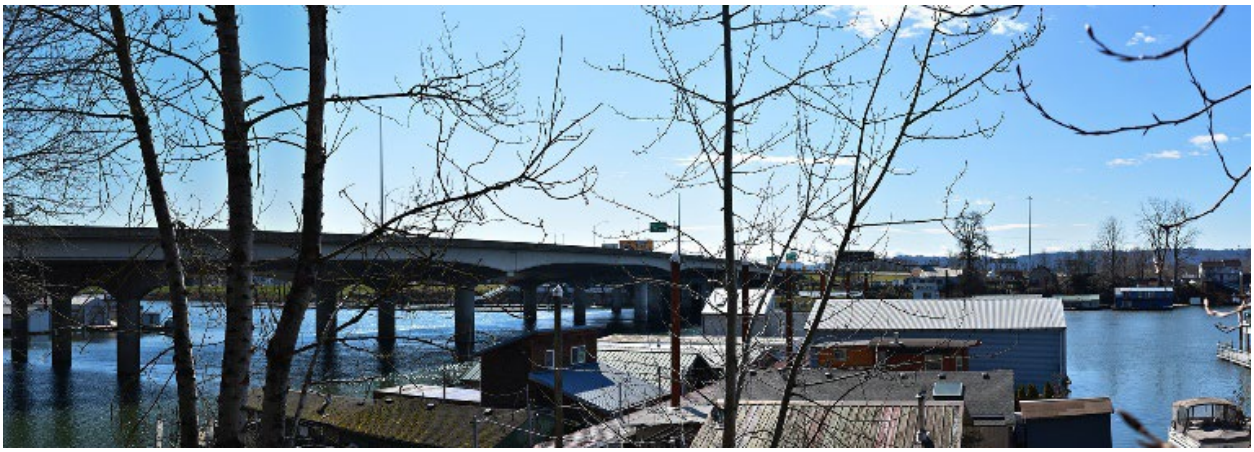
Figure 3-8. Hayden Island: Looking East from the Commercial/Retail Area (KVP 9)

Residential development is found primarily in the northwestern and eastern portions of Hayden Island. The residences in the northwestern portion are manufactured homes. In the eastern portion, there are single- and multi-family dwellings, along with houseboats on the Columbia River and North Portland Harbor.

Views from North Portland Harbor contain many structures such as docks, marinas, and the North Portland Harbor bridge across the slough (Figure 3-9 and Figure 3-10). From the interior of Hayden Island and the I-5 mainline, the views consist of floating homes, marina roofs, low- to mid-rise buildings, heavy industrial developments along the southern shoreline (including cranes extending above horizon lines), or the dense group of tall masts and dock piles in the marinas. Overall, the cultural environment does not have an easily definable character and has a low level of cultural order.

Figure 3-9. North Portland Harbor: Looking West toward the North Portland Harbor Bridge (KVP 5)

Figure 3-10. North Portland Harbor: Looking Southeast toward the North Portland Harbor Bridge (KVP 6)



VISUAL CHARACTER OF THE PROJECT ENVIRONMENT

I-5 consists of the existing Interstate Bridge over the main channel of the Columbia River, the northbound and southbound bridge over the North Portland Harbor channel, and an interchange on Hayden Island. In this LU, I-5 has three lanes in each direction and medians, with a posted speed limit of 50 mph. Traffic conditions can be very heavy, with bumper-to-bumper conditions during morning and evening rush hours and complete stops during bridge lifts. Vehicular movement is common, and human-made materials, lights, bright colors, and reflective surfaces are abundant.

The existing Interstate Bridge includes narrow, shared bicycle and pedestrian facilities on the east and west sides that link to local and regional sidewalks and trails (KVP 16). The existing shared bicycle and pedestrian facilities are only separated from vehicles traveling at freeway speeds by concrete dividers between bridge columns; there are no pedestrian amenities such as benches or overlooks on the existing Interstate Bridge. Shared-use path connections north and south of the existing Interstate Bridge are characterized by vacant and infrequently maintained areas and do not include lighting.

The area under the existing Interstate Bridge on Hayden Island (the south side) is characterized by roadways with no formal pedestrian facilities, security fencing with and without barbed wire, unmaintained vegetation, storage areas, and garbage that often collects along fence lines. The only formal east/west pedestrian access on Hayden Island, other than along Jantzen Street on the far south edge of the island, is the tunnel under I-5 south of the ODOT permit facility.

The Waterfront Renaissance Trail offers a good bicycle and pedestrian connection under the existing Interstate Bridge on the north side of the Columbia River; however, the connection to the bicycle and pedestrian facilities on the bridge is not continuous, and users are required to cross SE Columbia Way at an unmarked crossing. Ornamental railing, separated sidewalks, and site amenities (benches, pedestrian lighting, and art features) characterize the trail; however, it is very close to the river, and the bottom of the bridge is just over 14 feet from SE Columbia Way. While the area underneath the bridge on the north side includes a regional trail connection in close proximity to the water, the low clearance, large bridge landings (north of SE Columbia Street) and overhead bridge structures can make the area under the bridges feel like a visual barrier for bicyclists and pedestrians, as well as

motorists along SE Columbia Street. Additionally, heavy shadows and poor lighting can make the area feel oppressive and dark due to the large bridge landing and overhead bridge structures and poor lighting.

The existing Interstate Bridge dominates views; the eastern bridge carrying northbound I-5 traffic is listed in the National Register of Historic Places and has been an iconic landmark in this LU for decades. The existing Interstate Bridge can be seen from most points along the Columbia River within the AVE and many viewpoints with some elevation (Figure 3-11 through Figure 3-20). The industrial character of the towers and the complexity of the trusses are not coherent with the sinuous lines of the river channel or the hill and mountain profiles on the horizon.

From I-5, the views are dominated by highway structures and signage and, nearer the river, by the Interstate Bridge (Figure 3-15 and Figure 3-20).

Figure 3-11. Hayden Island: Looking North toward the Existing Interstate Bridge (KVP 7)

Figure 3-12. Hayden Island: Looking Northwest at the Existing Interstate Bridge and Vancouver (KVP 8)

Figure 3-13. Hayden Island: Looking Northeast toward the Existing Interstate Bridge (KVP 11)

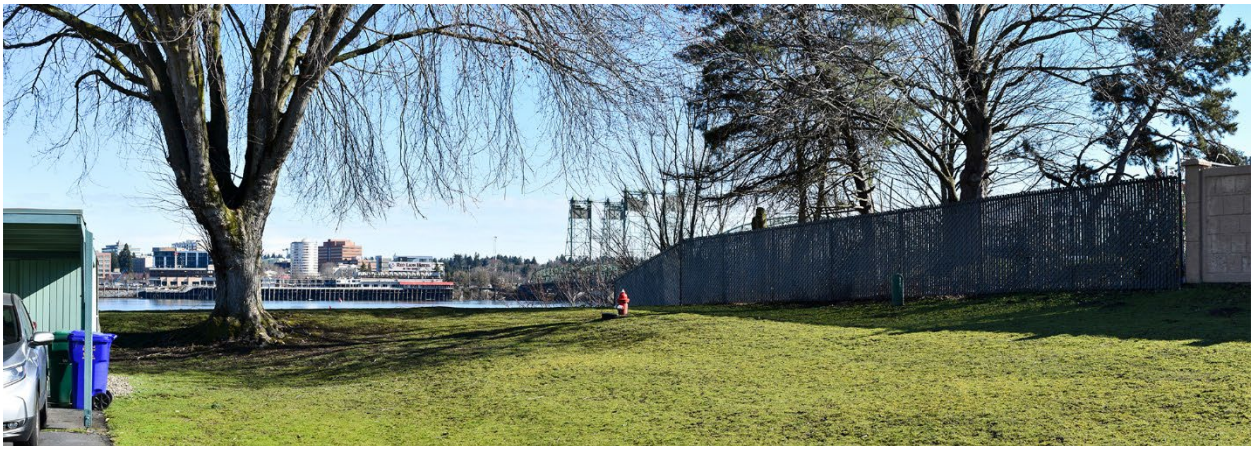


Figure 3-14. Columbia River: Looking North toward Vancouver, Washington (KVP 15)

Figure 3-15 through Figure 3-20 provide additional photographs of the Columbia River LU showing the existing natural, cultural, and project environments.

Figure 3-15. Existing Interstate Bridge Pedestrian Facilities (KVP 16)

Figure 3-16. Columbia River – From the Ilchee Statue: West toward the Existing Interstate Bridge – (KVP 17)

Figure 3-17. Vancouver Waterfront Park: Looking West at the Existing Interstate Bridge (KVP 18)

Figure 3-18. Columbia River: Looking toward the Existing Interstate Bridge from Vancouver Waterfront Park

Figure 3-19. Vancouver Waterfront: Looking Southeast toward the Existing Interstate Bridge and Oregon Shoreline (KVP 20)

Figure 3-20. Representative Photographs of the Columbia River Landscape Unit

Natural Environment

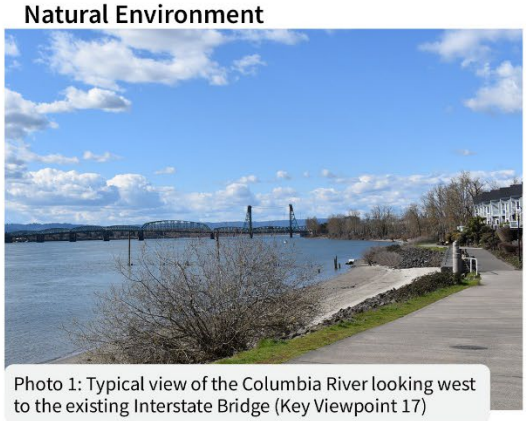


Photo 1: Typical view of the Columbia River looking west to the existing Interstate Bridge (Key Viewpoint 17)

Photo 2: Photo of the existing Interstate Bridge over the Columbia River from Hayden Island

Cultural Environment

Photo 3: View of floating homes in North Portland Harbor (see Key Viewpoint 5)

Photo 4: View of the Hayden Island retail area

Project Environment

Photo 5: Typical view from the existing southbound Interstate Bridge (see Key Viewpoint 12)

Photo 6: Typical view of I-5 from Hayden Island (see Key Viewpoint 7)

Photos were taken in March and June 2022

3.2.2.2 Viewer Groups and Visual Quality

Viewers in the Columbia River LU include commercial, retail, and industrial neighbors working and visiting areas on Hayden Island. Following FHWA's guidance, retail neighbors typically prefer cultural order and natural harmony, while commercial and industrial neighbors have a preference for project coherence (FHWA 2015). Retail viewers see the limited vegetation, uses, and scale of the retail, commercial, and industrial land use along the shoreline as not compatible with the natural and scenic elements of the Columbia River. However, views of the Columbia River and distant hills and mountains provide an overall moderate degree of natural harmony.

Neighbors in this LU also include residents, who prefer natural harmony and cultural order. Residential viewers are present in several residential developments on Hayden Island and floating homes on North Portland Harbor. Residential neighbors have long-range views of the broad Columbia River, which can be iconic. Views of I-5 and industrial development are incongruous with adjacent residential uses, but most residential areas have mature vegetation that limits views. These residential areas have moderate natural harmony. Similarly, for residential neighbors, the dominance of I-5, the existing Interstate Bridge structures, large buildings, parking lots, storage yards, car lots, fencing, and other human-made elements reduce the perceived degree of cultural order.

Recreational neighbors in this LU include boaters on the Columbia River, park users, and trail users. The Columbia River, Lotus Isle Park, and some small-scale private recreation areas provide some recreational and cultural amenities. These viewers are likely to have higher expectations for a visually pleasing experience. Recreational viewers perceive the development in this LU as decreasing their experience of natural harmony. Recreational viewers prefer some project coherence and perceive views of the existing Interstate Bridge in this LU to be memorable because of the dominant natural character of the river, water, and distant hills and mountains (Figure 3-20).

Travelers in this area are a diverse mix of motorists, bicyclists, and pedestrians on the Interstate Bridge and side streets. Narrow widths and proximity to traffic make the visual environment unsettling for pedestrian users on the existing Interstate Bridge. Under both the north and south sides of the existing Interstate Bridge, the low height of the overhead bridge structures and inadequate lighting make visual access through the area to the other side difficult. The length and limited lighting of the pedestrian access ways on Hayden Island can also make them visually incongruous to many pedestrian users.

Passengers, including commuters on transit buses, or other travelers who have the time to enjoy the views and can observe their surroundings are likely to expect to see scenic, pleasant landscapes. These viewers are typically focused on driving or navigation. Long-range views of the broad Columbia River are very memorable and are enjoyed by travelers; however, extensive bridge structures (trusses), heavy traffic, narrow lanes, periodic bridge lifts, and on- and off-ramps of I-5, as well as elements along the shipping channels, create a low degree of project coherence.

3.2.3 Vancouver Downtown Landscape Unit

The Vancouver Downtown LU is bounded by the limits of the AVE on the west, the Columbia River on the south, and the Burnt Bridge Creek valley on the north. The Vancouver Downtown LU is bounded

on the east by the east side of the I-5 corridor, including I-5 lanes and ramps. (By contrast, the Greater Central Park LU does not include any portions of I-5.)

The landform is primarily a south-trending slope that starts on the southern bank of Burnt Bridge Creek and ends at the northern bank of the Columbia River. A portion of the LU lies east of I-5, north of the Greater Central Park LU, but it has a similar visual character to the residential areas west of I-5.

3.2.3.1 Visual Character

The Vancouver Downtown LU is primarily developed residential, commercial, and retail areas (including single- and multi-family homes, mixed-use buildings, and an urban commercial and business core) on the plateau and plains north of the Columbia River. It consists of some of Vancouver's older neighborhoods, including Lincoln, Carter Park, Shumway, Hough, Arnada, and Esther Short on the west side of I-5, and Rose Village on the east side of I-5. The Rose Village neighborhood also includes the Fort Vancouver Historic Cemetery, immediately east of I-5. The Vancouver Downtown LU also includes the new Vancouver Waterfront development north of Vancouver Waterfront Park and south of the railroad tracks paralleling the Columbia River. The overall visual character of the Vancouver Downtown LU is of finely textured urban form such as small-scale buildings, streets that are generally two lanes, small landscape areas, and low-level night lighting of residential areas.

VISUAL CHARACTER OF THE NATURAL ENVIRONMENT

Natural visual elements are primarily associated with urban landscaping (such as street trees of mixed ages), residential landscaping, and ornamental landscaping associated with public parks, schools, and business and commercial areas. Vegetation includes native conifer trees planted both within WSDOT rights of way and in surrounding areas. Water and riparian vegetation are generally not visible from areas north of the BNSF railroad tracks between the downtown Vancouver and waterfront areas. The City of Vancouver has a formally landscaped gateway entrance at the intersection of I-5 and E 15th Street and the 6th Street entrance. Esther Short and Waterfront Parks are community parks in the revitalization area of downtown Vancouver. These parks are the site of many festivals, concerts, and the Vancouver Farmers Market. Ornamental trees, shrubs, and lawns are ubiquitous in residential areas. Overall, the Vancouver Downtown LU has a moderate level of natural harmony.

VISUAL CHARACTER OF THE CULTURAL ENVIRONMENT

The cultural environment consists of residential housing of all types and ages, mixed-use buildings, recreation centers, schools, and a downtown business and commercial core. Development is continuous throughout this LU, primarily of moderate density. There are some areas of higher density and taller structures, particularly in the Esther Short and Waterfront areas, where six-plus story buildings are common. While there is a range of residential scales and densities, the residential areas have a fine texture overall because of the generally small-scale street grid and the small to moderate scale of building footprints and lot sizes. Residential neighborhoods are located within an organized network of streets, and the cultural environment has a high degree of order.

The texture of the business and commercial core areas is medium because the development is larger, with sizable lots for parks, apartment and condominium complexes, and wider streets (see Figure 3-21

and Figure 3-22). The Upper Vancouver business district (Main Street between McLoughlin and Fourth Plain Boulevards) includes mixed uses and many small businesses. Commercial uses have clustered along Main Street, Broadway, and portions of McLoughlin Boulevard. The downtown commercial area also includes developments and buildings significant to the entire area, such as City Hall, the County Public Service Center, the State Patrol Crime Laboratory, the Federal Building, a train station, and government offices.

Figure 3-21. Vancouver: Southeast at Evergreen Boulevard (KVP 32)

Figure 3-22. Vancouver: East from 17th Street and C Street

Photos were taken in March 2022

The street system is a north-south and east-west oriented grid that is broken occasionally by large lots and where Main Street runs obliquely through North Vancouver. The grid allows long views up and down the street corridors and contributes to the sense of overall cohesion. Streets range in size from narrow two-lane residential streets to wider boulevards downtown (Figure 3-21). Figure 3-22 shows a typical street corridor with overhead lights, transmission lines, signage, and traffic control structures. Because of the continuity of the street trees and the presence of mature park vegetation, the overhead appurtenances are not obvious.

Much of the area in the Vancouver Downtown LU, including areas north of Mill Plain Boulevard west of I-5 and north of Fourth Plain Boulevard east of I-5, consists of single-family residential land use. Residential areas include neighborhoods with properties directly adjacent to the I-5 corridor, such as Esther Short, Arnada, Shumway, Lincoln, and Rose Village. Commercial and retail areas are present in this LU, especially along main roads such as Main Street, Fourth Plain Boulevard, 39th Street, and others, but this residential area is primarily characterized by two-lane roads, one- or two-story residential homes, landscaped yards, and large, mature conifer and deciduous trees.

Small neighborhood parks and schools are common and provide natural visual elements. Long views are generally blocked by existing vegetation and land cover, but some longer views are available and may include the existing Interstate Bridge and lift towers (see Figure 3-23 and Figure 3-24). Some areas and neighborhoods have distinctive signage, painted road murals, and other cultural elements that make them unique. Overhead utilities, street lights, and other infrastructure elements are common.

Figure 3-23. Vancouver: South from Columbia Street and 6th toward the Interstate Bridge Lift Towers (KVP 28)

Figure 3-24. Vancouver: South from Columbia Street and 33rd Street toward the Interstate Bridge Lift Towers (KVP 37)

There are many historic or older buildings and homes throughout the Vancouver Downtown LU that contribute to a distinctive residential urban character. Vancouver has identified buildings of concern that may have historic resource status and would be sensitive to visual impacts (City of Vancouver 2021). Table 3-3 presents buildings identified as "Key Buildings" in the City of Vancouver's Heritage Overlay, Vancouver Municipal Code 20.510.

Table 3-3. List of "Key Buildings" Identified in City of Vancouver Heritage Overlay

Building	Location
C.C. Dept Store	101 E 8th Street
Pearlman Building	705 Main Street
Chronis Building	617 Main Street
605–607 Main Street	605–607 Main Street
Heritage Building	601 Main Street
Vancouver National Bank	801 Main Street
Schofield Building	600 Main Street
Donegan Building	614 Main Street
Cady Building	109 W 7th Street

In addition to the Key Buildings identified in the Vancouver Municipal Code, there are numerous historic structures listed on the National Register of Historic Places, the Washington State Heritage Register, and the Clark County Heritage Register. Historic buildings are discussed in detail in the IBR Program's Historic Built Environment Technical Report. Visual impacts associated with the National Register of Historic Places criteria for buildings listed on, or eligible for listing on, the register will be separately assessed by architectural historians in the Historic Built Environment Technical Report. Additionally, historic properties will be fully evaluated through the Section 106 process.

The Vancouver Downtown area is characterized by mixed-use high-rise buildings (at least six stories) that are the cultural, entertainment, office, and civic center of Vancouver and Clark County. Associated parking areas, electric and non-electric signage, fencing, signs, electrical lighting, overhead utilities, streetlights, and other utilities are in abundance. Views along streets tend to be a harmonious mix of similar-scale buildings, street trees, and residential and urban activity centers (see Figure 3-24). Parks in the downtown and waterfront areas also offer extensive cultural elements such as site amenities (benches, seating, lighting, shelters, picnic areas, etc.), art pieces (see photo 3, Figure 3-25), signage, plazas, ornamental paving, and other elements that create a strong cultural visual environment.

The waterfront developments are characterized by newer high-rise mixed-use retail, commercial, and residential developments. Ground levels of buildings are generally commercial and retail uses, such as restaurants and retail shops, while upper stories are commercial offices or residential uses. Streets are

tree-lined with attached and detached sidewalks with pedestrian-friendly amenities such as wide sidewalks, signalized crosswalks, and a small pocket park.

The development is also adjacent to the Vancouver Waterfront Park. The park is located in the Columbia River LU but offers regional trail connections. It also offers natural elements to the Vancouver waterfront area such as trees, grass, vegetation, and views of the river. The downtown and waterfront areas have medium to coarse texture because of larger buildings that contribute to a distinctive urban character (see Figure 3-23).

VISUAL CHARACTER OF THE PROJECT ENVIRONMENT

I-5 consists of three lanes in each direction, ramps, interchanges, and medians, with a posted speed limit of 50 to 60 mph. I-5 includes interchanges at Fourth Plain, Mill Plain, and SR 14 and bridges over McLoughlin Boulevard and under Evergreen Boulevard. No bicycle or pedestrian facilities exist on I-5 within the Vancouver Downtown LU. Vehicular movement is common, and human-made materials, lights, bright colors, and reflective surfaces are abundant. Traffic conditions can be heavy, particularly during rush hours and when the existing Interstate Bridge is lifted. On- and off-ramps are somewhat visible but are largely screened by buildings and mature trees.

The motorist's view from I-5 is a wide highway with several overpasses and groomed roadside landscapes. The existing Interstate Bridge is intermittently visible from the southbound lanes near E Mill Plain Boulevard and dominate the view south of the SR 14 interchange. The highway facility is not visible from most of the downtown area and neighborhoods; however, when visible, the ramps and highway noticeably block and cut off views of typical urban and residential areas such as buildings and other urban visual elements and replace them with concrete walls and structures, thus reducing cultural order.

Pedestrian facilities throughout the Vancouver Downtown LU primarily include on-street bicycle lanes and sidewalks, including on or under existing overpasses at Evergreen Boulevard, Mill Plain, McLoughlin Boulevard, Fourth Plain, 29th Street, and 33rd Street. Pedestrian facilities at these overpasses are generally characterized by long stretches of attached sidewalks in close proximity to traffic.

The existing Interstate Bridge is visible from several north-south streets and various locations throughout Vancouver. The lift towers are part of the urban view looking south between downtown buildings (see Figure 3-23) and can be seen from as far north as 33rd Street along Columbia Street (see Figure 3-24). However, the Interstate Bridge does not dominate views from the LU because of the existing composition of many buildings, street signs, fixtures, and street trees that block the view. From the conference center and hotels along the north shoreline, the bridge structure is highly visible from unobstructed viewpoints. Given the traffic conditions, multiple overpasses, on- and off-ramps, interchanges, and road elevations, the existing project environment has a low degree of project coherence.

Figure 3-25 provides additional photographs of the Vancouver Downtown LU showing the existing natural, cultural, and project environments.

Figure 3-25. Representative Photographs of the Vancouver Downtown Landscape Unit

Natural Environment

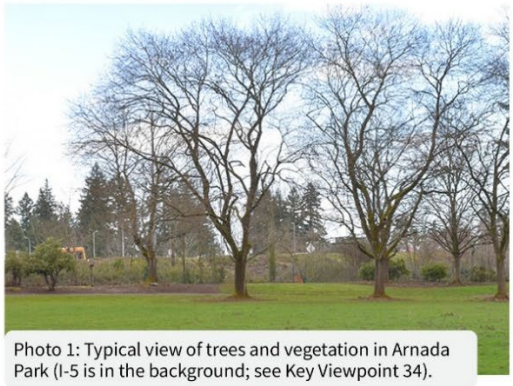


Photo 1: Typical view of trees and vegetation in Arnada Park (I-5 is in the background; see Key Viewpoint 34).

Photo 2: View of a residential area along I Street. Evergreen and deciduous trees and ornamental landscapes are visible (see Key Viewpoint 38).

Cultural Environment

Photo 3: View of Vancouver Waterfront Park and high-density residential areas along Waterfront Way

Photo 4: Typical view of urban environment looking east along 9th Street

Project Environment

Photo 5: Typical view of I-5 from Evergreen Boulevard Bridge (see Key Viewpoint 30)

Photo 6: View of the Interstate Bridge and the I-5 and SR 14 interchange from the eastbound ramp (see Key Viewpoint 29)

Photos were taken in March and June 2022

3.2.3.2 Viewer Groups and Visual Quality

Viewers in the Vancouver Downtown LU include residential, retail, commercial, civic, and other neighbors. Residential neighbors prefer familiar, attractive visual settings and neighborhood or urban environments that maintain natural harmony and cultural order. Neighbors would place a priority on

preserving cultural resources and on street trees and vegetation that are important to the visual quality of their neighborhoods.

This LU is memorable because of the continuity of stylistic neighborhoods and the character of the downtown and waterfront areas. The noteworthy views and memorable dramatic features in this LU are concentrated in the downtown and waterfront areas, Waterfront Park, and Grant Street Pier, which offer views overlooking the Columbia River and distant landscapes. Visual resources that can be seen from taller buildings and along the edge of the Columbia River include Mount Hood, Mount St. Helens, the West Hills of Portland, the broad expanse of the Columbia River itself, and (from a few locations) the tall buildings in downtown Portland.

In the remainder of the Vancouver Downtown LU, even though there are no wide or extensive views, views along streets tend to be a harmonious mix of similar-scale buildings, street trees, and residential and urban activity centers. Civic, institutional, retail, and commercial neighbors prefer visual environments that maintain cultural order but would have an interest in natural harmony and project coherence. All types of neighbors would perceive a high degree of cultural order within this LU.

The motorist's view from I-5 is a wide highway with several overpasses and groomed roadside landscapes. The highway facility is not visible from most of the downtown area and neighborhoods; however, when visible, the ramps and highway noticeably add roads, slopes, walls, signage, and other visual elements. These elements decrease project coherence and the quality of views. The existing Interstate Bridge is intermittently visible from the southbound lanes near E Mill Plain Boulevard and dominates the view south of the SR 14 interchange. Expanses of pavement, fencing, and safety railing can make these interchanges uncomfortable for pedestrians, and ramp crossings introduce safety concerns where pedestrians are potentially exposed to vehicles.

The attention of drivers on I-5 is focused on traffic and driving. Passengers, including passengers on transit buses, or other travelers have more time and attention focused on observing their surroundings; however, lateral views would be limited because the roadbed is between hills, slightly below grade, and limited by existing vegetation. Traffic conditions can be heavy, particularly during rush hours and when the existing bridge is lifted. Travelers would see the Vancouver Downtown LU as having a low degree of existing project coherence.

3.2.4 Greater Central Park Landscape Unit

The Greater Central Park LU is bounded by Fourth Plain Boulevard on the north, the I-5 corridor on the west, and the Columbia River LU on the south. It includes the Fort Vancouver National Historic Site, Clark College, Officers Row, Pearson Field, Marshall Park, and Hudson's Bay High School.

3.2.4.1 Visual Character

The Greater Central Park LU landform is a south-trending slope that extends from E Fourth Plain Boulevard to the railroad berm paralleling the Columbia River. The overall visual character of this LU is a park-like campus and open fields, but the area is crossed by several major roadways and elevated railroad tracks that can be physical and visual barriers. Development is recreation- and education-oriented, with the previous military/commercial activities having evolved into historic landscapes for recreation activities.

The Fort Vancouver National Historic Site is a nationally recognized historic and recreation resource that draws hundreds of thousands of visitors each year. The fort site is a broad, grassy plain bounded by I-5 on the west, SR 14 on the south, and the Grandview hillside on the east. The BNSF railroad berm blocks views of the Columbia River from the interior of the fort (see Figure 3-26). The Fort Vancouver National Historic Site has a multicultural gathering place (The Village) in the west corner of the plain near the SR 14 and I-5 interchange (Figure 3-27, Figure 3-28).

Figure 3-26. Vancouver Land Bridge: Looking Southwest toward the Interstate Bridge (KVP 22)

Figure 3-27. Fort Vancouver National Historic Site: Looking Southwest from The Village toward I-5 Truss Arches and Lift Towers (KVP 23)

Figure 3-28. Fort Vancouver: Looking Southwest from Inside the Stockade toward the Existing Interstate Bridge (KVP 24)

To the south, a pedestrian overpass (the Vancouver Land Bridge) over SR 14 connects the fort to the waterfront and Old Apple Tree Park. The Vancouver Land Bridge is part of the Lewis and Clark bicentennial celebration, known as the Confluence Project. It is an important symbolic and physical connection that provides panoramic views of the Columbia River and the existing Interstate Bridge (Figure 3-29).

Figure 3-29. Vancouver Land Bridge: Looking Southwest toward the Existing Interstate Bridge (KVP 22)

VISUAL CHARACTER OF THE NATURAL ENVIRONMENT

Within the Greater Central Park LU, vegetation and landscaping are highly diverse. The Fort Vancouver National Historic Site's landscaping includes mature street trees, groves of trees dispersed over expanses of lawn, and other special landscapes. In Fort Vancouver, some landscaping has been reconstructed to reflect original designs and uses. The parks and campuses have a wide variety of landscaping styles and vegetation, including sports fields, ornamental plantings around buildings, and street and parking plantings. The residential portion of the LU at its eastern edge has mature street trees and yard landscaping. Except for a few locations on hillsides (Figure 3-30), there are few unobstructed views of visual resources (e.g., the West Hills of Portland or the Columbia River).

Figure 3-30. Grand Boulevard, Vancouver: Looking Southwest toward the Existing Interstate Bridge (KVP 25)

VISUAL CHARACTER OF THE CULTURAL ENVIRONMENT

East Reserve Street separates development styles in the Greater Central Park LU. To the west are the Fort Vancouver National Historic Site and various campuses, including Clark College; Veterans Administration offices and hospital; parks and expanses of open space; and, to the east, hillside residential areas.

In the west, the park-like campus areas have large, irregular lot sizes and building styles that range from a modern college campus to a historic fort and settlement. Streets tend to be broad thoroughfares that follow campus boundaries and are either perpendicular to I-5 or curve obliquely across lots. Institutional and civic structures are generally one- to four-story structures. Structures include dispersed school buildings associated with Clark College and Hudson's Bay High School, civic buildings such as the Marshall Center Building, and historic structures associated with the fort and Pearson Field.

North of Mill Plain Boulevard, the scale and architecture of public buildings, including Hudson's Bay High School, Clark College, Vancouver Community Library, Officers Row, Luepke Center, and Marshall Community Centers, and associated landscapes establish the institutional character of the Greater Central Park LU. These institutions are also important resources for the City of Vancouver.

The residential areas in the eastern portions of the LU are structured by a small-scale north-south street grid and small-footprint dwellings. Streets vary in style and size appropriate to their settings.

Artwork, wayfinding and interpretive signage, and historic displays are located throughout the LU. Parking areas, signage, electrical lighting, overhead utilities, streetlights, and other utilities are common. This LU includes the Vancouver Land Bridge, which provides a pedestrian connection between the Vancouver waterfront area and the Fort Vancouver National Historic Site. The Land Bridge includes cultural elements characterized by Native American art pieces and informational signage, entry features, overlooks, ornamental paving, and site amenities (seating, lighting, shade canopies, and ornamental fencing).

VISUAL CHARACTER OF THE PROJECT ENVIRONMENT

The existing Interstate Bridge is visible from many prominent locations in this LU, including Pearson Airfield, the areas within and surrounding Fort Vancouver, and the upper floor of the bastion (a lookout tower that is part of the stockade) (Figure 3-28). The Interstate Bridge is less visible north of E 8th Street due to the increased distance and to the presence of tall street trees or structures. While the arches of the Interstate Bridge are not visible from most locations in this LU because of topography, the lift towers are frequently visible (Figure 3-31). The lift towers dominate middle to distant views because they are close to the Washington shoreline. Views of I-5, or sections of I-5, are part of the visual character of the major roads that intersect I-5, such as Evergreen Boulevard.

Figure 3-31. SR 14 Westbound: West at I-5 Looking toward the Existing Interstate Bridge Lift Towers (KVP 21)

Roads through the residential areas provide a logical network, and major east-west roads provide access through the LU and either over or under I-5, connecting with downtown Vancouver. The existing elevated I-5 roadway and ramps are visual barriers to views between downtown Vancouver and this LU. The traffic conditions, multiple overpasses, on- and off-ramps, interchanges, and signage give the existing project environment a low degree of project coherence.

Figure 3-32 provides additional photographs of the Greater Central Park LU showing the existing natural, cultural, and project environments.

Figure 3-32. Representative Photographs of the Greater Central Park Landscape Unit

Natural Environment

Photo 1: Typical view of trees and vegetation at Clark College (see Key Viewpoint 33)

Photo 2: Typical view of open fields at Fort Vancouver

Cultural Environment

Photo 3: View of Vancouver Land Bridge entrance monument

Photo 4: View of the Hudson's Bay Company's Fort Vancouver and Pearson Field Airport

Project Environment

Photo 5: Typical view of SR 14 from the Vancouver Land Bridge

Photo 6: Typical view of SR 14 (see Key Viewpoint 21)

Photos were taken in March and June 2022

3.2.4.2 Viewer Groups and Visual Quality

Residential neighbors in the Greater Central Park LU include residents living east of Reserve Street and residents with homes on southwest-facing hills (for example, near Grand Boulevard) that have views of the Fort Vancouver National Historic Site, Columbia River, Vancouver Land Bridge overpass, and existing Interstate Bridge with memorable and picturesque views. Residents with views from their homes would have long-duration views.

Neighbors also include recreational visitors to the Fort Vancouver National Historic Site and institutional neighbors, including students, workers, and visitors to Clark College. These neighbors would expect to see scenic or familiar, pleasant landscapes and have the time to enjoy the views. They would perceive the trees and the near-continuous expanses of the park and campus landscapes as having a high degree of natural harmony.

There are few intrusions to disrupt the landscape, and the buildings fit in their settings. The LU is generally beautifully landscaped and maintained, and the historic nature of Fort Vancouver's old buildings is notable. The elements of the cultural environment fit into the picturesque views and park-like character, giving the LU a high degree of cultural order.

Viewers in this LU also include travelers and commuters on I-5 and SR 14. Drivers on I-5 would focus their attention on traffic and driving. Passengers, including those taking transit, or other travelers can have more time and attention focused on observing their surroundings than drivers and are likely to expect to see scenic or familiar, pleasant landscapes. However, the roadbed is often below grade for much of I-5 in this LU, and the side slopes and adjacent vegetation limit lateral views. The existing elevated roadway and ramps at the SR 14 interchange are visual barriers to views between Vancouver and the Greater Central Park LU. Overall, travelers would view the project environment as incoherent because of the numerous interchanges, ramps, overpasses, merging traffic, speed changes, and, at times, heavy congestion.

3.2.5 Burnt Bridge Creek Landscape Unit

The Burnt Bridge Creek LU is bounded by the top of the Burnt Bridge Creek valley slope on the north and by the top of the southern Burnt Bridge Creek valley slope on the south. Figure 3-33 and Figure 3-34 include photographs of representative views within the Burnt Bridge Creek LU showing the existing natural, cultural, and project environment.

Figure 3-33. View from 39th Street Overpass: Looking South over I-5 toward SR 500 Ramps (KVP 40)

Figure 3-34. Representative Photographs of the Burnt Bridge Creek Landscape Unit

Natural Environment

Photo 1: Typical view of trees and vegetation in the Burnt Bridge Creek valley

Photo 2: Typical view of water, trees, and vegetation in and along Burnt Bridge Creek

Cultural Environment

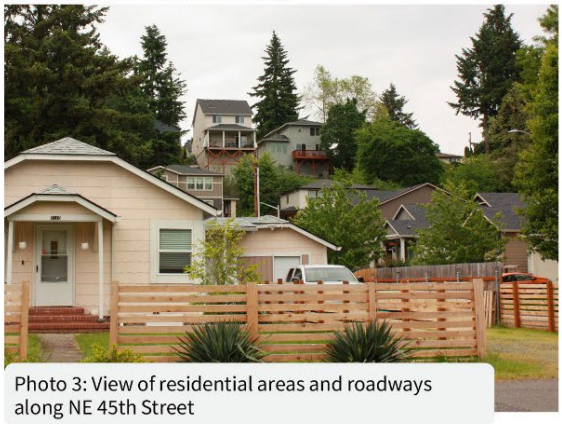


Photo 3: View of residential areas and roadways along NE 45th Street

Photo 4: View of rural residential areas and roadways along Alki Road

Project Environment

Photo 3: View of I-5 from the 39th Street Bridge (see Key Viewpoint 40)

Photo 4: View of SR 500 interchange (see Key Viewpoint 39)

Photos were taken in March and June 2022

3.2.5.1 Visual Character

The landform of the Burnt Bridge Creek LU is a riparian valley between steep-sided slopes. The valley is a broad plain east of I-5 but narrows on the west side as it approaches Vancouver Lake. A band of dispersed residential development occurs on the west side of I-5 consisting of one- to two-story single-family homes and other related buildings. West of these homes is the open space of Burnt Bridge Creek's floodplain, which includes small farms. Areas east of I-5 also include open spaces and residential developments, but residential areas are typically slightly higher density than those west of I-5.

VISUAL CHARACTER OF THE NATURAL ENVIRONMENT

Within this LU, Burnt Bridge Creek provides natural environment elements such as water, riparian vegetation, and natural banks and hillsides. Open space throughout this LU consists of a riparian greenbelt with stands of mixed woodland along Burnt Bridge Creek's channel slopes, young to mature street trees, and ornamental trees and landscaping common to residential areas. More rural elements are also present, including crops and a few open fields. Kiggins Bowl Sports Fields and Stadium, Leverich Park, and the Burnt Bridge Creek Multi-Use Trail are within this LU. These areas feature mature vegetation and are somewhat sunken or lower than I-5 and SR 500, which reduces the visibility of I-5 and SR 500 from these recreational areas. The natural visual environment of the Burnt Bridge Creek LU has a high degree of harmony.

VISUAL CHARACTER OF THE CULTURAL ENVIRONMENT

The cultural environment of the Burnt Bridge Creek LU primarily consists of low-density, single-family residential homes but also includes schools, commercial and industrial buildings with large parking and storage areas, fencing, signs, electrical lighting, overhead utilities, and streetlights. Residential structures are generally traditional stick-built one- or two-story homes. Local streets are organized in a rough grid where the adjacent areas are not steeply sloped. Where the topography is hilly, streets are windy and discontinuous, as they have been adapted to the hilly terrain.

A Bonneville Power Administration (BPA) substation and office complex adjoin I-5 on the east side. A wide corridor for overhead high-power transmission lines cuts obliquely toward the southwest parallel to the riparian channel. In addition to power and communication lines, this transmission line corridor includes signage and illumination poles.

Within the Burnt Bridge Creek LU, no cultural elements stand out from the normal pattern of residential land uses and development. Industrial development is incongruous with residential development but is screened from most views by existing vegetation. In addition to natural visual elements, Leverich Park includes some cultural elements, such as picnic shelters, restrooms, pedestrian paths and bridges, and a 12-hole disc golf course. The cultural environment of the Burnt Bridge Creek LU does not have a strong organization and would have a low cultural order.

VISUAL CHARACTER OF THE PROJECT ENVIRONMENT

Within the Burnt Bridge Creek LU, I-5 consists of three lanes in each direction, ramps, interchanges, and medians, with a posted speed limit of 60 mph. SR 500 intersects with I-5 at the south end of the LU. SR 500 includes two lanes in each direction with posted speed limits of 50 to 55 mph. Vehicular

movement is common, and human-made materials, lights, bright colors, and reflective surfaces are abundant. No bicycle or pedestrian facilities exist on I-5 or SR 500. Pedestrian connections are available across I-5 on the north side of the 39th Street Bridge and the Discovery Trail Pedestrian Bridge.

The visual character of the I-5 corridor is that of a tree-lined interstate highway with associated signage and structures. Views are framed by tall trees, curving roads, and hilly topography, creating a pleasant and rural quality. I-5 is not generally visible from residences due to their distance from the roadway and the hilly, wooded terrain. There are views of I-5 from the bridges over the highway, as shown in Figure 3-33. This figure also shows how the highway is lower than the surrounding land and screened with trees. The project environment of the Burnt Bridge Creek LU is coherent with the existing visual character.

3.2.5.2 Viewer Groups and Visual Quality

Neighbors in the Burnt Bridge Creek LU are primarily residential viewers from neighborhoods, with some agricultural viewers and industrial viewers. Residents, who value natural harmony, would likely expect an attractive, familiar suburban or neighborhood environment. Trees, vegetation, and land cover in the Burnt Bridge Creek LU block most views of I-5 and SR 500 and establish natural harmony within the LU that blends with natural elements in other LUs and beyond. Residential neighbors would perceive the visual quality as having natural harmony and cultural order.

Agricultural viewers include workers on small farms west of I-5. Industrial viewers are workers at the BPA substation. Both agricultural and industrial viewers would typically focus on work-related activities with a shared preference for cultural order and project coherence; agricultural viewers also prefer natural harmony. Agricultural and industrial neighbors would view the overall visual environment as having natural harmony, cultural order, and project coherence.

Travelers in this LU are primarily motorists on I-5 and SR 500 passing through the corridor on their way to or from home. From the travelers' perspective, the project environment could be perceived as cluttered and incoherent from the numerous and disconnected elements, such as northbound and southbound ramps at Main Street with bridges over I-5, a pedestrian bridge over I-5 for the Discovery Trail, a bridge over I-5 at 39th Street, four bridges on SR 500, and discontinuous connections from SR 500 to northbound I-5. Most drivers on I-5 are likely to have their attention focused on traffic and driving. Passengers or other travelers would have more time and attention focused on observing their surroundings; however, lateral views are limited as the roadbed is between hills and often slightly below grade.

3.2.6 Ruby Junction Landscape Unit

The Ruby Junction LU includes the approximately 40-acre Ruby Junction Maintenance Facility and the Ruby Junction transit stop located in Gresham, Oregon.

3.2.6.1 Visual Character

VISUAL CHARACTER OF THE NATURAL ENVIRONMENT

Elements of the natural environment are limited to the trees and shrubs along the perimeters of the large industrial sites that are intended to screen views from adjacent areas. The topography in the Ruby Junction LU slopes gently from the southeast and does not offer views above the vegetation and other land cover. Water in the sand and gravel pits is generally not visible from areas outside of the individual sites. The trees and shrubs throughout the LU provide some natural elements; however, the large industrial developments (i.e., sand and gravel operations) that occupy large portions of the LU and commercial, retail, and industrial developments give the overall LU a low degree of natural harmony.

VISUAL CHARACTER OF THE CULTURAL ENVIRONMENT

The cultural environment of the Ruby Junction LU is distinguished by its industrial uses and elements. The overall LU is dominated in size by the large Knife River Sand and Gravel extraction facility and the JW Underground Enterprises sand and gravel pit facility. These heavy industrial sand and gravel sites are open pit mining facilities with large storage piles, settling ponds, gravel parking, conveyor systems, industrial buildings, storage areas, and heavy equipment. Adjacent developments also include the approximately 20-acre Multnomah County John B. Yeon Facility and the City of Gresham Fleet Services facilities, a gated site with large industrial and office buildings, parking lots, and storage areas.

Lighter industrial developments and commercial/retail uses occur along the major roads within the LU. These areas are characterized by large buildings, warehouses, large parking lots, fencing, and storage areas. Along NW Division Street and NW Burnside Road, the character is more retail and commercial with box stores, automotive repair, grocery stores, public storage, and other similar developments. Development has a coarse scale and texture because of the very large-footprint buildings, large parking lots, and large lot sizes. Large paved parking areas, electrical and non-electrical signage, storage yards, fencing, overhead utilities, and other visible infrastructure are common.

Residential developments, in the form of moderate-scale apartments and condominiums, and single-family residential homes, occupy several areas within the LU. They are primarily located in areas separated by the large industrial developments and/or main roads, but several residential homes are located adjacent to the Ruby Junction site along SE 202nd Avenue. The Ruby Junction light-rail station does offer some cultural amenities, such as transit structures and bicycle racks; however, the mix of land uses, particularly the large industrial developments, give the LU a low degree of cultural order.

VISUAL CHARACTER OF THE PROJECT ENVIRONMENT

The existing Ruby Junction Maintenance Facility site contains large buildings, numerous light-rail tracks, storage areas, parking lots, and fencing. Vehicular movement, including LRVs, is common, and human-made materials, lights, bright colors, and reflective surfaces are abundant. This area is heavily crisscrossed and partitioned by rail tracks. The facility and tracks are mainly visible from NW Eleven

Mile Road, which enters the site, but, due to existing land cover and vegetation, facility rooftops may be intermittently visible from the east along SE 202nd Avenue (Figure 3-35). Viewers in the northern portions of the LU, particularly along SE Burnside Street, may also see the movement of LRVs. The mix of rail lines, maintenance rails, and roadways can make the LU confusing for motorists. Overall the LU has a low degree of project coherence.

Figure 3-35. Ruby Junction: Looking West toward the Ruby Junction Site (KVP 42)

Source: Google Maps Street View

Figure 3-36 provides additional photographs of the Ruby Junction LU showing the existing natural, cultural and project environments.

Figure 3-36. Representative Photographs of the Ruby Junction Landscape Unit

Natural Environment

Photo 1: View of natural elements from the corner of SE 202nd Avenue and NW Division Street

Photo 1: Typical view of natural elements along SE 190th Avenue

Cultural Environment

Photo 3: View of industrial areas along SE 190th Avenue

Photo 4: View of commercial/retail area along Burnside Street

Project Environment

Photo 5: View of light-rail lines and Ruby Junction and 197th light-rail stop (on left) from NW Eleven Mile Avenue

Photo 6: View of Ruby Junction Facility from NW Eleven Mile Avenue

Photos were taken in March and June 2022 | Sources: Google Maps Street View

3.2.6.2 Viewer Groups and Visual Quality

Viewers in this area are a mix of industrial neighbors who work at the Ruby Junction facility and other heavy and light industrial developments, including workers in the Multnomah County John B. Yeon Facility and the City of Gresham Fleet Services facilities; industrial areas generally have few visitors. Existing land cover and vegetation block most views of the existing facility. They would generally not be exposed to or aware of changes in the visual environment but industrial viewers who have direct views of the site are typically focused on work-related activities and not affected by changes in the visual environment. Industrial viewers, who are generally focused on work activities, would perceive the LU as having a moderate degree of cultural order and project coherence.

Retail and residential neighbors are also present within the LU. Natural harmony and cultural order are more important to these viewers. While existing vegetation and land cover block most views of the Ruby Junction Maintenance Facility, extensive human-made structures, fences, signs, open pits, vehicle movement, and other visual elements give the cultural environment a disorderly appearance and a low degree of natural harmony. Similarly, existing vegetation and land cover currently block the views of the Ruby Junction Maintenance Facility for all industrial, retail, and residential neighbors. Additionally, multiple roads, alleys, walkways, intersections, and railways with traffic gates and lights in close proximity result in a low degree of project coherence.

Travelers are typically defined as viewers who are “on the highway that is the subject of the VIA” (FHWA 2015). Therefore, the Ruby Junction LU does not include traveling viewers.

4. LONG-TERM EFFECTS (ANALYSIS PHASE)

"Long-term effects to visual quality" refers to how changes to visual resources affect the character of the physical, cultural, and project environments as perceived by viewers. The degree of impact to visual quality is determined by the compatibility of the visual change with the existing conditions and the sensitivity of viewers. This chapter describes the analysis phase, which assesses the visual changes anticipated to occur as a result of the No-Build Alternative and the Modified LPA and the subsequent long-term effects on the visual quality of the AVE. This analysis determines visual quality impacts by identifying changes to the existing visual character, assesses whether those changes are compatible or incompatible with the existing visual character, and predicts viewer sensitivity to the changes. Based on the compatibility of the visual character and the viewer's sensitivity, the value of the effect on visual quality is identified as neutral, beneficial, or adverse.

Conceptual photographic simulations are provided in each LU discussion to aid the impact analysis. These conceptual photographic simulations illustrate a conservative approach to depicting the Modified LPA's general size, height, and form; these three dimensions are referred to as massing, which refers to the exterior shape of a component. To represent the highest visual impacts, simulations use existing condition photographs that were taken on a clear winter day when the visibility of the project environment was at its greatest (i.e., leafless deciduous vegetation). Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

4.1 No-Build Alternative

Within the AVE, the No-Build Alternative would retain the existing I-5 roadway, Interstate Bridge, ramps, stormwater facilities, and all other infrastructure in its existing condition and configuration. The current transportation system and existing road networks (e.g., I-5/SR 514/SR 500) would continue to serve as regional and interstate corridors. Commuters, freight traffic, tourists, and other travelers would continue to use the existing Interstate Bridge crossing of the Columbia River. With regular maintenance such as painting, views containing the bridge structures are not expected to decline in visual quality, except in the event of a major earthquake, which could visibly damage the structures.

The No-Build Alternative assumes that, except for the Modified LPA, all highway, roadway, and transit projects within the AVE planned to be built by 2045 would be constructed. Even with completion of those projects, traffic congestion and delays are forecasted to increase within the AVE. Additionally, periodic bridge lifts to allow Columbia River traffic to pass under the existing Interstate Bridges would continue to cause stopped traffic and congestion on I-5. Additional congestion reduces the coherence of the project environment, particularly as viewed by motorists, which could reduce visual quality.

4.1.1 Visual Compatibility

Under the No-Build Alternative, the existing Interstate Bridge would continue to be a dominant feature in views near the Columbia River and would be visible from many places in Vancouver, including the Fort Vancouver National Historic Site, North Portland, and the Columbia River. As development, or the modernization of buildings and structures, in the AVE continues to occur, the Interstate Bridge may be

one of the sole remaining elements from the era of steel bridge construction. This could be seen as visually positive or negative. With regular maintenance, such as painting, views containing the bridge structures are not expected to decline in visual quality, except in the event of a major earthquake that visibly damaged the structures.

The existing natural, cultural, and project visual environments within the AVE have been established over decades of growth. The existing natural and cultural visual environments are not static and would change over time; however, they would not be expected to change enough under the No-Build Alternative to substantially change the visual environment and would generally maintain the conditions described in Section 3. Under the No-Build Alternative, the visual quality of the project environment would likely decrease over time and would become less coherent as the number of vehicles on the highway is expected to increase congestion, which would vary vehicle speeds and increase the difficulty of movements from lane to lane and ramps and interchanges. The compatibility of the No-Build Alternative's visual character with the visual character that currently exists in the AVE is summarized in Table 4-1.

Table 4-1. No-Build Alternative Visual Compatibility Matrix

Visual Character Element	No-Build Alternative Visual Compatibility
Scale	The No-Build Alternative would not change the scale of the existing Interstate Bridge. Changes to visual resources may occur to adjoining roadways and residential or commercial areas based on other development or infrastructure projects. Those development or infrastructure projects would be expected to be visually compatible with the existing natural, cultural, or project environments.
Form	The horizontal alignment, vertical profile, piers, and supporting elements of the existing Interstate Bridge and I-5 corridor would not change; therefore, viewers would not be sensitive.
Materials	Materials within the AVE are not expected to change under the No-Build Alternative. Other planned traffic and transit projects would be expected to be compatible with the existing natural, cultural, and project environments. However, maintenance and repair operations, such as repaving, bridge lift maintenance, painting, and other maintenance would periodically and temporarily degrade the existing visual conditions. Maintenance activities and materials such as bright colors, flashing lights, caution cones, flaggers, construction equipment, and other materials would degrade the project environment.
Visual Character	The No-Build Alternative would not result in a change in visual character that would contrast with the existing scale, form, and materials within the AVE. Other traffic and transit projects planned within the AVE would be expected to be compatible with the existing natural, cultural, and project environments. However, traffic and congestion on the existing Interstate Bridge and in the surrounding areas would reduce the overall visual coherence of the project environment, which would be a slight decrease in the existing visual quality.

AVE = area of visual effect; I-5 = Interstate 5

4.1.2 Viewer Sensitivity

The number, proximity, duration, and awareness of neighboring viewers from all LUs within the AVE would not change as a result of the No-Build Alternative.

Traveling viewers would experience longer durations of traffic congestion over time. Their attention and focus would remain on driving activities and the project environment.

Neighbors within the AVE with views of I-5 may be aware of worsening traffic congestion. Visual changes from traffic congestion may adversely affect visual quality for some viewers in all LUs except for the Ruby Junction LU. However, these conditions would likely develop over time, allowing viewers to become accustomed to the changing visual environment. The overall long-term impact on visual quality would be neutral. Additionally, viewer exposure and awareness of changes could increase for adjacent neighbors; however, I-5 is not the primary view for most neighbors.

The resulting sensitivity of both traveling and neighboring viewers would be low to moderate.

4.1.3 Overall Visual Quality Impact

Within the AVE, natural and cultural visual elements associated with the No-Build Alternative would be expected to be compatible with the existing visual environment and would likely not change the existing natural harmony or cultural order. Project coherence would be negatively affected by increased traffic and congestion; other planned transportation projects would be coherent with the existing project environment. However, since traveling and neighboring viewers would typically not be sensitive to changes in project coherence, the overall impact on visual quality would be neutral.

4.2 Modified LPA

The primary elements of the Modified LPA that would alter visual character and quality are the new bridges across the Columbia River and North Portland Harbor; reconfiguration of roadways and interchanges; and construction of new light-rail transit facilities and park-and-ride sites. Within the AVE, the Modified LPA, with any of the design options, would have perceptible changes in scale, form, and materials from:

- The greater heights and widths of the new Columbia River bridges.
- Reconfiguration or modification of interchanges at N Marine Drive, Hayden Island, SR 14, Mill Plain Boulevard, Fourth Plain Boulevard, and SR 500.
- The introduction of light-rail transit guideways and stations.
- Removal of the existing Interstate Bridge.

For each LU, the following section provides an assessment of the visual compatibility of, and viewer sensitivity to, the Modified LPA, including an assessment of the design options in the applicable LU, and its overall impact on visual quality.

4.2.1 Columbia Slough Landscape Unit

4.2.1.1 Visual Compatibility

Within the Columbia Slough LU, the Modified LPA includes changes to the Marine Drive and Victory Boulevard interchanges, the extension of light-rail transit from the existing terminus at the Expo Center, and a facility on the Expo Center property that would provide a small number of storage tracks, one small maintenance building for light maintenance, an operator break facility, and a parking lot for operators. This facility would necessitate reconstruction of the Expo Road entrance to the Expo Center and the parking lot gates and booths, but it would not alter the existing Expo Center buildings. The Modified LPA would not change the visual character of the Columbia Slough scenic corridor or views from the scenic corridor. The compatibility of the Modified LPA's visual character with the visual character that currently exists in the Columbia Slough LU is summarized in Table 4-2.

Table 4-2. Columbia Slough Landscape Unit - Modified LPA Compatibility Matrix

Visual Character Element	Modified LPA Visual Compatibility
Project Scale	The Modified LPA would revise the scale of structures, ramps, roadways, and other Program improvements of the North Portland Harbor bridge, interchanges, and other elements in this LU, but the scale would be similar to the scale of existing elements. Visual impacts due to tolling are associated with the electronic tolling infrastructure and would be very slight.
Project Form	The horizontal and vertical alignments of Modified LPA would follow the existing alignments and the resulting form would be compatible with the existing visual character. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway.
Project Materials	The Modified LPA would primarily use concrete, asphalt, and steel construction that matches existing elements within the LU. The final design would also integrate lighting that promotes safety for motorists while minimizing ambient light spillover that would obtrude into adjacent landscapes. Cultural elements in the existing environment would be similar to existing.
Modified LPA Visual Character	In summary, the Modified LPA would be compatible with the existing scale, form, and materials in the existing visual environment.

AVE = area of visual effect; LPA = Locally Preferred Alternative; LU = landscape unit

4.2.1.2 Viewer Sensitivity

For each type of viewer within this LU, Table 4-3 provides an assessment of the viewer's exposure to and awareness of elements of the Modified LPA and a summary of the viewer's overall sensitivity.

Table 4-3. Columbia Slough Landscape Unit Viewer Sensitivity

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
Traveler	Motorist	Motorists would have views of the Modified LPA from I-5, ramps, Marine Drive interchange, and local roads. Views would be of short duration as motorists travel through the LU.	Motorists would be aware of the Modified LPA but would be focused on driving. Project coherence would be improved. Passengers may be more aware but would have short-duration views. Traveling viewers prefer project coherence.	Low
	Bicyclist/ Pedestrian	Viewers would have views of the Modified LPA from shared-use path facilities included with the Modified LPA and connecting facilities. Views would be of short duration.	Bicyclists and pedestrians on Modified LPA facilities be aware of the new facilities, particularly those utilizing the new bridges. Project coherence and cultural order would be improved.	High
Neighbor	Residential	Residential viewers would include residential areas east of the North Portland Harbor bridges (KVP 3). Viewers would also include those in areas east of the harbor bridge, floating home communities on North Portland Harbor, and north of Bridgeton Road. These viewers would have long-term views in close proximity to the Modified LPA.	Existing trees and land cover would block views of the Modified LPA from most residential areas on Hayden Island. Viewers in the floating homes communities would have direct views of the Modified LPA.	High
	Recreational	Recreational viewers would include those in Delta Park, Portland International Raceway, Heron Lakes Golf Course, and Bridgeton Trail users along North Portland Harbor. They would also include recreational users from the water (boaters, jet skiers, fishermen/ women, paddle boarders, etc.). Recreational views would be of short duration.	Viewers would be aware of the Modified LPA and would be highly sensitive. Recreational viewers typically prefer natural harmony with project coherence.	High
	Commercial/ Retail	Retail and commercial areas within the LU, including hotels directly east of I-5 and north of Marine Drive, may have direct views of the Modified LPA. Land cover would block many views, but vegetation is	Commercial/retail viewers and shoppers and workers who are generally focused on shopping and work activities. Viewers would have a low awareness but prefer project coherence and natural harmony.	Moderate

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
		limited by extensive parking areas. Retail and commercial viewers are generally transitory, but workers can have longer-duration views.		
	Industrial	Industrial areas are mainly located south and east of the Marine Drive interchange. Views would be long duration, but most views would likely be blocked by existing trees and vegetation.	Industrial viewers would generally focus on work-related activities. They prefer project coherence.	Low

I-5 = Interstate 5; KVP = key viewpoint; LPA = Locally Preferred Alternative; LU = landscape unit

4.2.1.3 Visual Quality

NATURAL ENVIRONMENT

Views of the Portland and Vancouver skylines would be visible from both northbound and southbound I-5, as would distant shorelines, rolling hills, and mountain profiles. The natural environment under the Modified LPA would be compatible with the existing natural environment and would be harmonious for most residential viewers (KVP 3) who are not adjacent to the Modified LPA improvements.

Trees, vegetation, shorelines (North Portland Harbor), and other natural elements would likely be affected by the Modified LPA for viewers that are closer to the Marine Drive interchange. Relocated lanes, lane expansion, new roads, retaining walls, and other elements would likely be perceived as reducing natural harmony for recreational viewers (KVP 1). Figure 4-1 and Figure 4-2 shows a photograph of existing conditions and a simulation of the Modified LPA with the double-deck fixed-span configuration. Commercial, retail, and industrial viewers do not prefer natural harmony. Recreational viewers, such as viewers at Delta Park (KVP 1), would perceive a reduction in natural harmony but would have short-duration views and would typically be more focused on recreational activities.

CULTURAL ENVIRONMENT

The cultural environment would generally remain unchanged for the Columbia Slough LU. The new ramp from I-5 to Martin Luther King Jr. Boulevard would be several feet higher than the existing ramp, which would make it more visible from a few locations in Delta Park. A retaining wall would be required in the corner of Delta Park, introducing a new visual feature. Sensitive recreational viewers would be exposed to new retaining walls, but retaining walls and other similar elements are common in the existing visual context.

For travelers, human-made materials associated with the Modified LPA such as concrete, metal, glass, and plastic, and visual elements such as site lighting and advertising, are ubiquitous in the existing cultural environment. Most traveling viewers would still perceive the cultural environment as orderly.

Figure 4-1. KVP 2: Existing Conditions Photograph and Conceptual Photographic Simulation (Marine Drive Looking Northwest at Pedestrian Trails)

Existing Conditions

Photographic simulation of Modified LPA

Note: The simulation illustrates the general layout and massing. Visual elements of the Modified LPA may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

Figure 4-2. KVP 4: Existing Conditions Photograph and Conceptual Photographic Simulation (Marine Drive Looking Southeast at Pier 99 Street)

Existing Conditions

Photographic simulation of Modified LPA

Note: The simulation illustrates the general layout and massing of the Modified LPA. Visual elements of the Modified LPA may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

PROJECT ENVIRONMENT

The Modified LPA would reconfigure the Marine Drive interchange, ramps, I-5 lanes, shoulders, bridges, elevated lanes, new roads, a transit structure, and other features. Residential viewers are sensitive to changes in their visual environments, especially for those in close proximity; however, the new Modified LPA North Portland Harbor bridges would have visual characteristics similar to those of the existing North Portland Harbor bridge; therefore, these features would present a moderate degree of change in the visual environments and would be compatible with the existing visual conditions. The project environment would be coherent.

For commercial, retail, and recreational viewers, the ramp proposed to serve motorists entering Marine Drive eastbound from northbound I-5, and the expanded transit facilities, would be more noticeable from Delta Park and the hotel due east of the interchange. Changes to the existing conditions would be

extensive, especially for the I-5/Marine Drive interchange. However, the existing interchange includes similar project environment visual elements that would lessen the overall visual impacts of the Modified LPA. Project coherence would be improved as traffic conditions improve (Figure 4-1 and Figure 4-2). Commercial, retail, and recreational viewers prefer project coherence.

Visual impacts due to tolling are associated with the electronic tolling infrastructure and would be very slight. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway, but would result in low visual impacts.

Light and glare conditions and impacts would be similar to those described for the Vancouver Downtown LU (Section 4.2.3).

4.2.1.4 Degree of Impact

Four KVPs were identified to assess the visual quality in the Columbia Slough LU. For each KVP within the Columbia Slough LU, Table 4-4 provides a quantitative assessment of the existing visual quality and the visual quality with the Modified LPA, and the overall visual quality score for the LU. Natural harmony, cultural order, and project coherence were rated on a scale of 1 to 7, with 1 being very low, 4 being moderate, and 7 being very high. The three scores for each visual quality element were averaged to arrive at an overall visual quality score for the existing conditions and conditions under the Modified LPA. If the change to the overall visual quality score was positive, the assessment of the degree of visual quality impact was determined to be beneficial. If the change was negative, or there was no change, the degree of visual quality impact was determined to be adverse or neutral, respectively. To determine an overall degree of impact for the LU, the change in the overall visual quality score for each viewpoint was added together. A positive score was determined to have a beneficial impact to the LU's visual quality, a negative score was determined to have an adverse impact, and no change was determined to be a neutral degree of impact.

As shown in Table 4-4, the Modified LPA was found to have a neutral degree of impact on one KVP (KVP 3), an adverse degree of impact on one KVP (KVP 1), and a beneficial degree of impact on two KVPs (KVP 2 and 4). For the Columbia Slough LU overall, the change in visual quality would be expected to be beneficial.

Table 4-4. Columbia Slough Landscape Unit Degree of Impact

KVP	Visual Quality – Existing [a]				Visual Quality – with Modified LPA [b]				Change	Degree of Impact to Visual Quality
	Natural Harmony	Cultural Order	Project Coherence	Overall	Natural Harmony	Cultural Order	Project Coherence	Overall		
1	5	3	3	3.7	3	3	3	3	-0.7	Adverse
2	3	2	2	2.3	3	2	3	2.7	0.4	Beneficial
3	5	3	3	3.7	5	3	3	3.7	0	Neutral
4	2	1	2	1.7	2	2	3	2.3	0.6	Beneficial
Overall Landscape Unit Change	–	–	–	–	–	–	–	–	**0.3**	Beneficial

Notes:
Visual quality score definitions: 1 = very low, 2 = low, 3 = moderately low, 4 = moderate, 5 = moderately high, 6 = high, 7 = very high
a The visual quality ratings for the No Build Alternative are the same as the existing conditions.
b The visual quality ratings for the Modified LPA are the same for each design option.
KVP = key viewpoint; LPA = Locally Preferred Alternative

4.2.1.5 Design Options

The I-5 mainline westward shift, SR 14 interchange without C Street ramps, and park-and-ride site design options would not impact the Columbia Slough LU and are not discussed below.

TWO AUXILIARY LANES

Within the Columbia Slough LU, the Modified LPA with two auxiliary lanes would have similar visual impacts as the Modified LPA with one auxiliary lane, except that the width of the I-5 mainline roadway would increase by 16 feet, which would move elements of the highway closer to adjacent viewers. In the Columbia Slough LU, this difference would have a negligible change on visual character and quality.

BRIDGE CONFIGURATIONS

In the Columbia Slough LU, because of the distance to the Columbia River bridges, there would be no change in the assessment of visual quality for the different bridge configurations (double-deck fixed-span configuration, the single-level fixed-span configuration, or the single-level movable-span configuration).

4.2.2 Columbia River Landscape Unit

4.2.2.1 Visual Compatibility

Within the Columbia River LU, the Modified LPA, with any of the design options, would include two new parallel Columbia River bridges, North Portland Harbor bridges, the extension of light-rail transit including transit facilities on the Columbia River bridges (where the transit structure would require the relocation of some floating homes on the North Portland Harbor), a new interchange on Hayden Island, a modified SR 14 interchange, shared-use paths along the new bridge structures providing an active transportation connection across the North Portland Harbor and Columbia River, and the removal of the existing Interstate bridge. The Modified LPA does not include construction of buildings that would affect the visual character of the Columbia River scenic corridor.

Under the Modified LPA with the double-deck fixed-span configuration, the new Columbia River bridges would provide approximately 116 feet of vertical clearance over the primary navigation channel and would not include a lift span. Each of the new Columbia River bridge structures would be supported by six piers in the water and two on land, making the views above and below the structures more open to the river, shorelines, and surrounding areas.

Elevated roadways on Hayden Island, particularly on the north end, would be a high level of visual change in this LU. On both the north and south banks of the Columbia River, the height of the proposed bridge structures would be higher than the existing Interstate Bridges. The exact height above ground level would vary depending on location. This additional height would likely increase views along the Columbia River between piers and reduce the shaded conditions that currently exist on both sides of the river, providing increased light and air to the area under the bridges. Pedestrian connections to local and regional trail systems east and west of the new Columbia River bridges would be improved, and connections to pedestrian facilities on the bridge (north/south connections) would be provided.

The Modified LPA location and the layout of the North Portland Harbor bridges and transit structure would result in relocating some of the floating homes on the North Portland Harbor. Some homes would be relocated, and the Columbia River bridges and transit structures would be closer to the remaining floating homes. The scale of the North Portland Harbor bridge structures, ramps, and roadways would increase the existing footprint, modifying the visual environment from the floating home community. While the existing bridges over the North Portland Habor provide a visual precedent, the expanded footprint of the North Portland Harbor bridges and new transit bridge under the Modified LPA would be new visual elements for adjacent residential viewers. These residential viewers would experience a high degree of visual change and the new North Portland Harbor bridges would not be compatible with the existing visual conditions.

The new Columbia River bridge decks and ramps would be higher in elevation than the existing Interstate Bridges but would not be as high as the existing lift towers. These higher structures would be much more visible and likely block views of neighbors in surrounding areas. As currently conceptualized the Modified LPA with the double-deck fixed-span configuration would not have substantial structural elements extending above the bridge deck, which would maximize views to the surrounding landscape from the top bridge deck and improve views of the surrounding landscape from the Columbia River bridges for travelers.

For viewers on the water of the Columbia River or from the shorelines, transit, pedestrian, and utility facilities on the lower decks would contribute to the visual height and mass of the Modified LPA's Columbia River bridges, but fewer piers and the higher deck height would allow greater view corridors between piers and under the bridge. Therefore, the scale and magnitude for on-water viewers and viewers at lower elevations would be similar to those of the existing Interstate Bridges.

Compared to the existing shared-use path on the existing Interstate Bridges, the shared-use path with the Modified LPA would be moved to the lower-level bridge deck. Views for pedestrians and bicyclists would be nearly enclosed and exposed to the underside of the bridge deck above. However, generously sized bicycle and pedestrian facilities with overlooks and rest points would replace the existing narrow pedestrian path adjacent to vehicular traffic and views would be improved as viewers would be higher than the existing bridge. Features such as safety railing and bicycle lane striping would improve the project coherence for bicyclists and pedestrians. Safe facilities would allow more focus and attention on beneficial elements in the cultural and natural visual environment.

The compatibility of the Modified LPA's visual character with the visual character that currently exists in the Columbia River LU is summarized in Table 4-5.

Table 4-5. Columbia River Landscape Unit – Modified LPA Compatibility Matrix

Visual Character Element	Modified LPA Visual Compatibility
Project Scale	The Modified LPA would increase the width of the Interstate Bridge deck by including three lanes in each direction, an auxiliary lane, and full shoulders. The bridge decks would also be higher in elevation than the existing bridge but would not be as high as the existing Interstate Bridge lift towers. Transit, pedestrian, and utility facilities on the lower decks would contribute to the visual height and mass of the Modified LPA's Columbia River bridges, but fewer piers and the higher deck height would allow greater view corridors between piers and under the bridge. Therefore, the scale and magnitude of the project for on-water viewers and viewers at lower elevations would be similar to those of the existing bridge. A higher roadway with few obstructions above the deck (i.e., steel structures) would also increase and improve views of the surrounding landscape from the bridge for travelers. The scale of structures, ramps, roadways, and other Program improvements on the North Portland Harbor bridge, interchanges, and other elements would increase the existing footprint and would impact the floating home community. Higher ramps, roadways, and other structures in surrounding areas leading up to the Modified LPA Columbia River bridges, such as Hayden Island, would be higher to meet the higher bridge elevation. Ramps, elevated roadways, and other structures would be much more visible and likely block views of neighbors in surrounding areas. Visual impacts due to tolling are associated with the electronic tolling infrastructure and would be very slight. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway, but would result in low to no visual impacts.

Visual Character Element	Modified LPA Visual Compatibility
Project Form	As currently conceptualized for the Modified LPA with the double-deck fixed-span configuration, no substantial structural elements would extend above the bridge deck, such as the green steel lattice structure or lift span on the existing Interstate Bridges, which would maximize views above the bridge deck to the surrounding landscape. The form of the Modified LPA would be compatible with the existing visual character for most viewers. The existing North Portland Harbor bridges over the North Portland Habor does provide a visual precedent; however, the expanded footprint of the North Portland Harbor bridges and new transit structure under the Modified LPA would be new visual elements for adjacent viewers. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway.
Project Materials	The Modified LPA would primarily use concrete and steel construction. Material, color selection, and textures would be identified during the final design phase of the Modified LPA but would be specified to be consistent with design recommendations, local design directives, and guidance of the IBR Urban Design Committee. A consistent design character would be applied across the entire Modified LPA for elements such as railings, retaining walls/barriers, light posts, signs, and landscape/mitigation areas. The final design would also integrate lighting that promotes safety for motorists, bicyclists, and pedestrians on the shared-use path, while also minimizing ambient light spillover that would obtrude into adjacent waterways and toward the surrounding landscapes.
Modified LPA Visual Character	In summary, new visual elements would be included with the Modified LPA but similar forms and materials are in the existing visual environment, but the Modified LPA with a new seismically sound bridge, including transit and bicycle and pedestrian shared-use paths, would be larger in scale than the features of the existing I-5 area. The Modified LPA would contrast with the existing visual environment for neighbors adjacent to structures.

AVE = area of visual effect; IBR = Interstate Bridge Replacement; LPA = Locally Preferred Alternative

4.2.2.2 Viewer Sensitivity

For each type of viewer within this LU, Table 4-6 provides an assessment of the viewer's exposure to and awareness of elements of the Modified LPA and a summary of the viewer's overall sensitivity.

Table 4-6. Columbia River Landscape Unit Viewer Sensitivity

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
Traveler	Motorist	Motorists would have views of the Modified LPA from I-5, ramps, Jantzen Drive, Hayden Drive, and local roads. Viewers may also include shippers or other travelers on the Columbia River. Views would be of short duration as motorists travel through the LU. Commuting viewers would include passengers on the proposed light-rail extension and other transit facilities who would be new viewers in this LU.	Motorists would be aware of the Modified LPA but would be focused on driving. Project coherence would be improved. Passengers may be more aware but would have short-duration views. Traveling viewers prefer project coherence.	Low
	Bicyclist/Pedestrian	Bicyclists and pedestrians would have views of the Modified LPA from the shared-use path facilities proposed under the Modified LPA and connecting facilities. Views would be of moderate duration.	Bicyclists and pedestrians on Modified LPA facilities would be aware of the new facilities, particularly those using the new Columbia River bridges. Project coherence and cultural order would be improved; however, pedestrians would be aware of the transit structure on the southbound bridge. Views of the river to the west would be negatively impacted.	High
Neighbor	Residential	Residential viewers would include those in residential areas on Hayden Island. Viewers would also include those in floating home communities in North Portland Harbor. These viewers may be in close proximity to the Modified LPA and would have long-term views.	Existing trees and land cover would block views of the Modified LPA from most residential areas on Hayden Island. Viewers in the floating homes communities would have direct views of the Modified LPA.	High
	Recreational	Recreational viewers would be park and trail users along the Columbia River and North Portland Harbor. They would also include recreational users from the water (boaters, jet skiers, fishermen/women, paddle boarders, etc.). Recreational views would be of short duration.	Viewers would be aware of the Modified LPA and would be highly sensitive. Recreational viewers typically prefer natural harmony with project coherence.	High

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
	Commercial/ Retail	Retail and commercial areas within the LU may have direct views of the Modified LPA. Elevated roadways and structures would be higher than existing features. Land cover would block many views, but vegetation is limited by extensive parking areas. Retail and commercial viewers are generally transitory, but workers can have longer-duration views.	Commercial/retail viewers and shoppers and workers who are generally focused on shopping and work activities. Viewers would have a low awareness but prefer project coherence and natural harmony.	Moderate

I-5 = Interstate 5; LPA = Locally Preferred Alternative LU = landscape unit

4.2.2.3 Visual Quality

NATURAL ENVIRONMENT

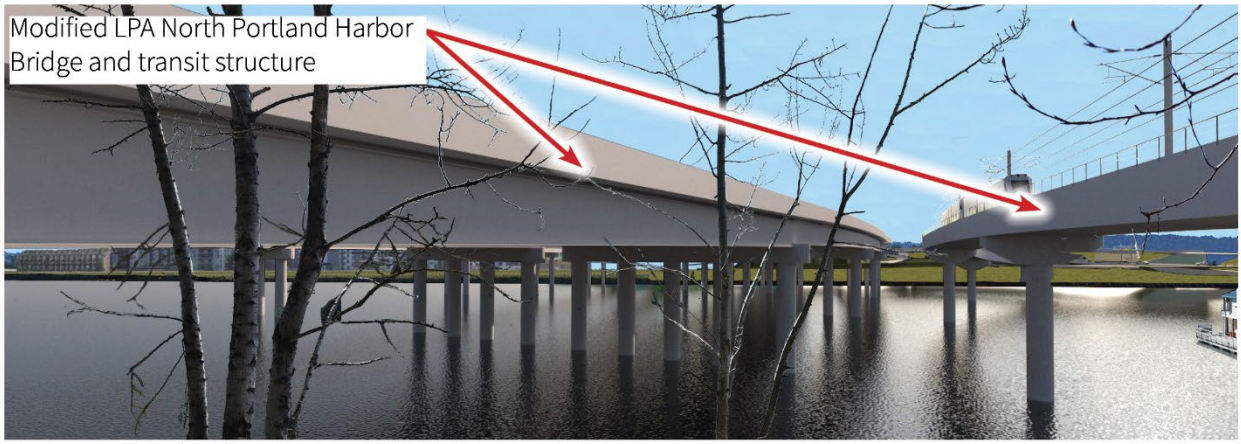
Trees, vegetation, shorelines (both on the Columbia River and North Portland Harbor), and other natural elements would be relatively unchanged by the Modified LPA. From both northbound and southbound directions on I-5, views of the Portland and Vancouver skylines would be visible, as would distant shorelines, rolling hills, and mountain profiles. The Columbia River bridges would be higher, which may increase a visual sense of openness along the Columbia River shoreline and improve natural harmony (see Figure 4-4, Figure 4-7, Figure 4-8, and Figure 4-9).

From sensitive recreational viewpoints along the river (KVP 17, 18, 20), the existing Interstate Bridge is noticeable primarily because of the complex trussing and variable arching, but the height and box-like framework of the lift towers boost its visibility. The Interstate Bridge is a smaller part of the overall landscape from distant views, outside of the AVE, and does not hamper views of distant mountain profiles or landscapes to the same degree as from close viewpoints. With the Modified LPA, the new Columbia River bridge decks would be higher than the existing Interstate Bridge decks, which would increase the visibility from most riverside locations. Depending on the bridge type and architecture, the Modified LPA may enhance the natural environment as seen by recreational viewers along the river by opening views of the river and mountains in the background.

The bridges, ramps, and elevated lane structures on Hayden Island would be higher and more visible to adjacent viewers, but existing land cover and vegetation would block most views for residential viewers (KVP 8, 11) on Hayden Island. However, the expanded footprint of the North Portland Harbor bridges crossing the North Portland Harbor would require the relocation of some floating homes and would be closer to remaining residential viewers, who would perceive a decrease in natural harmony (KVP 6; see Figure 4-3).

Figure 4-3. KVP 6: Existing Conditions Photograph and Conceptual Photographic Simulation (North Portland Harbor from JBM Floating Homes)

Existing Conditions



Photographic simulation of Modified LPA

Note: The simulation illustrates the general layout and massing of the Modified LPA. Visual elements of the Modified LPA may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses

Figure 4-4. KVP 8: Existing Conditions Photograph and Conceptual Photographic Simulations (Columbia River Crossing)

Existing Condition

Photographic simulation of Modified LPA Columbia River bridges with a double-deck fixed-span configuration

Photographic simulation of Modified LPA with single-level movable-span configuration

Note: The simulations illustrate the general layout and massing of the Modified LPA double-deck fixed-span and single-level movable-span configurations. The movable-span configuration is shown in the closed position only because the open position would be intermittent and limited. Visual elements of the Modified LPA may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

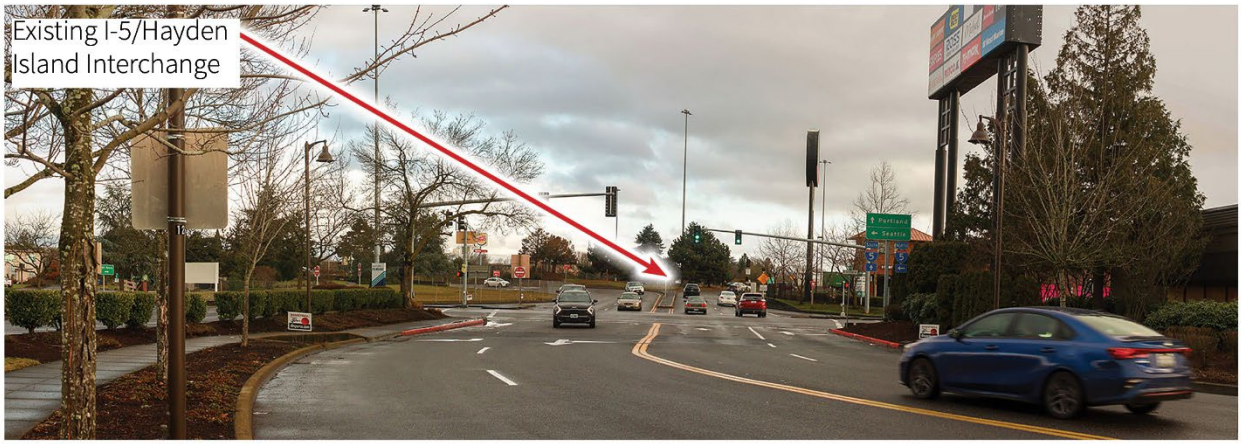
CULTURAL ENVIRONMENT

Visual elements associated with the Modified LPA, such as concrete, metal, glass, and plastic, and elements such as site lighting and advertising, are ubiquitous in the existing cultural environment. The cultural environment would be altered with elevated lanes, ramps, and retaining walls, for neighboring commercial and retail viewers (KVP 9), but land cover would block most direct views. The existing ODOT permitting facility lies directly adjacent to the I-5 mainline. This facility would be removed and relocated within the new I-5 right of way. Visual impacts associated with the new permit facility would likely be similar to existing conditions.

The Modified LPA would include a transit station adjacent to I-5 and would be located on an elevated structure (see Figure 4-5). Cultural elements would help to offset negative impacts to the natural and project environments, such as elevated structural elements and retaining walls. The overall cultural environment would be orderly. See Chapter 7 for recommended mitigation measures.

The existing ODOT permit facility located adjacent to the existing I-5 mainline roadway is in the approximate location of the proposed mainline and will be vacated. The final location, building, and site design will be determined in future phases but will likely be relocated within ODOT right of way.

Figure 4-5. KVP 9: Existing Conditions Photograph and Conceptual Photographic Simulation (Hayden Island from Commercial Area Looking East at Tomahawk Drive)



Existing Conditions

Photographic simulation of Modified LPA

Note: The simulation illustrates the general layout and massing of the Modified LPA. Visual elements of the Modified LPA may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

PROJECT ENVIRONMENT

In the Columbia River LU, the new Columbia River bridges, ramps, roadways, and the extension of light-rail transit would constitute a high level of visual change (see Figure 4-6). The function of the mainline I-5 would be similar to the existing conditions, and the sensitivities and character of these traveling viewers would be similar to those described for the Vancouver Downtown LU. Improved movements and speeds would be beneficial to project coherence. Travelers on Hayden Island looking to enter I-5 southbound, however, would need to cross North Portland Harbor, cross under I-5 using the new local street, cross under Marine Drive, merge with the Marine Drive southbound on-ramp, and enter I-5 southbound at the Marine Drive interchange. This would add complexity to the southbound movement and would reduce project coherence for these travelers.

Existing bicycle and pedestrian facilities (KVP 16) generally do not meet current standards, and low railings, inadequate width, and close proximity to obstructions (i.e., metal bridge supports) add visual clutter to the facilities. Improvements to I-5, Jantzen Drive, and Hayden Island Drive would include pedestrian and bicycle facilities, including connections to other local and regional facilities and improve project coherence for these travelers (see Figure 4-6 and Figure 4-9). Existing bicycle and pedestrian facilities on the existing southbound Interstate Bridge offer views to the west (KVP 14). The Modified LPA southbound bridge would include transit facilities that would likely block or obscure views to the west, but views to the east (toward Mount Hood) would be preserved. Furthermore, the higher bridge elevation and adequately spaced bicycle and pedestrian elements on the northbound bridge would reduce visual clutter and enhance views to the east. The proposed shared-use path would include connections on the north and south sides of the Columbia River, as well as across the North Portland Harbor.

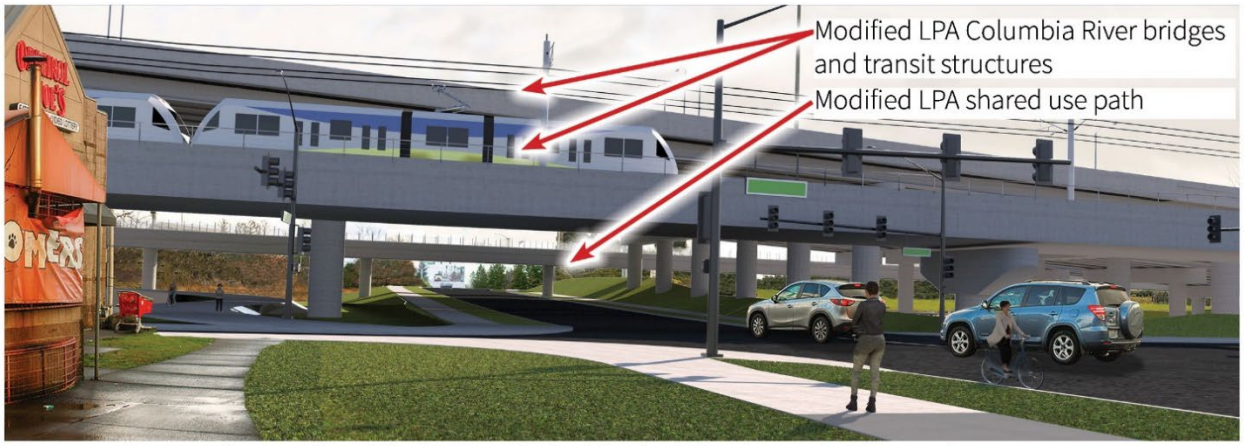
Residential viewers are sensitive to changes in their visual environments, and new visual elements associated with the North Portland Harbor bridges would be visible and in close proximity to floating homes in North Portland Harbor (KVP 6). Although the new North Portland Harbor bridges would include transit on the east and the two-lane arterial bridge on the east, changes to the project environment would be somewhat tempered by the fact that there are existing bridges with similar visual characteristics. These features would present a high degree of change for the sensitive residential viewers that would not be compatible with the existing visual conditions, and the project environment would not be coherent.

Visual impacts due to tolling are associated with the electronic tolling infrastructure and would be very slight. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway, but would result in low visual impacts.

Light and glare conditions and impacts would be like those described for the Vancouver Downtown LU (Section 4.2.3).

Figure 4-6. KVP 10: Existing Conditions Photograph and Conceptual Photographic Simulation (Hayden Island from Hayden Island Drive and N Center Avenue Looking East)

Existing Conditions



Photographic simulation of Modified LPA with double-deck fixed-span bridge configuration

Note: The simulation illustrates the general layout and massing of the Modified LPA. Visual elements of the Modified LPA may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

Figure 4-7. KVP 11: Existing Conditions Photograph and Conceptual Photographic Simulations (River Crossing Northeast)

Existing Conditions

Photographic Simulation of Modified LPA Columbia River bridges with a double-deck fixed-span configuration

Photographic Simulation of Modified LPA with single-level movable-span closed configuration

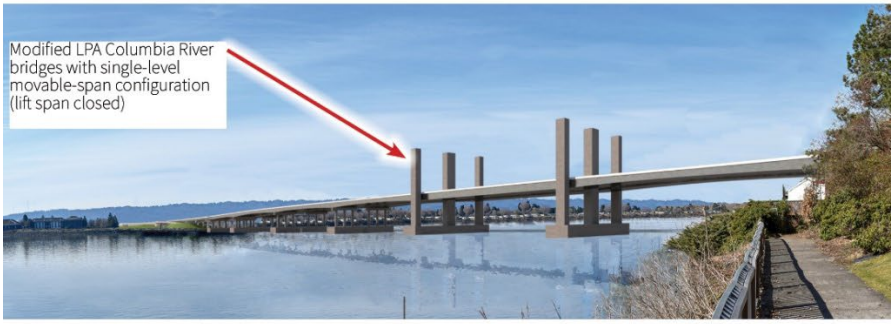
Photographic Simulation of Modified LPA with single-level movable-span open configuration

Note: The simulations illustrate the general layout and massing of the Modified LPA double-deck fixed-span and single-level movable-span configurations. Visual elements of the Modified LPA bridge configurations may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

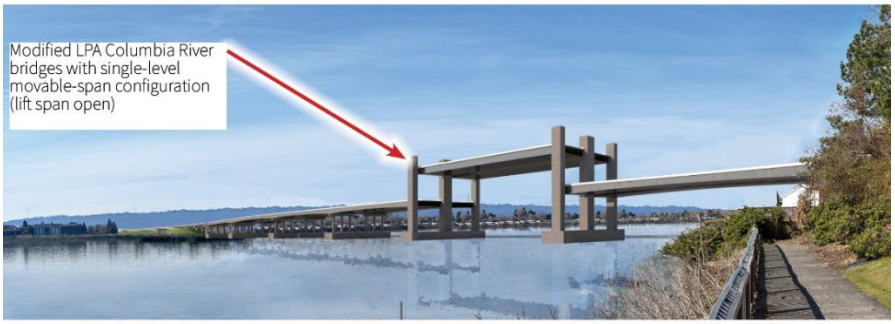
Figure 4-8. KVP 18: Existing Conditions Photograph and Conceptual Photographic Simulations (Vancouver Waterfront East)

Existing Conditions

Photographic simulation of Modified LPA Columbia River bridges with a double-deck fixed-span configuration



Photographic simulation of Modified LPA with single-level movable-span closed configuration with C Street ramp



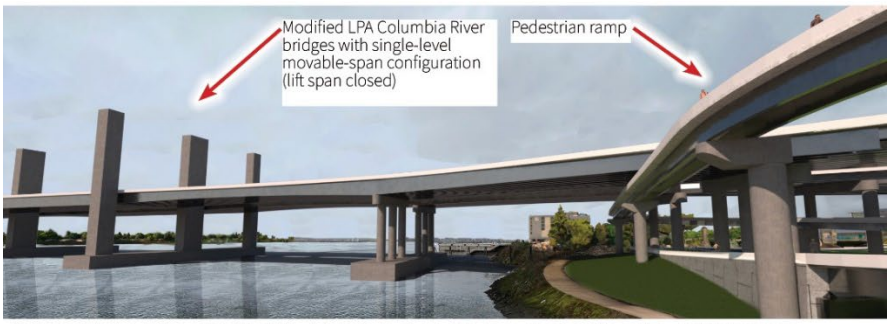
Photographic simulation of Modified LPA with single-level movable-span open configuration with C Street ramp

Note: The simulations illustrate the general layout and massing of the Modified LPA double-deck fixed-span and single-level movable-span configurations. Visual elements of the Modified LPA bridge configurations may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

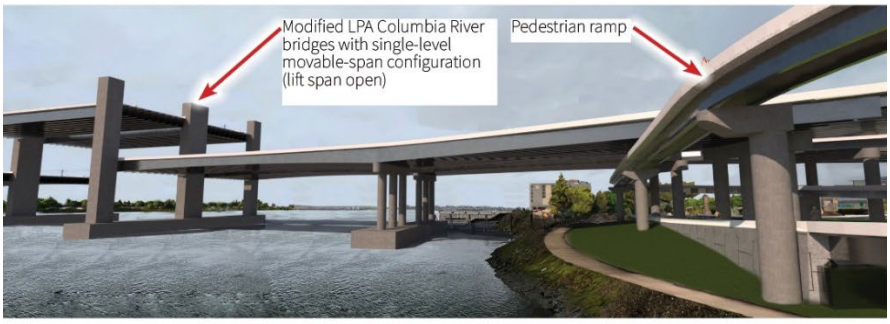
Figure 4-9. KVP 19: Existing Conditions Photograph and Conceptual Photographic Simulations (Vancouver Waterfront East)

Existing Conditions

Photographic simulation of Modified LPA Columbia River bridges with a double-deck fixed-span configuration



Photographic simulation of Modified LPA with single-level movable-span closed configuration with C Street ramp



Photographic simulation of Modified LPA with single-level movable-span open configuration with C Street ramp

Note: The simulations illustrate the general layout and massing of the Modified LPA double-deck fixed-span and single-level movable-span configurations. Visual elements of the Modified LPA bridge configurations may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

4.2.2.4 Degree of Impact

Sixteen KVPs were identified to assess the visual quality in the Columbia River LU. For each KVP within the Columbia River LU, Table 4-7 provides a quantitative assessment of the existing visual quality and the visual quality with the Modified LPA. Natural harmony, cultural order, and project coherence were rated on a scale of 1 to 7, with 1 being very low, 4 being moderate, and 7 being very high. The three scores for each visual quality element were then averaged to arrive at an overall visual quality score and assessment of the degree of impact to visual quality for each KVP and the LU overall.

As shown in Table 4-7, five KVPs could have an adverse degree of impact to visual quality, five would have a neutral impact, and the remaining six would have a beneficial degree of impact. The overall landscape unit change is a numeric average of the change of all KVPs combined. Based on this assessment, the Modified LPA would be expected to have a combined positive numeric change in the visual quality of KVPs and, therefore, an overall beneficial degree of impact to the visual quality of the Columbia River LU.

Table 4-7. Columbia River Landscape Unit Degree of Impact

KVP	Visual Quality – Existing a				Visual Quality – with Modified LPA b				Change	Degree of Impact to Visual Quality
	Natural Harmony	Cultural Order	Project Coherence	Overall	Natural Harmony	Cultural Order	Project Coherence	Overall		
5	6	4	4	4.7	6	4	4	4.7	0.0	Neutral
6	6	3	2	3.7	4	2	1	2.3	-1.4	Adverse
7	2	2	2	2.0	2	4	4	3.3	+1.3	Beneficial
8	6	4	4	4.7	6	4	4	4.7	0.0	Neutral
9	2	2	3	2.3	2	2	3	2.3	0.0	Neutral
10	2	2	3	2.3	2	2	2	2.0	-0.3	Adverse
11	5	4	3	4.0	5	4	2	3.7	-0.3	Adverse
12	2	1	2	1.7	3	2	4	3.0	+1.3	Beneficial
13	4	2	1	2.3	4	3	3	3.3	+1.0	Beneficial
14	4	2	1	2.3	1	3	3	3.3	+1.0	Beneficial
15	2	1	2	1.7	3	2	4	3.0	+1.3	Beneficial
16	2	1	2	1.7	3	2	4	3.0	+1.3	Beneficial
17	6	4	4	4.7	6	4	3	4.3	-0.4	Adverse
18	4	4	2	3.3	4	4	2	3.3	0.0	Neutral
19	4	4	2	3.3	4	4	2	3.3	0.0	Neutral
20	6	5	3	4.7	6	5	2	4.3	-0.4	Adverse
Overall Landscape Unit Change	–	–	–	–	–	–	–	–	4.4	Beneficial

Notes:
Visual quality score definitions: 1 = very low, 2 = low, 3 = moderately low, 4 = moderate, 5 = moderately high, 6 = high, 7 = very high
a The visual quality ratings for the No Build Alternative are the same as the existing conditions.
b The visual quality ratings for the Modified LPA are the same for each design option.
KVP = key viewpoint; LPA = Locally Preferred Alternative

4.2.2.5 Design Options

The I-5 mainline westward shift, SR 14 interchange without C Street Ramps, and park-and-ride site design options would not impact the Columbia River LU and are not discussed below.

TWO AUXILIARY LANES

The Modified LPA with the design option of two auxiliary lanes would expand the roadway width of I-5 by 16 feet, which would add to the visual mass of the structure and move elements closer to viewers. The increased visual mass may be noticeable for viewers in proximity or beneath the structures. This is particularly true for bicyclists and pedestrians under the Modified LPA with the double-deck fixed-span configuration because the shared-use path would be on the lower-level bridge deck, and viewers would be exposed to the broader bridge deck above. On the other hand, motorists inside enclosed vehicles (including light-rail cars on the lower deck) would likely not discern the slight expansion associated with the second auxiliary lane. Similarly, the additional 16-foot width would likely have minimal visual change to viewers somewhat farther from the bridge. From far away, the difference would be negligible.

Walking, bicycling, rolling, and other viewers using the pedestrian facilities on the Modified LPA with two auxiliary lanes would likely have a slight increase in visual impacts due to the wider highway bridge deck above. Because commuters would be in an enclosed vehicle, they would likely have few increased visual impacts due to the wider highway bridge deck.

SINGLE-LEVEL FIXED-SPAN BRIDGE CONFIGURATIONS

In comparison to the Modified LPA with a double-deck fixed-span configuration, the Modified LPA with the single-level fixed-span configuration would be slightly wider and somewhat closer to nearby viewers. However, the single-level bridge configurations would have a slimmer vertical profile and would grant viewers in proximity or beneath the Columbia River bridges along the Vancouver waterfront with more expansive and unobstructed views below bridge decks and between piers. In addition, the Modified LPA with the single-level fixed-span configuration would provide more options for bridge architecture, such as the potential to use a finback or extradosed design. While those architectural designs would have additional associated visual mass and height above the bridge deck, they would also provide greater opportunity for a bridge design that meets the communities' design goals and could become a beneficial feature from nearby views.

SINGLE-LEVEL MOVABLE-SPAN BRIDGE CONFIGURATION

While the fixed-span configurations are designed with a vertical navigation clearance of up to 116 feet, the movable-span configuration would provide 178 feet of vertical navigation clearance in the open position. The primary navigation channel would be relocated approximately 500 feet south, as measured by the channel centerline, from its current location near the Vancouver shoreline.

Figure 4-4 and Figure 4-7 show a photograph of existing conditions and a simulation of the Modified LPA with the double-deck fixed-span configuration. They also show a simulation of the Modified LPA with the single-level movable-span configuration.

The single-level movable-span configuration between Piers 5 and 6 would consist of two side-by-side, single-level steel girder bridges with movable spans. The movable spans would be vertical lift spans with counterweights. The increased height of the lift towers would add to the bridges' visual weight, meaning their size, color, and shape would draw more attention. The single-level movable-span design would typically be configured in the closed position, but the visual conditions and impacts would change when the bridge is open. In the open configuration the bridge deck between the lift towers would be significantly higher and more visible (see Figure 4-7, Figure 4-8, Figure 4-9).

The increased visibility of the towers and bridge deck when open may obstruct additional views and skylines, and likely intensify visual impacts, especially for sensitive residential and recreational viewers. The single-level movable-span configuration would only be open intermittently for limited periods of time during a bridge opening.

The Modified LPA with the single-level movable-span configuration would have bridge decks somewhat higher than the existing Interstate Bridge and fewer number of piers, which would slightly open up views from underneath. In the open position, the view under the bridge would provide even more open views along the river. The overall bridge deck would be higher than the existing bridge deck, allowing more boats to pass under the bridge without raising the movable span. Because bridge lifts would not be lengthy or frequent, the exposure of these visual effects to both sensitive and non-sensitive viewers would be limited.

Overall, the scale of structures and roadways and the visual character and massing of the Modified LPA with the single-level movable-span configuration would be similar to the existing conditions or No-Build Alternative as there would be lift towers that would protrude higher into the skyline for areas in Vancouver, Fort Vancouver, and toward and from Hayden Island (see Figure 3-18).

4.2.3 Vancouver Downtown Landscape Unit

4.2.3.1 Visual Compatibility

The existing Interstate Bridge, which consists of two parallel bridges crossing over the Columbia River, would be replaced by two new parallel bridges. Details of the Modified LPA bridge width, type, and aesthetic design are still at a conceptual level that would be further developed with the progression of the Modified LPA design.

Under the Modified LPA, the new Columbia River bridge structures would not include lift spans, which would reduce the resulting traffic congestion that occurs when the bridge is lifted. The existing Interstate Bridge would be removed, including removing the lift towers and the steel structures. The Modified LPA also includes the extension of a dedicated light-rail guideway and structure from the lower bridge deck to the west side of the I-5 corridor in downtown Vancouver.

SR 500 marks the boundary between the Burnt Bridge Creek LU and the Vancouver Downtown LU. As discussed above, minor improvements would be made to the SR 500 interchange within the Vancouver Downtown LU, including reconstruction of the off-ramp from I-5 southbound to 39th Street to establish the beginning of the braided ramps to Fourth Plain Boulevard and restore the loop ramp to 39th Street. Changes in views for travelers moving through these project features would be barely noticeable. The

compatibility of the Modified LPA's visual character with the visual character that currently exists in the Vancouver Downtown LU is summarized in Table 4-8.

Table 4-8. Vancouver Downtown Landscape Unit - Modified LPA Visual Character Compatibility Matrix

Visual Character Element	Modified LPA Visual Compatibility
Project Scale	The Columbia River bridge decks with the Modified LPA with the double-deck fixed-span configuration would not be as high as the top of the existing Interstate Bridges' lift towers but would be higher than the existing bridge decks. The double-deck of the Columbia River bridges would make them thicker in profile and more visible from some locations in the Vancouver Downtown LU (see Figure 4-15). The profile of the ramps and structures leading up to the Columbia River bridges and SR 14 would also be higher to meet the higher Columbia River bridge elevation. The reduced number of pier sets in the Columbia River would provide greater visual openings between piers under the bridge. Viewers at lower elevations would notice the increased scale and magnitude of the Columbia River bridge structures but they would be perceived within the context of the existing bridges, steel structures, lift towers, and other visual elements. In the Vancouver Downtown LU, the existing I-5 roadway and ramps are at or below adjacent grades. However, from many locations, the higher ramps and roadways with the Modified LPA would be more visible than the existing ramps and roadways. Visual impacts due to tolling are associated with the electronic tolling infrastructure and would be very slight. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway, but would result in low to no visual impacts.
Project Form	Interchanges would be designed to accommodate the traffic, including high, wide, and heavy freight vehicles that travel between the Port of Vancouver and I-5. Bicycle and pedestrian improvements will be included with the Modified LPA including bicycle lanes and sidewalks, clear delineation, neighborhood connections, and a tie-in to the planned City of Vancouver road diet and two-way cycle track on Fourth Plain Boulevard and signing. Northbound I-5 traffic exiting to Fourth Plain Boulevard would use the off-ramp just north of the SR 14 interchange and southbound I-5 exit to the Mill Plain interchange would be reconstructed as a tight-diamond configuration but would otherwise remain similar in function to the existing interchange. Access to and from I-5, SR 14, and the Fourth Plain and Mill Plain interchanges would generally be provided as it is today, but the connection points would be relocated. Access to downtown Vancouver from southbound I-5 would be at C Street. This location is currently a gateway into the downtown leading up to the Vancouver Community Library and the House of Providence (also known as The Academy), past the City Center 12 cinemas. Downtown connections to and from SR 14 would be made by way of Columbia Street at 4th Street. These new or revised ramp systems would continue the trend of becoming denser and more intensely used corridors. A lid over I-5 (the Community Connector) would cross I-5 directly south of Evergreen Boulevard (see Figure 4-13). The intent of the structure is to improve the active transportation connection between the Vancouver Historic Reserve and downtown Vancouver. In addition to active transportation facilities, it would include public space and amenities. The design and treatments of the Community Connector would be completed in

Visual Character Element	Modified LPA Visual Compatibility
	future phases. This report assesses the potential visual effects of the new structure described in the Project Description (Chapter 1). Pedestrian facilities at Evergreen Boulevard, Mill Plain, McLoughlin Boulevard, Fourth Plain, 29th Street, and 33rd Street include on-street bicycle lanes and sidewalks but are generally characterized by long stretches of attached sidewalks in close proximity to traffic. The Modified LPA would include new east/west bicycle and pedestrian connections underneath the Columbia River bridges and new north/south regional connections via circular ramps and bicycle and pedestrian facilities on the east (northbound) Columbia River bridge. Proposed light-rail transit and active transportation structures would be new visual elements in the existing environment and may affect some viewers. Light-rail structures would be integral with the bridge and would be screened by other bridge and ramp elements for much of the LU. Some adjacent viewers along C Street would be exposed to rail structures and the light-rail station, but views would become routine over time. The design of the light-rail station would be completed at a later phase, but would include cultural elements such as plazas, site amenities, art pieces, and others that may be beneficial. Park-and-ride structures would be new visual elements, but the form, scale, materials, and other visual elements would likely be similar to other buildings in the downtown area. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway.
Project Materials	The Modified LPA would replace the open steel truss system of the existing Interstate Bridge with human-made elements such as concrete and steel. Material, color, and textures would be finalized during the final design phases but materials are anticipated to be consistent with design recommendations and local design directives. A consistent project design character would be applied across the entire Modified LPA for elements such as railings, retaining walls/barriers, light posts, benches, signs, and landscape/mitigation areas. The final design would also integrate safety lighting for motorists, bicyclists, and pedestrians on the shared-use path. New lighting would use new cut-off light fixtures that would minimize ambient light spillover into adjacent waterways and toward the surrounding landscapes. Cultural elements in the existing environment, such as the Boat of Discovery and Brick Arches in Vancouver, would be relocated in accordance with local guidelines.
Modified LPA Visual Character	In summary, the scale, form, and materials of the Modified LPA would vary from the existing structures but would replace existing bridges and structures. New transit and bicycle and pedestrian structures would be new visual elements but would be similar in character to other proposed elements. New views of the landscape would be created for pedestrians and bicyclists on the proposed Columbia River bridges, enhancing recreational activities.

I-5 = Interstate 5; LPA = Locally Preferred Alternative; LU = landscape unit; SR = State Route

4.2.3.2 Viewer Sensitivity

Most neighbors in the Vancouver Downtown LU would have low sensitivity because of blocked views and/or distance from visible changes. However, viewers near, and with direct views of, the Columbia River bridges or SR 14 interchange, such as from residential areas near the southbound braided ramp and historic neighborhoods, would have a moderate or high degree of visual change. To accommodate

the southbound braided ramp, some residential properties in the Shumway neighborhood may be partially or fully acquired or may include temporary or subsurface easements. Both the east and west sides of I-5 north of Fourth Plain Boulevard would include noise walls. Additionally, much of the west side of I-5 between Fourth Plain Boulevard and Mill Plain Boulevard would include a noise wall. These walls would replace existing walls in most locations but viewers could be highly impacted where the existing walls are moved. Neighbors with direct views of new walls would also be highly impacted. For neighboring viewers with a high degree of visual sensitivity, the project environment would not be compatible with the existing environment. Figure 4-12 shows the existing conditions adjacent to the noise wall and a simulation of what the conditions of the Modified LPA alternative would be.

Viewers adjacent to elements of the Modified LPA in higher-density residential areas (such as those in downtown Vancouver, the Vancouver Waterfront Park, and the Waterfront Community) may have altered views, particularly from upper floors where views may be farther. Growing numbers of residential viewers would be less sensitive to the infrastructure elements because they would be more accustomed to the downtown urban context (see Figure 4-13 and Figure 4-14) but would have longer-duration views. These viewers would adapt over time to changes in the visual environment.

Traveling viewers, including active transportation viewers, using components of the Modified LPA would have improved driving conditions and simplified lanes and ramps that would provide a more coherent project environment.

For each type of viewer within this LU, Table 4-9 provides an assessment of the viewer's exposure to and awareness of elements of the Modified LPA and a summary of the viewer's overall sensitivity.

Table 4-9. Vancouver Downtown Landscape Unit Viewer Sensitivity

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
Traveler	Motorist	Motorists within the LU would have views of the Modified LPA from I-5. Views would be of short duration as they travel through the LU. Commuting viewers would include passengers on new the proposed light-rail extension, who would be new viewers in this LU.	Motorists would be aware of the Modified LPA but would be focused on driving. Project coherence would be improved. Passengers on the new light-rail extension may be more aware but would have short-duration views.	Low
	Bicyclist/ Pedestrian	Bicyclist/pedestrian viewers would have views of the Modified LPA from proposed bicycle and pedestrian facilities and connecting facilities. The shared-use path proposed with the Modified LPA would meet current design standards. Views would be of short to moderate duration.	Bicyclists and pedestrians on Modified LPA facilities would be aware of new facilities including improved trail connections and site amenities such as lighting, directional signage, and safety railings. Project coherence and cultural order would be improved.	Moderate

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
Neighbor	Residential	Existing trees and land cover would block or obscure views for most residential viewers within the LU. However, a small number of viewers adjacent to the Modified LPA, such as in the Shumway, Rose Village, and Arnada neighborhoods, in high-density buildings in downtown Vancouver and the waterfront development, may have prolonged views of noise walls, the elevated roadway, bridges, and other elements. Residential viewers may be impacted by direct views of light sources, reflected light, and increased nighttime ambient light conditions.	Awareness would be low for most but would be high for adjacent viewers, particularly in areas where residential properties would be closer to new or relocated noise walls or where homes are removed due to widening. Over time prolonged views would become routine. Residential viewers typically prefer natural harmony and cultural order.	Moderate to high
	Recreational	Recreational viewers would be park and pathway users from Esther Short Park, neighborhood parks, trails, and open spaces within the LU. Views within most parks and trails would be blocked by existing vegetation and land cover. Recreational views would be of short duration. Viewers from Arnada Park (KVP 34) may also be affected by interchange upgrades.	Existing trees, vegetation, and land cover would obscure most views of the Modified LPA. Recreational viewers typically prefer natural harmony and project coherence.	High
	Institutional	Institutional viewers would be from schools, hospitals, or similar developments. Institutional viewers may also include library users. The Vancouver Community Library is located adjacent to I-5 and the proposed light-rail transit station. Viewers would be exposed to extensive changes to their visual environment. Overall viewer numbers from the library would be low and view duration would be short for most. Library workers would have longer-duration views.	Viewers in most areas would not be aware of changes from the Modified LPA. However, library users would be aware of extensive changes. Institutional viewers strongly prefer cultural order but would also be interested in project coherence.	Moderate

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
	Civic	Civic viewers from Clark County buildings along Franklin Street would likely not have direct views of the Modified LPA. Viewers from the upper floors of the City of Vancouver Building would likely be exposed to direct long-term views of the new Columbia River bridges and SR 14 interchange.	Most Civic viewers in the City of Vancouver building would be workers from the upper floors. They would be aware of the Columbia River bridges and SR 14 interchange. Civic viewers strongly prefer cultural order but may also be interested in project coherence and natural harmony.	Moderate
	Commercial/ Retail	Most retail and commercial areas within the LU would have direct views of components of the Modified LPA blocked by existing vegetation and land cover. Areas adjacent to I-5 and within the waterfront area would be exposed to direct views and in close proximity. Retail and Commercial viewers are generally transitory, but workers can have longer-duration views.	Commercial/retail viewers are shoppers and workers who are generally focused on shopping and work activities. Viewers would have a low awareness but prefer project coherence and natural harmony.	Low to Moderate

I-5 = Interstate 5; KVP = key viewpoint; LPA = Locally Preferred Alternative; LU = Landscape Unit; SR = State Route

4.2.3.3 Visual Quality

NATURAL ENVIRONMENT

Modifications to the Fourth Plain and Mill Plain interchanges would not substantially increase facility heights or roadway footprints in the Vancouver Downtown LU. Efforts would be made to retain existing landscapes and vegetation along roadways and ramps where possible to maintain screening and blending characteristics. However, some trees and vegetation would be removed due to an expanded footprint of facilities with the Modified LPA. The Modified LPA would include areas of landscape restoration that would meet current standards and requirements, but this new landscaping would not substantially replace visual elements associated with mature trees for many years. While stormwater treatment areas would be included and would provide some natural visual elements, these facilities are not intended as aesthetic elements and are maintained for their stormwater function.

Some areas, particularly close to the new Columbia River bridges, where lanes and ramps would be elevated to meet the bridge elevation, would have commercial, retail, institutional, and civic viewers. These viewers are typically more sensitive to changes in the cultural and project environments. Removing existing structures may open views of the Columbia River, particularly closer to the ground, which would enhance the natural harmony viewed by neighbors.

The Fourth Plain improvements would require moving an existing noise wall to the west toward several residential homes along I Street between 35th and 37th streets (see Figure 4-12), reducing the rear yards and potentially moving the location of outbuildings. Residential viewers in these homes would

be highly sensitive to adverse visual impacts. Landscaping and revegetation would be included under the Modified LPA; however, it would take several years to several decades for vegetation to provide effective screening of new visual elements, and even then would not entirely eliminate impacts for affected viewers.

Many sensitive residential viewers within the Vancouver Downtown LU would not be exposed to or aware of changes in the natural environment. Similarly, most sensitive recreational viewers would not be exposed to or aware of changes in the natural environment.

The natural environment would remain harmonious for most traveling viewers. An existing City of Vancouver entry sign is located at the C Street off-ramp. The edges of landscaping at this entry feature would likely be removed by roadway reconfiguration, which may affect traveling viewers, but the majority of the landscape and the entry sign are expected to remain in place.

CULTURAL ENVIRONMENT

The South Main Landmark (sometimes referred to as the Vancouver Arches or Brick Arches) is located at the northern edge of the SR 14 interchange. It was installed in 1984 to create a landmark for downtown Vancouver. The Boat of Discovery is located on Columbia Boulevard, very near the north end of the existing bridges (see Figure 4-10). It is a metal, concrete, granite, and brick piece created by artist, Jay Rood. Installed in 1992, its creation and dedication coincided with the bicentennial celebration of the exploration and naming of the Columbia River in 1792. City of Vancouver policy would dictate that, if there was a need to displace the South Main Landmark or the Boat of Discovery, recommendations would be developed for relocation based on public input, input from the City of Vancouver, and project team specialists.

Figure 4-10. Vancouver Downtown Landscape Unit – Cultural Environment

Cultural Environment

Photo 1: Brick Arches

Photo 1: Boat of Discovery

Photos were taken in March and June 2022 | Sources: Google Maps Street View

The architectural design of the transit stations and park-and-ride facility would be determined as the design progresses; both stations and park and rides would use compatible massing, materials, and landscaping.

Figure 4-11 provides representative images of architectural features of transit structures. These images were shown in prior public workshops conducted for the CRC project. Designs for elements with the Modified LPA would be developed through public workshops and community partner group meetings.

Figure 4-11. Architectural Features of Transit Structures Shown during the CRC Project

Transit, Amtrak, Sound Transit, Greyhound Station, Everett, Washington

Mockingbird Station, Dallas, Texas

Pioneer Place Garage, Portland, Oregon

Legacy Hospital Parking Garage, Portland, Oregon

Hotel deLuxe Garage, Portland, Oregon

Viewer awareness of and exposure to cultural elements of the Modified LPA such as unified design elements, transit stations, park-and-ride facilities, improved lighting, and other elements, would be higher than in the existing cultural environments for neighboring institutional, retail, institutional, and civic viewers. These viewers would likely be aware of beneficial changes in the cultural environment. The changes would also be beneficial to sensitive residential and recreational viewers.

The visual environment will change with the removal of the steel structures especially the removal of the higher lift towers as they are the most visible elements (see Figure 3-23, Figure 3-24, and Figure 3-27 through Figure 3-31). However, these elements have been part of the visual environment for more than 100 years and are part of the existing cultural environment. The new SR 14 ramp connection would introduce elevated structures to the visual environment; however, it would also allow views south on Main Street toward the Columbia River. This historic view was an important view that was interrupted when the existing SR 14 interchange was constructed; therefore, the removal of the existing Interstate Bridge, lift towers, and SR 14 may be considered adverse (new visual elements and removal of 100-year-old cultural elements) as well as beneficial (removal of structures and opening views toward the river).

The cultural environment would be altered for traveling viewers and neighbors in the Vancouver Downtown LU by adding elements such as the Community Connector and transit station. The cultural environment would be altered with retaining walls, ornamental railings and paving, signage, art pieces, and site furnishings. Additionally, noise walls and retaining walls along the LU would add visual elements to the cultural environment. Textures, patterns, colors, finishes, and art elements would help to provide rhythm and unity to the cultural environment. Human-made materials that would be used in the Modified LPA (such as concrete, metal, glass, and plastic), along with visual elements such as site lighting and signage (electric and non-electric signs, billboards, banners, etc.), are ubiquitous in the existing visual environment for traveling viewers and neighbors. Therefore, the new visual elements associated with the Modified LPA would be consistent with the existing visual character. Figure 4-13 shows the existing conditions looking south from the Evergreen Bridge and a preliminary simulation of the Community Connector area. The simulation shows the location and mass of the Community Connector. The final design will be completed in partnership with interested parties and the community.

Traveling viewers, who are not typically sensitive to visual changes, would experience neutral impacts on the cultural environment. The new light-rail transit station would bring a new type of traveling viewers into the Vancouver Downtown LU. These transit viewers would have a beneficial experience with the cultural elements, such as art pieces, site furnishings, public plazas, and ornamental lighting associated with the light-rail transit station, the Community Connector, the VNHR, as well as the existing Vancouver Community Library and other development in downtown Vancouver.

Changes to the cultural environment would be adverse because of new visual elements associated with the Modified LPA alternative, such as the removal of the 100-year-old bridge; however, the design of the Modified LPA would also include beneficial visual elements associated with the light-rail transit station and Community Connector. (See Chapter 7 for mitigation measures.) Overall, the Modified LPA alternative will have a neutral impact on the cultural environment.

PROJECT ENVIRONMENT

The function of elements of the Modified LPA, such as overpasses and interchanges, would remain largely the same, while lane widths, shoulders, structures, walls, minimum height clearances, and other elements would meet current WSDOT design standards for fully managed access roadways and interchanges. WSDOT has adopted manuals that dictate the design standards, signage, and light levels applicable to highway and highway interchanges (WSDOT 2017, 2022).

Modifications to the Fourth Plain and Mill Plain interchanges and other areas in the northern downtown Vancouver area would not substantially increase facility heights or roadway footprint, no visual impacts are expected, and the project environment would be coherent. Fourth Plain Boulevard would be braided with the SR 500 connection to I-5, which would simplify the connection and provide a visual benefit for motorists. The layout would expand the existing right of way, which would require relocating a noise wall adjacent to a few residential viewers.

Due to the overall mass and height of the proposed Columbia River bridge structures, elevated ramps and roadways, and other Modified LPA elements, the Modified LPA would be more visible to some neighboring viewers. Existing vegetation and land cover would block many views from areas not directly adjacent; however, some viewers and viewpoints, particularly for viewers in close proximity,

such as the waterfront development and upper levels of high-rise buildings in Vancouver, would likely experience moderate to high visual impacts. The views from these areas would experience a high degree of change; however, changes would be viewed within the existing visual context that includes other project environment elements. See Figure 4-14 and Figure 4-15 for existing conditions and simulations of the Modified LPA alternative.

The Columbia River bridge decks under the Modified LPA would be higher than the existing bridge decks, which would alter views. The higher decks would improve views of the Columbia River and distant mountains, both east from the northbound and views west from the southbound lanes. Views north toward downtown Vancouver and south toward Hayden Island and Portland would also be changed by the additional height. Views of areas close to the Columbia River and bridges would likely be blocked by higher bridge decks, barriers, railings, and other roadway and bridge elements, but views of distant hills and mountains would be improved (see Figure 4-16).

New bridges, intersections, roads, lanes, signage, and other Program improvements would likely improve traffic and congestion both locally and regionally. New pedestrian facilities and connections and transit facilities would present new visual elements within the project environment but would improve project coherence for bicyclists.

The Modified LPA alternative would also change nighttime visual conditions. Under the Modified LPA, a large number of viewers would travel through an area where there is a large number of both fixed light sources (streetlights) and moving sources (cars and transit vehicles). The Modified LPA would be expected to light most road, ramp, rail, and pedestrian facilities. These lights would be higher and more visible to a larger area than existing roadway lighting. Replacement lights and signs would be designed with modern materials that limit light and glare, and lighting and signing elements would be unified throughout using similar lines, colors, and styles.

Light-rail transit station area lighting would be bright enough to allow light-rail operators to see that the platform is clear while minimizing light and glare entering nearby residential areas through the use of anti-glare materials, indirect lighting, and/or shielding. Lighting in transit stations and the park-and-ride structure would also be consistent with crime prevention through environmental design (CPTED) principles, the practice of designing the built environment in a manner that discourages criminal activity. Outcomes of CPTED that could impact the amount of light and glare experienced by viewers include transit stations that are brightly lit with unobscured visibility from nearby streets and/or public areas. Final decisions on lighting at transit stations would also take local context, as well as artistic and cultural themes of the immediate neighborhoods, into consideration. Overall, an increase in ambient light levels may be perceptible compared to the existing conditions.

Visual impacts due to tolling are associated with the electronic tolling infrastructure and would be very slight. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway, but would result in low visual impacts.

The overall impact of the Modified LPA on the visual quality of the Vancouver Downtown LU unit for traveling viewers would be beneficial.

Figure 4-12. KVP 38: Existing Conditions Photograph and Conceptual Photographic Simulation (I Street and 37th Street Looking Southeast [Shumway Neighborhood])

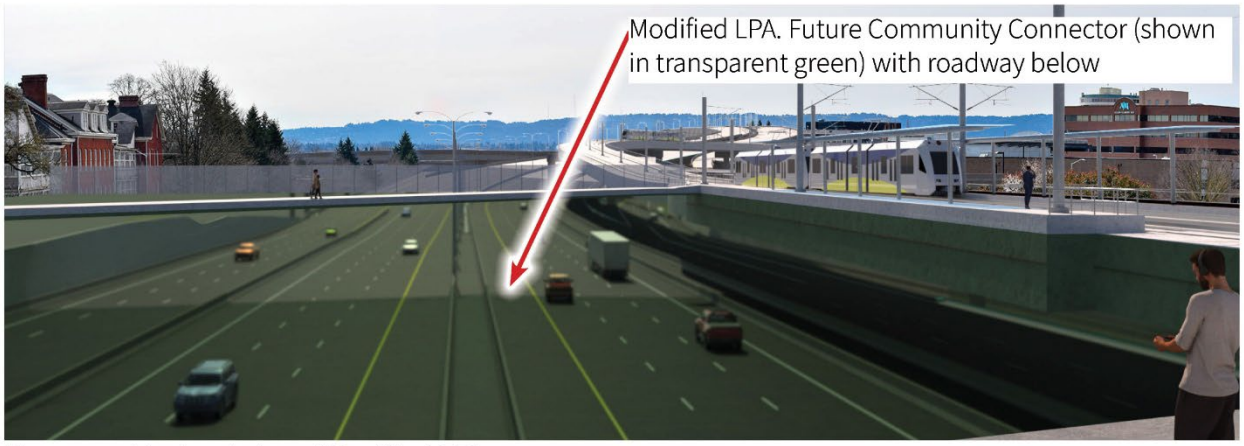
Existing Conditions

Photographic simulation of Modified LPA

Note: The simulation illustrates the general layout and massing of the Modified LPA. Visual elements of the Modified LPA may change as the design progresses. Simulated elements are for illustration purposes only. The early conceptual design may change as the design progresses.

Figure 4-13. KVP 31: Existing Conditions Photograph and Conceptual Visual Simulation (Evergreen Bridge Looking South along I-5)

Existing Conditions



Photographic simulation of Modified LPA

Note: The simulation illustrates the general layout and massing of the Modified LPA. Visual elements of the Modified LPA may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration only. The early conceptual design may change as the design progresses.

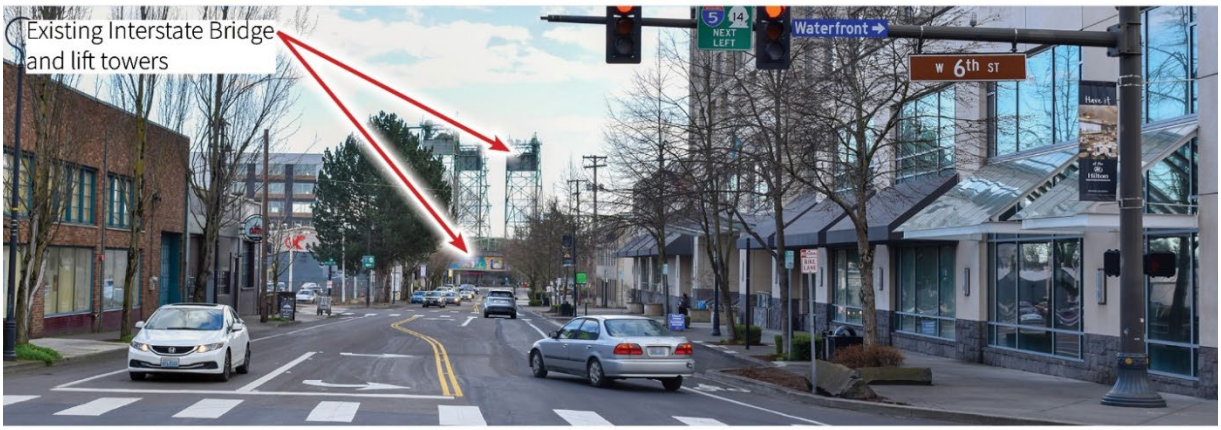
Figure 4-14. KVP 27: Existing Conditions Photograph and Conceptual Photographic Simulation (Esther Street)

Existing Conditions

Photographic simulation of Modified LPA with double-deck fixed-span bridge configuration

Note: The simulation illustrates the general layout and massing of the Modified LPA. Visual elements of the Modified LPA may change as the design progresses. Conceptual photographic simulations are intended to illustrate. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration only. The early conceptual design may change as the design progresses.

Figure 4-15. KVP 28: Existing Conditions Photograph and Conceptual Photographic Simulations (6th Street)



Existing Conditions

Photographic simulation of Modified LPA Columbia River bridges with a double-deck fixed-span configuration

Photographic simulation of Modified LPA Columbia River bridges with single-level movable-span configuration

Note: The simulation illustrates the general layout and massing of the Modified LPA double-deck fixed-span and single-level movable-span configurations. Visual elements of the bridge configurations may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration only. The early conceptual design may change as the design progresses.

Figure 4-16. KVP 15: Existing Conditions Photograph and Conceptual Photographic Simulations (Columbia River Bridge northbound lane looking north to Vancouver)

Existing Conditions

Photographic Simulation of the Modified LPA with double-deck fixed-span bridge configuration

Photographic simulation of Modified LPA Columbia River bridge with single-level movable-span configuration

Note: The simulation illustrates the general layout and massing of the Modified LPA double-deck fixed-span and single-level movable-span configurations. Visual elements of the configurations may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration only. The early conceptual design may change as the design progresses.

4.2.3.4 Degree of Impact

Twelve KVPs were identified to assess visual quality in the Vancouver Downtown LU. For KVP 28, looking south toward I-5 from 6th Street in downtown Vancouver, Figure 4-15 shows a photograph of the existing view, which includes the existing Interstate Bridge lift towers, a simulation of the general height and massing of the Modified LPA with double-deck fixed-span bridge configuration, and a simulation of the general height and massing of the Modified LPA with movable span bridge configuration.

For each KVP within the Vancouver Downtown LU, Table 4-10 provides a quantitative assessment of the existing visual quality and the visual quality with the Modified LPA. Impacts on natural harmony, cultural order, and project coherence were rated on a scale of 1 to 7, with 1 being very low, 4 being moderate, and 7 being very high. The three scores for each visual quality element were then averaged to arrive at an overall visual quality score and assessment of the degree of impact to visual quality, for each KVP and the landscape unit overall.

As shown in Table 4-10, six of the KVPs would have a neutral degree of impact to visual quality, two would have a beneficial degree of impact, and four would have an adverse degree of impact. Based on this assessment, the Modified LPA would be expected to have a combined positive numeric change in the visual quality of KVPs and, therefore, an overall slightly beneficial degree of impact on the visual quality of the Vancouver Downtown LU.

Table 4-10. Vancouver Downtown Landscape Unit Degree of Impact on Visual Quality

KVP	Visual Quality – Existing [a]				Visual Quality – with Modified LPA [b]				Change	Degree of Impact to Visual Quality
	Natural Harmony	Cultural Order	Project Coherence	Overall	Natural Harmony	Cultural Order	Project Coherence	Overall		
26	3	3	3	3.0	3	3	2	2.7	-0.3	Adverse
27	3	3	3	3.0	3	3	3	3.0	0.0	Neutral
28	4	4	4	4.0	4	4	3	3.7	-0.3	Adverse
29	4	2	2	2.7	2	2	2	2.0	-0.7	Adverse
30	3	2	2	2.3	2	2	2	2.0	-0.3	Adverse
31	3	2	2	2.3	4	4	4	4.0	1.7	Beneficial
32	2	3	2	2.3	2	3	2	2.3	0.0	Neutral
34	5	4	4	4.3	5	4	4	4.3	0.0	Neutral
35	4	3	3	3.3	4	4	3	3.6	0.3	Beneficial
36	4	4	4	4.0	4	4	4	4.0	0.0	Neutral
37	4	4	4	4.0	4	4	4	4.0	0.0	Neutral
38	4	4	4	4.0	4	4	4	4.0	0.0	Neutral
Overall Landscape Unit Change	–	–	–	–	–	–	–	–	0.4	Beneficial

Notes:
Visual quality score definitions: 1 = very low, 2 = low, 3 = moderately low, 4 = moderate, 5 = moderately high, 6 = high, 7 = very high.
a The visual quality ratings for the No Build Alternative are the same as the existing conditions.
b The visual quality ratings for the Modified LPA are the same for each design option.
KVP = key viewpoint; LPA = Locally Preferred Alternative

4.2.3.5 Design Options

In the Vancouver Downtown LU the Modified LPA with one or two auxiliary lanes would have similar visual changes as described in the Columbia Slough LU and the Columbia River LU. In addition, the visual changes with the different bridge configurations would be the same as described in the Columbia River LU. See Section 4.2.2.5.

Figure 4-15 and Figure 4-16 show a photograph of existing conditions and a simulation of the Modified LPA with the double-deck fixed-span configuration. They also show a simulation of the Modified LPA with the single-level movable-span configuration.

SR 14 INTERCHANGE WITHOUT I-5 C STREET RAMPS

With this design option, there would be no eastside loop ramp from I-5 northbound to C Street and no directional ramp on the west side of I-5 from C Street to I-5 southbound; the existing east side loop

ramp would be removed. Access from I-5 to downtown Vancouver, to and from the south, would be through the Mill Plain interchange rather than C Street. Most viewers in the Vancouver Downtown LU would not be exposed to the visual change associated with removing the C Street ramps. Recreational viewers, such as those at Esther Short Park, would benefit from slightly more open views to the east; however, those views would still likely include project environmental elements such as the I-5 mainline and Columbia River bridge structures. Overall, this design option would have a neutral degree of impact to visual quality.

I-5 MAINLINE WESTWARD SHIFT

This design option would shift the alignment of the I-5 mainline slightly west, which would impact buildings between C Street and the I-5 mainline. Building renovation or reconstruction would likely be similar in visual character to other buildings in the Vancouver Downtown LU. New development would be integrated with development of the light-rail station near Evergreen Boulevard, park-and-ride facility, and other elements of the Modified LPA. Affected viewers would be located primarily along C Street as existing land cover (i.e., buildings) would block most views west of C Street.) For travelers along I-5, particularly from southbound lanes, would block most views retaining walls, the Community Connector, and the Evergreen Bridge would block most views. Travelers in northbound lanes on I-5 would have views of the area from the elevated Columbia River bridges; however, the project environment elements and developed areas of Vancouver would block most views, and the alignment shift, would not be distinct (see Figure 4-16). The impacts to visual quality in the Vancouver Downtown LU from this design option would be low.

PARK AND RIDES

Two park and ride facilities would be built in Vancouver along the light-rail alignment—one near the Evergreen Station and one near the Waterfront Station. There are two site options for the park and ride near the Evergreen Station and three options near the Waterfront Station.

Each park-and-ride option would be developed in compliance with City of Vancouver regulations and guidelines including building design and materials, lighting and signage, art elements, landscaping and street trees. This will ensure the facilities fits in with the existing visual character and are consistent with other existing park-and-ride facilities in the Vancouver Downtown LU. At each location new visual elements would be introduced into the existing visual environment, which would change existing views for directly adjacent viewers. Since the number of affected viewers would be low, and the facilities would be consistent with the visual character existing in the Vancouver Downtown LU, the design options for the park-and-ride facilities would each have a neutral degree of impact to visual quality.

4.2.4 Greater Central Park Landscape Unit

4.2.4.1 Visual Compatibility

In the Greater Central Park LU, most views toward the Modified LPA would be blocked by existing vegetation and land cover. The new Columbia River bridges under the Modified LPA with the double-deck fixed-span configuration would provide 116 feet of vertical clearance over the primary navigation

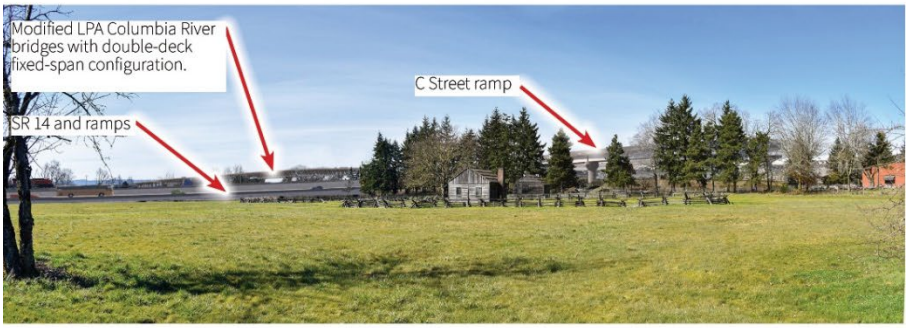
channel, would not include a lift span, and would each be supported by six piers in the water and two piers on land.

The Modified LPA's design of the SR 14 interchange with the C Street ramps would result in a significantly different view from the Kanaka Village area (KVP 23). While the bridge type and architecture are yet to be determined, a new bridge structure and the revised SR 14 interchange would noticeably change the visual experience as elevated structures such as piers, bridge decks, railings, barriers, and others would shift slightly closer to viewers. Existing trees would provide some screening for viewers at the Fort of Vancouver, but the proximity and height of the SR 14 off-ramp would have additional impacts for viewers at the Kanaka Village. Views farther east in the Fort Vancouver National Historic Site would also have noticeable changes (see Figure 4-17and Figure 4-18).

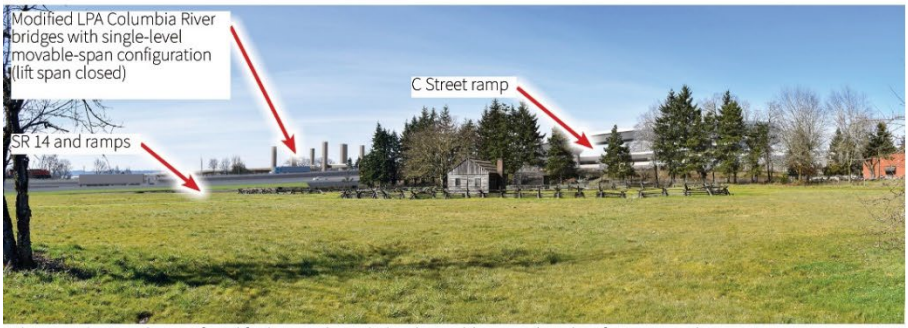
The compatibility of the Modified LPA's visual character with the visual character that currently exists in the Greater Central Park LU would be expected to be similar to the visual character described in the Vancouver Downtown LU (see Table 4-8).

Figure 4-17. KVP 23: Existing Conditions Photograph and Conceptual Photographic Simulations (Fort Vancouver National Historic Site)

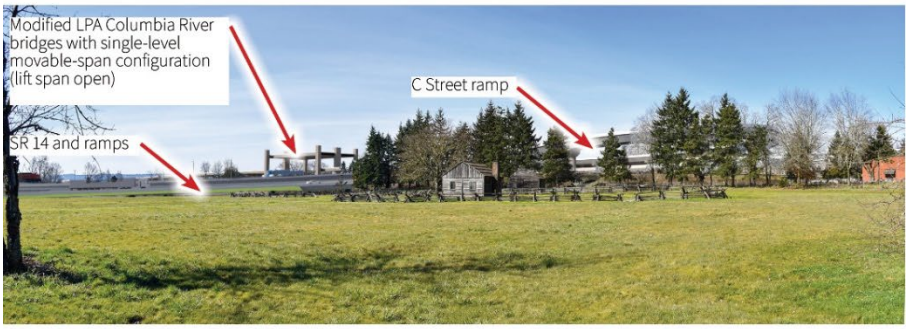
Existing Conditions



Photographic simulation of Modified LPA with double-deck fixed-span configuration with C Street Ramp



Photographic simulation of Modified LPA with single-level movable-span closedconfiguration with C Street ramp



Photographic simulation of Modified LPA with single-level movable-span open configuration with C Street ramp

Note: The simulation illustrates the general layout and massing of the Modified LPA double-deck fixed-span and single-level movable-span configurations. Visual elements of the bridge configurations may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

Figure 4-18. KVP 23: Existing Conditions Photograph and Conceptual Photographic Simulation – SR 14 without I-5 C Street Ramps (Fort Vancouver National Historic Site)

Existing Conditions

Photographic simulation of Modified LPA with double-deck fixed-span configuration without C Street Ramp

Photographic simulation of Modified LPA with single-level movable-span configuration without C Street ramp

Photographic simulation of Modified LPA with single-level movable-span open configuration with C Street ramp

Note: The simulation illustrates the general layout and massing of the Modified LPA double-deck fixed-span and single-level movable-span configurations. Visual elements of the configurations may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are conceptual and shown for illustration purposes only. The early conceptual design may change as the design progresses.

4.2.4.2 Viewer Sensitivity

For each type of viewer within this LU, Table 4-11 provides an assessment of the viewer's exposure to and awareness of elements of the Modified LPA and a summary of the viewer's overall sensitivity.

Residential (KVP 25) and institutional viewers (KVP 33) are typically more sensitive to changes in the cultural environment. Residential viewers would not be expected to be exposed to direct views of the Modified LPA. Institutional viewers may be exposed to and aware of cultural changes, but beneficial impacts would balance negative changes.

Table 4-11. Greater Central Park Landscape Unit Viewer Sensitivity

Viewer Group	Viewer Type	Viewer Sensitivity		
		Exposure	Awareness	Overall Sensitivity
Traveler	Motorist	Motorists on SR 14 would have views of the Modified LPA within the LU. Views would be of short duration as motorists travel through the LU. See the Vancouver Downtown LU for I-5 viewers.	Motorists would be aware of the Modified LPA but would be focused on driving. Project coherence would be improved. Passengers may be more aware but would have short-duration views.	Low
	Bicyclist/ Pedestrian	See the Vancouver Downtown LU for a discussion of Modified LPA bicycle/pedestrian viewers.	See the Vancouver Downtown LU for bicycle/pedestrian viewers.	Moderate
Neighbor	Residential	Existing trees and land cover would block or obscure views for most residential viewers within the LU.	Existing trees and land cover would block views of the Modified LPA from residential areas.	Low
	Recreational	Recreational viewers are visitors to the Fort Vancouver National Historic Site, the Vancouver Land Bridge, or Marshall Park. Views within most of the LU would be blocked by existing vegetation and land cover. However, viewers from the Fort Vancouver National Historic Site (KVP 24) and historic Kanaka Village (KVP 23) or areas directly adjacent to I-5 or SR 14 would have views, some in close proximity, of elements of the Modified LPA. Recreational views would be of short duration.	Existing trees, vegetation, and land cover would obscure most views of the Modified LPA. Viewers at the Fort Vancouver National Historic Site would be aware of the Modified LPA and would be highly sensitive. Recreational viewers typically prefer natural harmony and project coherence.	High

Viewer Group	Viewer Type	Viewer Sensitivity		
		Exposure	Awareness	Overall Sensitivity
	Institutional	Institutional viewers would be from Hudson's Bay High School and Clark College. Viewers may be exposed to changes to their visual environment. Overall viewer numbers from the schools would be low and view duration would be short to moderate for most. Full-time workers would have longer-duration views.	Viewers in most areas would not be aware of changes. Institutional viewers strongly prefer cultural order but would also be interested in project coherence.	Moderate

I-5 = Interstate 5; KVP = key viewpoint; LPA = Locally Preferred Alternative; LU = Landscape Unit; SR = State Route

4.2.4.3 Visual Quality

NATURAL ENVIRONMENT

Compared to the existing Interstate Bridge, the Modified LPA could block views of distant hills to the southwest from adjacent ground-level viewpoints to a slightly greater degree but would not interfere with views from greater distance or elevation, such as Grand Boulevard to the east (KVP 25). Compared to the existing Interstate Bridge, the Modified LPA and all of the design options would open views under the bridge as a result of the increased bridge height and the wider spacing between piers. Most natural visual elements would remain.

The natural environment would remain harmonious for most recreational (KVP 22, 24) and institutional viewers (KVP 33). However, visual changes would not be compatible with the existing natural environment for sensitive recreational viewers in close proximity to structures associated with the Modified LPA, such as viewers from the Fort and Historic Village (KVP 23) (see Figure 4-17). SR 14 and elements of the new Columbia River bridges would still be visible, but visual elements would move farther away from sensitive recreational viewers at Fort of Vancouver, particularly at Kanaka Village (KVP 23) and other views from the Fort Vancouver National Historic Site (see Figure 4-17 and Figure 4-18).

Most existing vegetation would be retained within the LU. New landscape areas and other improvements would provide beneficial impacts. However, trees would be removed adjacent to the SR 14/I-5 interchange. Viewer awareness of removed vegetation and exposure to new structures would be high; however, the natural environment would remain similar to existing conditions for neighboring residential, recreational, and institutional viewers not directly adjacent to the I-5 and SR 14 interchange. Their exposure to and awareness of visual changes would be low.

The proposed shared-use path under the Vancouver bridgehead would provide a connection between the waterfront parks and walkways both east and west of I-5, increasing public access to views and activities along the waterfront. Similarly, the Modified LPA would extend Main Street under the rail lines opening up views of the Columbia River to travelers on Main Street. Available views of the

Columbia River and Vancouver shoreline area, under the Columbia River bridges and through fewer in-water piers, may be expanded for viewers along the Vancouver Waterfront Park and Renaissance Trail. The final design of these connections and roadway extensions would include input from the public, project staff, the City of Vancouver, and both the Vancouver and Clark County Departments of Parks and Recreation.

CULTURAL ENVIRONMENT

The existing cultural environment, including the Fort Vancouver National Historic Site, Clark College, Hudson's Bay High School, the Vancouver Landbridge, and other areas of the Greater Central Park LU, would largely remain. Some areas close to the new Columbia River bridges would include new retaining walls; however, human-made materials associated with new Modified LPA features, such as concrete, asphalt, metal, glass, and plastic, and elements such as site lighting and advertising, are ubiquitous in the existing cultural environment.

The visual character of the existing Interstate Bridge has been a distinctive part of the cultural environment for a long time. Removal of the existing Interstate Bridge and lift towers would remove this character and would replace it with the selected aesthetic treatments, colors, textures, lighting, and other elements of the new Columbia River bridges.

New cultural elements, such as unified design elements and improved lighting, would likely be beneficial to the cultural environment.

Additionally, cultural elements associated with the Community Connector (discussed above for the Vancouver Downtown LU) would provide visual and physical connections with cultural elements in the Vancouver Downtown LU.

PROJECT ENVIRONMENT

The function and character of mainline I-5 would be similar to that described for the Vancouver Downtown LU. The new Columbia River bridges and SR 14 ramps would be visible because they would be higher than the existing mainline and ramps and could fill the immediate view with the rising north approach of the roadway. The current alignment of I-5 right of way is within a few feet of the historic Post Hospital. A wider I-5 corridor (accommodating the revised SR 14 and Mill Plain interchanges) would bring I-5 closer to the hospital. While this is somewhat consistent with the current conditions and the trend of urbanization along a primary transportation corridor, it would reduce the project coherence from views inside the hospital (currently vacant).

In the southwest corner of the Fort Vancouver National Historic Site near the Kanaka Village and the Fort Stockade, the new ramps for the SR 14 interchange would encroach on the perimeter of the Kanaka Village area and would be more visually prominent due to their height and proximity, making the project environment less coherent.

New bridges, intersections, roads, lanes, signage, and other Program improvements would likely improve traffic and congestion for motorists, both locally and regionally. Reduced congestion and the new shared-use path facilities and connections would increase the project coherence for bicyclists and pedestrians.

Visual impacts due to tolling are associated with the electronic tolling infrastructure and would be very slight. The overhead tolling technology would use noticeable structures, very similar to overhead signage structures, in views from and toward the highway, but would result in low visual impacts.

Light and glare conditions and impacts would be similar to those described for the Vancouver Downtown LU.

4.2.4.4 Degree of Impact

Six KVPs were identified to assess visual quality in the Greater Central Park LU. For each KVP within the Greater Central Park LU, Table 4-12 provides a quantitative assessment of the existing visual quality and the visual quality with the Modified LPA. Natural harmony, cultural order, and project coherence were rated on a scale of 1 to 7, with 1 being very low, 4 being moderate, and 7 being very high. The three scores for each visual quality element were then averaged to arrive at an overall visual quality score and assessment of the degree of impact to visual quality, for each KVP and the LU overall.

As shown in Table 4-12, four of the KVPs would have a neutral degree of impact to visual quality, and two would have an adverse degree of impact. Based on this assessment, the Modified LPA would be expected to have a combined negative numeric change in the visual quality of the KVPs and, therefore, an overall adverse degree of impact on the visual quality of the Greater Central Park LU.

Table 4-12. Greater Central Park Landscape Unit Degree of Impact on Visual Quality

KVP	Visual Quality – Existing [a]				Visual Quality – with Modified LPA [b]				Change	Degree of Impact to Visual Quality
	Natural Harmony	Cultural Order	Project Coherence	Overall	Natural Harmony	Cultural Order	Project Coherence	Overall		
21	4	3	4	3.7	4	3	4	3.7	0.0	Neutral
22	5	5	3	4.3	5	5	3	4.3	0.0	Neutral
23	6	6	2	4.7	3	6	2	3.7	-1.0	Adverse
24	6	6	2	4.7	6	6	2	4.7	0.0	Neutral
25	4	3	3	3.3	4	3	3	3.3	0.0	Neutral
33	6	4	4	4.7	5	4	4	4.3	-0.4	Adverse
Overall Landscape Unit Change	–	–	–	–	–	–	–	–	-1.4	Adverse

Notes:
Visual quality score definitions: 1 = very low, 2 = low, 3 = moderately low, 4 = moderate, 5 = moderately high, 6 = high; 7 = very high.
a The visual quality ratings for the No Build Alternative are the same as the existing conditions.
b The visual quality ratings for the Modified LPA are the same for each design option.
KVP = key viewpoint; LPA = Locally Preferred Alternative Burnt Bridge Creek Landscape Unit

4.2.4.5 Design Options

The Modified LPA with one or two auxiliary lanes and all of the bridge configurations would have the same discussion of impacts as the Columbia River LU in Section 4.2.2.5. Visual changes with the different bridge alternatives would be the same as described in the Columbia River LU.

Figure 4-17 and Figure 4-18 show a photograph of existing conditions and a simulation of the Modified LPA with the double-deck fixed-span configuration. They also show a simulation of the Modified LPA with the single-level movable-span configuration. With both bridge configurations, I-5 and the Columbia River bridges would likely still be at least partially visible beyond existing vegetation.

The Modified LPA with the single-level movable-span configuration would have bridge decks somewhat higher than the existing Interstate Bridges. However, compared to the double-deck fixed-span and single-level fixed-span configurations, the deck height would be lower, resulting in less visibility from the Greater Central Park LU. The single-level movable-span bridge configuration would have a slimmer profile than the double-deck fixed-span bridge configuration, but the increased height of the lift towers would add to the visual weight, meaning the size, color, and shape would draw more attention. In the normal (closed) conditions, the lower bridge deck and higher towers would likely balance the visual effects compared to the double-deck fixed span configuration; however, impacts would change when the bridge is open. The bridge deck between the lift towers would be higher and more visible when in an open configuration (see Figure 4-17, Figure 4-18). This increased visibility of the bridge deck may obstruct additional views and skylines, and likely intensify visual impacts, especially for sensitive recreational viewers. The overall bridge deck would be higher and more visible than the existing bridge deck. Because bridge lifts would not be lengthy or frequent, the exposure of these visual effects to sensitive and non-sensitive viewers would be limited.

SR 14 INTERCHANGE WITHOUT I-5 C STREET RAMPS

This design option would eliminate the C Street ramps, including the eastside loop ramp from I-5 northbound to C Street and on the west side of I-5 from C Street to I-5 southbound. Program improvements associated with the C Street ramp would be removed, and ground-level elements would be eliminated for sensitive recreational viewers within the Greater Central Park LU (see Figure 4-18). Not all visual impacts would be eliminated, as elements associated with I-5 and the Columbia River bridges would likely still be at least partially visible beyond existing vegetation. Visual elements associated with the Columbia River bridges and SR 14 would remain, but the overall degree of impact to visual quality with this design option would be beneficial.

I-5 MAINLINE WESTWARD SHIFT

This design option would slightly shift the I-5 mainline west, slightly farther from sensitive viewers at Kanaka Village (KVP 23) and other views from the Fort Vancouver National Historic Site. With this design option, the existing elevation of the Evergreen Bridge would not change; therefore, many project elements would be at or below ground level for viewers within the Greater Central Park LU (see Figure 4-18). Visual elements associated with the Columbia River bridges and SR 14 would remain, but the overall degree of impact to visual quality with this design option would be beneficial.

PARK AND RIDES

The park and ride site options would be located in the Vancouver Downtown LU. Viewers from the Vancouver Barracks Post Hospital would likely have direct views of the Evergreen Station park and ride location. However, for most viewers from the Greater Central Park LU the site options for park and ride facilities would be behind or under the I-5 mainline or Columbia River bridges. The number of affected viewers would be low. For the Greater Central Park LU, the overall degree of impact to visual quality associated with the design options for the park-and-ride facilities would be neutral.

4.2.5 Burnt Bridge Creek Landscape Unit

4.2.5.1 Visual Compatibility

The compatibility of the Modified LPA's visual character with the visual character that currently exists in the Burnt Bridge Creek LU is summarized in Table 4-13.

Table 4-13. Burnt Bridge Creek Landscape Unit - Modified LPA Visual Character Compatibility Matrix

Visual Character Element	Modified LPA Visual Compatibility
Project Scale	The scale and height of ramps, roadways, and other Modified LPA improvements within the LU would be similar to the scale of existing elements but would include a new ramp associated with the braided Fourth Plain connection. Because most elements would be similar in scale, the Modified LPA would be compatible with the existing visual environment.
Project Form	The horizontal and vertical alignments of the Modified LPA would generally follow the existing alignments in the Burnt Bridge Creek LU. The braided ramp would be similar to existing ramps and roadways. The resulting form would be compatible with the existing visual character.
Project Materials	The Modified LPA would primarily use concrete, asphalt, and steel construction that matches existing roadway elements within the LU. The final design would also integrate lighting that promotes safety for motorists and active transportation users while minimizing ambient light spillover that would obtrude into adjacent landscapes. The Modified LPA would not change the existing elements of the cultural environment.
Modified LPA Visual Character	In summary, the visual character of the Modified LPA would be similar to existing conditions in scale and form and would use similar materials. The overall character would be compatible with the existing visual environments.

AVE = area of visual effect; LPA = Locally Preferred Alternative; LU = landscape unit

4.2.5.2 Viewer Sensitivity

Topography, vegetation, and land cover with the Modified LPA are not expected to change outside of the I-5 corridor; they would continue to block most views for neighboring viewers. Direct exposure to and awareness of the project environment would likely not change for most viewers (see Table 4-14).

Table 4-14. Burnt Bridge Creek Landscape Unit Viewer Sensitivity

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
Traveler	Motorist	Motorists would have views of the Modified LPA from I-5 within the LU. Views would be of short duration as motorists travel through the LU. Visual changes would primarily be associated with roadway expansion and updated ramps.	Motorists would be aware of the Modified LPA but would be focused on driving. Project coherence would be improved. Passengers may be more aware but would have short-duration views.	Low
	Bicyclist/ Pedestrian	There are no existing or proposed bicycle or pedestrian facilities or viewers along I-5 within the Burnt Bridge Creek LU. Bicyclists and pedestrians on the 39th Street Bridge and Discovery Trail bridge over I-5 would be exposed to visual elements of the Modified LPA.	Bicyclists and pedestrians may be aware of changes in the visual environment with the Modified LPA, but changes in this LU would be minimal and viewers would have short-duration views as they pass through.	Low
Neighbor	Residential	Existing trees and land cover would block or obscure views for most viewers. Direct view of light sources and overall ambient light conditions are not expected to change.	Awareness would be low as no direct views of the Modified LPA are anticipated for this LU.	Low
	Recreational	Existing trees and land cover would block or obscure views for most recreational viewers at Leverich Park or along the Burnt Bridge Creek Trail. Direct views of light sources and overall ambient light conditions are not expected to change.	Awareness would be low as no direct views are anticipated for this LU.	Low
	Agricultural	Existing trees and land cover would block or obscure views for most viewers. Direct views of light sources and overall ambient light conditions are not expected to change.	Awareness would be low as no direct views are anticipated for this LU.	Low
	Industrial	Industrial areas are mainly located on the BPA substation and office complex. Views of the Modified LPA would be long but most views would likely be blocked by existing trees and vegetation.	Industrial viewers would generally focus on work-related activities. They prefer project coherence.	Low

BPA = Bonneville Power Administration; LPA = Locally Preferred Alternative; LU = landscape unit

4.2.5.3 Visual Quality

NATURAL ENVIRONMENT

Within the Burnt Bridge Creek LU, the existing character of the natural environment is that of a suburban greenway, and the highway with landscaped edges softens the facilities and helps to create a more open quality. The Modified LPA is not expected to remove large trees or reduce open space that is part of the natural environment outside of the I-5 corridor. Some existing vegetation (i.e., grasses, shrubs, and trees) may be removed within existing transportation right of way to slightly widen shoulders or lanes of I-5 or SR 500, but the character of the natural environment, which is that of a suburban greenway, is not expected to change. However, the existing topography, vegetation, and land cover within the Burnt Bridge Creek LU would mainly be unaffected and the natural environment elements would continue to block most views toward and from roadways for neighboring residential, recreational, agricultural, and industrial viewers. Overall, the effect of the Modified LPA on the natural harmony within the Burnt Bridge Creek LU would primarily be neutral.

CULTURAL ENVIRONMENT

Materials, signage, and lighting associated with the Modified LPA are common in the cultural environment. Roadways and other elements of the Modified LPA, such as colors, textures, rails, and lighting, would be designed to be consistent with the existing I-5 system. Once construction is complete, additional ramps, retaining walls, pavement, and other visual elements would likely be discernable; however, they would be similar in scale and form to existing elements. No changes are expected in other cultural elements such as public art, artifacts, or buildings within the Burnt Bridge Creek LU.

The character of the cultural environment would remain largely unchanged and compatible for neighboring viewers in the Burnt Bridge Creek LU. The noise analysis for the Modified LPA proposes a noise wall along the west I-5 right of way north of 39th Street. The wall would be placed where an existing steep vegetated slope exists. The new wall would replace the vegetated slope; however, the vegetation is not regularly maintained or ornamental and the wall would not block views beyond the slope. The overall cultural environment would be orderly and compatible with the existing environment and would be a neutral visual impact.

PROJECT ENVIRONMENT

Minor improvements associated with the braided connection to Fourth Plain Boulevard would be made to the I-5/SR 500 interchange, but the Modified LPA would primarily rebuild existing ramps and roadways. Reconstructed ramps would tie into existing I-5 northbound to SR 500 eastbound, and SR 500 westbound to I-5 northbound. The existing bridge structures for 39th Street over I-5 and SR 500 westbound to I-5 southbound would be retained.

The Modified LPA would alter lanes, shoulders, and ramp structures associated with existing roadways, including I-5 and SR 500. Because the Modified LPA would use materials and visual elements (asphalt, concrete, metal, signage, lighting) similar to those of the existing I-5 and SR 500 facilities, it would be coherent with the existing visual context of the project environment.

Light and glare can have aesthetic, as well as comfort and safety impacts on viewers. The Modified LPA would include lighting similar to the existing I-5 and SR 500 facilities. Lighting elements would be unified throughout the Modified LPA using similar lines, colors, and styles; furthermore, light and glare impacts from fixed light sources are expected to be less than the No-Build Alternative, as replacement lights would be designed with modern fixtures and materials that limit light spill and glare and reduce ambient light levels.

For KVP 40, Figure 4-19 shows that visual changes to the interchange ramp would be similar in scale, form, and materials to the existing conditions; therefore, visual changes to the natural, cultural, and project environments would be minor.

Figure 4-19. KVP 40: Existing Conditions and Conceptual Photographic Simulation (39th Street Bridge Looking South)

Existing Conditions

Photographic simulation of Modified LPA

Note: The simulation illustrates the general layout and massing of the Modified LPA. Visual elements of the Modified LPA may change as the design progresses. Roadways, intersections, signage, markings, and other simulated elements are for illustration purposes only. The early conceptual design may change as the design progresses.

4.2.5.4 Degree of Impact

Three KVPs were identified to assess the degree of impact on viewers and the overall visual quality in the Burnt Bridge Creek LU: KVP 41 from Leverich Park looking toward the SR 500/I-5 interchange, KVP 40 looking south from the 39th Street bridge, and KVP 39, where SR 500 merges with I-5 looking south.

For each KVP within the Burnt Bridge Creek LU, Table 4-15 provides a quantitative assessment of the existing visual quality of the Burnt Bridge Creek LU and the visual quality with the Modified LPA. Natural harmony, cultural order, and project coherence were rated on a scale of 1 to 7, with 1 being very low, 4 being moderate, and 7 being very high. The three scores for each visual quality element were then averaged to arrive at an overall visual quality score and assessment of the degree of impact to visual quality, for each KVP and the LU overall. Based on this assessment, the Modified LPA would be expected to have a combined numeric change of 0 in the visual quality of the KVPs and, therefore, an overall neutral degree of impact on the visual quality of the Burnt Bridge Creek LU.

Table 4-15. Burnt Bridge Creek Landscape Unit Degree of Impact on Visual Quality

KVP	Visual Quality – Existing [a]				Visual Quality – with Modified LPA [b]				Change	Degree of Impact to Visual Quality
	Natural Harmony	Cultural Order	Project Coherence	Overall	Natural Harmony	Cultural Order	Project Coherence	Overall		
39	5	4	4	4.3	5	4	4	4.3	0.0	Neutral
40	4	3	4	3.7	3	3	5	3.7	0.0	Neutral
41	6	5	3	4.7	6	5	3	4.7	0.0	Neutral
Overall Landscape Unit Change	–	–	–	–	–	–	–	–	0.0	Neutral

Notes:

Visual quality score definitions: 1 = very low, 2 = low, 3 = moderately low, 4 = moderate, 5 = moderately high, 6 = high, 7 = very high. Scores are based on the visual simulations prepared for the project.

a The visual quality ratings for the No Build Alternative are the same as the existing conditions.

b The visual quality ratings for the Modified LPA are the same for each design option.

As shown in Table 4-15, the existing visual environment would generally change little with the Modified LPA and the overall score for KVPs 41 and 39 would be the same. For KVP 40, the proposed ramps in the Modified LPA would reduce some elements of the natural visual environment but the cultural environment would remain similar. Project coherence for travelers would likely be improved by the added ramps. The overall visual quality score would remain the same under the Modified LPA as conditions with a degree of impact score of 4.7, 3.7, and 4.3, which would be a neutral degree of impact to visual quality. Therefore, the degree of visual quality impact for the Burnt Bridge Creek LU would be neutral.

4.2.5.5 Design Options

The I-5 mainline westward shift, SR 14 interchange without C Street ramps, and park-and-ride site design options would not impact the Burnt Bridge Creek LU.

TWO AUXILIARY LANES

Within the Burnt Bridge Creek LU, the Modified LPA with two auxiliary lanes would have similar visual impacts as the Modified LPA with one auxiliary lane. While the width of the I-5 mainline roadway would increase by 16 feet, this difference would not change the visual character and quality compared to the Modified LPA with one auxiliary lane.

BRIDGE CONFIGURATIONS

In the Burnt Bridge Creek LU, because of the distance to the Columbia River bridges, the Columbia River bridges would not be visible from most locations; therefore, the different bridge configurations do not result in changes in visual character or quality.

4.2.6 Ruby Junction Landscape Unit

The Ruby Junction Maintenance Facility would be expanded to accommodate the additional LRVs associated with the extension of light-rail with the Modified LPA. Several parcels would be purchased to expand the site. Existing buildings, structures, vegetation, and other elements on the purchased properties would be removed. Improvements would include additional storage for LRVs and other maintenance material, expansion of LRV maintenance bays, and expanded parking for additional personnel. See the Description of Alternatives.

Additional light-rail trains entering the site may be visible to surrounding viewers, but the reconfiguration of the facility would not substantially change the visual character of the facility or surrounding areas, nor would it noticeably change the visual quality. Industrial, commercial, and retail viewers would likely not be sensitive to changes in the visual environment.

The compatibility of the Modified LPA's visual character with the visual character that currently exists in the Ruby Junction LU is summarized in Table 4-16.

Table 4-16. Ruby Junction Landscape Unit – Modified LPA Compatibility Matrix

Visual Character Element	Modified LPA Visual Compatibility
Project Scale	The Modified LPA would revise the number of structures, rails, and the number of light-rail vehicles entering or parked at the site, but the scale would be similar to the scale of existing elements.
Project Form	The horizontal and vertical alignments of Modified LPA light-rail lines would follow the existing alignments, and the resulting form would be compatible with the existing visual character.
Project Materials	The Modified LPA would primarily use construction that matches existing elements within the LU.

Visual Character Element	Modified LPA Visual Compatibility
Modified LPA Visual Character	In summary, the Modified LPA would be compatible with the existing scale, form, and materials of the existing visual environment.

AVE = area of visual impact; LPA = Locally Preferred Alternative LU = landscape unit

4.2.6.1 Viewer Sensitivity

For each type of viewer within this LU, Table 4-17 provides an assessment of the viewer's exposure to, and awareness of, elements of the Modified LPA and a summary of the viewer's overall sensitivity.

Table 4-17. Ruby Junction Landscape Unit Viewer Sensitivity

Viewer Group	Viewer Type	Exposure	Awareness	Overall Sensitivity
Neighbor	Residential	Residential viewers would include residential areas outside of the Ruby Junction Maintenance Facility (KVP 42). Most views of the site would be blocked by vegetation or land cover, but a small number of viewers would have long-term views.	Existing trees and land cover would block views of the Modified LPA from most residential areas.	Low
	Commercial/ Retail	Retail and commercial areas within the LU may have views of the site, but most would be blocked by land cover. Retail and commercial viewers are generally transitory, but workers can have longer-duration views.	Commercial/retail viewers are generally focused on shopping and work activities. Viewers would have a low awareness but prefer project coherence and natural harmony.	Low
	Industrial	Industrial areas occupy the majority of LU. Views would be long but most views would likely be blocked by existing trees and vegetation.	Industrial viewers would generally focus on work-related activities. They prefer project coherence.	Low

KVP = key viewpoint; LPA = Locally Preferred Alternative LU = landscape unit

4.2.6.2 Visual Quality

NATURAL ENVIRONMENT

The Modified LPA would result in low-level changes to the natural environment in the Ruby Junction LU. Some trees and other vegetation would likely need to be removed in the areas where the facility would be expanded. Changes to the natural environment and harmony, as perceived from surrounding areas, would be minimal, and exposure and awareness of viewers would likely not change.

CULTURAL ENVIRONMENT

The cultural environment would generally remain unchanged for the Ruby Junction LU. The proposed scale of the expanded facilities would be similar to the existing maintenance activities, and the proposed materials would be similar as well. The overall order of the cultural environment would remain the same.

PROJECT ENVIRONMENT

The expansion of the Ruby Junction Maintenance Facility would be very similar to the existing site and would not change the perceived coherence of the project environment.

4.2.6.3 Degree of Impact

KVP 42, was identified to assess the visual quality in the Ruby Junction LU. Table 4-18 provides a quantitative assessment of the existing visual quality and the visual quality with the Modified LPA from KVP 42. Natural harmony, cultural order, and project coherence were rated on a scale of 1 to 7, with 1 being very low, 4 being moderate, and 7 being very high. The three scores for each visual quality element were then averaged to arrive at an overall visual quality score and assessment of degree of impact to visual quality, for each KVP and the LU overall.

As shown in Table 4-18, the Modified LPA was determined to have a neutral degree of impact to the visual quality at KVP 42. Based on this assessment, the Modified LPA would be expected to have a combined numeric change of 0 in the visual quality of the KVPs and, therefore, an overall neutral degree of impact on the visual quality of the Ruby Junction LU.

Table 4-18. Ruby Junction Landscape Unit Degree of Impact to Visual Quality

KVP	Visual Quality – Existing [a]				Visual Quality – with Modified LPA [b]				Change	Degree of Impact to Visual Quality
	Natural Harmony	Cultural Order	Project Coherence	Overall	Natural Harmony	Cultural Order	Project Coherence	Overall		
42	3	2	3	2.7	3	2	3	2.7	0.0	Neutral
Overall Landscape Unit Change	–	–	–	–	–	–	–	–	0.0	Neutral

Note: Visual quality score definitions: 1 = very low, 2 = low, 3 = moderately low, 4 = moderate, 5 = moderately high, 6 = high, 7 = very high.

a The visual quality ratings for the No Build Alternative are the same as the existing conditions.

b The visual quality ratings for the Modified LPA are the same for each design option.

Key: KVP = key viewpoint; LPA = Locally Preferred Alternative

5. TEMPORARY EFFECTS (ANALYSIS PHASE)

5.1 No-Build Alternative

The No-Build Alternative includes planned transportation projects in the AVE through 2045. Construction of these projects, as well as ongoing repair and maintenance activities for I-5 in the AVE (e.g., painting, repaving, and repairing pavement), would take place under the No-Build Alternative. Ongoing maintenance, repair, and construction would result in repeated temporary visual impacts introducing visual clutter that would have a slight adverse degree of impact to visual quality.

Although difficult to predict, if a future seismic event were to occur under the No-Build Alternative, it could result in cracks, damaged surfaces and finishes, structural deformations, or collapses of structures and the Interstate Bridge, depending on severity. Bridge closures could affect regional vehicular and river traffic for extended periods of time. Viewers may be exposed to heavy traffic on detour routes for long durations and visual clutter from construction activities to repair or replace bridge and roadway elements. The degree of impact to visual quality would be major and adverse.

5.2 Modified LPA

Construction of the Modified LPA is expected to last 9 to 15 years, during which views toward and from the AVE would be altered. Temporary effects on visual quality would result from construction-related activities and would occur throughout the AVE to varying degrees.

Short-term changes to the visual character of the AVE could result from:

- Construction vehicles and equipment, which may include excavators, loaders, lifts, backhoes, bulldozers, compactors, mixers, pump trucks, barges, and cranes. This equipment is often brightly colored to promote visibility and safety.
- Construction lighting may be used for nighttime work that may impact neighbors and traveling viewers. Impact would likely impact residential viewers the most.
- Removal of mature/established deciduous and coniferous trees.
- Clearing and grading activities resulting in exposed soils until replanting or repaving occurs.
- Erosion control devices such as silt fences, plastic ground cover, and straw bales.
- Dust, exhaust, and airborne debris in areas of active construction.
- Stockpiles of excavated material.
- Staging areas used for storage of equipment and materials.
- Disruption to the navigation corridor.
- Overhead gantries and scaffolding to support elevated structures such as stanchions or ramps.

The construction of new bridges over the Columbia River is the most substantial element of the Modified LPA, and this element sets the sequencing for other components. The main river crossing

and immediately adjacent highway improvement elements would account for the majority of the construction activities. Barges and cranes would be visible in the Columbia River during the construction of the piers and would be present when the replacement bridge deck is assembled. Boats would bring workers to and from the overwater construction area. Similar equipment would be used to deconstruct the existing bridge after it has been replaced, which would take approximately 1.5 to 2 years. These impacts would be temporary, occurring while the new Columbia River bridges are built and the existing Interstate Bridge is deconstructed.

Mature and established trees removed in areas designated for Modified LPA elements and for construction would be replaced with revegetation measures; however, screening, blending, and other natural elements associated with mature vegetation would take many years to be fully replaced and vegetation removal would be considered a long-term impact.

Equipment and materials would be staged as needed for construction of the Modified LPA, generally within existing or newly purchased right of way or on nearby vacant parcels. However, at least two potential large sites have been identified for staging and for storing the larger equipment such as cranes, and materials such as rebar and aggregate. One site is located on Hayden Island on the west side of I-5. A large portion of this parcel has already been established as part of the new right of way for the Modified LPA. The second site is located in Vancouver on the east side of I-5, west of Clark College. Other major staging sites may be identified during the design process or by the contractor.

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

Temporary impacts at the Ruby Junction Maintenance Facility would likely be of a much shorter duration. Construction would occur within the existing site and on expansion properties surrounded by existing fence lines. Few neighboring viewers would have direct views of the site and impacts would be minimal. Furthermore, heavy construction vehicles, bright colors, fencing, dust, and other visual elements are present in the existing context in neighboring properties. Nighttime construction would not be anticipated for this site.

5.2.1 Design Options

All design options would have similar visual temporary effects to those of the Modified LPA. Under the Modified LPA and each design option, tall cranes would be required for the demolition of the existing lift towers. For the single-level movable-span configuration, tall cranes would be needed to construct the lift towers. In addition, construction of the Modified LPA and the temporary visual effects could last up to two additional years with the single-level movable span.

5.2.2 Visual Compatibility

Vegetation may be removed from some areas to accommodate the construction of the bridges, new ramps, and transit guideways. Each area would be revegetated upon project completion, but construction activities would degrade or partially obstruct views or vistas.

Roadway improvements and connections would occur within I-5; SR 14; SR 500; Marine Drive; NE Martin Luther King Jr. Boulevard; and other rights of way but may include the acquisition of additional properties where the existing structures, vegetation, and other improvements would be displaced. Construction activities would be associated with roads, bridge structures, stormwater elements, retaining walls, grading, and pedestrian features. The existing Interstate Bridge would remain in use and would not be removed until the new Columbia River bridges are operational. These construction and demolition activities would be highly visible to travelers along I-5, as well as neighbors throughout the AVE, particularly those in close proximity to the bridges.

Construction equipment and activities would be noticeable throughout the active construction period. For the Modified LPA, construction equipment is likely to include barges, cranes, excavators, loaders, lifts, backhoes, bulldozers, compactors, mixers, pump trucks, boats, and other construction-related equipment. Barricades, cones, flagging and flaggers, flashing lights, warning signs, and lane closure indicators are also likely to be used in vehicle management. This equipment is often brightly colored to promote visibility and safety. Other sources of visual changes during construction would include staging areas, material storage, trailers, fencing, vehicular and pedestrian detours, construction signing, flashing safety lights, and work lighting. Lights may be used to safely illuminate the workspaces, which could cause spillover light onto adjacent parcels. These activities and objects may be visible to neighbors and travelers throughout the AVE. Visual detractions associated with construction activities would be removed upon completion of construction.

To reduce potential street closures that would disrupt daytime vehicular traffic, nighttime construction would be necessary to minimize disruption to daytime traffic. Temporary lighting may be necessary for nighttime construction of certain project elements. Existing nighttime lighting is already common within much of the AVE from the street and adjacent industrial, commercial, and developed residential areas; however, construction lighting would affect residential areas by exposing residents to glare from unshielded light sources and by increasing ambient nighttime light levels.

Casting and staging areas, as well as the construction of the Ruby Junction Maintenance Facility, would likely be impacted by vegetation removal, construction vehicles and movement, fencing, material storage, bright colors, flashing lights, nighttime lighting, dust, and other visual elements. These would have adverse visual impacts on neighbors and travelers.

5.2.3 Viewer Sensitivity

Construction activities would be visible to both neighbors and travelers in the AVE, primarily within the visual context of the existing roadway. These visual changes would contribute to viewers perceiving a disorderly cultural environment and an incoherent project environment.

5.2.4 Degree of Impact

Construction activities would be visible to both neighbors and travelers in the AVE, primarily within the visual context of the existing roadway. Lighting, human-made structures and materials, bright colors, and vehicle movement would be visible within the AVE. While these visual changes are typical of construction activities, they would contribute to a perception of a disorderly cultural environment and incoherent project environment. Therefore, during construction, both neighbors and travelers would perceive a temporary degradation and adverse degree of impact to visual quality. In particular, residential neighbors (who prefer maintaining natural harmony and cultural order) adjacent to construction activities would perceive construction activities as degrading the existing visual quality.

Visual impacts due to construction activities are, by nature, temporary, and visible detractions related to construction would be removed upon completion. Therefore, the Modified LPA would have a high degree of adverse impact on the visual quality of the AVE but would be limited by the duration of the construction of each item, and impacts would be temporary.

6. INDIRECT EFFECTS (ANALYSIS PHASE)

The Modified LPA would have indirect effects on visual character and visual quality. These effects could result from potential changes in land use within the AVE that may occur over time as a result of the Modified LPA and are anticipated to occur primarily in the Columbia River LU and the Vancouver Downtown LU.

6.1 Columbia Slough Landscape Unit

The Columbia Slough LU lies south of Hayden Island and the North Portland Harbor bridge and includes the Marine Drive interchange. With the Modified LPA, anticipated land use changes in this LU are primarily around the proposed Marine Drive interchange.

Viewers in this area include travelers on I-5, Marine Drive, Martin Luther King Jr. Boulevard, and other local roads, transit riders, and bicyclists and pedestrians. Neighboring viewers include recreational, commercial, retail, and industrial neighbors. Of these groups, vehicle passengers, bicyclists, pedestrians, recreational, and commercial/retail viewers are likely to have moderate to high sensitivity to the views and visual character of the area because they have time to observe the environs. They are also likely to have higher expectations of a visually pleasing experience, particularly if walking across the Columbia River bridge, boating, or using one of the waterfront trails or parks.

This LU is already a highly developed urban area, but improved vehicular access and reduced congestion may support denser development in areas currently planned for such development (see the Land Use Technical Report). Development would occur in compliance with the City of Portland land use plans and regulations. This would likely have a positive effect on the visual character, depending on the quality of design and materials used compared with what is being replaced (primarily existing buildings and parking lots). Indirect impacts to visual quality as a result of the Modified LPA for this LU are not anticipated.

6.2 Columbia River Landscape Unit

The Columbia River LU lies between Marine Drive and the Vancouver waterfront development on the north shore of the river. This unit includes North Portland Harbor, Hayden Island, and the main river channel. The existing overall visual character in this unit is defined by the Columbia River, the project environment, and the near-continuous development along the shorelines.

Under the Modified LPA, potential indirect land use changes in this LU would primarily involve redevelopment around the proposed transit station on Hayden Island. New development would occur in compliance with the City of Portland's land use plans and regulations. These areas are already highly developed and planning for transit-oriented development.

Viewers in this area include travelers on I-5, those on side streets, recreational boaters on the waterways and park and trail users, and people in trains crossing the river. Of these groups, recreationists and travelers are likely to have moderate sensitivity to the views and visual character of the area because they have time to observe their surroundings. They are also likely to have higher

expectations of a visually pleasing experience, particularly if walking across the Columbia River bridge, boating, or using one of the waterfront trails or parks. Residential viewers would most likely experience indirect visual changes when they are outside their homes—for example, as pedestrians and vehicle passengers.

Views for boaters, air passengers, and pedestrians are unlikely to change significantly because views of new development are likely to be blocked by existing structures or would be in character with existing development. In some instances, existing views of the Columbia River, distant hills, and Mount Hood may be obstructed by new development. However, as most transit-oriented development is anticipated to occur west of I-5, the impacts on views of Mount Hood from I-5 should be relatively minor. Therefore, the indirect effect to visual quality from the Modified LPA for this LU is anticipated to be neutral.

6.3 Vancouver Downtown Landscape Unit

The Vancouver Downtown LU includes Vancouver's downtown core of commercial and office buildings west of I-5, as well as the surrounding residential neighborhoods north toward Mill Plain Boulevard. This is an urban landscape with a mix of historic and contemporary buildings and both small- and large-scale developments. The overall visual character of this LU is defined by Vancouver's urban form. Development is continuous and moderately dense and consists of single- and multi-family homes, mixed-use buildings, and a pedestrian-friendly urban commercial and business core. There are many historic or vintage buildings and homes that contribute to a distinctive residential urban character.

The Modified LPA may have an indirect effect of encouraging redevelopment in the more urban areas of this LU, particularly in areas near new LRT stations consistent with Vancouver's plans to accommodate growth by increasing land use density in areas served by high-capacity transit, adding to the buildings, street signs, street trees, and miscellaneous site furnishings typical of an urban core that would be visible to most views in downtown Vancouver. Development would occur in compliance with the City of Vancouver's land use plans and regulations. Development in this LU could obstruct views of the project environment, as well as the Columbia River, distant hills in Portland, and Mount Hood. The exception is views from the conference center and hotels along the Vancouver shoreline, and the upper floors of taller downtown buildings. I-5 is recessed into the grade through this section, and views of it from the surrounding area are limited by landforms, buildings, and trees. Views outward from the roadway are limited by berms and retaining walls.

Viewers in this LU are travelers on I-5 and local streets, commuters, shoppers, visitors, tourists, residents with direct views of I-5, and people engaged in recreational activities. Residents and visitors to the commercial and business areas may be sensitive to view quality because they are likely to expect an attractive, familiar urban environment.

Indirect land use changes may occur primarily around the proposed transit stations in downtown Vancouver and near Evergreen Boulevard (including the Community Connector), as new areas are opened or removed due to the SR 14 interchange and adjustments to the Mill Plain intersection. Again, development would occur in compliance with the City of Vancouver's land use plans and regulations and would, therefore, be expected to be performed in a manner that is visually compatible with the existing environment. Because these areas are already highly developed, potential new

transit-oriented development is anticipated to have either no effect or a positive effect on the visual character, depending on the quality of design and materials. The visual quality experienced by neighbors on local streets is unlikely to be noticeably changed, as new buildings would become part of the existing urban view. Travelers on I-5 are also unlikely to experience changes in views, as views are already limited to the highway infrastructure. Therefore, the indirect effect on visual quality from the Modified LPA is anticipated to be neutral.

6.4 Greater Central Park Landscape Unit

The Greater Central Park LU includes the Fort Vancouver National Historic Site, Clark College, Officers Row, Pearson Field, Marshall Park, and Hudson's Bay High School. Most areas within the LU are either protected or developed. Indirect impacts to visual quality as a result of changed land use or substantially increased development density are not anticipated for this LU.

6.5 Burnt Bridge Creek Landscape Unit

The Burnt Bridge Creek LU is characterized by a riparian valley between steep-sided hills but also includes the I-5/SR 500 interchange. This LU includes residential neighborhoods, small agricultural areas, parks, the Burnt Bridge Creek Greenway, and the BPA substation. Riparian areas and steep slopes that define the visual character in this LU would not change, and improving local and regional traffic congestion is not likely to change land uses. Indirect impacts to visual quality from the Modified LPA are not anticipated for this LU.

6.6 Ruby Junction Landscape Unit

Indirect impacts to visual quality as a result of changed land use or substantially increased development density are not anticipated for this LU.

7. POTENTIAL AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

7.1 Long-Term Effects

The following section identifies potential mitigation measures to address the long-term effects of the Modified LPA to visual quality.

7.1.1 Regulatory Requirements

- Meet the design standards of the Cities of Vancouver and Portland and the Tri-County Metropolitan Transportation District and the Clark County Public Transit Benefit Area Authority for visual quality, including street furniture and transit stations.
- Restore impacted roadsides in interchange and corridor areas in accordance with applicable vegetation and tree mitigation requirements.

7.1.2 Program-Specific Mitigation

The following Program-specific mitigation is recommended for the Modified LPA.

7.1.2.1 Mitigation Common to All Landscape Units

- For local streets and transit stations, restore damaged landscapes, replant street trees, and provide enhanced landscapes to integrate the facilities into the community.
- Shield station and facility lighting.
- Minimize structural bulk, such as for ramps and columns.
- Design architectural features to blend with the surrounding community.
- Design gateways in coordination with applicable local plans including designs for landscaping, wall treatments, and other Program improvements.

7.1.2.2 Mitigation for Transit Stops and Stations

- Design transit structural and architectural elements to be context-sensitive, and system-related signage and transit patron cues to be consistent with other transit system elements within respective systems.
- Design the signal pole color, location, and style in accordance with the lighting district standards of the jurisdiction where the poles would be located (Portland or Vancouver).
- Integrate transit facilities into the design of the community connector.

7.1.2.3 Place-Specific Design Recommendations

TRANSIT STATIONS AND PARK AND RIDES

- Conduct public design charrettes during the final design phases to refine the plans for each station area and park and ride.

COLUMBIA RIVER LANDSCAPE UNIT

North Portland Harbor Crossings

- Preserve views of Mount Hood, to the extent practicable, for all users.

Hayden Island

- Integrate transit stations with the ground level, such as with landscaping.
- Evaluate surrounding views from the transit platform.
- Consult with the federally recognized tribes in the design process and provide opportunities to include cultural features such as public art, historic education, plazas, or indigenous canoe watercraft landing and taking off locations.

Hayden Island Bridgehead

- Separate structures to admit daylight, if feasible. Maintain the separation between bridge structures across the island to ensure daylight and viable landscape at ground level, if feasible.
- Explore the incorporation of preserved bridgehead character into final design.
- Consult with the federally recognized tribes in the design process and provide opportunities to include public art, historic education, plazas, water access, or other cultural features.
- Explore public art opportunities on Hayden Island to announce arrival in Oregon, including pylons, piers, and other structures.

Columbia River Spans

- Design the active transportation on the Columbia River bridges for a low-stress environment as possible.
- Use art and landscaping to build anticipation of the river crossing in those approaching the main span, as feasible.
- Include lighting that would give expression to the architecture after dark, as feasible.

North Bank

- Incorporate a destination public open space under the bridge area, as feasible.
- Consult with the federally recognized tribes in the design process and provide opportunities to include cultural features such as public art, historic education, plazas, or water access.
- Encourage creating or enhancing spaces, events, or initiatives that activate open spaces and urban environments along the Main Street extension to the river. Enhancements may include

public art, street furniture, bike and pedestrian facilities, popup markets and public events, or other measures.

- Activate open spaces and screen structures with landscaping.
- Use architecture or public art to mark entry and departure from each bridge.

VANCOUVER DOWNTOWN LANDSCAPE UNIT

Transit Structure "Landing" in Vancouver

- Provide landscaping, public art, or other façade treatments for the walls of the light-rail landing structure, as feasible.
- Coordinate and design transit structures and facilities in conjunction with the Community Connector.

Park-and-Ride Facilities

- Incorporate design guidelines and consider input from Central Park and downtown interested parties and the general public.
- Buffer the park and ride from adjacent uses, mainly with landscaping but potentially with public art, fencing, or other elements, as feasible.
- Comply with City of Vancouver Design Standards and have plans reviewed by the Vancouver Design Review Committee.
- To the extent feasible, eliminate potential glare from the park-and-ride structure components.
- Incorporate public art reflective of the unique context at each park-and-ride facility.

McLoughlin Boulevard Crossing

- Coordinate lighting under structures with city and I-5 lighting.
- Keep the spaces beneath freeway structures clear of unauthorized uses to the extent possible.

GREATER CENTRAL PARK LANDSCAPE UNIT

SR 14 Interchange

- Maintain existing vegetation wherever possible, particularly between the Kanaka Village and SR 14 ramps. Landscape plans should include plantings as visual screens. Replacement trees should be as large caliper trees as practical to replace screening value as quickly as possible.
- Provide visual and physical connections between under-bridge structures. Connect the Vancouver Land Bridge and Old Apple Tree Park with downtown Vancouver by combining improved sight lines, improved access, and integrated landscape design.
- Use Vancouver Land Bridge landscaping in new landscaped areas as feasible.
- Activate open spaces and screen structures with landscaping. Use landscape to organize the diversity and extent of open spaces associated with the interchanges and to screen the railroad berm.

BURNT BRIDGE CREEK LANDSCAPE UNIT

- Ensure compatibility of overpass approaches with neighborhoods with input from the neighborhood facing each end of the bridges, as feasible.
- Identify a local design theme for overpasses.

RUBY JUNCTION LANDSCAPE UNIT

No mitigation for construction impacts would be warranted in the Ruby Junction LU.

7.2 Mitigation for Temporary Effects

7.2.1 Regulatory Requirements

There are no regulatory requirements for temporary effects to visual quality, specifically. The Program would meet federal, state, and local design standards for light and glare.

7.2.2 Program-Specific Mitigation

- Follow standard construction specifications regarding the reduction of light and glare.
- Shield construction site lighting to reduce spillover light onto nearby residences and businesses, as feasible.
- Minimize visual obtrusiveness by locating construction equipment and stockpiling materials in less visually sensitive areas, when feasible, and in areas not visible from the road or to residents and businesses.
- Provide, as feasible, public areas to observe the construction and demolition processes, using them as an opportunity for public education.

8. PERMITS AND APPROVALS

8.1 Federal

No federal permits relating to visual and aesthetic impacts would be required. However, coordination with the National Park Service regarding the Fort Vancouver National Historic Site would be necessary if visual impacts alter the context of the historic landscape and buildings.

8.2 State

No state permits relating to visual and aesthetic impacts would be required. However, coordination with the State Historic Preservation Officer at the Washington Department of Archaeology and Historic Preservation would be required regarding visual impacts to the historic landscape and buildings at the Fort Vancouver National Historic Site.

8.3 Local

No relating to visual and aesthetic impacts local permits are necessary. The Cities of Portland and Vancouver have design review functions, which are addressed in the IBR Program's Land Use Technical Report.

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Appendix A Visual Impact Assessment Scoping Questionnaire

GUIDELINES FOR THE VISUAL IMPACT ASSESSMENT OF HIGHWAY PROJECTS - APPENDICES

Appendix C
VIA Scoping Questionnaire

The following ten questions can be used to determine the appropriate level of effort for assessing the impacts on visual quality that may result from a proposed highway project. The first set of five questions is concerned with environmental compatibility impacts on the visual resources of the affected environment. The second set of five questions deals with the sensitivity of the affected population of viewers to those impacts.

Consider each of the ten questions on the questionnaire and select the response that most closely applies to the project in question. Each response has a corresponding point value. After the questionnaire is completed the total score will represent the type of VIA document suitable for the project.

It is important that this scoring system be used as a preliminary guide only. Although these questions provide some guidelines for determining if a VIA is necessary, it should not, by itself, be considered definitive. If there is any hint that visual issues may be a factor in assessing impacts, it is recommended that a VIA be conducted. Although the total score will direct the user toward a particular level of VIA documentation, circumstances may necessitate selecting a different level of analysis and documentation based on previous experience, local concerns, or professional judgment. This checklist is meant to assist the writer of the VIA to understand the degree and breadth of the possible visual issues. The goal is to develop an analysis and document strategy that is appropriately thorough, efficient, and defensible.

Visual Impact Assessment Guidelines –Update C-1 January 2015

Federal Highway Administration

Visual Impact Assessment Scoping Questionnaire

Project Name: Interstate Bridge Replacement	Site Visit Date: Day, 00/00/0000
Location: Vancouver WA / Portland OR	Time: 0:00 a.m. / p.m.
Special Conditions/Notes:	Conducted By:

Environmental Compatibility

1. *Will the project result in a noticeable change in the physical characteristics of the existing environment?* (Consider all project components and construction impacts - both permanent and temporary, including landform changes, structures, noise barriers, vegetation removal, railing, signage, and contractor activities.)

- ☒ High level of permanent change (3)
- ☐ Moderate level of permanent change (2)
- ☐ Low level of permanent or temporary change (1)
- ☐ No Noticeable Change (0)

2. *Will the project complement or contrast with the visual character desired by the community?* (Evaluate the scale and extent of the project features compared to the surrounding scale of the community. Is the project likely to give an urban appearance to an existing rural or suburban community? Do you anticipate that the change will be viewed by the public as positive or negative? Research planning documents or talk with local planners and community representatives to understand the type of visual environment local residents envision for their community.)

- ☐ Low Compatibility (3)
- ☒ Moderate Compatibility (2)
- ☐ High compatibility (1)

3. *What level of local concern is there for the types of project features (e.g., bridge structures, large excavations, sound barriers, or median planting removal) and construction impacts that are proposed?* (Certain project improvements can be of special interest to local citizens, causing a heightened level of public concern, and requiring a more focused visual analysis.)

- ☒ High concern (3)
- ☐ Moderate concern (2)
- ☐ Low concern (1)
- ☐ Negligible Project Features (0)

4. *Is it anticipated that to mitigate visual impacts, it may be necessary to develop extensive or novel mitigation strategies to avoid, minimize, or compensate for adverse impacts or will using conventional mitigation strategies, such as landscape or architectural treatment adequately mitigate adverse visual impacts?*

- ☐ Extensive Non-Conventional Mitigation Likely (3)
- ☒ Some non-conventional Mitigation Likely (2)
- ☐ Only Conventional Mitigation Likely (1)
- ☐ No Mitigation Likely (0)

Federal Highway Administration

5. Will this project, when seen collectively with other projects, result in an aggregate adverse change (cumulative impacts) in overall visual quality or character? (Identify any projects [both state and local] in the area that have been constructed in recent years and those currently planned for future construction. The window of time and the extent of area applicable to possible cumulative impacts should be based on a reasonable anticipation of the viewing public's perception.)

- ☐ Cumulative Impacts likely: 0-5 years (3)
- ☐ Cumulative Impacts likely: 6-10 years (2)
- ☒ Cumulative Impacts unlikely (1)

Viewer Sensitivity

1. *What is the potential that the project proposal may be controversial within the community, or opposed by any organized group?* (This can be researched initially by talking with the state DOT and local agency management and staff familiar with the affected community's sentiments as evidenced by past projects and/or current information.)

- ☒ High Potential (3)
- ☐ Moderate Potential (2)
- ☐ Low Potential (1)
- ☐ No Potential (0)

2. *How sensitive are potential viewer-groups likely to be regarding visible changes proposed by the project?* (Consider among other factors the number of viewers within the group, probable viewer expectations, activities, viewing duration, and orientation. The expected viewer sensitivity level may be scoped by applying professional judgment, and by soliciting information from other DOT staff, local agencies and community representatives familiar with the affected community's sentiments and demonstrated concerns.)

- ☒ High Sensitivity (3)
- ☐ Moderate Sensitivity (2)
- ☐ Low Sensitivity (1)

3. *To what degree does the project's aesthetic approach appear to be consistent with applicable laws, ordinances, regulations, policies or standards?*

- ☐ Low Compatibility (3)
- ☒ Moderate Compatibility (2)
- ☐ High compatibility (1)

4. *Are permits going to be required by outside regulatory agencies (i.e., Federal, State, or local)?* (Permit requirements can have an unintended consequence on the visual environment. Anticipated permits, as well as specific permit requirements - which are defined by the permitter, may be determined by talking with the project environmental planner and project engineer. Note: coordinate with the state DOT representative responsible for obtaining the permit prior to communicating directly with any permitting agency. Permits that may benefit from additional analysis include permits that may result in visible built features, such as infiltration basins or devices under a storm water permit or a retaining wall for wetland

Visual Impact Assessment Guidelines –Update C-3 January 2015

avoidance or permits for work in sensitive areas such as coastal development permits or on Federal lands, such as impacts to Wild and Scenic Rivers.)

- ☒ Yes (3)
- ☐ Maybe (2)
- ☐ No (1)

5. *Will the project sponsor or public benefit from a more detailed visual analysis in order to help reach consensus on a course of action to address potential visual impacts?* (Consider the proposed project features, possible visual impacts, and probable mitigation recommendations.)

- ☐ Yes (3)
- ☐ Maybe (2)
- ☒ No (1)

Federal Highway Administration

Determining the Level of Visual Impact Assessment

Total the scores of the answers to all ten questions on the Visual Impact Assessment Scoping Questionnaire. Use the total score from the questionnaire as an indicator of the appropriate level of VIA to perform for the project. Confirm that the level suggested by the checklist is consistent with the project teams' professional judgments. If there remains doubt about whether a VIA needs to be completed, it may be prudent to conduct an Abbreviated VIA. If there remains doubt about the level of the VIA, begin with the simpler VIA process. If visual impacts emerge as a more substantial concern than anticipated, the level of VIA documentation can always be increased.

The level of the VIA can initially be based on the following ranges of total scores:

☐ ***Score 25-30***
An *Expanded VIA* is probably necessary. It is recommended that it should be proceeded by a formal visual scoping study prior to beginning the VIA to alert the project team to potential highly adverse impacts and to develop new project alternatives to avoid those impacts. These technical studies will likely receive state-wide, even national, public review. Extensive use of visual simulations and a comprehensive public involvement program would be typical.

☒ ***Score 20-24***
A *Standard VIA* is recommended. This technical study will likely receive extensive local, perhaps state-wide, public review. It would typically include several visual simulations. It would also include a thorough examination of public planning and policy documents supplemented with a direct public engagement processes to determine visual preferences.

☐ ***Score 15-19***
An *Abbreviated VIA* would briefly describe project features, impacts and mitigation requirements. Visual simulations would be optional. An Abbreviated VIA would receive little direct public interest beyond a summary of its findings in the project's environmental documents. Visual preferences would be based on observation and review of planning and policy documents by local jurisdictions.

☐ ***Score 10-14***
A *VIA Memorandum* addressing minor visual issues that indicates the nature of the limited impacts and any necessary mitigation strategies that should be implemented would likely be sufficient along with an explanation of why no formal analysis is required.

☐ ***Score 6-9***
No noticeable physical changes to the environment are proposed and no further analysis is required. Print out a copy of this completed questionnaire for your project file to document that there is no effect. A *VIA Memorandum* may be used to document that there is no effect and to explain the approach used for the determination.

Appendix B Key Viewpoint Existing Conditions Photographs

Appendix B: Existing Conditions Photographs

Viewpoint Key Map

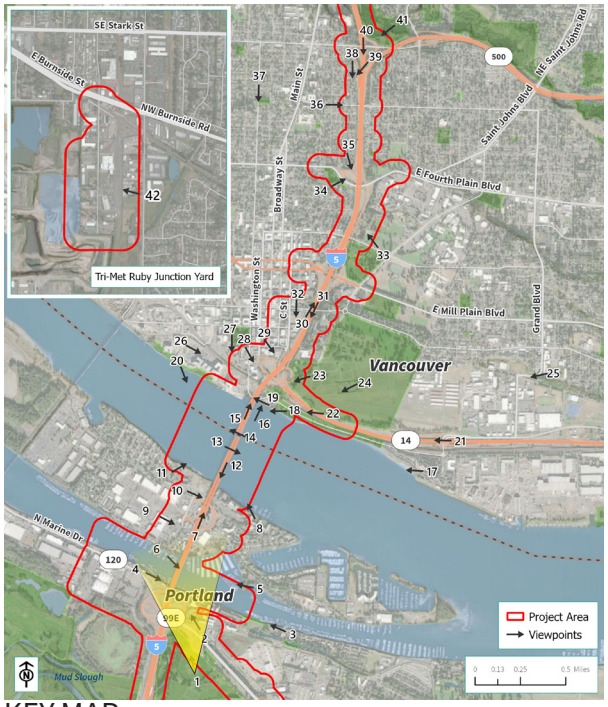
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 1
Notes: Marine Drive Interchange at Delta Park
Landscape Unit: Columbia Slough

Longitude: 122° 40.869’
Latitude: 45° 36.086’
Date: March 9, 2022
Time: 12:58 pm
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: north
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 2
Notes: Marine Drive looking northwest at pedestrian trails
Landscape Unit: Columbia Slough

Longitude: 122° 40.820’
Latitude: 45° 36.215’
Date: January 21, 2023
Time: 1:42 pm
Weather: Cloudy
Visibility: Clear

Camera: Canon EOS Rebel XSI
Lens setting: 34mm
Camera Bearing: northwest
Height of Camera: 5’-6”

KEY MAP

Appendix B: Existing Conditions Photographs

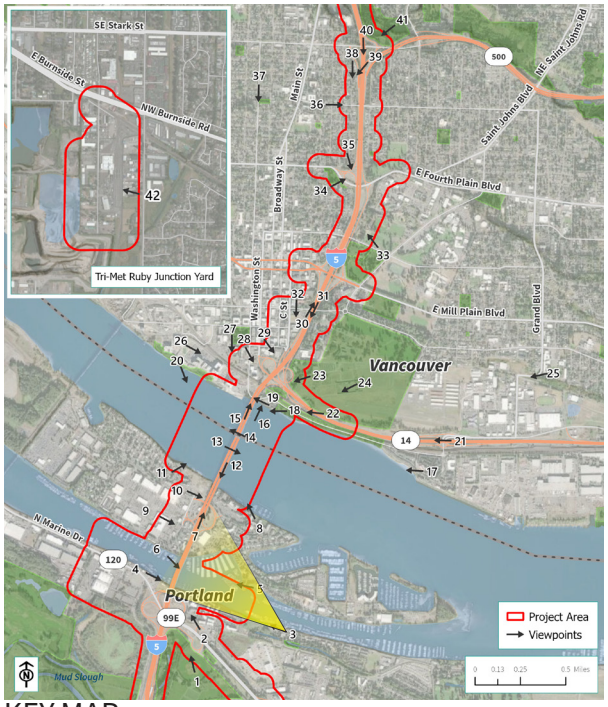
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 3
Notes: North Portland Harbor from Bridgeton Trail
Landscape Unit: Columbia Slough

Longitude: 122° 40.263’
Latitude: 45° 36.215’
Date: March 9, 2022
Time: 12:42 pm
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: northwest
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

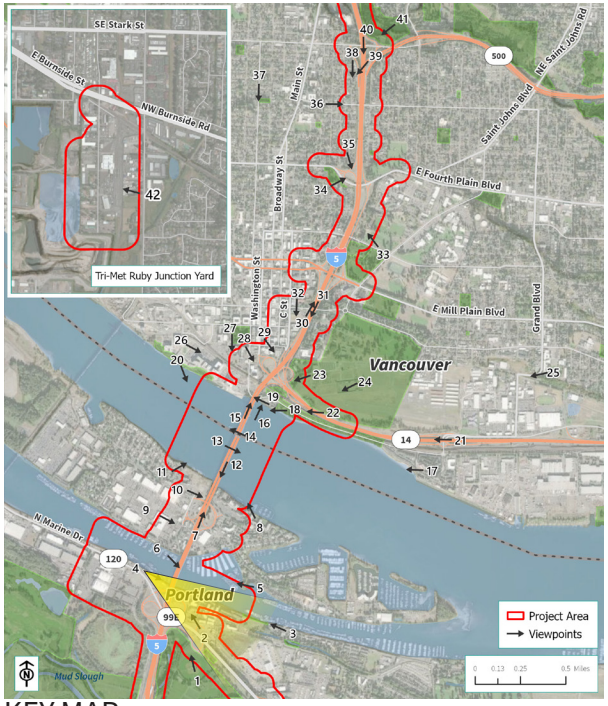
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 4
Notes: Marine Drive looking southeast at Pier 99 Street
Landscape Unit: Columbia Slough

Longitude: 122° 41.078’
Latitude: 45° 36.429’
Date: January 21, 2023
Time: 1:15 pm
Weather: Cloudy
Visibility: Clear

Camera: Canon EOS Rebel XSI
Lens setting: 35mm
Camera Bearing: southeast
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

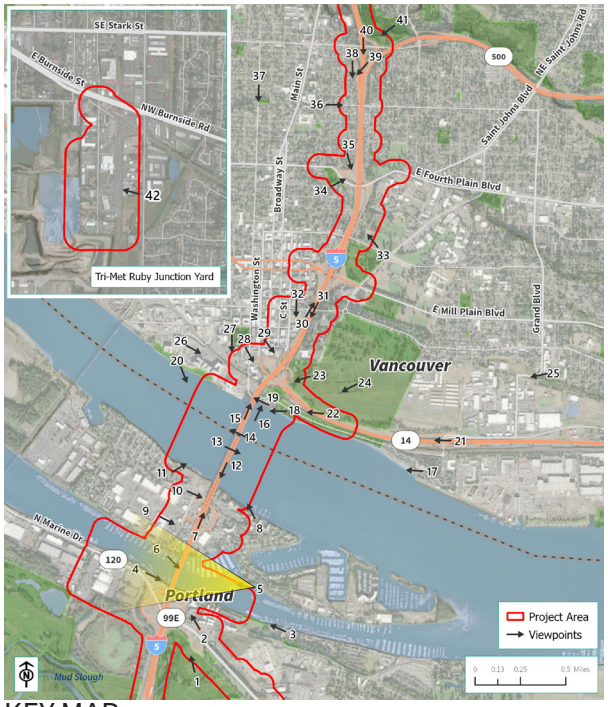
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 5
Notes: North Portland Harbor from Lotus Isle Park
Landscape Unit: Columbia River

Longitude: 122° 40.435’
Latitude: 45° 36.440’
Date: March 9, 2022
Time: 11:40 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: west
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

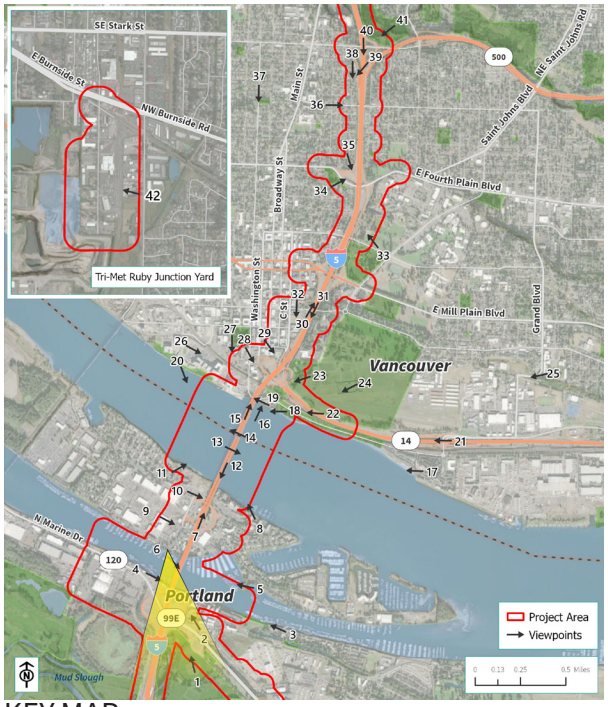
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 6
Notes: North Portland Harbor from JBM Floating Homes and Wild West Emporium
Landscape Unit: Columbia River

Longitude: 122° 40.899’
Latitude: 45° 36.537’
Date: March 9, 2022
Time: 11:50 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: south
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

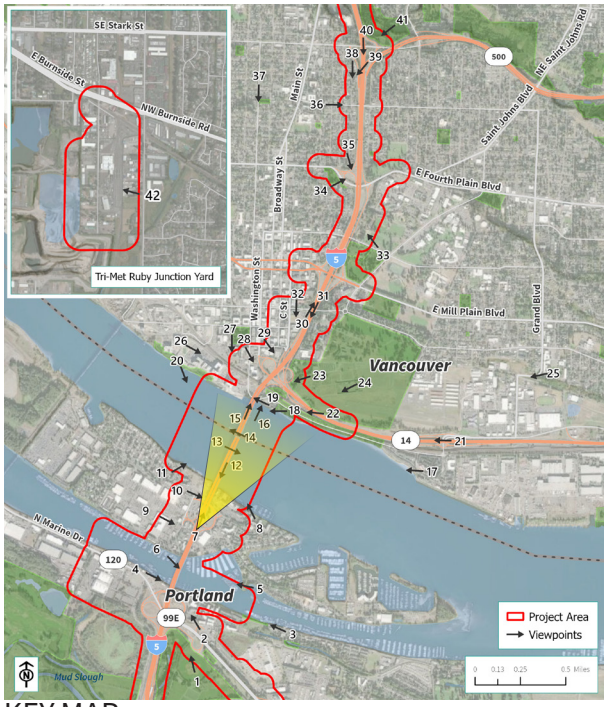
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 7
Notes: I-5 at Hayden Island
Landscape Unit: Columbia River

Longitude: 122° 40.682’
Latitude: 45° 36.962’
Date: March 9, 2022
Time: 1:10 pm
Weather: Partly Cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 18mm
Camera Bearing: northeast
Height of Camera: -



KEY MAP

Appendix B: Existing Conditions Photographs

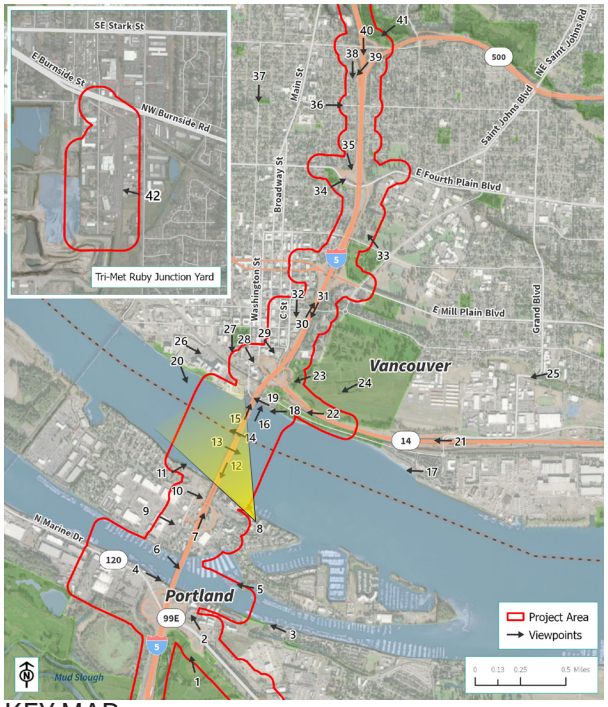
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 8
Notes: Holiday Inn Portland - Columbia Riverfront looking northwest
Landscape Unit: Columbia River

Longitude: 122° 40.406’
Latitude: 45° 36.742’
Date: March 9, 2022
Time: 8:58 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: northwest
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

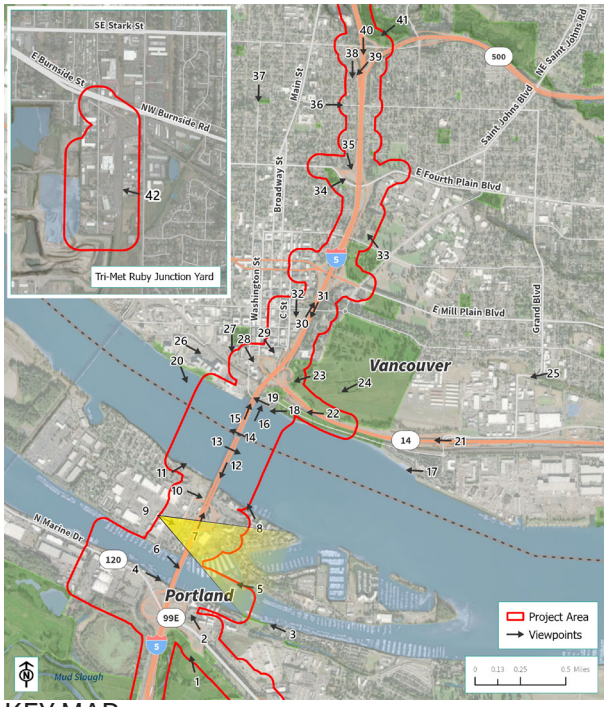
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 9
Notes: Hayden Island from commercial area looking east at Tomahawk Drive
Landscape Unit: Columbia River

Longitude: 122° 40.897’
Latitude: 45° 36.723’
Date: January 21, 2023
Time: 1:40 pm
Weather: Mostly cloudy
Visibility: Cloudy

Camera: Canon EOS Rebel XSI
Lens setting: 34mm
Camera Bearing: east
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

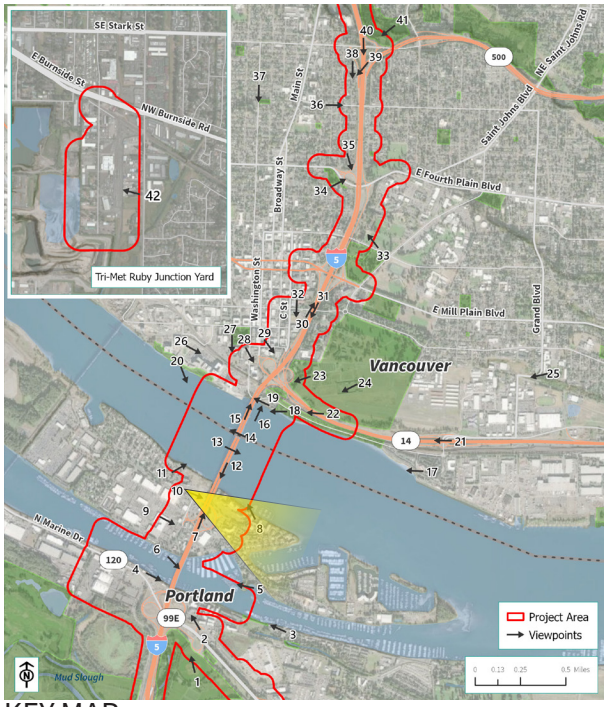
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 10
Notes: Hayden Island Drive and N Center Ave looking east.
Landscape Unit: Columbia River

Longitude: 122° 40.821’
Latitude: 45° 36.811’
Date: January 21, 2023
Time: 1:57 pm
Weather: Mostly cloudy
Visibility: Cloudy

Source: Canon EOS Rebel XSI
Lens setting: 35mm
Camera Bearing: southeast
Height of Camera: 5’-6”



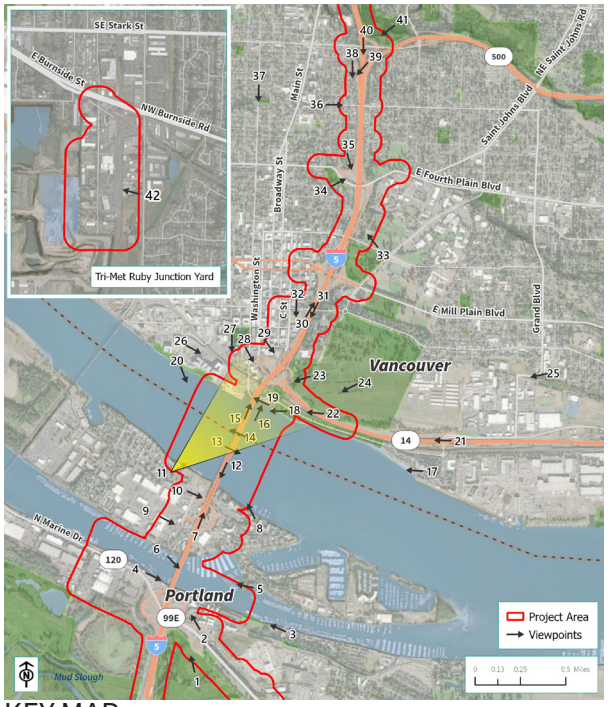
KEY MAP

Appendix B: Existing Conditions Photographs

Viewpoint 11
Notes: N River Drive looking northeast
Landscape Unit: Columbia River

Longitude: 122° 40.896’
Latitude: 45° 36.962’
Date: March 9, 2022
Time: 9:42 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: northeast
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

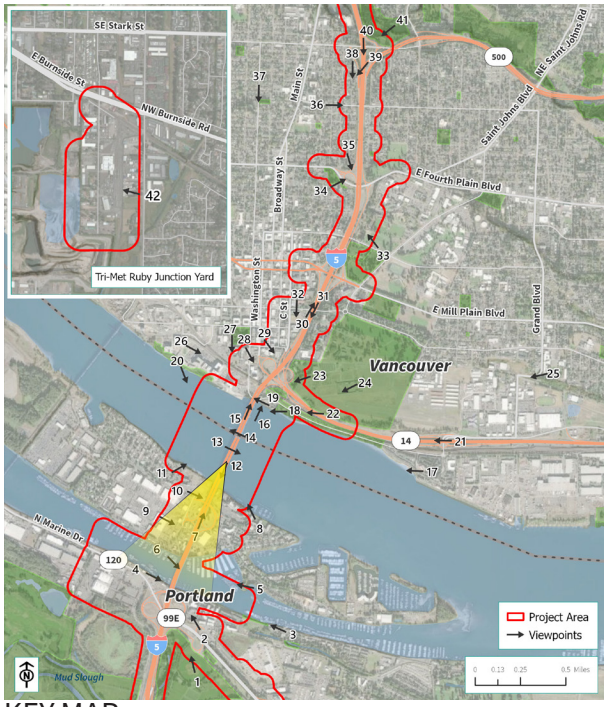
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 12
Notes: View of commuter on I-5 south bridge
Landscape Unit: Columbia River

Longitude: 122° 40.607’
Latitude: 45° 36.939’
Date: March 9, 2022
Time: 4:54 pm
Weather: Mostly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 18mm
Camera Bearing: south
Height of Camera: -



KEY MAP

Appendix B: Existing Conditions Photographs

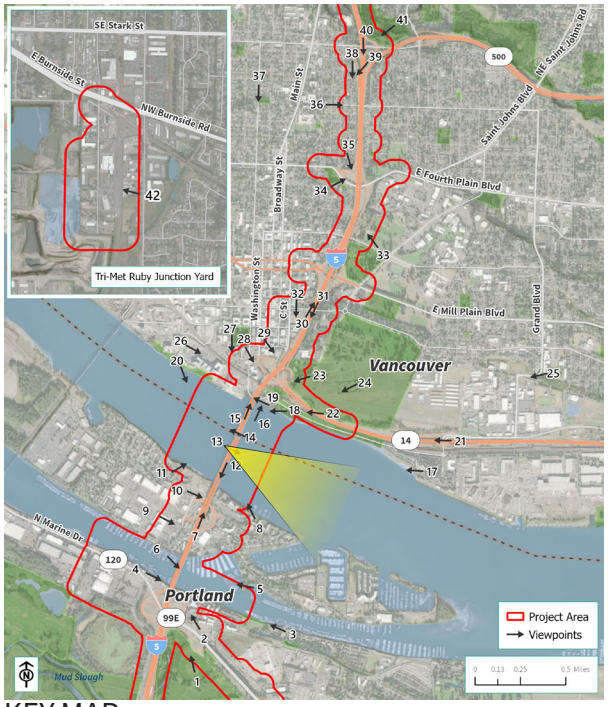
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 13
Notes: View of pedestrian looking east from Northbound I-5 Bridge
Landscape Unit: Columbia River

Longitude: 122° 40.428’
Latitude: 45° 37.195’
Date: March 9, 2022
Time: 10:55 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: east
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

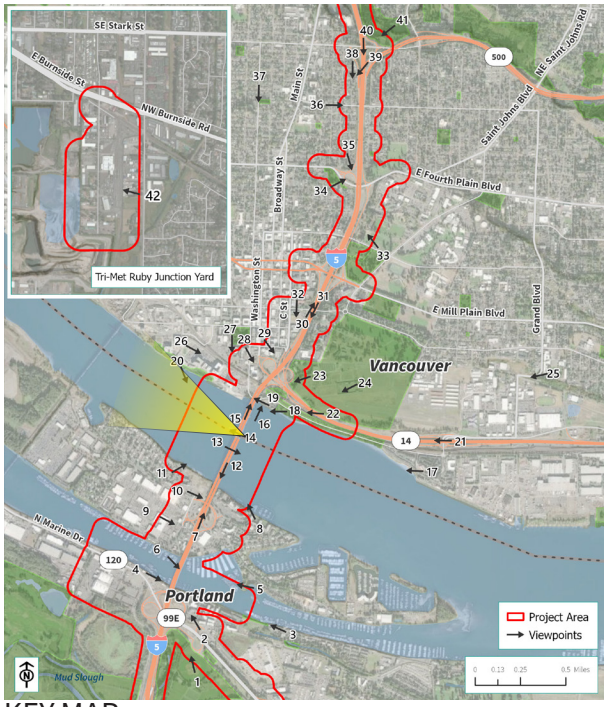
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 14
Notes: View of pedestrian looking west from Southbound I-5 Bridge
Landscape Unit: Columbia River

Longitude: 122° 40.479’
Latitude: 45° 37.205’
Date: March 9, 2022
Time: 10:10 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: east
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

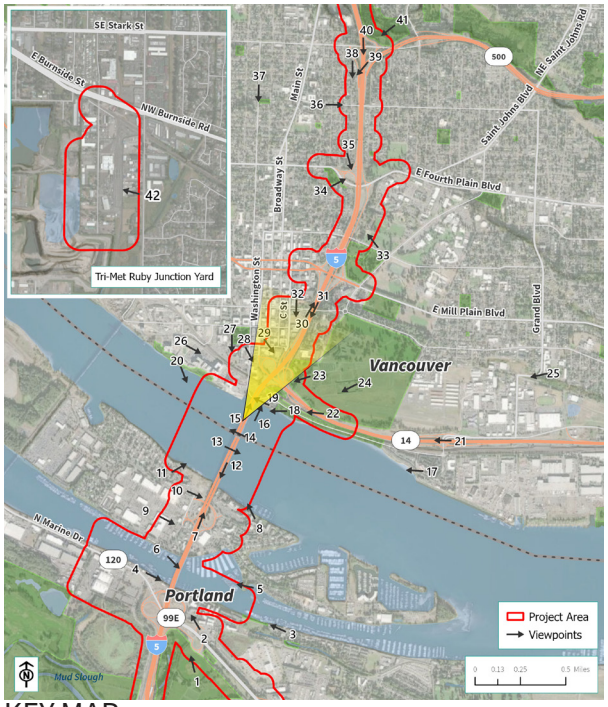
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 15
Notes: View of commuter looking north on the Northbound I-5 Bridge
Landscape Unit: Columbia River

Longitude: 122° 40.402’
Latitude: 45° 37.255’
Date: March 9, 2022
Time: 10:29 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 18mm
Camera Bearing: north
Height of Camera: -



KEY MAP

Appendix B: Existing Conditions Photographs

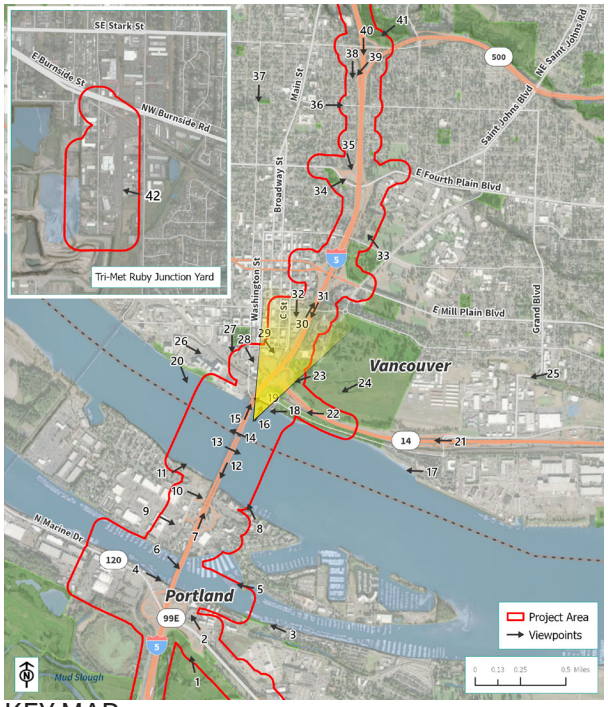
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 16
Notes: View of a bicyclist/pedestrian looking north on the Northbound I-5 Bridge
Landscape Unit: Columbia River

Longitude: 122° 40.500’
Latitude: 45° 37.089’
Date: March 9, 2022
Time: 10:59 am
Weather: Mostly sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: northeast
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 17
Notes: River Crossing from Illchee stature looking west
Landscape Unit: Columbia River

Longitude: 122° 39.298’
Latitude: 45° 36.955’
Date: March 9, 2022
Time: 1:26 pm
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 36mm
Camera Bearing: west
Height of Camera: 5’-6”

KEY MAP

Appendix B: Existing Conditions Photographs

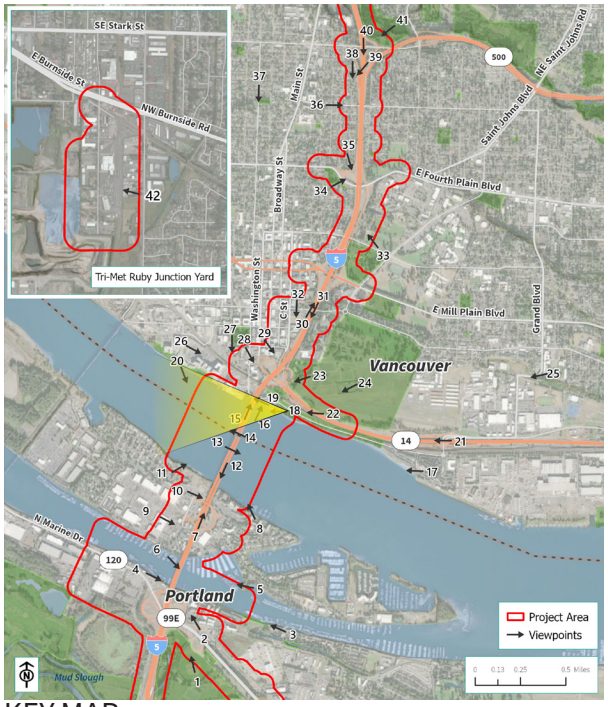
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 18
Notes: Waterfront Park -looking southwest
Landscape Unit: Columbia River

Longitude: 122° 40.210’
Latitude: 45° 37.235’
Date: March 10, 2022
Time: 10:47 pm
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: west
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

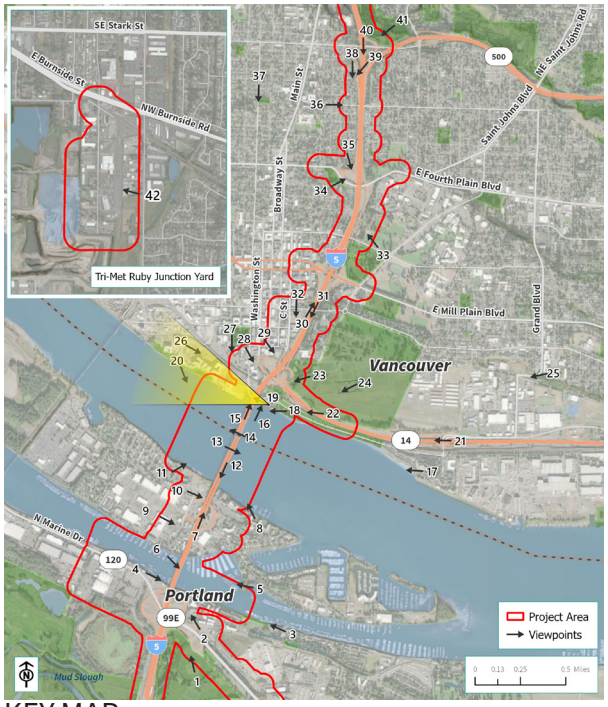
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 19
Notes: View under facility looking west
Landscape Unit: Columbia River

Longitude: 122° 40.342’
Latitude: 45° 37.272’
Date: February 7, 2023
Time: 3:38 pm
Weather: Overcast
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: west
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 20
Notes: Grant Street Pier looking east
Landscape Unit: Columbia River

Longitude: 122° 40.876’
Latitude: 45° 37.415’
Date: March 8, 2022
Time: 12:22 pm
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: southeast
Height of Camera: 5’-6”

KEY MAP

Appendix B: Existing Conditions Photographs

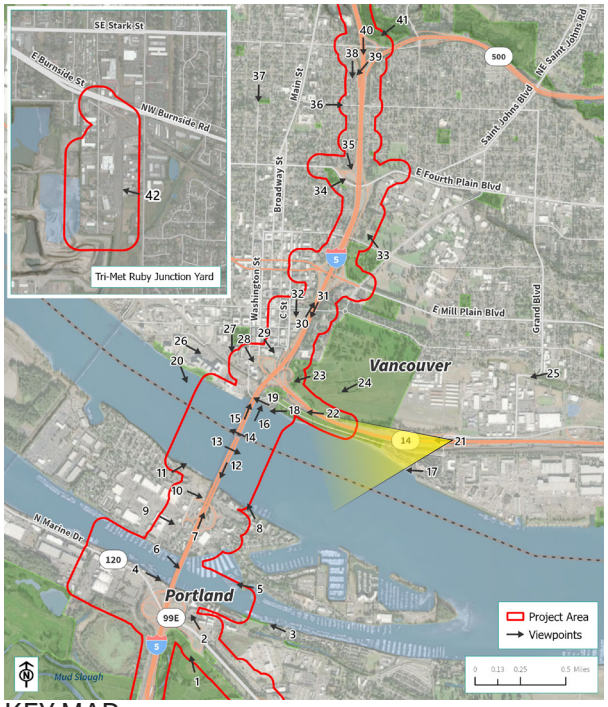
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 21
Notes: SR 14 west of Grand Blvd interchange looking west
Landscape Unit: Greater Central Park

Longitude: 122° 39.288’
Latitude: 45° 37.097’
Date: March 10, 2022
Time: 10:32 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: west
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

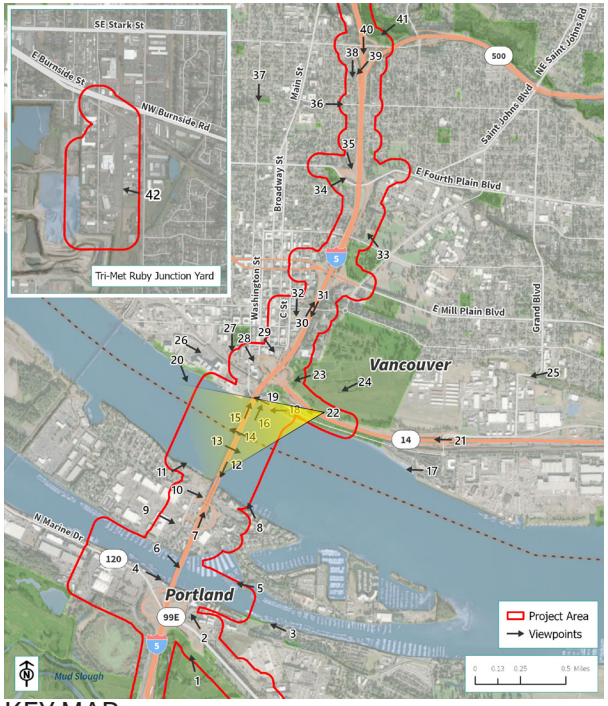
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 22
Notes: Vancouver Land Bridge overlook looking west
Landscape Unit: Greater Central Park

Longitude: 122° 40.024’
Latitude: 45° 37.234’
Date: March 10, 2022
Time: 12:07 pm
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: west
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

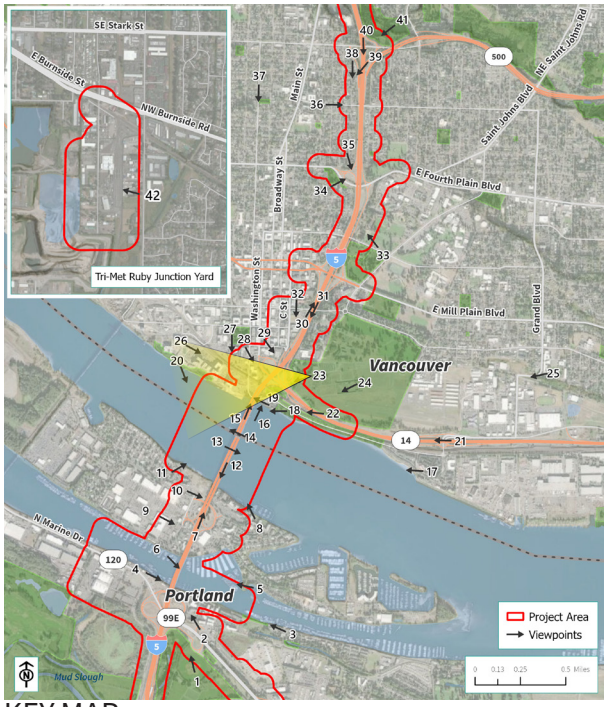
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 23
Notes: Fort Vancouver Kanaka Village
Landscape Unit: Greater Central Park

Longitude: 122° 40.017’
Latitude: 45° 37.368’
Date: March 10, 2022
Time: 10:58 am
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: west
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 24
Notes: From historic Fort Vancouver
Landscape Unit: Greater Central Park

Longitude: 122° 39.705’
Latitude: 45° 37.373’
Date: March 10, 2022
Time: 11:06 am
Weather: Sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: west
Height of Camera: 5’-6”

KEY MAP

Appendix B: Existing Conditions Photographs

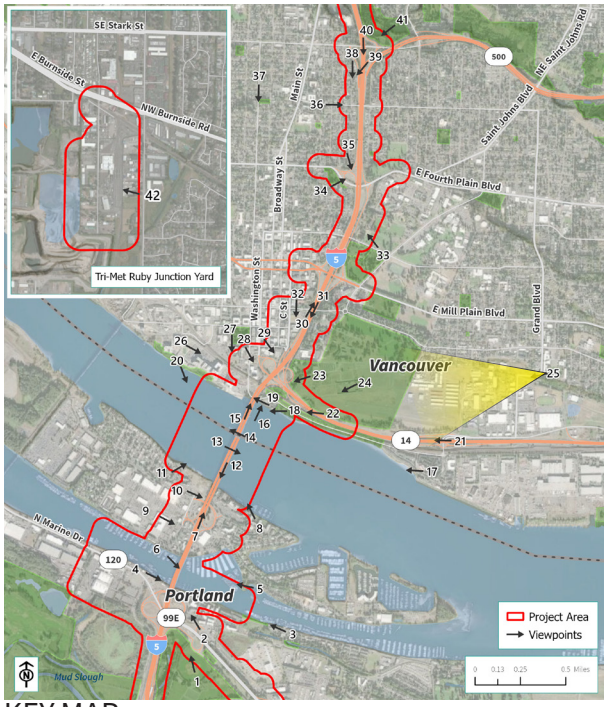
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 25
Notes: N Grand Blvd looking southwest
Landscape Unit: Greater Central Park

Longitude: 122° 38.491’
Latitude: 45° 37.422’
Date: March 9, 2022
Time: 1:45 pm
Weather: Partly sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: west
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

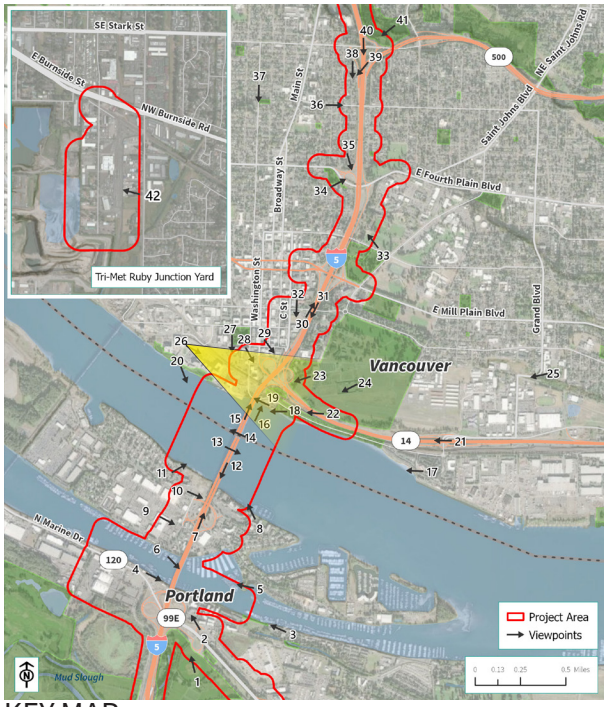
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 26
Notes: Columbia Way and Grant Street looking southeast
Landscape Unit: Vancouver Downtown

Longitude: 122° 40.817’
Latitude: 45° 37.507’
Date: January 21, 2023
Time: 9:01 am
Weather: Cloudy
Visibility: Overcast

Camera: Canon EOS Rebel XSI
Lens setting: 33mm
Camera Bearing: southeast
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

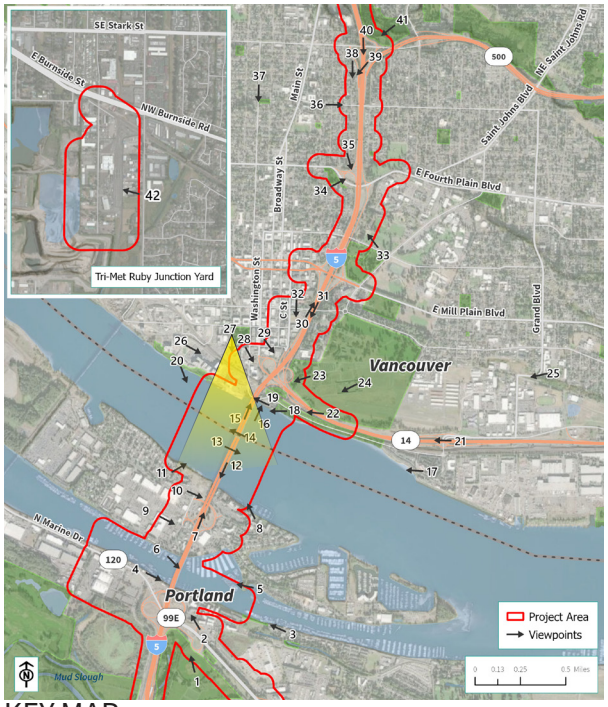
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 27
Notes: Esther Street looking south
Landscape Unit: Downtown Vancouver

Longitude: 122° 40.568’
Latitude: 45° 37.526’
Date: January 21, 2023
Time: 11:00 am
Weather: Rainy
Visibility: Overcast

Camera: Canon EOS Rebel XSI
Lens setting: 35mm
Camera Bearing: south
Height of Camera: 5’-6”



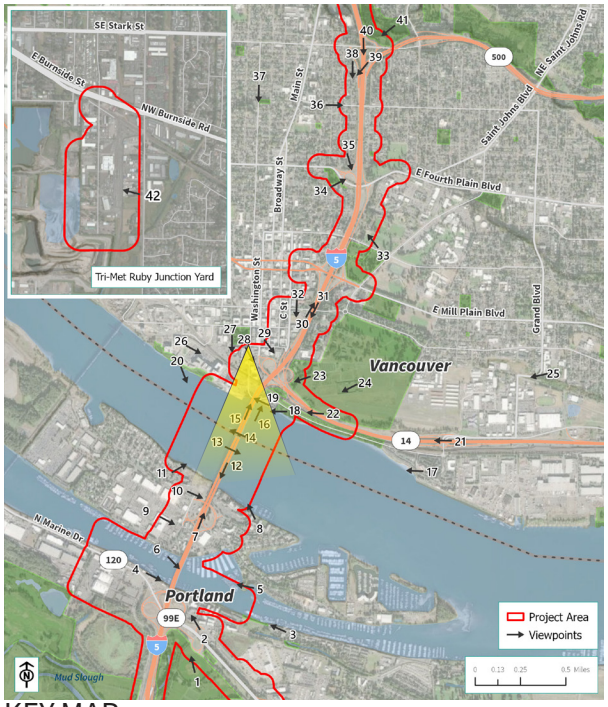
KEY MAP

Appendix B: Existing Conditions Photographs

Viewpoint 28
Notes: Columbia Street and 6th looking south
Landscape Unit: Downtown Vancouver

Longitude: 122° 40.432’
Latitude: 45° 37.548’
Date: March 9, 2022
Time: 4:08 pm
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 23mm
Camera Bearing: south
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

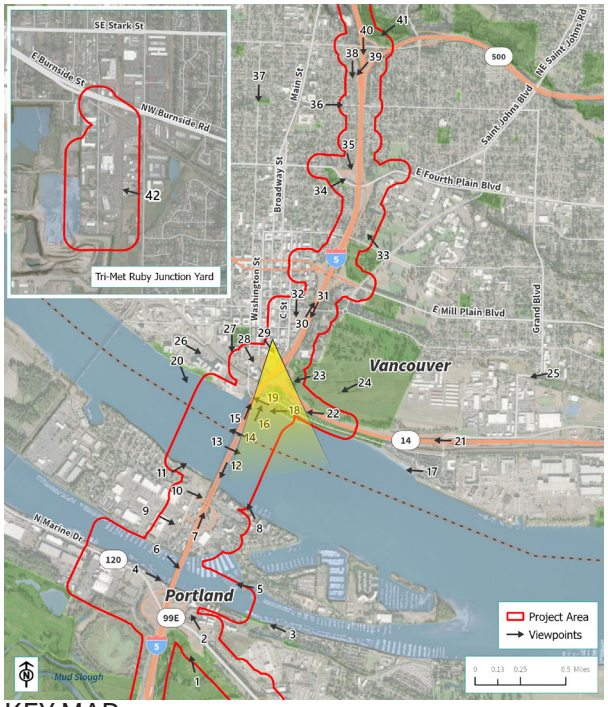
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 29
Notes: SR 14 Ramp eastbound looking south
Landscape Unit: Downtown Vancouver

Longitude: 122° 40.147’
Latitude: 45° 37.547’
Date: March 9, 2022
Time: 4:48 pm
Weather: Partly sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 23mm
Camera Bearing: south
Height of Camera: -



KEY MAP

Appendix B: Existing Conditions Photographs

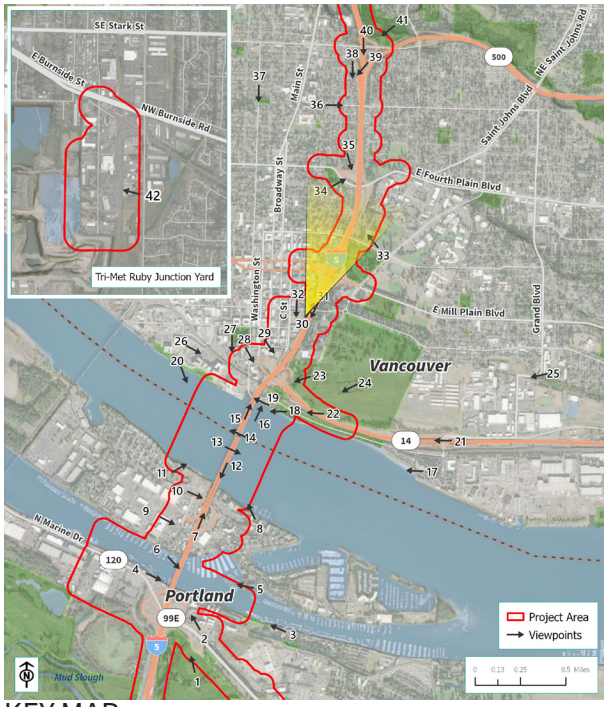
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 30
Notes: Evergreen Bridge looking north
Landscape Unit: Downtown Vancouver

Longitude: 122° 40.000’
Latitude: 45° 37.724’
Date: March 10, 2022
Time: 12:29 pm
Weather: Partly sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: north
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

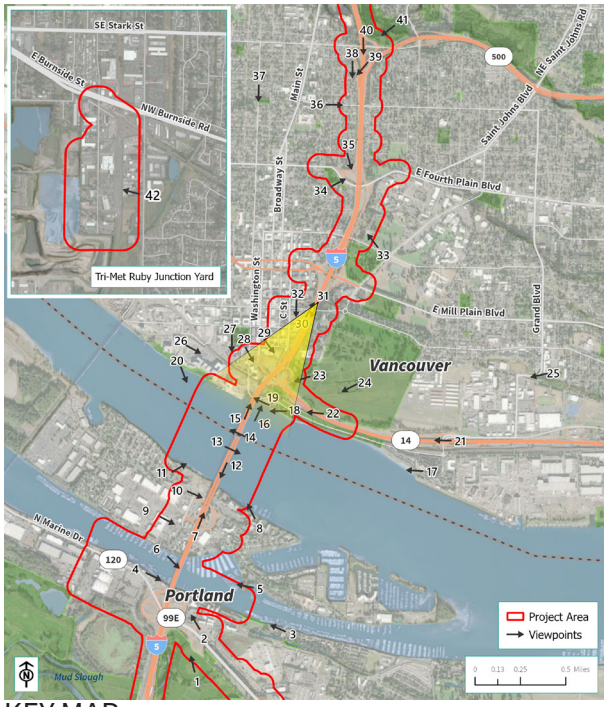
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 31
Notes: Evergreen Bridge looking south along I-5
Landscape Unit: Downtown Vancouver

Longitude: 122° 39.998’
Latitude: 45° 37.718’
Date: March 10, 2022
Time: 12:28 am
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: southwest
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 32
Notes: Evergreen and C Street looking southeast
Landscape Unit: Downtown Vancouver

Longitude: 122° 40.170’
Latitude: 45° 37.732’
Date: January 22 , 2023
Time: 9:24 am
Weather: Cloudy
Visibility: Cloudy

Camera: Canon EOS Rebel XSI
Lens setting: 35mm
Camera Bearing: southeast
Height of Camera: 5’-6”

KEY MAP

Appendix B: Existing Conditions Photographs

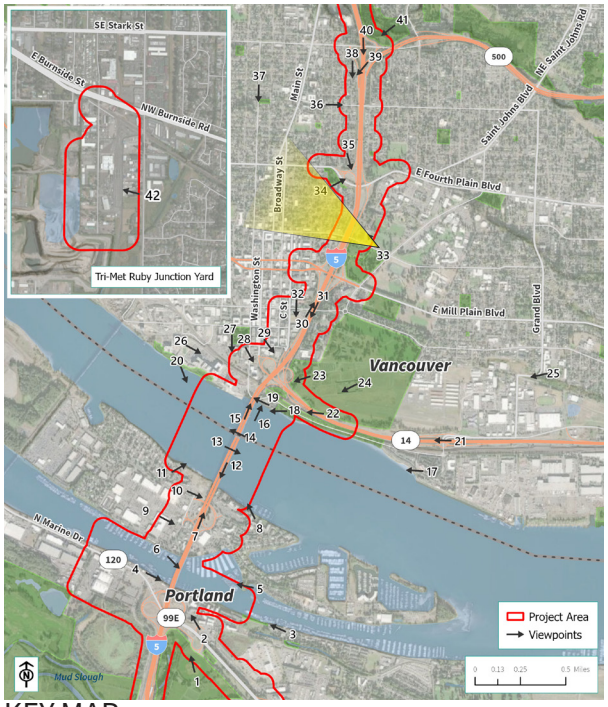
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 33
Notes: Clark College ball fields looking west to future Park and Ride
Landscape Unit: Greater Central Park

Longitude: 122° 39.545’
Latitude: 45° 38.070’
Date: March 9, 2022
Time: 2:02 pm
Weather: Mostly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 36mm
Camera Bearing: west
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

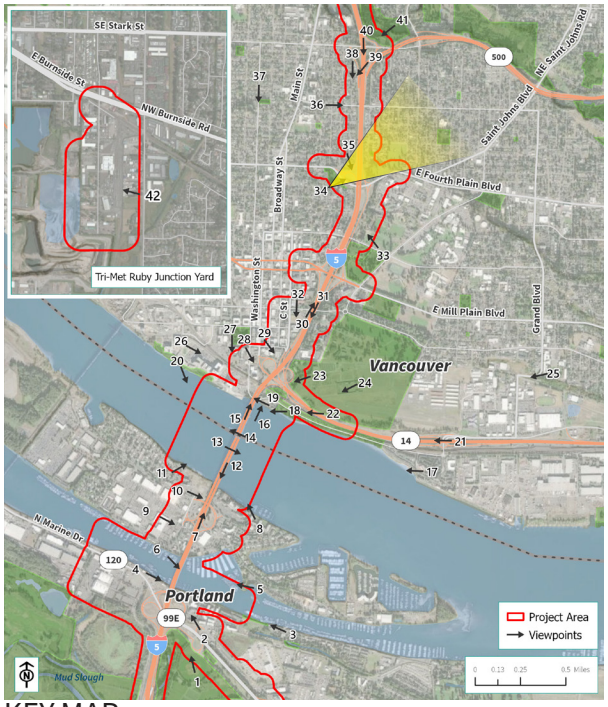
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 34
Notes: Fourth Plain at I-5 from Arnada Park
Landscape Unit: Downtown Vancouver

Longitude: 122° 39.919’
Latitude: 45° 38.347’
Date: March 9, 2022
Time: 2:17 pm
Weather: Partly cloudy
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: northeast
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

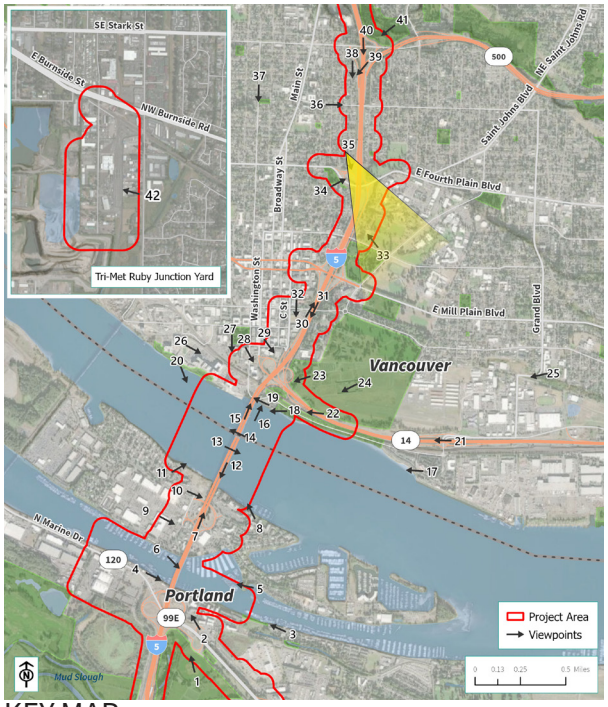
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 35
Notes: Fourth Plain at I-5 looking south
Landscape Unit: Downtown Vancouver

Longitude: 122° 39.858’
Latitude: 45° 38.398’
Date: March 9, 2022
Time: 2:28 pm
Weather: Partly sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: southeast
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

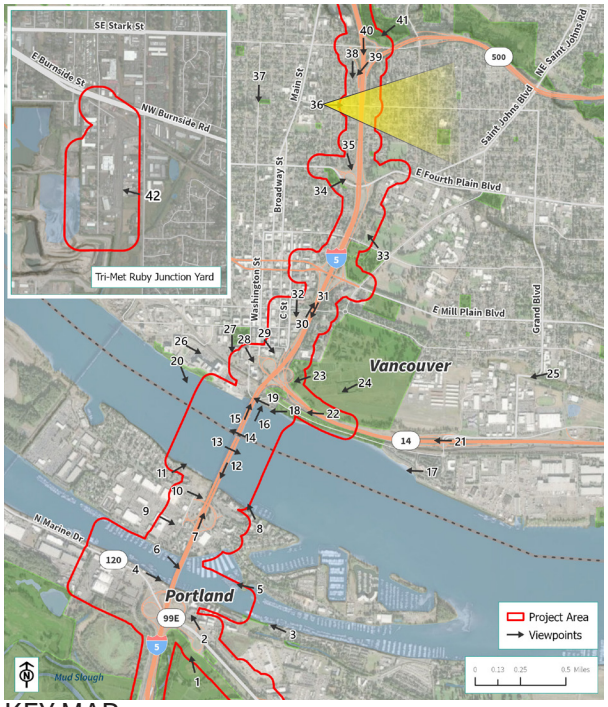
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 36
Notes: On 33rd Street looking east
Landscape Unit: Downtown Vancouver

Longitude: 122° 39.817’
Latitude: 45° 38.705’
Date: January 21, 2023
Time: 10:09 am
Weather: Cloudy, light rain
Visibility: Clear

Camera: Canon EOS Rebel XSI
Lens setting: 35mm
Camera Bearing: east
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

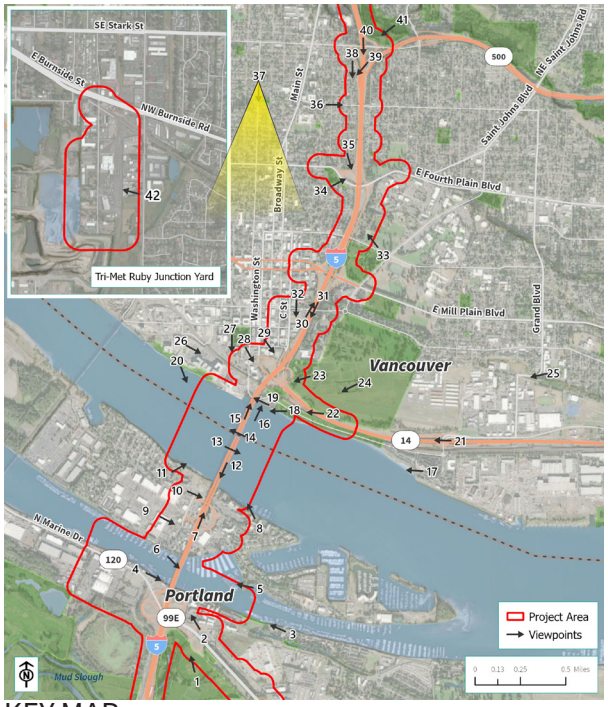
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 37
Notes: Upper Columbia Street- Distant view of the bridge
Landscape Unit: Downtown Vancouver

Longitude: 122° 40.406’
Latitude: 45° 38.776’
Date: March 9, 2022
Time: 3:37 pm
Weather: Partly sunny
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: south
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

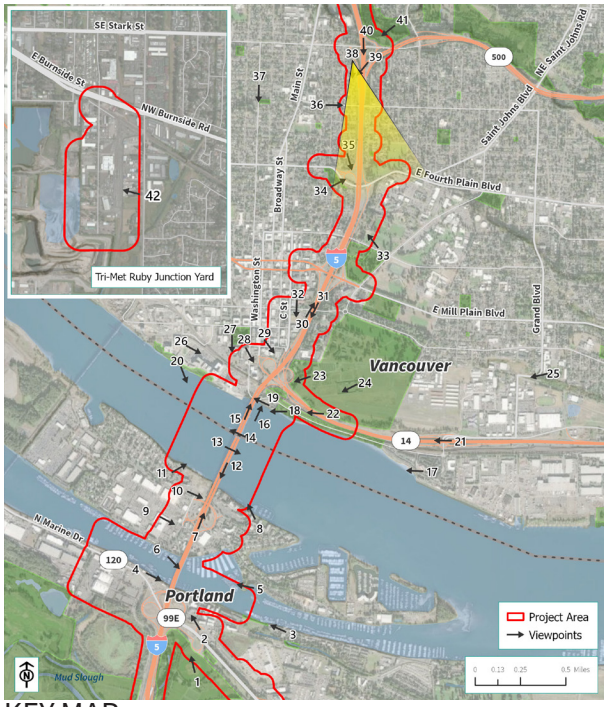
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 38
Notes: **I Street and 37th looking southeast (Shumway Neighborhood)**
Landscape Unit: Vancouver Downtown

Longitude: 122° 39.777’
Latitude: 45° 38.883’
Date: January 21, 2023
Time: 10:00 am
Weather: Rainy
Visibility: Clear

Camera: Canon EOS Rebel XSI
Lens setting: 34mm
Camera Bearing: southeast
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

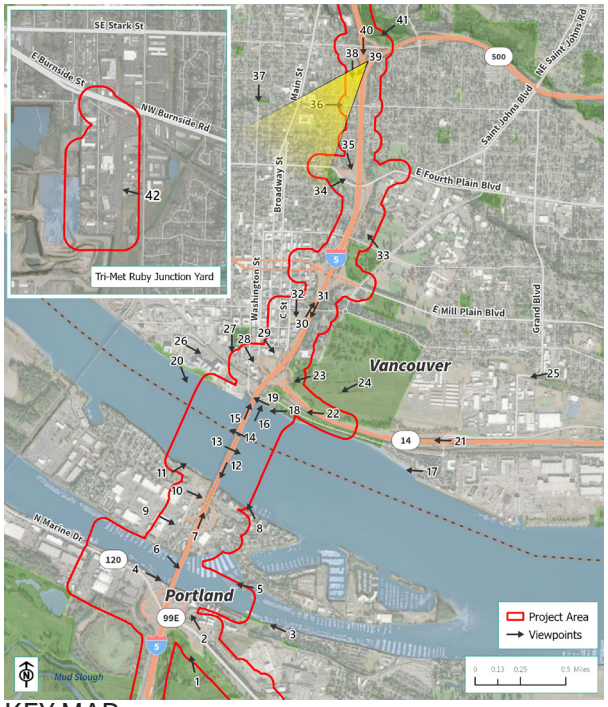
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 39
Notes: Viewpoint at the north end of the Downtown Vancouver LU
Landscape Unit: Burnt Bridge Creek

Longitude: 122° 39.625’
Latitude: 45° 38.923’
Date: March 8, 2022
Time: 8:47 am
Weather: Cloudy, light rain
Visibility: Clear

Camera: Nikon D3400
Lens setting: 34mm
Camera Bearing: southwest
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

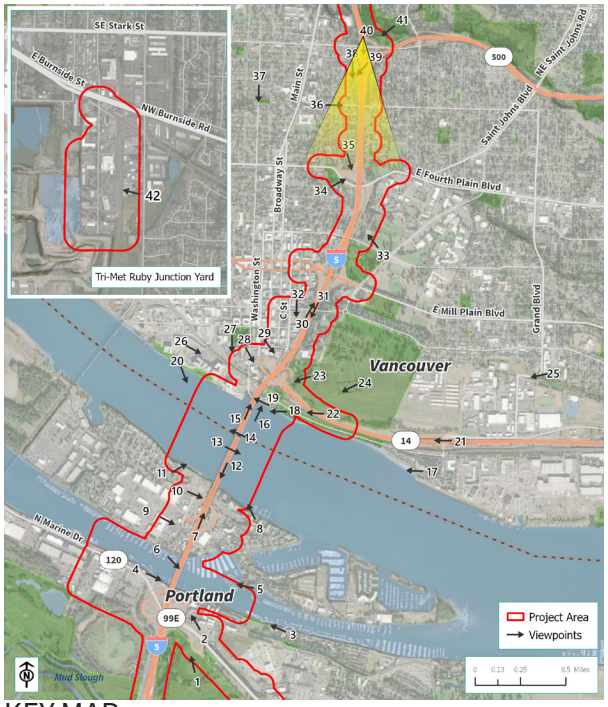
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 40
Notes: SR 500 at I-5 looking south (39th Street bridge over I-5)
Landscape Unit: Burnt Bridge Creek

Longitude: 122° 39.708’
Latitude: 45° 38.986’
Date: March 8, 2022
Time: 9:15 am
Weather: Cloudy, light rain
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: south
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

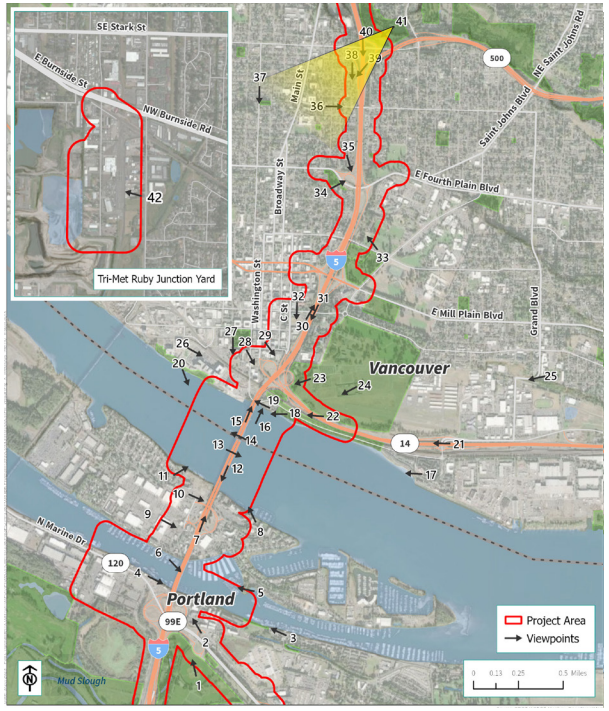
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 41
Notes: SR 500 at I-5 looking from Leverich Park
Landscape Unit: Downtown Vancouver

Longitude: 122° 39.518’
Latitude: 45° 39.120’
Date: March 8, 2022
Time: 9:08 am
Weather: Cloudy, light rain
Visibility: Clear

Camera: Nikon D3400
Lens setting: 35mm
Camera Bearing: southwest
Height of Camera: 5’-6”



KEY MAP

Appendix B: Existing Conditions Photographs

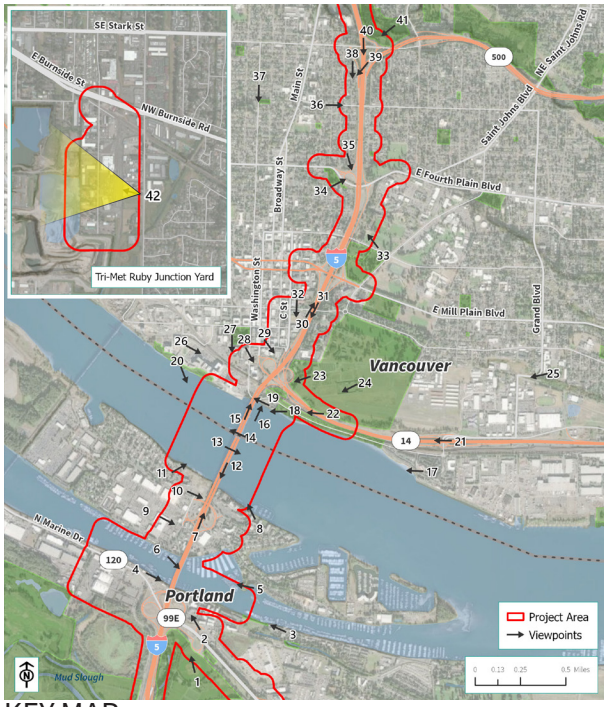
Interstate BRIDGE Replacement Program

Visual and Aesthetics Technical Report

Viewpoint 42
Notes: Along 202nd Ave looking west toward the Ruby Junction Maintenance Facility
Landscape Unit: Ruby Junction

Longitude: -
Latitude: -
Date: -
Time: -
Weather: Sunny
Visibility: Clear

Source: Google Maps Street View
Lens setting: -
Camera Bearing: west
Height of Camera: -



KEY MAP

Appendix B: Existing Conditions Photographs