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Utilities Technical Report

March 2026

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Utilities Technical Report

CONTENTS

1.	PROGRAM OVERVIEW	1-1
1.1	Components of the Modified LPA	1-2
1.1.1	Interstate 5 Mainline	1-7
1.1.2	Portland Mainland and Hayden Island (Subarea A).....	1-12
1.1.3	Columbia River Bridges (Subarea B)	1-22
1.1.4	Downtown Vancouver (Subarea C).....	1-44
1.1.5	Upper Vancouver (Subarea D)	1-52
1.1.6	Transit Support Facilities.....	1-55
1.1.7	Transit Operating Characteristics	1-58
1.1.8	Tolling.....	1-62
1.1.9	Transportation System- and Demand-Management Measures	1-65
1.1.10	Off-Site Mitigation Sites	1-66
1.2	Modified LPA Construction	1-69
1.2.1	Construction Components, Packaging Plan, and Duration	1-69
1.2.2	Potential Staging Sites and Casting Yards	1-73
1.3	No-Build Alternative.....	1-74
2.	METHODS	2-1
2.1	Introduction	2-1
2.2	Study Area	2-1
2.3	Relevant Laws and Regulations.....	2-3
2.4	Effects Guidelines.....	2-3
2.5	Data Collection Methods.....	2-3
3.	AFFECTED ENVIRONMENT.....	3-1
3.1	Introduction	3-1
3.2	Existing Utilities – Oregon.....	3-2
3.2.1	Water and Sanitary Sewer	3-4
3.2.2	Storm Sewer.....	3-4
3.2.3	Power and Natural Gas	3-5
3.2.4	Communications.....	3-5
3.3	Existing Utilities – Washington	3-6
3.3.1	Water and Sanitary Sewer	3-9
3.3.2	Storm Sewers	3-9

3.3.3 Power and Natural Gas 3-9

3.3.4 Communication 3-10

4. LONG-TERM EFFECTS 4-1

4.1 No-Build Alternative..... 4-1

4.2 Modified Locally Preferred Alternative..... 4-1

4.2.1 Potential Long-Term Effects – Oregon 4-2

4.2.2 Potential Long-Term Effects – Washington..... 4-5

4.2.3 Design Options 4-6

5. TEMPORARY EFFECTS 5-1

5.1 Modified LPA..... 5-1

5.1.1 Potential Temporary Effects – Oregon 5-2

5.1.2 Potential Temporary Effects – Washington 5-2

5.2 Design Options 5-3

6. INDIRECT EFFECTS 6-1

7. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES..... 7-1

8. PERMITS AND APPROVALS..... 8-1

9. REFERENCES..... 9-1

FIGURES

Figure 1-1. IBR Program Location Overview 1-2

Figure 1-2. Modified LPA Components 1-6

Figure 1-3. Modified LPA – Geographic Subareas 1-7

Figure 1-4. Auxiliary Lane Configurations 1-9

Figure 1-5. Auxiliary Lane Configuration Footprint Differences 1-10

Figure 1-6. Portland Mainland and Hayden Island (Subarea A) 1-14

Figure 1-7. Levee Systems in Subarea A 1-15

Figure 1-8. Transit and Roadway Improvements in North Portland 1-16

Figure 1-9. Vehicle Circulation between Hayden Island and the Portland Mainland 1-20

Figure 1-10. Columbia River Bridges (Subarea B) 1-23

Figure 1-11. Bridge Foundation Concept 1-24

Figure 1-12. Existing Navigation Clearances of the Interstate Bridge 1-26

Figure 1-13. Navigation Clearances and Proposed Profile of the Modified LPA Columbia River Bridges with a Double-Deck Fixed-Span Configuration..... 1-26

Figure 1-14. Conceptual Drawing of a Double-Deck Fixed-Span Configuration 1-27

Figure 1-15. Typical Cross Section of the Double-Deck Fixed-Span Configuration 1-28

Figure 1-16. Conceptual Drawings of Single-Level Fixed-Span Bridge Types..... 1-30

Figure 1-17. Typical Cross Section of the Single-Level Fixed-Span Configuration (Extradosed Type) 1-31

Figure 1-18. Typical Cross Section of the Single-Level Fixed-Span Configuration (Girder Type) 1-32

Figure 1-19. Conceptual Drawings of Single-Level Movable-Span Configurations in the Closed and Open Positions 1-34

Figure 1-20. Typical Cross Section of the Single-Level Movable-Span Bridge Type 1-35

Figure 1-21. Bridge Configuration Footprint Comparison..... 1-37

Figure 1-22. Bridge Configuration Profile Comparison..... 1-38

Figure 1-23. Downtown Vancouver (Subarea C) 1-45

Figure 1-24. Modified LPA with C Street Ramps 1-47

Figure 1-25. Collector-Distributor Roadways..... 1-48

Figure 1-26. Typical Cross Section of the Collector-Distributor Roadways 1-49

Figure 1-27. Upper Vancouver (Subarea D) 1-53

Figure 1-28. Ruby Junction Light-Rail Operations and Maintenance Facility Study Area..... 1-56

Figure 1-29. Expo Center Overnight LRV Facility 1-58

Figure 1-30. Toll Zone..... 1-64

Figure 1-31. Potential Compensatory Mitigation Sites 1-68

Figure 1-32. Preliminary Construction Packages..... 1-72

Figure 2-1. Utilities Study Area 2-2

Figure 3-1. Existing Major Utilities in Oregon Study Area 3-3

Figure 3-2. Existing Major Utilities in Downtown Vancouver Study Area 3-7

Figure 3-3. Existing Major Utilities in North Vancouver Study Area..... 3-8

Figure 4-1. Impacts to Existing Major Utilities in Oregon Study Area..... 4-3

Figure 4-2. Impacts to Existing Major Utilities in Downtown Vancouver Study Area 4-7

Figure 4-3. Impacts to Existing Major Utilities in North Vancouver Study Area 4-8

TABLES

Table 1-1. Modified LPA Design Options.....	1-5
Table 1-2. Summary of Bridge Configurations.....	1-39
Table 1-3. Proposed TriMet and C-TRAN Bus Route Changes	1-61
Table 1-4. Preliminary Construction Packaging Plan	1-70
Table 7-1. Avoidance and Minimization Measures.....	7-1
Table 7-2. Mitigation Measures.....	7-2

APPENDICES

A	ODOT and WSDOT Permits and Franchises
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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
AASHTO	American Association of State Highway and Transportation Officials
BRT	bus rapid transit
CCFS	Columbia Corridor Flood Safety
C-D	collector-distributor
CRC	Columbia River Crossing
CTR	Commute Trip Reduction
C-TRAN	Clark County Public Transit Benefit Area Authority
EIS	Environmental Impact Statement
I-5	Interstate 5
IBR	Interstate Bridge Replacement
kV	kilovolts
LPA	Locally Preferred Alternative
LRT	light-rail transit
LRV	light-rail vehicle
MAX	Metropolitan Area Express
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
OMF	Operations and Maintenance Facility
OTC	Oregon Transportation Commission
PMLS	Portland Metro Levee System
RTC	Regional Transportation Plan
SOV	single-occupancy vehicle

Acronym/Abbreviation	Definition
SR	state route
TPSS	traction power substation
TriMet	Tri-County Metropolitan Transportation District
UFSWQD	Urban Flood Safety and Water Quality District
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCG	U.S. Coast Guard
VNHR	Vancouver National Historic Reserve
WSDOT	Washington State Department of Transportation
WSTC	Washington State Transportation Commission

1. PROGRAM OVERVIEW

This technical report identifies, describes, and evaluates short-term and long-term effects on utilities from the Interstate Bridge Replacement (IBR) Program. The construction and operation of transportation infrastructure can have temporary and permanent effects on utilities such as water, sewer, electricity, natural gas, and communications. The Modified Locally Preferred Alternative (LPA) would be designed to avoid and/or minimize these effects to the greatest extent possible. This report provides mitigation measures for potential effects on these resources 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 (U.S.C.) 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 Final Supplemental Environmental Impact Statement (SEIS) for the IBR Program pursuant to 42 U.S.C. 4332.

The objectives of this report are to:

- Define the Program study area and the methods of data collection and evaluation used for the analysis (Chapter 2).
- Describe existing utilities within the study area (Chapter 3).
- Discuss potential long-term, temporary, and indirect effects on utilities resulting from construction and operation of the Modified LPA in comparison to the No-Build Alternative (Chapters 4, 5, and 6). Because the Modified LPA is in the early stages of design, these impacts are described at a general level and with a focus on critical utilities.
- Provide proposed avoidance and mitigation measures to help prevent, eliminate, or minimize environmental consequences 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 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 Interstate 5 (I-5) corridor that extends from approximately Victory Boulevard in Portland to State Route (SR) 500 in Vancouver, as shown in Figure 1-1.

Figure 1-1. IBR Program Location Overview



1.1 Components of the Modified LPA

The basic proposed components of the Modified LPA¹ 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 in each direction. When all highway, transit, and active transportation would be moved to the new Columbia River bridges, the existing

¹ All transportation facilities would be designed to current AASHTO, WSDOT, and ODOT specifications.

Interstate Bridge (both spans) would be removed.² The primary navigation channel would be relocated approximately 500 feet south (measured by the channel centerline) of its existing location near the Vancouver shoreline.

- 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 reconstruction of the existing Expo Center MAX Station. The Tri-County Metropolitan Transportation District of Oregon (TriMet), which operates the MAX system, would also operate the Yellow Line extension.
- Associated LRT improvements such as traction power substations (TPSS),³ an 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 existing Ruby Junction Light-Rail Operations and Maintenance Facility (OMF).
- Connections to local bus transit service, including bus rapid transit (BRT) and express bus routes, in collaboration with the Clark County Public Transit Benefit Area Authority (C-TRAN), in addition to the proposed new LRT service.
- 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, including three additional bus bays for new buses at the existing C-TRAN OMF (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.
- 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 to Hayden Island 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

² For purposes of this report, the existing I-5 bridges over the Columbia River are referred to as the "Interstate Bridge." The new replacement I-5 bridges over the Columbia River are referred to as the "Columbia River bridges."

³ Each TPSS would be approximately 75 feet by 50 feet, including parking and access areas.

facility improvements to comply with the Americans with Disabilities Act. These are referred to in this document as “active transportation improvements.”

- Variable-rate tolling, including signage and equipment, for motorists using the river crossing as a demand-management and financing tool.

In addition to the basic components described above, the Modified LPA includes five sets of design options. The design options are related to (1) the number of auxiliary lanes; (2) the bridge configuration; (3) the presence of the C Street ramps; (4) the I-5 alignment in downtown Vancouver; and (5) the park and rides. The Recommended Design Options are identified with bold text and an asterisk in Table 1-1.

- **Auxiliary Lanes.** Options for one or two auxiliary lanes. Auxiliary lanes are ramp-to-ramp connections on the highway that improve interchange safety by providing drivers with more space and time to merge, diverge, and weave at highway access points.
 - The one auxiliary lane design option would extend across the Columbia River bridges between the Marine Drive interchange and the Mill Plain Boulevard interchange.
 - The two auxiliary lane design option would extend a second auxiliary lane in each direction of I-5 in addition to the one auxiliary lane included in the Modified LPA. The second auxiliary lane would also extend across the Columbia River bridges in addition to and in combination with the existing auxiliary lanes from approximately Interstate Avenue/Victory Boulevard to SR 500/39th Street.
- **Bridge Configurations.** Three bridge configurations are under consideration.
 - Double-deck fixed-span bridges: 116 feet of vertical navigation clearance over the primary navigation channel.
 - Single-level fixed-span bridges: 116 feet of vertical navigation clearance over the primary navigation channel.
 - Single-level movable-span bridges: with the movable spans over the primary navigation channel: 178 feet of vertical navigation clearance in the open position and 90 feet in the closed position (the north barge channel would have 99 feet of vertical navigation clearance and the south barge channel would have 90 feet of vertical navigation clearance).
- **C Street Ramps.** Options that retain or eliminate the existing C Street ramps in downtown Vancouver.
- **I-5 Alignment in Downtown Vancouver.** Options that maintain the I-5 mainline at its current location or shift the I-5 mainline up to 40 feet westward in downtown Vancouver between the SR 14 interchange and Mill Plain Boulevard interchange.
- **Park and Rides.** Options to provide parking capacity to accommodate 1,270 vehicles at designated park and rides near the Waterfront Station and Evergreen Station to serve LRT riders.

Table 1-1. Modified LPA Design Options

Modified LPA Component	Design Options
Auxiliary lanes	<ul style="list-style-type: none"> ● One auxiliary lane in each direction on the new Columbia River bridges and nearby sections of I-5* ● Two auxiliary lanes in each direction of I-5 would extend across the Columbia River bridges in addition to and in combination with existing auxiliary lanes from approximately Interstate Avenue/Victory Boulevard to SR 500/39th Street
Bridge configuration	<ul style="list-style-type: none"> ● Double-deck fixed-span bridge configuration ● Single-level fixed-span bridge configuration* ● Single-level movable-span bridge configuration
C Street ramps	<ul style="list-style-type: none"> ● With C Street ramps* ● Without C Street ramps
I-5 Alignment in downtown Vancouver	<ul style="list-style-type: none"> ● Centered I-5 alignment* ● Westward shift of I-5 alignment
Park and Rides	<ul style="list-style-type: none"> ● Provide parking capacity to accommodate 1,270 vehicles distributed across just two park and rides: one park and ride with 570 parking spaces near the Waterfront Station and one park and ride with 700 parking spaces near the Evergreen Station. The locations for park and rides that were evaluated included: <ul style="list-style-type: none"> ➢ Potential Waterfront Station park and rides <ul style="list-style-type: none"> ▪ Columbia Way (below I-5) ▪ Columbia Street/SR 14 ▪ Columbia Street/Phil Arnold Way ➢ Potential Evergreen Station park and rides <ul style="list-style-type: none"> ▪ Library Square ▪ Columbia Credit Union ● Provide parking capacity to accommodate 1,270 vehicles dispersed among five park and rides listed above ^{aa}

Notes:

* Recommended Design Options are in bold.

a Depending on final design considerations, the decision may be made to use fewer than the five sites. The analysis assumes all five sites as it encompasses all physical impacts.

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, they are identified in the sections below.

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. The description of the Modified LPA and design options are based on conceptual design and are subject to refinement as the design is finalized. The IBR Program will continue to consult with regulatory agencies, local agencies with jurisdiction, and tribes to seek opportunities for improvements and avoidance and minimization of impacts.

Figure 1-2. Modified LPA Components



Figure 1-3. Modified LPA – Geographic Subareas



1.1.1 Interstate 5 Mainline

Today, within the 5-mile corridor, I-5 has three, typically 12-foot-wide, through lanes in each direction, an approximately 6- to 12-foot-wide inside shoulder, and an approximately 6- to 12-foot-wide outside shoulder, with the exception of the Interstate Bridge, which has approximately 1- to 2-foot-wide inside and outside shoulders. There are currently intermittent one and two auxiliary lane sections 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 one or two 12-foot auxiliary lanes, as detailed below and shown on Figure 1-4. 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 existing Interstate Bridge over the Columbia River does not have auxiliary lanes; the Modified LPA would add one or two auxiliary lanes in each direction across the new Columbia River bridges.

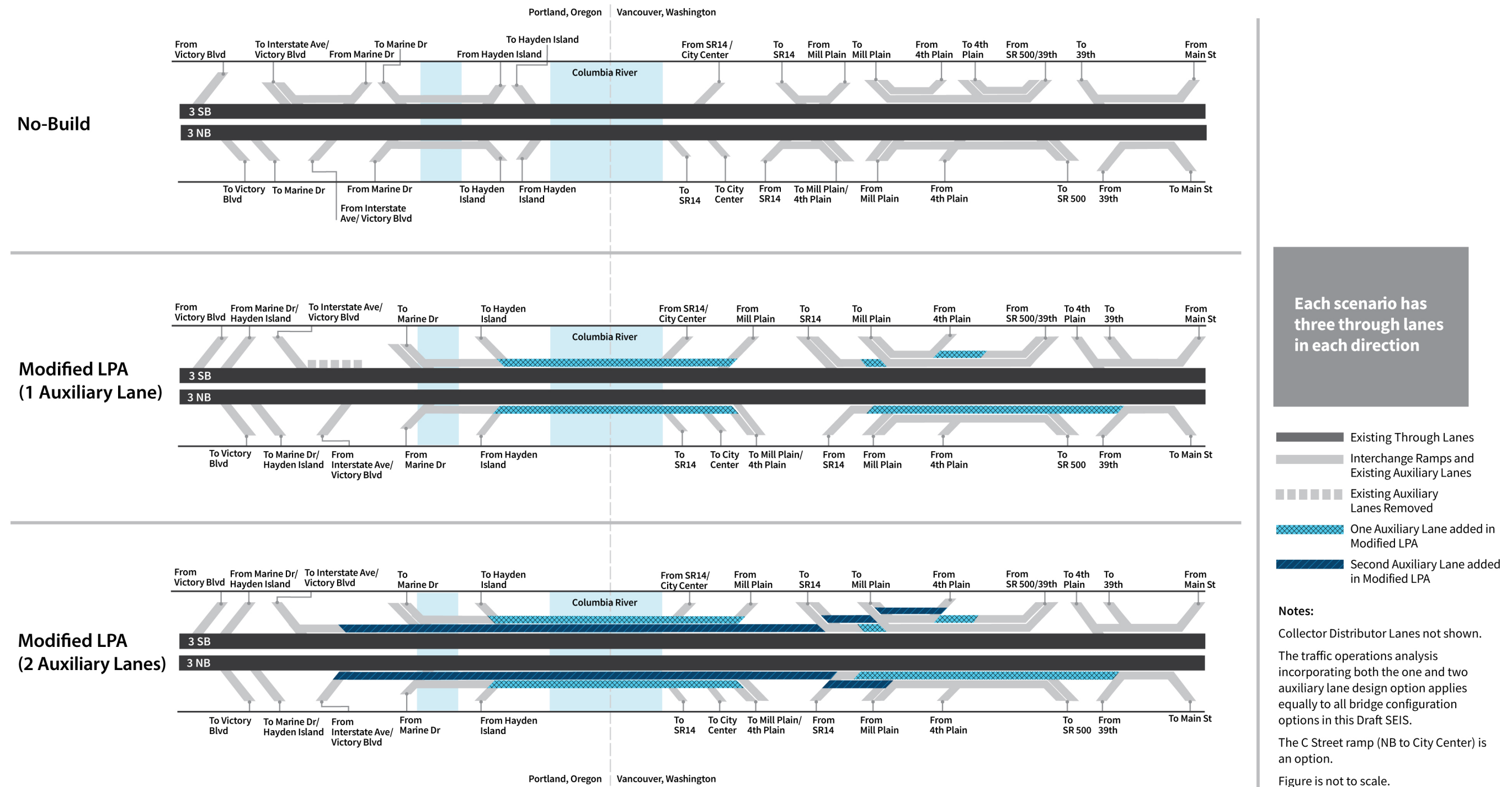
The Modified LPA would also include shoulders (11- to 14-foot inside shoulders and 10- to 14-foot outside shoulders) to be consistent with the design standards of the Oregon Department of Transportation (ODOT) and Washington State Department of Transportation (WSDOT). The inside shoulder would be used 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.

1.1.1.1 Auxiliary Lane Design Options

The Modified LPA includes design options for one auxiliary lane in each direction or two auxiliary lanes in each direction across the Columbia River bridges in addition to and in combination with existing auxiliary lanes in the area. The one auxiliary lane design option would include an auxiliary lane in each direction across the Columbia River bridges between the Marine Drive interchange and the Mill Plain Boulevard interchange. The two auxiliary lane design option would include a second auxiliary lane from the Interstate Avenue/Victory Boulevard interchange and the SR 500/39th Street interchange, including on the Columbia River bridges (see Figure 1-4). This section provides an overview of the one auxiliary lane and the two auxiliary lane design options.

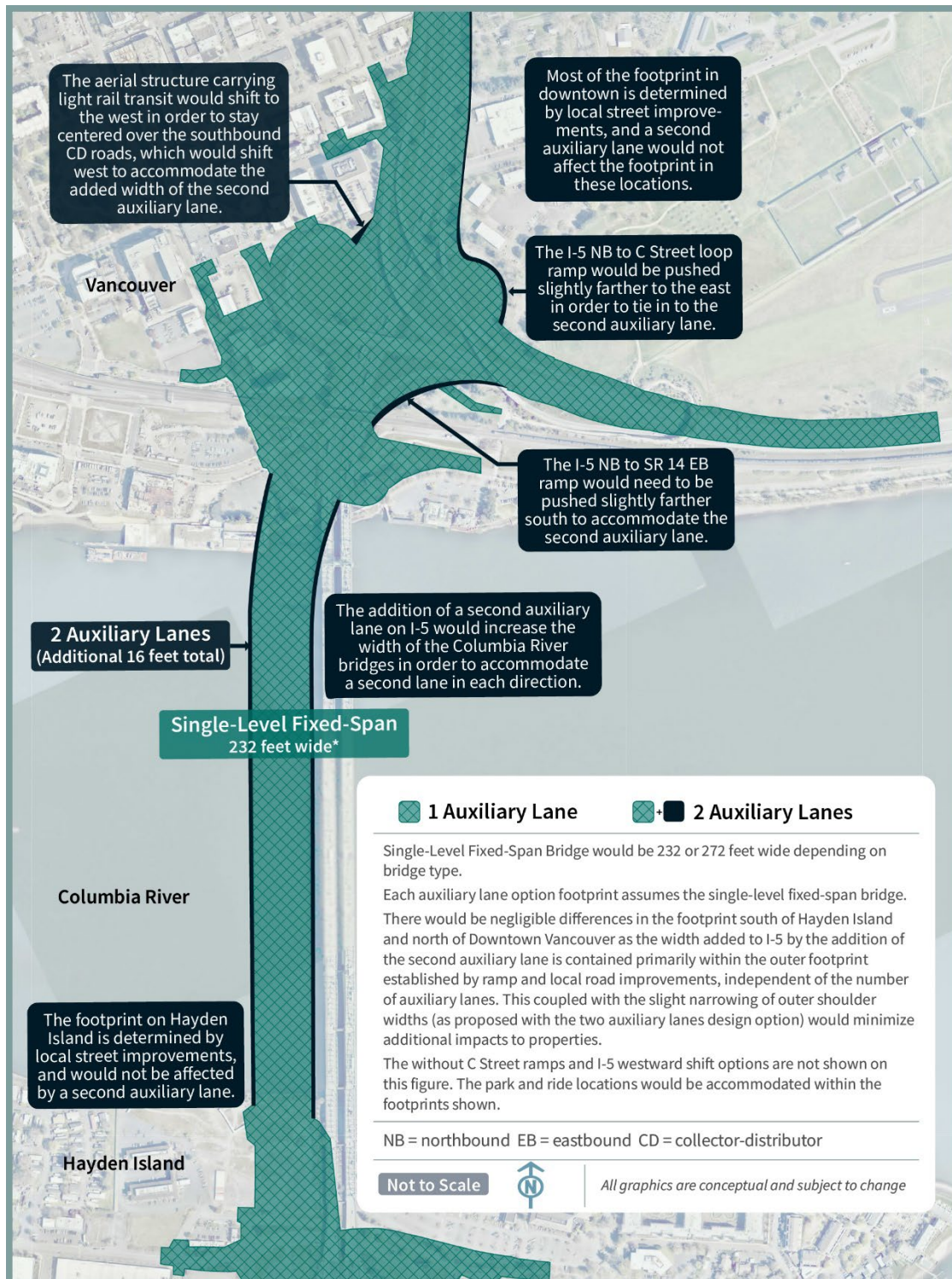
Figure 1-5, which shows a single-level fixed-span bridge configuration for comparison purposes, shows that the scale of the physical impacts (footprint, or the limits of permanent improvements) would be similar for the Modified LPA with one auxiliary lane design option and the Modified LPA with two auxiliary lanes design option, except over the Columbia River and in downtown Vancouver. For all bridge configuration design options, the two auxiliary lane design option would add a net of approximately 16 feet (8 feet in each direction) in total roadway width to the Columbia River bridges compared to the one auxiliary lane design option.

Figure 1-4. Auxiliary Lane Configurations



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Figure 1-5. Auxiliary Lane Configuration Footprint Differences



Note: All dimensions are approximate.

ONE AUXILIARY LANE DESIGN OPTION – RECOMMENDED DESIGN OPTION

The one auxiliary lane design option would include a 12-foot-wide auxiliary lane in each direction across the Columbia River bridges between the Marine Drive interchange and the Mill Plain Boulevard interchange.

On northbound I-5, the auxiliary lane would extend the existing auxiliary from the Marine Drive on-ramp to the Hayden Island off-ramp to continue across the Columbia River bridge, and end at the combined off-ramp to Mill Plain/Fourth Plain Boulevard, north of SR 14 (see Figure 1-4). The existing auxiliary lane from the SR 14 on-ramp to the Mill Plain/Fourth Plain off-ramp would be extended to connect to the existing auxiliary lane from the 39th Street on-ramp to the Main Street off-ramp, creating an auxiliary lane beginning at the SR 14 on-ramp and ending at the Main Street off-ramp. The existing auxiliary lane located between the Mill Plain Boulevard on-ramp and the SR 500 off-ramp would remain.

On southbound I-5, the two existing auxiliary lanes between SR 500/39th Street and Mill Plain Boulevard would remain, with some reconfiguration due to the braided ramps between the SR 500/39th Street and Fourth Plain Boulevard interchanges. The new auxiliary lane across the Columbia River would begin at the Mill Plain Boulevard on-ramp and would continue across the Columbia River bridge, connecting to the existing auxiliary lane on Hayden Island and ending at the Marine Drive off-ramp. The existing southbound auxiliary lane between Marine Drive and Victory Boulevard/Interstate Avenue would be removed due to ramp reconfigurations as part of the Marine Drive braided ramp with the Victory Boulevard/Interstate Avenue off-ramp.

TWO AUXILIARY LANE DESIGN OPTION

The two auxiliary lane design option would include the same improvements as described under the one auxiliary lane design option and would add a second 12-foot-wide auxiliary lane in each direction of I-5 across the Columbia River bridges to further improve safety and operations in the corridor.

On northbound I-5, the inside auxiliary lane would extend from the combined Interstate Avenue/Victory Boulevard on-ramp, continue across the Columbia River bridge, and end at the SR 500/39th Street interchange, connecting to the existing auxiliary lane between the SR 14 on-ramp and Mill Plain on-ramp and the existing auxiliary lane between the 39th Street on-ramp and the Main Street off-ramp. The outside auxiliary lane would extend from the Marine Drive on-ramp across the Columbia River bridge and end at the Mill Plain/Fourth Plain Boulevard off-ramp. A new outside auxiliary lane would begin at the SR 14 on-ramp connecting to the existing auxiliary lane between the Mill Plain Boulevard on-ramp and the SR 500/39th Street off-ramp.

The IBR Program recommends advancing the one auxiliary lane in each direction of I-5 design option. The one and two auxiliary lane design options would provide important benefits to highway operations and safety. Both options received a mix of positive and negative feedback from the public. The one auxiliary lane design option is recommended because it would reduce overall environmental impacts while improving transportation operations and safety. The one auxiliary lane design option is also supported by local transportation agencies.

On southbound I-5, the two existing auxiliary lanes between SR 500/39th Street and Mill Plain Boulevard would remain, with some reconfiguration because of the braided ramps between the SR 500/39th Street and Fourth Plain Boulevard interchanges. In addition, there would be a third auxiliary lane between the Fourth Plain Boulevard on-ramp and the Mill Plain Boulevard off-ramp to improve operations and safety between these two closely spaced ramps. The existing auxiliary lane between the SR 500/39th Street on-ramp would extend to the SR 14 collector-distributor off-ramp. This auxiliary lane would then continue across the Columbia River bridge to the Interstate Avenue/Victory Boulevard off-ramp. The outside auxiliary lane would extend from the Mill Plain on-ramp across the Columbia River bridge to connect to the existing auxiliary lane between Hayden Island and the Marine Drive off-ramp.

1.1.2 Portland Mainland and Hayden Island (Subarea A)

This section discusses the geographic Subarea A (Figure 1-3 provides an overview of the geographic subareas). Figure 1-6 shows highway and interchange improvements in Subarea A, including the North Portland Harbor bridges.

1.1.2.1 Levee System Improvements

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).

The levee systems are shown on Figure 1-7, and intersections with Modified LPA components are described throughout this section (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 were to fail. 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-5.⁴

There are two concurrent projects 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 Columbia Corridor Flood Safety (CCFS) projects (formerly known as “Flood Safe Columbia River” and “Levee Ready Columbia”).

⁴ 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.

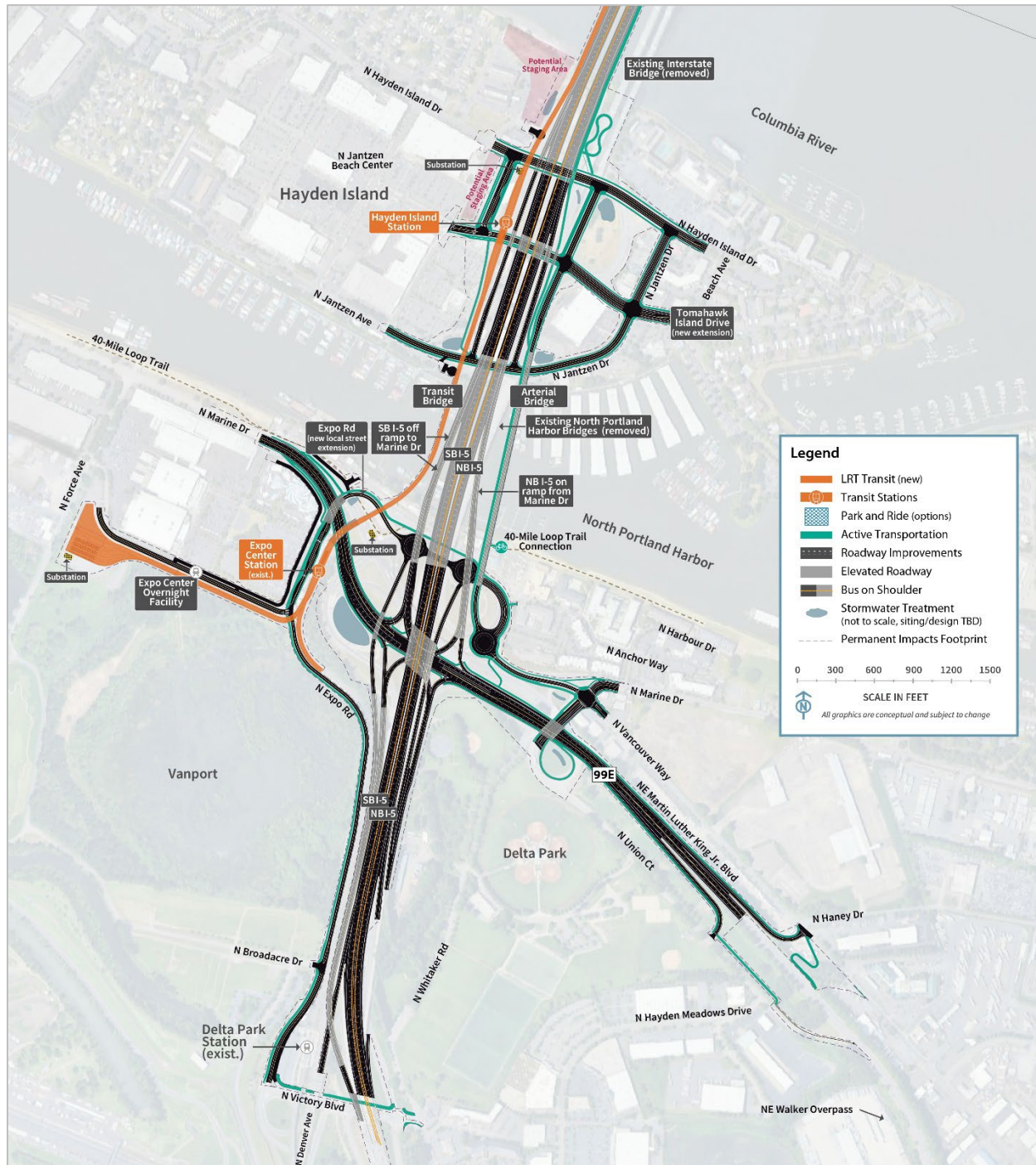
The Urban Flood Safety and Water Quality District (UFSWQD)⁵ is working in partnership with the USACE on the PMLS project, which includes improvements at PEN 1 and PEN 2 (e.g., raising these levees to elevation 38.2 feet for earthen levees and 39.2 feet for flood walls North American Vertical Datum of 1988 [NAVD 88]).⁶ Additionally, as part of the CCFS projects, UFSWQD has identified the need to raise a low spot in the Cross Levee on the southwest side of the Marine Drive interchange.

The IBR Program is in close coordination with UFSWQD and the USACE to ensure that the IBR Program's design efforts consider the timing and scope of the PMLS and the CCFS 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 CCFS projects are described below, where appropriate.

⁵ UFSWQD includes PEN 1 and PEN 2, Urban Flood Safety and Water Quality District No. 1, and the Sandy Drainage Improvement Company.

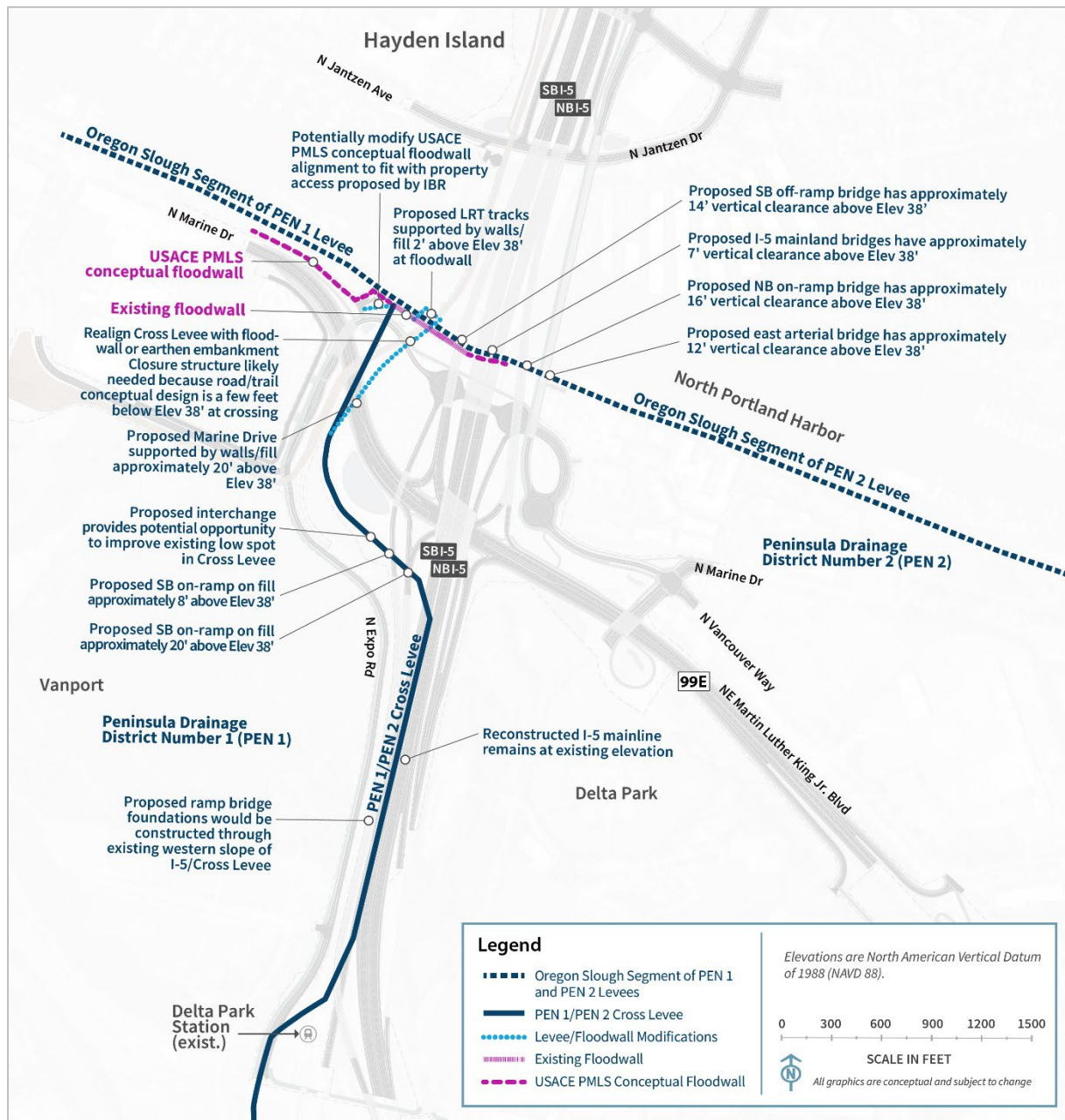
⁶ NAVD 88 is a vertical control datum (reference point) used by federal agencies for surveying.

Figure 1-6. Portland Mainland and Hayden Island (Subarea A)



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

Figure 1-7. Levee Systems in Subarea A



1.1.2.2 Highways, Interchanges, and Local Roadways

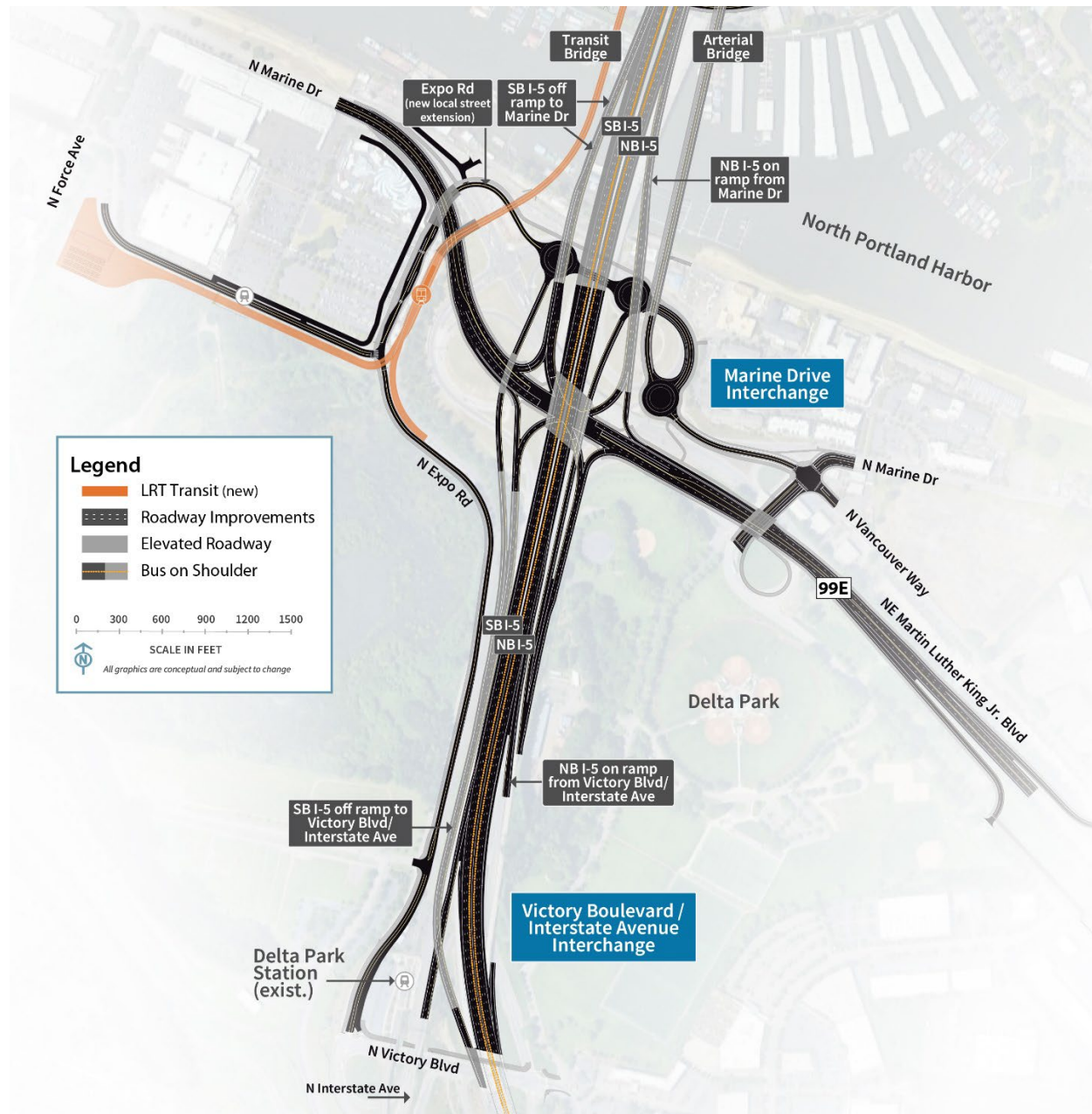
VICTORY BOULEVARD/INTERSTATE AVENUE INTERCHANGE AREA

The southern extent of the Modified LPA would improve two ramps at the Victory Boulevard/Interstate Avenue interchange (see Figure 1-6 and 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 1-7). 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.

Figure 1-8. Transit and Roadway Improvements in North Portland



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 improve safety and operations for motorists entering and exiting I-5, and all active transportation users accessing areas in the vicinity of the interchange. In addition, Marine Drive would be raised over the proposed LRT extension to separate motorist and transit users. The proposed Marine Drive interchange configuration would be a single-point urban interchange. Figure 1-8 shows Marine Drive interchange's layout and construction footprint.

Martin Luther King Jr. Boulevard would have new more direct connections to I-5. 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 Drive) would provide access to westbound Martin Luther King Jr. Boulevard for these two streets. The existing access to westbound Martin Luther King Jr. Boulevard from Vancouver Way east of Haney Drive would be closed. 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 (between the access to the East Delta Park Owens Sports Complex and N Hayden Meadows Drive).

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 intersections. The westernmost intersection would connect the new local street extension to I-5 southbound. The middle intersection would connect the I-5 northbound off-ramp to the local street extension. The easternmost intersection would connect the new local street extension to an arterial bridge crossing North Portland Harbor to Hayden Island. This intersection would also connect the local street extension to Marine Drive and Vancouver Way.

To access Hayden Island using the arterial bridge from the east on Martin Luther King Jr. Boulevard, motorists would exit Martin Luther King Jr. Boulevard at the existing off-ramp to Vancouver Way just west of the Walker Street overpass. Then motorists would travel west on Vancouver Way, through the intersection with Marine Drive and straight through the intersection 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 intersection 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 structures⁷ for property access. The Modified LPA would realign Marine Drive to the south to maintain traffic on existing Marine Drive during construction. The Modified LPA would provide access to the two industrial properties via the new local road extension from Expo Road. Therefore, the change in

⁷ Levee closure structures are put in place at openings along the embankment/floodwall to provide flood protection during high water conditions.

access for the two industrial properties could require small modifications to the floodwall alignment (a potential shift of approximately 5 to 10 feet to the south) and closure structure locations. The IBR Program is coordinating with USACE PMLS and the UFSWQD on modifications to the floodwall alignment.

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 1-6. 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 resilience.

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

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

All new structures would have at least as much vertical navigation clearance over North Portland Harbor as the existing North Portland Harbor bridge.

All of the six bridges would be designed and constructed to have sufficient clearance over the levees for access and maintenance. 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

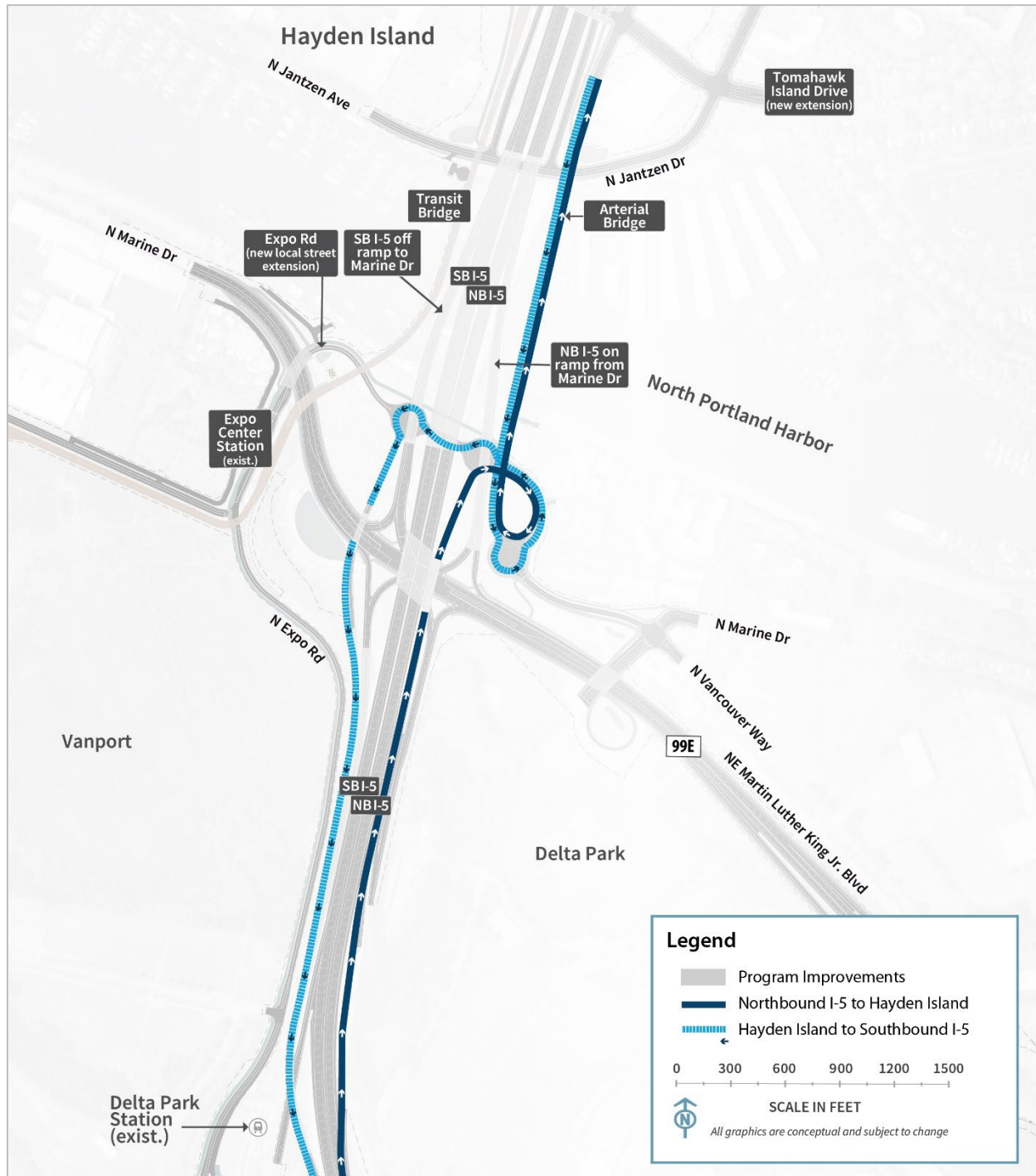
All traffic movements for the Hayden Island interchange would be reconfigured. Figure 1-6 shows the layout and construction footprint of the Hayden Island interchange. A partial interchange would be

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 improve ramp lengths to provide sufficient merging/diverging areas compared to the existing substandard ramps that require acceleration and deceleration in a short distance. The I-5 mainline would be partially located on fill across the island and partially elevated to provide east–west connections on Hayden Island.

There would not be a southbound I-5 on-ramp or northbound I-5 off-ramp located 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 1-9). 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 intersection at the Expo Road local street extension, 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 intersection, 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 1-9. Vehicle Circulation between Hayden Island and the Portland Mainland



NB = northbound; SB = southbound

1.1.2.3 Transit

A new light-rail alignment for northbound and southbound trains would be constructed within Subarea A (Figure 1-6) 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 southwest corner of the Expo Center property (Figure 1-6) to provide storage for trains during hours when the 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 could require reconstruction of the operator break facility, signal/communication buildings, and TPSSs. The existing TPSS at the end of TriMet's MAX Yellow Line would be decommissioned. A new TPSS would be constructed to the east of the LRT tracks and south of Expo Road, as well as at the overnight LRV facility, east of N Force Avenue. Immediately north of the Expo Center MAX Station, the LRT alignment would curve east toward I-5, pass beneath an elevated 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.

After crossing the new Expo Road extension, the new light-rail track would cross over the main levee (Figure 1-7). The light-rail profile is anticipated to provide sufficient clearance 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 the Modified LPA's light-rail extension would cross the north end of the existing Cross Levee, the IBR Program is proposing to realign the Cross Levee to the east of the light-rail alignment. This realigned Cross Levee would intersect the new Expo Road extension. A levee closure structure would be required because the proposed roadway is a few feet lower than the proposed elevation of the improved levee.

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. Active transportation facilities, described below, would connect to the new Hayden Island Station. A new TPSS would be constructed at the Hayden Island Station, north of the transit platform. If a single-level fixed-span or movable-span Columbia River bridge configuration were implemented, the light-rail alignment would extend north on Hayden Island along the western edge of I-5 before transitioning onto the outer (western) edge of the new western single-level bridge over the Columbia River. For the double-deck configuration, the light-rail alignment would transition to the lower level of the new double-deck southbound I-5 bridge over the Columbia River.

1.1.2.4 Active Transportation

In the Victory Boulevard interchange area (Figure 1-6), active transportation facilities would be provided on Victory Boulevard beneath I-5 and Interstate Avenue between Expo Road and the northbound on/off-ramp terminal east of I-5. Active transportation facilities would also be provided along Expo Road between Victory Boulevard and the Expo Center. These facilities would provide

direct connections 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, active transportation facilities 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 active transportation 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 (Figure 1-6). On Hayden Island, active transportation facilities would be provided on Jantzen Avenue, Hayden Island Drive, and Tomahawk Island Drive and would connect to the Hayden Island Station. 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 outer edge of the new single-level, or lower level of the double-deck 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 (Figure 1-3 provides an overview of the geographic subareas). Figure 1-10 shows highway and interchange improvements in Subarea B.

Figure 1-10. Columbia River Bridges (Subarea B)



1.1.3.1 Highways, Interchanges, and Local Roadways

The two existing parallel northbound and southbound I-5 bridges that cross the Columbia River were constructed in 1917 and 1958, respectively. When the 1958 bridge was constructed, pier 5 of the 1917 bridge was removed and the profile was raised to match the new bridge. For the IBR Program, the two existing bridges would be replaced by two new parallel bridges, located west of the existing bridges (Figure 1-10). The new bridges would be designed to current American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design Bridge Design Specifications and AASHTO Seismic Guide Specifications and in compliance with ODOT and WSDOT

design criteria. With all bridge configuration design options, the new eastern bridge would accommodate northbound highway traffic and a shared-use path. The new western bridge would carry southbound traffic and light-rail tracks. Whereas the existing bridges each have three lanes with no shoulders, each of the two new bridges would 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.

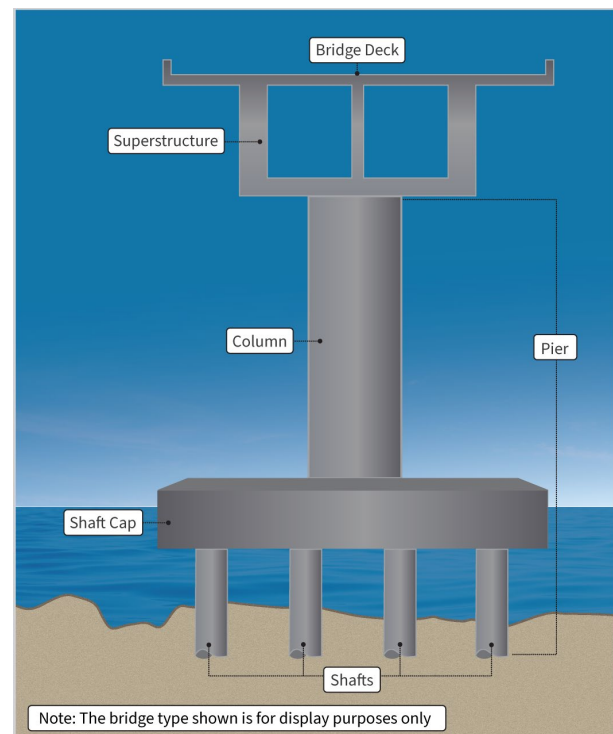
As with the existing bridge (Figure 1-12), the new Columbia River bridges would provide three navigation channels: a primary navigation channel (Figure 1-13). The current location of the primary navigation channel is near the Vancouver shoreline where the existing lift spans are located. The IBR Program is coordinating with the USACE to obtain authorization to change the location of the primary navigation channel. 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 USACE-authorized channel and a 50-foot channel maintenance buffer on each side of the authorized channel), and the two barge channels would also each be 400 feet wide.

The existing Interstate Bridge has nine in-water pier sets⁸ and four pier sets on land (pier locations are shown on Figure 1-12). 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 1-13). 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 (Figure 1-11).

BRIDGE CONFIGURATION OPTIONS

Three bridge configuration options are being considered: (1) double-deck fixed-span (with one bridge type); (2) a single-level fixed-span (with various 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, which was the vertical navigation clearance of the CRC LPA. The CRC LPA included a double-deck fixed-span bridge configuration. The single-

Figure 1-11. Bridge Foundation Concept



⁸ A pier set consists of the pier supporting the northbound bridge and the pier supporting the southbound bridge at a given location.

level fixed-span configuration was developed and is being considered as part of the IBR Program in response to the physical and contextual changes (e.g., design and operational considerations) since 2013 that allowed for opportunities to examine 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).

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. On January 16, 2026, the USCG issued a revised PNCD for the new Columbia River bridges and set the preliminary vertical navigation clearance at 116 feet or greater (USCG 2026).

The IBR Program is carrying forward the three bridge configurations, each of which meets the IBR Program's Purpose and Need, to address changed conditions to ensure a permissible bridge configuration is within the range of options considered in the Supplemental Environmental Impact Statement (SEIS). Each of the bridge configuration design options provides at least 116 feet of vertical navigation clearance and is consistent with the January 2026 PNCD issued by the USCG. Additional discussion on pending actions to obtain authorizations from USCG and USACE for the Columbia River bridges' primary navigation channel location are described in Section 2.6, Additional Compliance, of the Final SEIS.

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

Figure 1-12. Existing Navigation Clearances of the Interstate Bridge

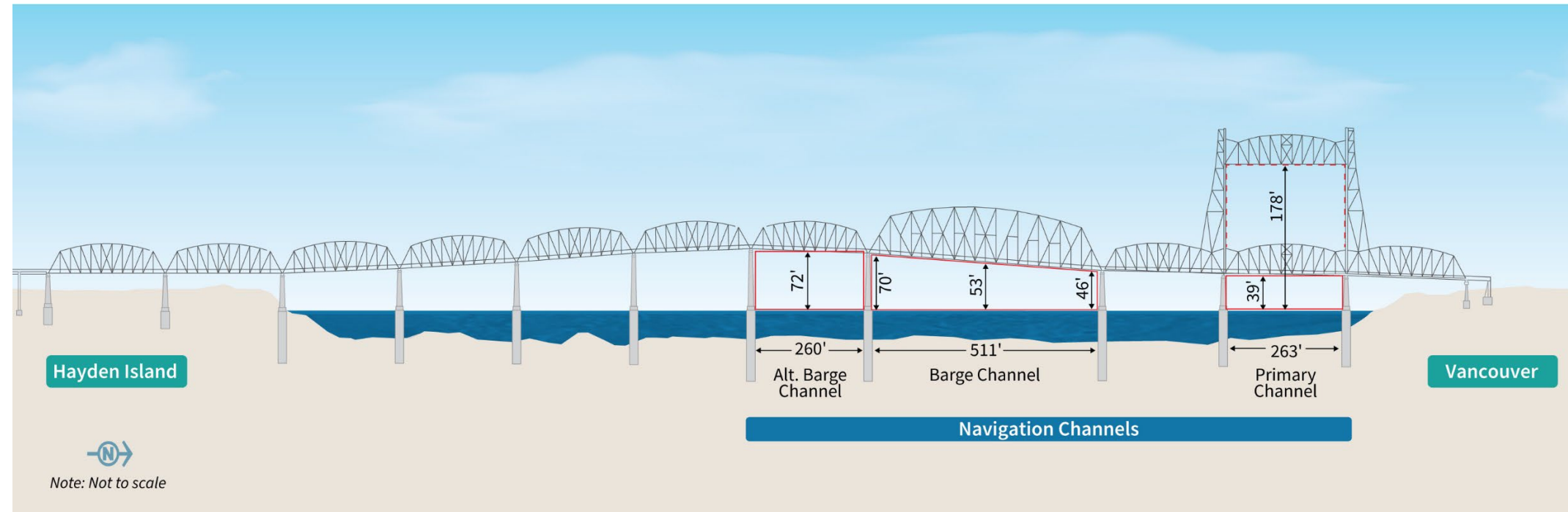
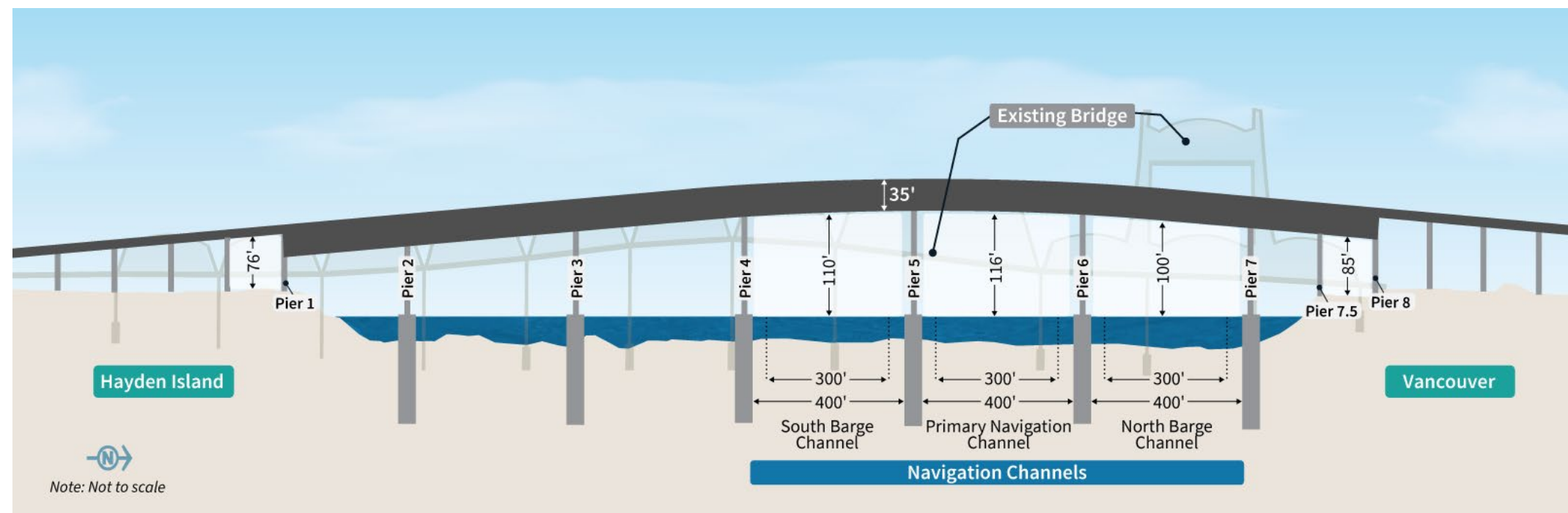


Figure 1-13. Navigation Clearances and Proposed Profile of the Modified LPA Columbia River Bridges with a Double-Deck Fixed-Span Configuration



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 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, as described in the following sections.

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 1-14 shows 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.

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 one set of light-rail tracks (one northbound track and one southbound track) on the lower level. Each bridge deck would typically be 79 feet wide, with a total out-to-out width of approximately 173 feet.⁹

Figure 1-14. Conceptual Drawing of a Double-Deck Fixed-Span Configuration

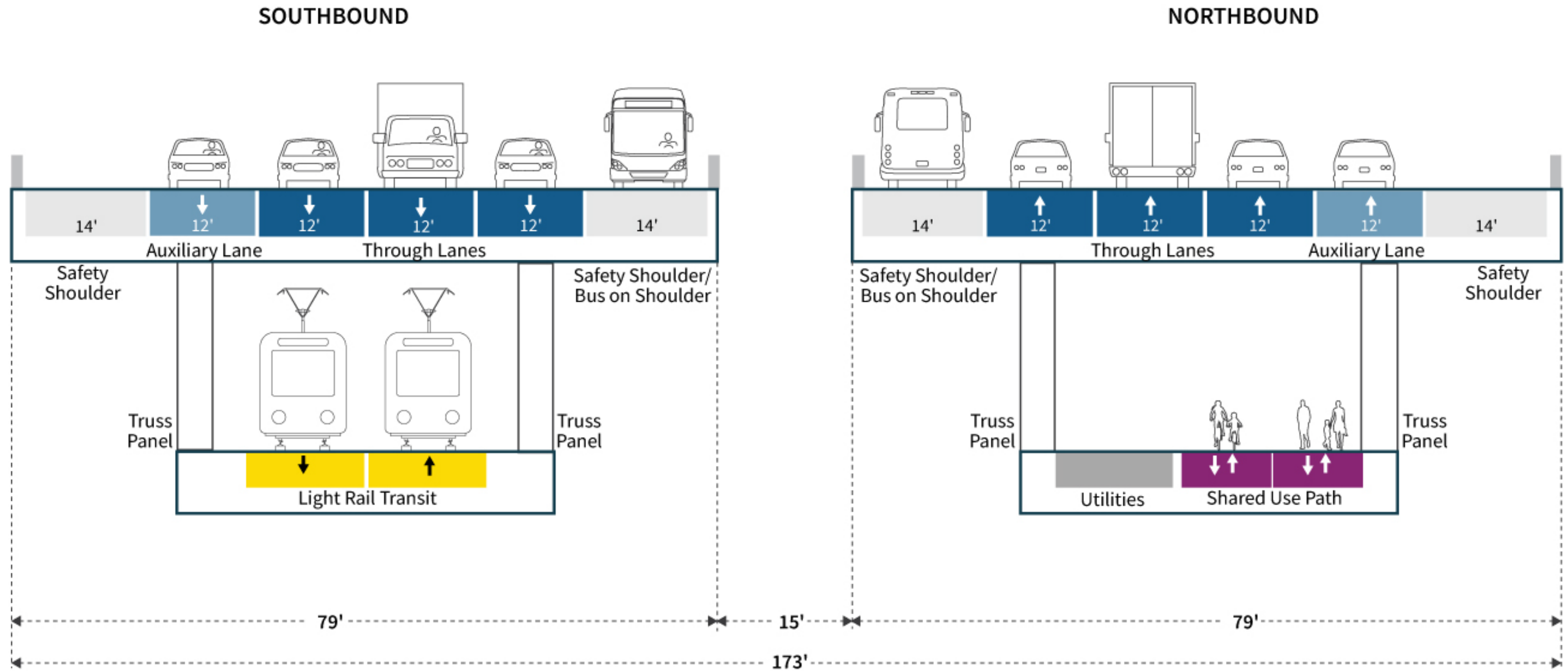


Note: Visualization is looking southeast from Vancouver.

Figure 1-15 shows a typical cross section of the two parallel double-deck bridges. Like all bridge configuration design options under consideration, 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 up to a 4% maximum grade on both the Oregon and Washington sides. All vertical profiles would follow AASHTO, WSDOT, and ODOT design standards.

⁹ “Out-to-out width” is the measurement between the outside edges of the bridge across its width at the widest point.

Figure 1-15. Typical Cross Section of the Double-Deck Fixed-Span Configuration



Note: Design is not final and subject to change. Widths may vary with final design. The one auxiliary lane design option is used for illustration purposes. The two auxiliary lane design option would add approximately 8 feet to each bridge (i.e., 16 feet to the total width).

Single-Level Fixed-Span Configuration – Recommended Design Option

The single-level fixed-span configuration would have two side-by-side, single-level, fixed-span steel or concrete bridges. This report considers two single-level fixed-span bridge type options: a girder (steel or concrete segmental) bridge and an extradosed bridge.¹⁰ The description in this section applies to both bridge types (unless otherwise indicated). Conceptual examples of both options are shown on Figure 1-16. 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, which is consistent with the January 2026 PNCD issued by the USCG.

The eastern bridge would accommodate northbound highway traffic and the shared-use path; the bridge deck would be approximately 104 feet wide. The western bridge would carry southbound traffic and light-rail tracks; the bridge deck would be approximately 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 as with the double-deck configuration. The total out-to-out width of the single-level fixed-span configuration (extradosed option) would be approximately 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 approximately 232 feet at its widest point. Figure 1-17 shows a typical cross section of the single-level configuration with an extradosed bridge as shown by the 10-foot-wide bridge columns. Figure 1-18 shows a

The IBR Program recommends advancing the single-level fixed-span bridge configuration. All bridge configurations would provide important benefits to highway operations and safety and have similar impacts to many resources. The main differences between either of the fixed-span configurations and the movable-span configuration is that the latter would provide more vertical clearance to accommodate larger vessels and a lower grade for all land-based transportation modes (which would benefit freight and active transportation users in particular), but this configuration would also periodically disrupt all other land-based transportation modes (personal vehicles, freight, transit, and active transportation) with bridge openings. The main differences between the double-deck and single-level fixed-span configurations are that the slightly higher grade of the former would impact freight traffic and active transportation users, and the latter would have faster emergency response times (although there would also be more exposure to vehicles) and give users of the shared-use path a greater sense of security due to “eyes on the path.” The fixed-span configurations received generally positive comments from the public, while there was mixed feedback on the movable-span because of the tradeoffs given above.

¹⁰ The Draft SEIS also included a finback as a single-level fixed-span bridge type. As the design of the various bridge types progressed, it was determined that the finback would have higher risks associated with increased cost and construction schedule because this bridge type is less common and applying this bridge type to the scale of the new Columbia River bridges would introduce more design and construction challenges than the other bridge type options. Other bridge types, such as concrete or steel girder or extradosed, would have fewer risks and would be a more suitable for this location. As a result, the finback bridge type was dropped from further consideration.

typical cross section with a girder bridge, which would not have the 10-foot-wide bridge columns shown on Figure 1-17.

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 approximately 50 feet by 230 feet.

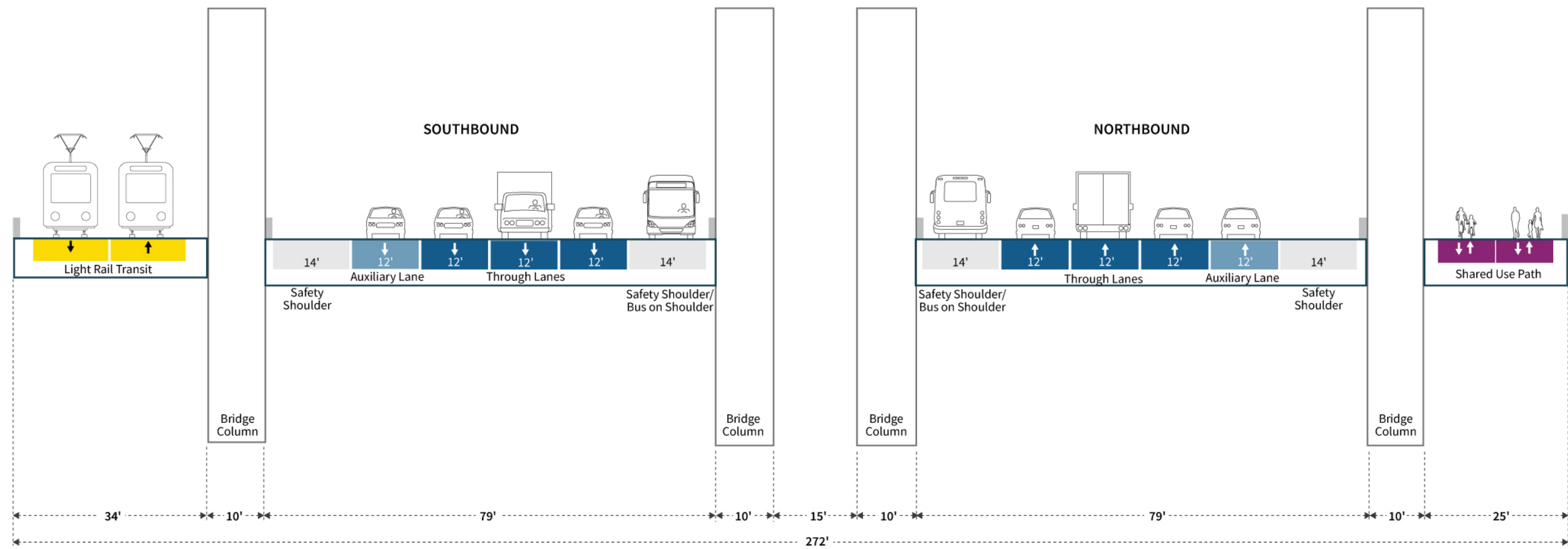
This bridge configuration would be expected to have an approximate grade of 3% on both the Oregon and Washington sides of the bridge. All vertical profiles would follow AASHTO, WSDOT, and ODOT design standards.

Figure 1-16. Conceptual Drawings of Single-Level Fixed-Span Bridge Types



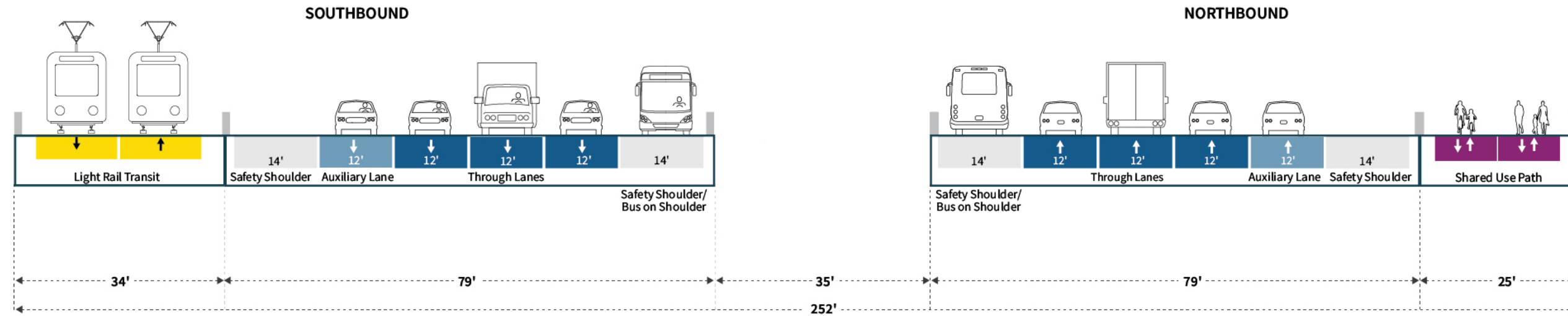
Note: Visualizations are for illustrative purposes only. They do not reflect property impacts or represent final design. Visualization is looking southeast from Vancouver.

Figure 1-17. Typical Cross Section of the Single-Level Fixed-Span Configuration (Extradosed Type)



Note: Design is not final and subject to change. Widths may vary with final design. The two auxiliary lane design option would add approximately 8 feet to each bridge (i.e., 16 feet to the total width).

Figure 1-18. Typical Cross Section of the Single-Level Fixed-Span Configuration (Girder Type)



Note: Design is not final and subject to change. Widths may vary with final design. The cross section for a girder bridge type would be the same as an extradosed bridge type except that it would not have the four 10-foot bridge columns. The distance between the two bridges could be reduced to 10 feet. The one auxiliary lane design option is used for illustration purposes. The two auxiliary lane design option would add approximately 8 feet to each bridge (i.e., 16 feet to the total width).

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 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 to the Final SEIS. 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 horizontal curvature and with minimal grade). 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 approximately 500 feet south of the existing lift span, between Piers 5 and 6.

The single-level movable-span configuration would provide approximately 90 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. 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] over the 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, which would be slightly shorter than the existing lift-span towers, which are 247 feet high.

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 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. Typical cross sections of the single-level movable-span configuration are shown in Figure 1-20; the top section depicts the vertical lift spans (Piers 5 and 6), and the bottom 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 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 approximately 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 (approximately 50 feet by 230 feet). The single-level movable-span configuration (with a vertical lift span) would have a total of 108 in-water drilled shafts.

This single-level movable-span configuration would be expected to have an approximate grade of 3% on the Oregon side of the bridge and an approximate grade of 1.5% on the Washington side. All vertical profiles would follow AASHTO, WSDOT, and ODOT design standards.

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

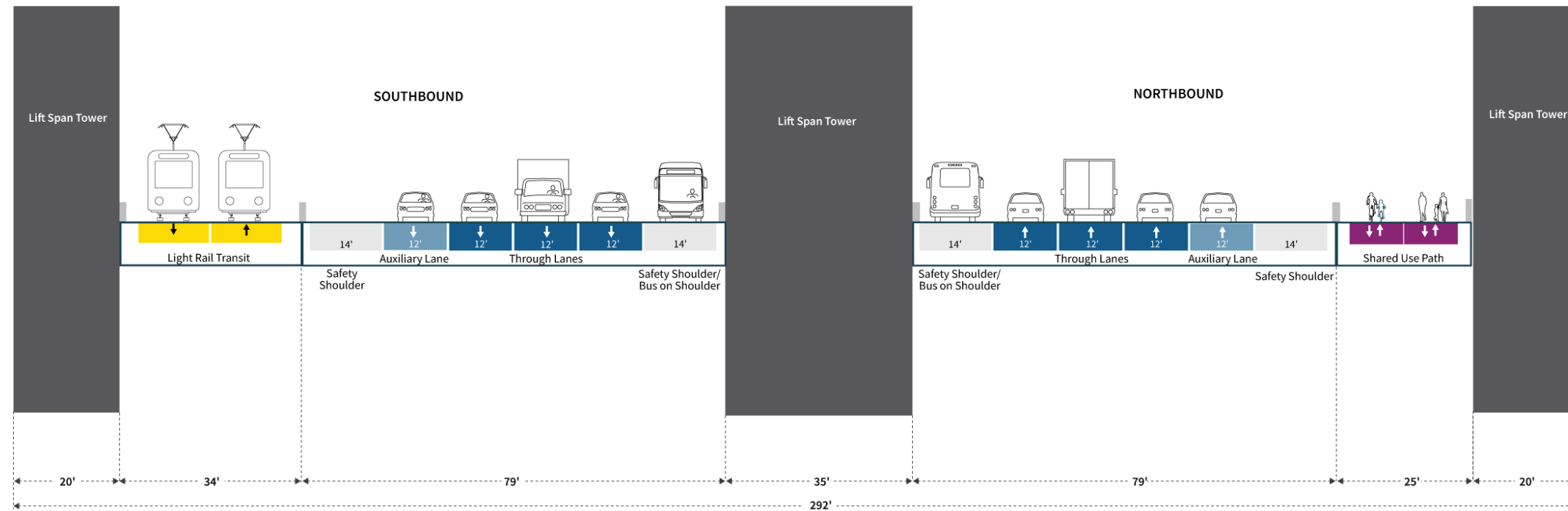


Visualizations are for illustration purposes only. They do not reflect property impacts or represent final design.

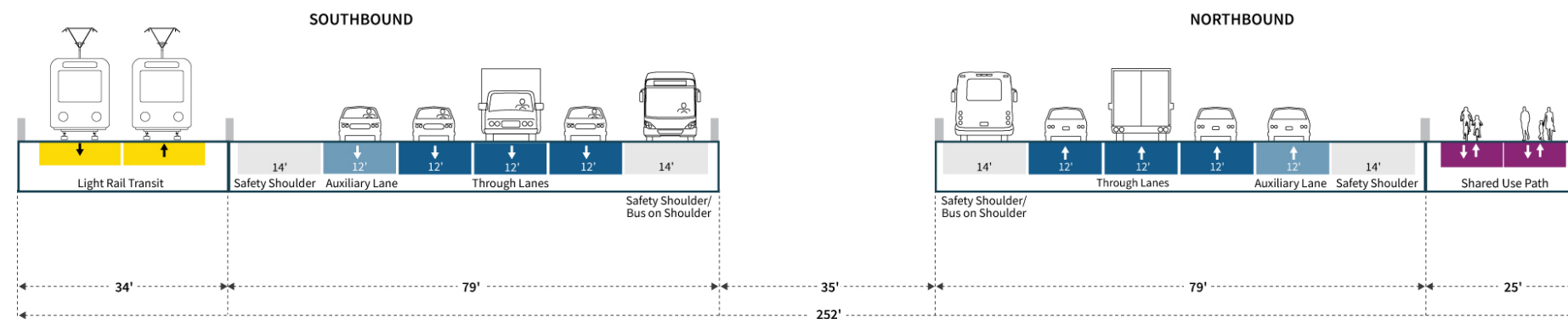
Note: Visualization is looking southeast (upstream) from Vancouver.

Figure 1-20. Typical 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)



Note: Design is not final and subject to change. Widths may vary with final design. The one auxiliary lane design option is used for illustration purposes. The two auxiliary lane design option would add approximately 8 feet to each bridge (i.e., 16 feet to the total width).

Bridge Configuration Comparison

This section summarizes and compares each of the bridge configurations. Table 1-2 lists the key considerations for each bridge configuration. Figure 1-21 compares each of the three bridge configurations' footprints with the one auxiliary lane design option (refer to Figure 1-5 for a comparison of the one and two auxiliary lane design options footprints). 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 approximately 173 feet wide. Comparatively, the extradosed bridge type of the single-level fixed-span configuration would be approximately 272 feet wide (approximately 99 feet wider), and the single-level fixed-span configuration with a girder bridge type would be approximately 232 feet wide (approximately 59 feet wider). The single-level movable-span configuration would be approximately 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 width of approximately 40 feet 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 and elevation of each configuration. The single-level fixed-span configuration and the lower deck of the double-deck fixed-span would have similar elevations, but the upper deck of the double-deck bridge would be approximately 35 feet higher. The single-level movable-span configuration would have a lower profile than the fixed-span configurations when the span is in the closed position.

Figure 1-21. Bridge Configuration Footprint Comparison

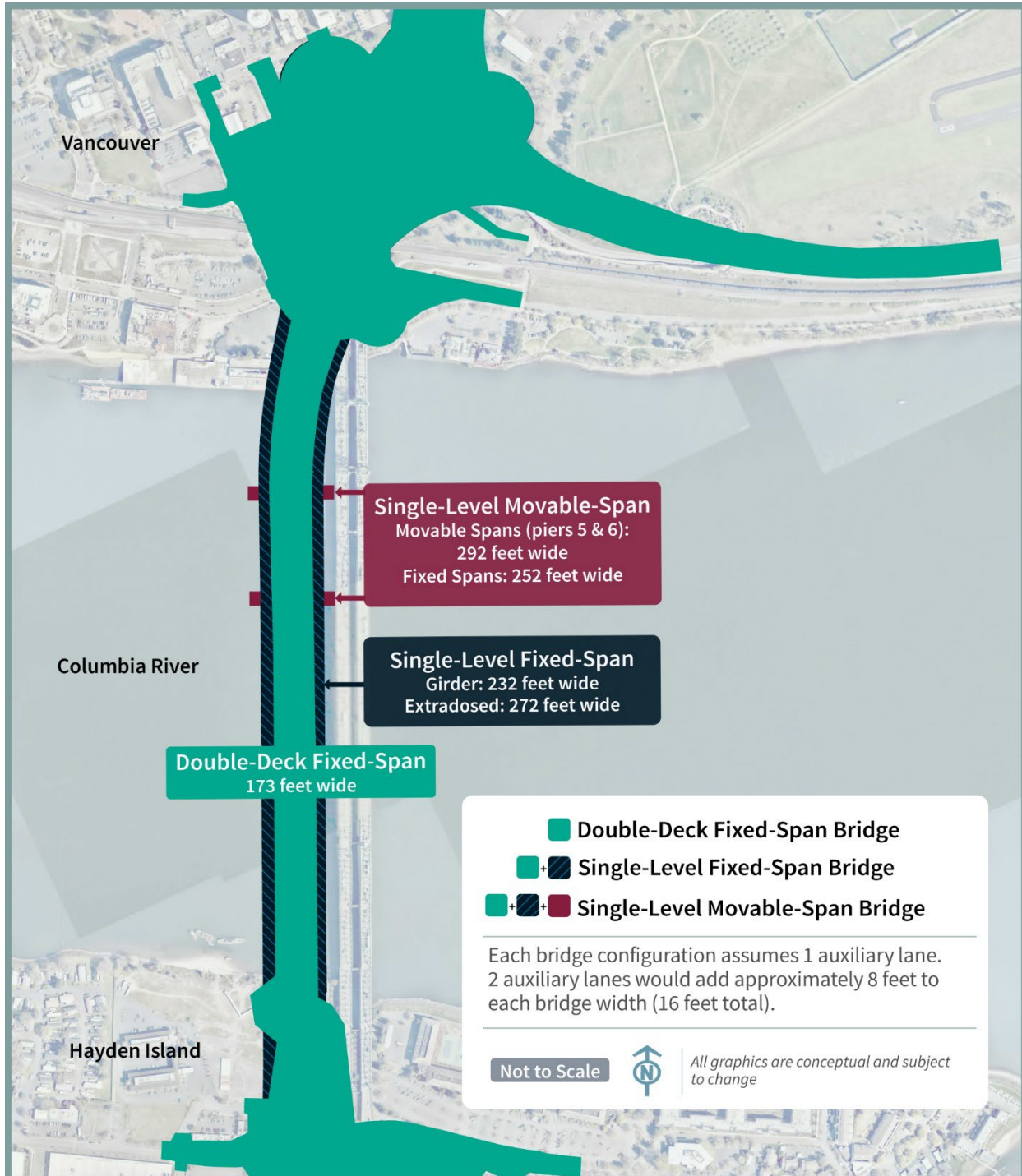
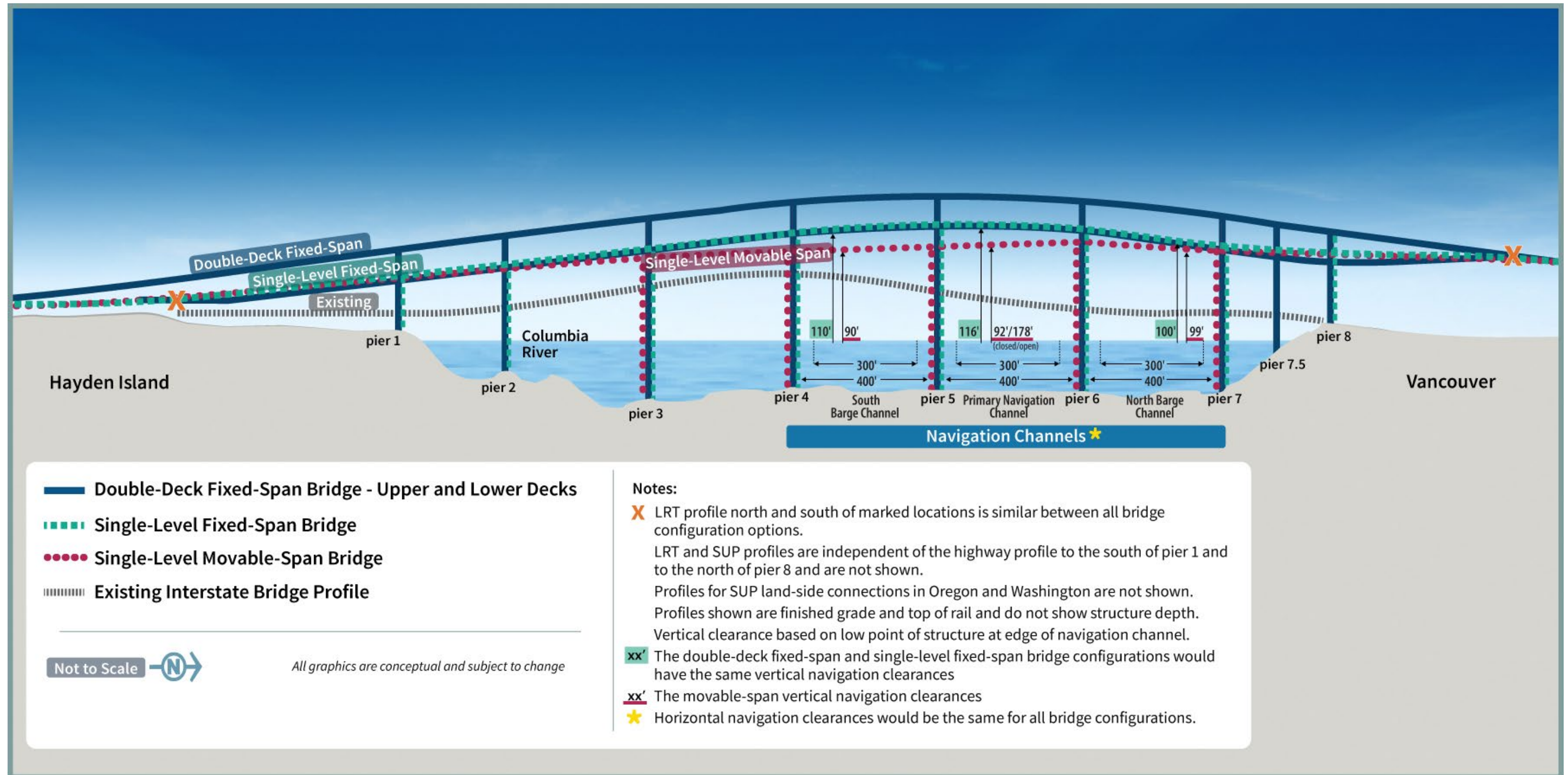


Figure 1-22. Bridge Configuration Profile Comparison



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

Table 1-2. Summary of Bridge Configurations

Component	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, or extradosed	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 for vessels	<p>Weekday peak AM and PM highway travel periods. ^b</p> <p>Typical bridge opening/gate closure durations are approximately 9 to 27 minutes depending on the purpose of the bridge lift (i.e., maintenance or vessel traffic) and lift elevation (i.e., partial lift or full lift). From 2007 to 2024, there was an average of 152 lifts per year (IBR 2025).</p>	N/A	N/A	<ul style="list-style-type: none"> Considering 2007–2024 trends in vessels transiting under the Interstate Bridge, there would be fewer bridge lifts compared to the No-Build Alternative due to increased vertical navigation clearance in the closed position (99 feet compared to 72 feet). Additional restrictions to daytime bridge openings would be requested to consolidate fewer bridge openings outside of morning, midday, and evening peak hours when vehicle and transit demand is high in order to improve LRT on-time performance and system reliability and reduce

Component	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
				<p>highway congestion. Changes to bridge opening restrictions would require 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</p> <p>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.</p>
Out-to-out width ^d	138 feet total width	~173 feet total width	Girder: ~232 feet total width Extradosed: 272 feet total width	<ul style="list-style-type: none"> ● ~292 feet at the movable span ● ~252 feet at the fixed spans

Component	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
Deck widths	52 feet (SB) 52 feet (NB)	~79 feet (SB) ~79 feet (NB)	Girder: <ul style="list-style-type: none"> • ~113 feet (SB) • ~104 feet (NB) Extradosed: <ul style="list-style-type: none"> • ~133 feet (SB) • ~124 feet (NB) 	~113 feet (SB) ~104 feet (NB)
Vertical navigation clearance	Primary navigation channel: <ul style="list-style-type: none"> • 39 feet when closed. • 178 feet when open. Barge channel: <ul style="list-style-type: none"> • 46 feet to 70 feet. Alternate barge channel: <ul style="list-style-type: none"> • 72 feet. 	Primary navigation channel: <ul style="list-style-type: none"> • 116 feet maximum. North barge channel: <ul style="list-style-type: none"> • 100 feet maximum. South barge channel: <ul style="list-style-type: none"> • 110 feet maximum. 	Primary navigation channel: <ul style="list-style-type: none"> • 116 feet maximum. North barge channel: <ul style="list-style-type: none"> • 100 feet maximum. South barge channel: <ul style="list-style-type: none"> • 110 feet maximum. 	Primary navigation channel: <ul style="list-style-type: none"> • Closed position: ~90 feet. • Open position: 178 feet. North barge channel: <ul style="list-style-type: none"> • ~99 feet maximum. South barge channel: <ul style="list-style-type: none"> • ~90 feet maximum.
Horizontal navigation clearance	<ul style="list-style-type: none"> • 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 USACE authorized channel plus a 50-foot channel maintenance buffer on each side).	400 feet for all navigation channels (300-foot USACE authorized channel plus a 50-foot channel maintenance buffer on each side).	400 feet for all navigation channels (300-foot USACE authorized channel plus a 50-foot channel maintenance buffer on each side).

Component	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 height of bridge component (elevation relative to NAVD 88) ^e	247 feet at top of lift tower	~166 feet	Girder: ~137 feet. Extradosed: ~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	<ul style="list-style-type: none"> • 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)
Conceptual vertical grade ^f	4.8%	~4% on the Washington side ~4% 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
LRT location	N/A	Below highway on SB bridge	West of highway on SB bridge	West of highway on SB bridge

Component	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
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

All dimensions and quantities are approximate.

- a When different bridge types are not mentioned, data apply to both bridge types under the single-level fixed-span bridge configuration.
- b The No-Build Alternative assume 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). For the Modified LPA with a single-level movable-span bridge configuration design option, additional timing restrictions, which would increase restrictions on the timing for and duration of bridge openings, except for emergencies, would be requested and coordinated with the USCG. Bridge openings would be required for vessels and/or cargo with heights greater than 72 feet under the No-Build Alternative; whereas, bridge openings for vessels and/or cargo requiring more than 99 feet of clearance would be required for the Modified LPA with the movable-span bridge configuration design option.
- c For the purposes of the transportation analysis in the Final SEIS (Section 3.1, Transportation of the Final SEIS), the movable-span opening time is assumed to be an average of 13.2 minutes.
- d “Out-to-out width” is the measurement between the outside edges of both northbound and southbound bridge across its width at the widest point and includes the space between the two bridges. The deck width is the measurement of the outer edges of either the northbound bridge or the southbound bridge.
- e NAVD 88 is a vertical control datum (reference point) used by federal agencies for surveying.
- f The maximum allowable vertical grade according to ODOT and WSDOT standards on the I-5 mainline is 4%.

I-5 = Interstate 5; LPA = Locally Preferred Alternative; LRT = light-rail transit; N/A = not applicable; NAVD 88 = North American Vertical Datum of 1988; NB = northbound; ODOT = Oregon Department of Transportation; SB = southbound; SEIS = Supplemental Environmental Impact Statement; USACE = U.S. Army Corps of Engineers; USCG = U.S. Coast Guard; WSDOT = Washington State Department of Transportation

1.1.4 Downtown Vancouver (Subarea C)

This section discusses the geographic Subarea C (Figure 1-3 shows an overview of the geographic subareas). Figure 1-23 shows all highway and interchange improvements in Subarea C.

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).

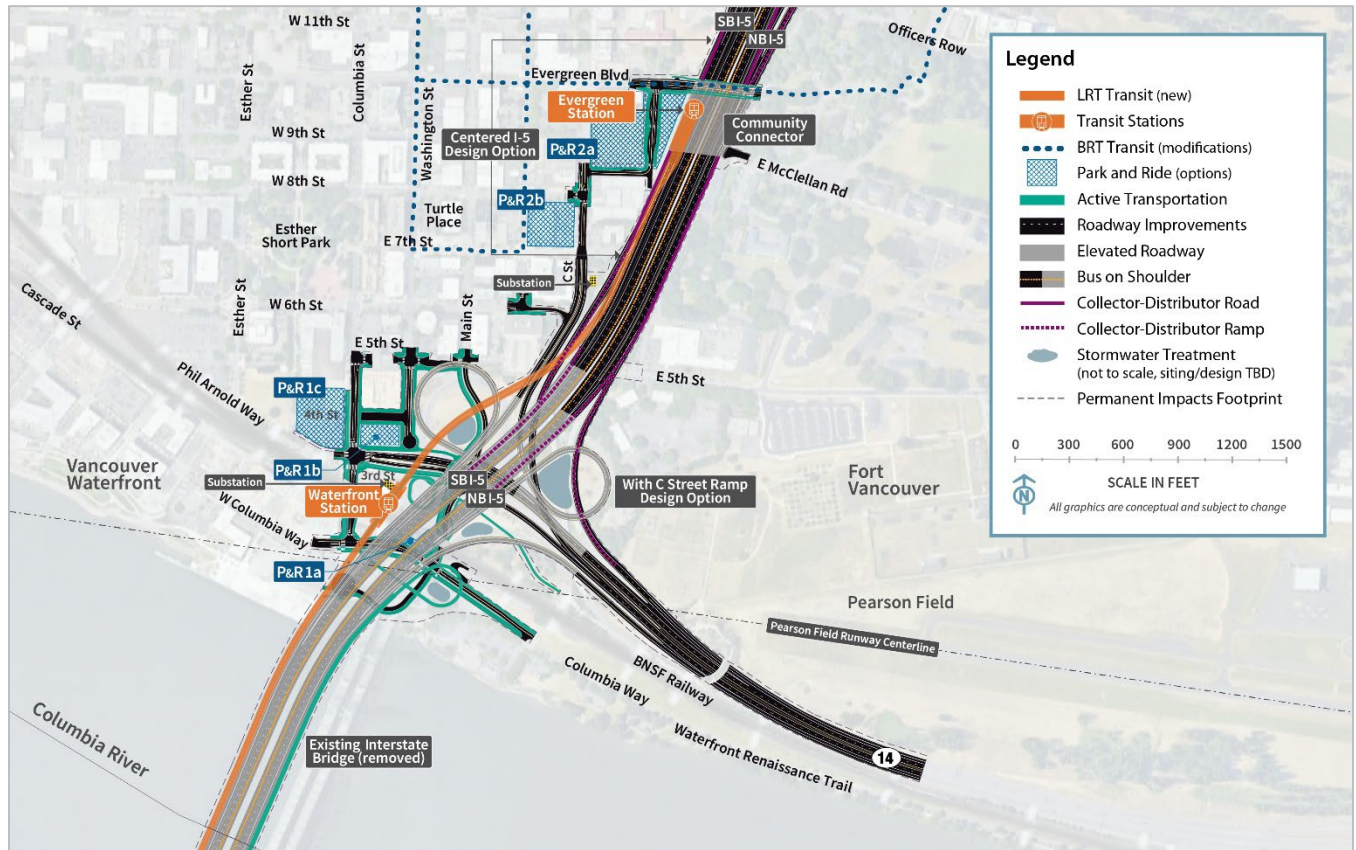
SR 14 INTERCHANGE/DOWNTOWN VANCOUVER

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 configuration would remain essentially the same as it is now, but the interchange would be elevated to meet the new Columbia River bridges that cross over the BNSF Railway tracks. 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. Access from downtown Vancouver to eastbound SR 14 would be relocated from the Washington Street and W 5th Street intersection to a new intersection at Columbia Street and W 3rd Street. Access from westbound SR 14 would also be shifted from C Street to the new Columbia Street and W 3rd Street intersection. Access from downtown Vancouver to southbound I-5 would be relocated from the Washington Street and W 5th Street intersection to C Street. Access from northbound I-5 to downtown Vancouver would remain at C Street. Connections to downtown Vancouver would vary under the two design options under consideration for this area (with C Street ramps and without C Street ramps), as detailed below.

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 intersection 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 intersection, 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.

Figure 1-23. Downtown Vancouver (Subarea C)



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

C Street Ramp Design Options

With C Street Ramps – Recommended Design Option

The design option with C Street ramps would provide access to and from downtown Vancouver similar to existing conditions but with some of the connection points relocated. Access from northbound I-5 to downtown Vancouver would be rebuilt in the same location as the current connection. Downtown Vancouver I-5 access to and from the south would be consolidated at C Street with SR 14 connections to and from downtown at Columbia Street/W 3rd Street (Figure 1-24).

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 northbound I-5 to C Street and no directional ramp on the west side of I-5 from C Street to southbound I-5. The existing eastside loop ramp would be removed. This option would reduce the footprint of the Modified LPA in this area.

I-5 Alignment Design Options

Centered I-5 – Recommended Design Option

This design option would maintain the location of the existing I-5 mainline alignment through downtown Vancouver between the SR 14 interchange and the Mill Plain Boulevard interchange.

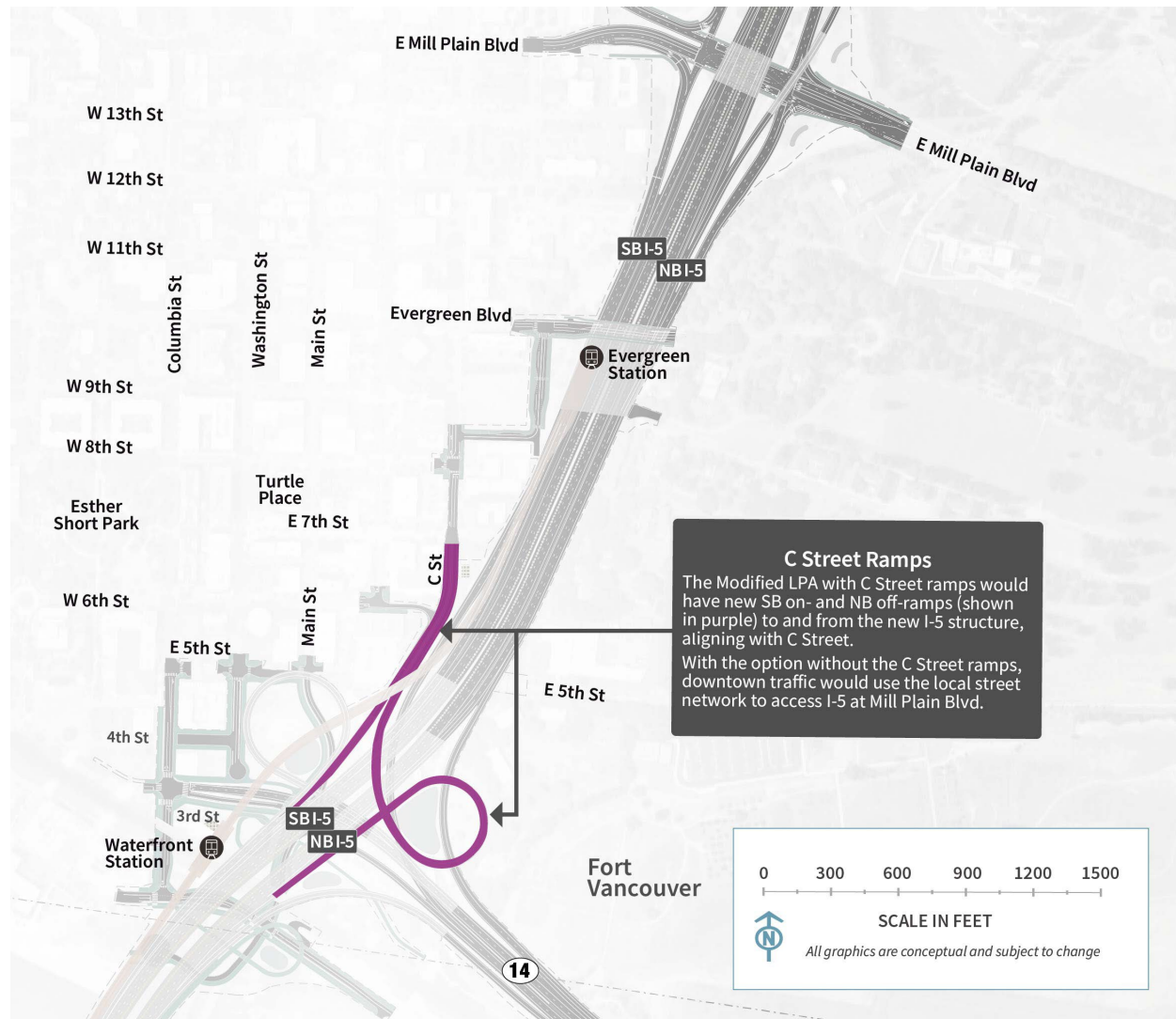
I-5 Shifted West

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 IBR Program recommends advancing the with C Street ramps design option. Both C Street ramp design options would provide important benefits to highway operations and safety and have similar impacts to many other resources, particularly the natural environment. While there would be some short-term construction cost savings and reduced visual impacts without C Street ramps, there would be greater impacts to local traffic as traffic that would have used the C Street ramps would be routed to the Mill Plain interchange, thereby increasing traffic volumes on the local street network and requiring additional mitigation. Both design options received a mix of positive and negative feedback from the public; however, there were more comments in support of the with C Street ramps design option. The with C Street ramps design option also has more support from the local partner agencies.

The IBR Program recommends advancing the centered I-5 alignment design option. Both I-5 mainline alignments would provide important benefits to highway operations and safety and have similar impacts to many other resources, particularly the natural environment. The westward shift design option would notably increase acquisitions resulting in the displacement of an additional three businesses (with approximately 140 employees) and 33 residential units, and the physical removal of the historic Normandy Apartments. However, the westward shift would reduce the area of acquisition and other impacts to the Vancouver National Historic Reserve (VNHR) Historic District (which includes the Fort Vancouver National Historic Site). While some public comments noted the reduced impacts to the VNHR Historic District from the westward shift design option, others raised concerns about its effects on safety, congestion, and increased residential and business displacements.

Figure 1-24. Modified LPA with C Street Ramps



COLLECTOR-DISTRIBUTOR ROADWAYS

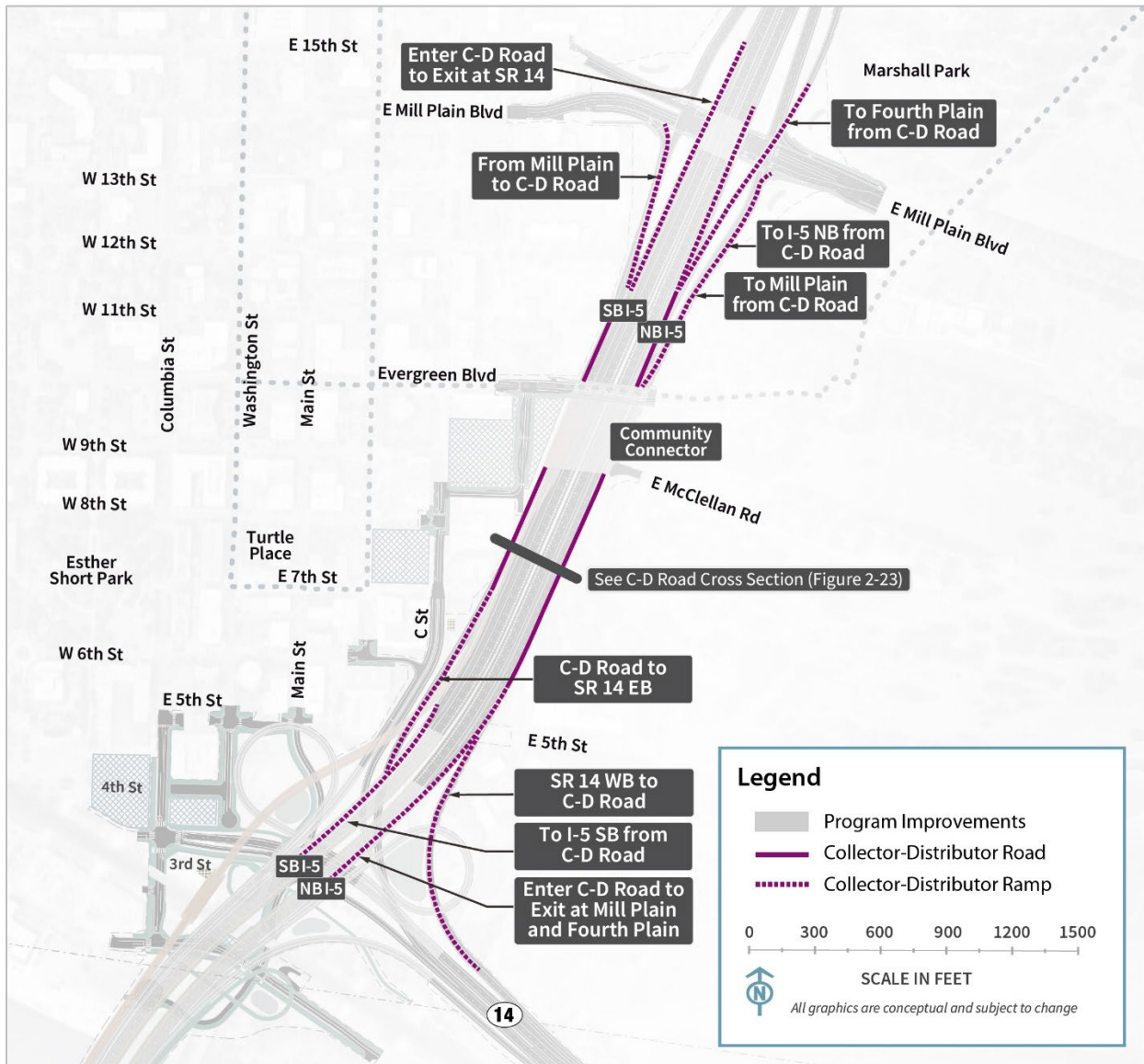
Figure 1-25 shows the location of the collector-distributor (C-D)¹¹ roadways in downtown Vancouver, and Figure 1-26 shows a typical cross section of the C-D roadways.

The on-ramp from SR 14 westbound would join the I-5 northbound off-ramp to Mill Plain/Fourth Plain Boulevard, forming the northbound C-D roadway between SR 14 and Fourth Plain Boulevard. The C-D roadway would provide access from northbound I-5 to the off-ramps at Mill Plain Boulevard and Fourth Plain Boulevard. The C-D roadway would also provide access from westbound SR 14 to the off-ramps at Mill Plain Boulevard and Fourth Plain Boulevard, and to the on-ramp to northbound I-5.

¹¹ A collector-distributor roadway parallels and connects the main travel lanes of a highway and frontage roads or entrance ramps.

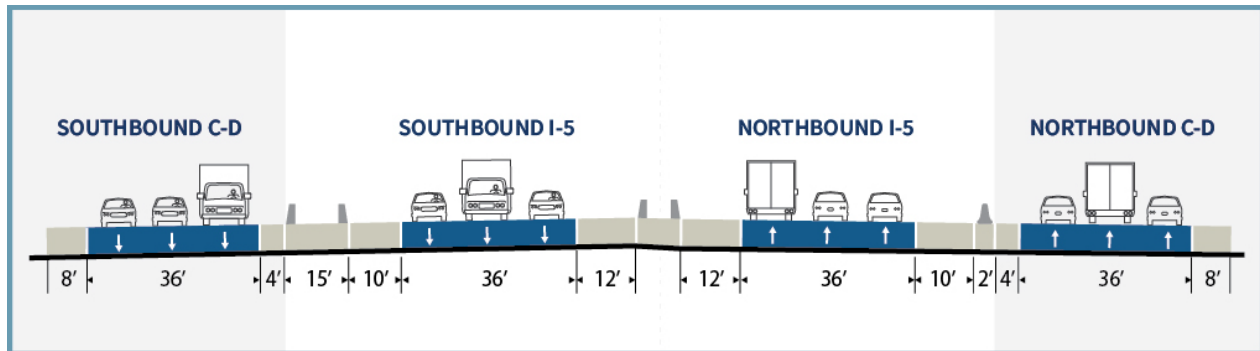
On southbound I-5, the off-ramp to SR 14 would join the southbound I-5 on-ramp from Mill Plain Boulevard to form a C-D roadway. The C-D roadway would provide access from southbound I-5 to the off-ramp to eastbound SR 14 and from Mill Plain Boulevard to the off-ramp to eastbound SR 14 and the on-ramp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

Figure 1-25. Collector-Distributor Roadways



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

Figure 1-26. Typical Cross Section of the Collector-Distributor Roadways



The location of this cross section is shown on Figure 1-25.

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 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 because the station would be situated approximately 90 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. Active transportation facilities, described below, would connect to the new Waterfront Station. A new TPSS would be constructed north of the transit platform. 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 would be similar between the C Street ramp and I-5 westward shift 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 (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 straddle bents¹² on either side of the roadway where needed. The Evergreen Station would be located at the same elevation as Evergreen Boulevard and the proposed Community Connector, and it would provide connections to the existing C-TRAN BRT system. Passenger drop-off facilities would be near the station and would be coordinated with the C-TRAN bus service at this location. Active transportation facilities, described below, would connect to the new Evergreen

¹² A straddle bent is a type of bridge support structure that “straddles” vehicle lanes and supports a flyover ramp.

Station. A new TPSS would be located on the south side of 7th Street, approximately 750 feet south of Evergreen Station.

PARK AND RIDES

The Modified LPA would provide parking capacity to accommodate 1,270 vehicles at designated park and rides in Vancouver along the LRT alignment (Figure 1-23) located near the Waterfront and Evergreen LRT stations. Parking capacity would be provided for 570 vehicles near the Waterfront Station and for 700 vehicles near the Evergreen Station.

Park and rides can expand the catchment area of public transit systems (the geographic area from which a station draws ridership), 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.

The park and rides would be designed to accomplish the following:

- Support transit ridership.
- Promote station access by walking, biking, rolling, and transit.
- Support City of Vancouver objectives to increase mobility and access for a vibrant downtown.
- Include existing parking facilities in downtown Vancouver to help meet the projected demand for park and rides in areas where City of Vancouver studies show surplus parking supply.

Additional information regarding the park and rides can be found in the Transportation Technical Report.

As presented in the Draft SEIS, the Modified LPA would provide parking capacity for LRT riders by locating a single park and ride near the Waterfront Station with approximately 570 parking spaces; three sites were considered for this facility. Similarly, a single park and ride near the Evergreen Station would provide approximately 700 parking spaces; two sites were considered. Based on further design analysis, public comment received on the Draft SEIS, and coordination with local agencies, the approach to providing parking capacity for LRT riders was adjusted to focus on dispersed parking across more facilities, including using all three sites previously identified near the Waterfront Station and both sites previously identified near the Evergreen Station. The approach to disperse parking capacity across more sites would correlate to smaller sites in terms of structure size above or below ground.

The sites under consideration are described below, and the evaluation of impacts and benefits to developing a single, large park and ride at each of the two LRT station or five smaller park and rides are evaluated in this report.

Waterfront Station Park and Rides

Studies included in Appendix D to the Final SEIS have shown the need for park-and-ride capacity to accommodate 570 vehicles in the vicinity of the Waterfront Station. Three possible sites are analyzed (Figure 1-23):

- 1a. Columbia Way (below I-5). This 0.75-acre site could be developed as a new aboveground one-level parking structure. Access would be via Columbia Way. It could support approximately 70 parking spaces.
- 1b. Columbia Street/SR 14. This 0.50-acre site could be developed as a new aboveground six-level structure along the east side of Columbia Street and north of the SR 14 westbound off-ramp. Access would be via Washington Street. It could accommodate approximately 250 parking spaces. To provide all 570 parking spaces at this site, the structure would need to be 10 to 12 levels.
- 1c. Columbia Street/Phil Arnold Way (Waterfront Gateway Site). This 1.5-acre site could be developed as a new surface lot along the west side of Columbia Street, north of Phil Arnold Way. Access would be via Phil Arnold Way. A surface lot would provide approximately 250 parking spaces. To provide all 570 parking spaces at this site, a new four-level structure would be needed.

Evergreen Station Park and Rides

Studies included in Appendix D to the Final SEIS have shown the need for park and rides to accommodate 700 vehicles in the vicinity of the Evergreen Station. Two possible sites are analyzed in this technical report (see Figure 1-23):

- 2a. Library Square. This 3.2-acre site could be developed as a new underground three- to four-level structure east of C Street and south of Evergreen Boulevard. It could accommodate approximately 400 parking spaces. To provide all 700 parking spaces at this site, the structure

The IBR Program recommends advancing 1,270 park-and-ride spaces dispersed across five sites in Vancouver along the light-rail alignment, including three sites near the Waterfront Station and two sites near the Evergreen Station. All of the park and rides would provide similar benefits to the community by increasing the transit stations' catchment areas and making transit more accessible. There could be minor localized differences in traffic patterns and transit ridership depending on the location of spaces. Dispersing the 1,270 parking spaces across five park and rides rather than concentrating the spaces at a single location each near the Waterfront Station and Evergreen Station would promote compatibility with local planning goals and plans for multiuse development, multimodal access, and attractive public spaces. As the FTA's Capital Investment Grant process progresses, the IBR Program team will refine the Program's transit components, which will contribute to further information on parking needs to support transit ridership.

Studies (Appendix D to the Final SEIS) leading to the Modified LPA in 2022 evaluated a mix of light-rail station sites and park and rides and found that 1,270 spaces serving the Waterfront and Evergreen Stations, combined with bus and active transportation improvements, would attract the most riders.

would require seven or more levels below ground.¹³ This site could be combined with Site 2b to provide a total of 700 spaces.

- 2b. Columbia Credit Union. This approximately 1-acre site is an existing parking structure/commercial building and provides an estimated 400 parking spaces to current users on four levels above ground. The parking capacity would not be exclusively available for transit users; however, up to 300 spaces could be used for transit riders. This site could be combined with Site 2a to provide a total of 700 spaces.

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 helix path, cross back below I-5 to the west side of I-5, run beneath the elevated light-rail crossing over BNSF, and then loop down to connect to the Main Street extension at the intersection underneath I-5 with connections to the Waterfront Station from the active transportation facilities. Connections to the Waterfront Renaissance Trail would be made by facilities along Main Street and Columbia Way (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 for all design options.

As part of the Modified LPA, a Community Connector is proposed to be built over I-5 just south of Evergreen Boulevard and east of the Evergreen Station (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 with connections to the Evergreen Station from 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)

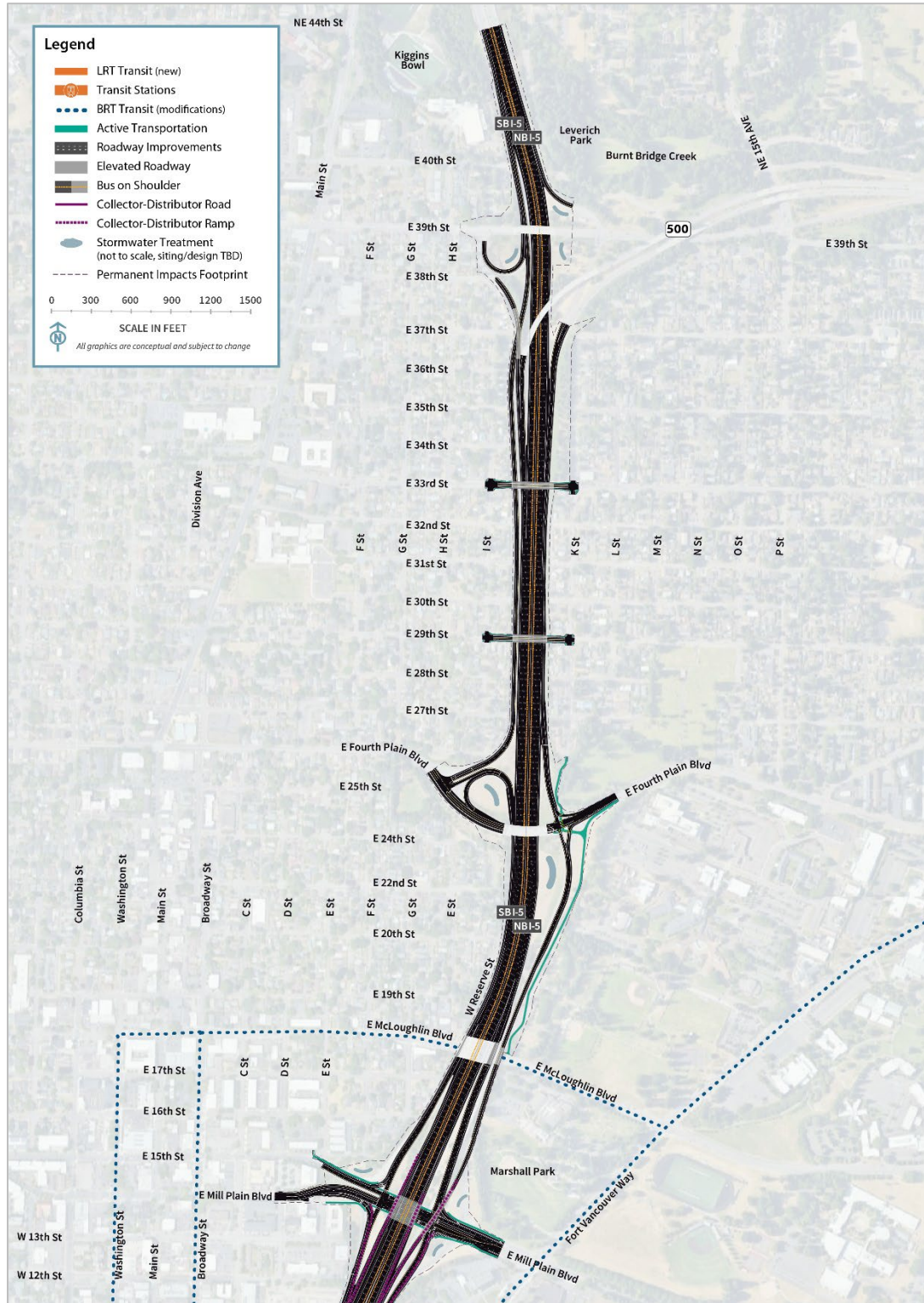
This section discusses the geographic Subarea D (Figure 1-3 shows an overview of the geographic subareas). Figure 1-27 shows all highway and interchange improvements in Subarea D.

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.

¹³ The maximum depth of an underground parking structure at Library Square is provided for comparative purposes only. An underground parking structure would likely not exceed 3 or 4 levels because of engineering and environmental constraints.

Figure 1-27. Upper Vancouver (Subarea D)



BRT = bus rapid transit; LRT = light-rail transit; TBD = to be determined

MILL PLAIN BOULEVARD INTERCHANGE

The Mill Plain Boulevard interchange is north of the SR 14 interchange (Figure 1-27). This interchange would be reconstructed as a tight-diamond configuration but would otherwise remain similar in function and footprint 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 1-27), improvements would include reconstruction of the I-5 ramp terminal intersections. The existing bridge for Fourth Plain Boulevard over I-5 would be retained. 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 500/39TH STREET INTERCHANGE AREA

The northern terminus of the I-5 improvements would be in the SR 500 interchange area (Figure 1-27). The improvements would primarily be to connect the Modified LPA to existing ramps. The off-ramp from I-5 southbound to 39th Street would be reconstructed to establish the beginning of the braided ramp to Fourth Plain Boulevard and restore the loop ramp to 39th Street. Ramps from existing I-5 northbound to SR 500 eastbound and from 39th Street to I-5 northbound would be partially reconstructed. The existing bridges for 39th Street over I-5 and SR 500 westbound to I-5 southbound would be retained. The 39th Street to I-5 southbound on-ramp would be reconstructed and braided over (i.e., grade separated or pass over) the new I-5 southbound off-ramp to Fourth Plain Boulevard.

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

1.1.5.2 Transit

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

1.1.5.3 Active Transportation

Several active transportation improvements would be made in Subarea D consistent with City of Vancouver plans and policies. On the east side of I-5, a new shared-use path would connect E McLoughlin Boulevard to Fourth Plain Boulevard. 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

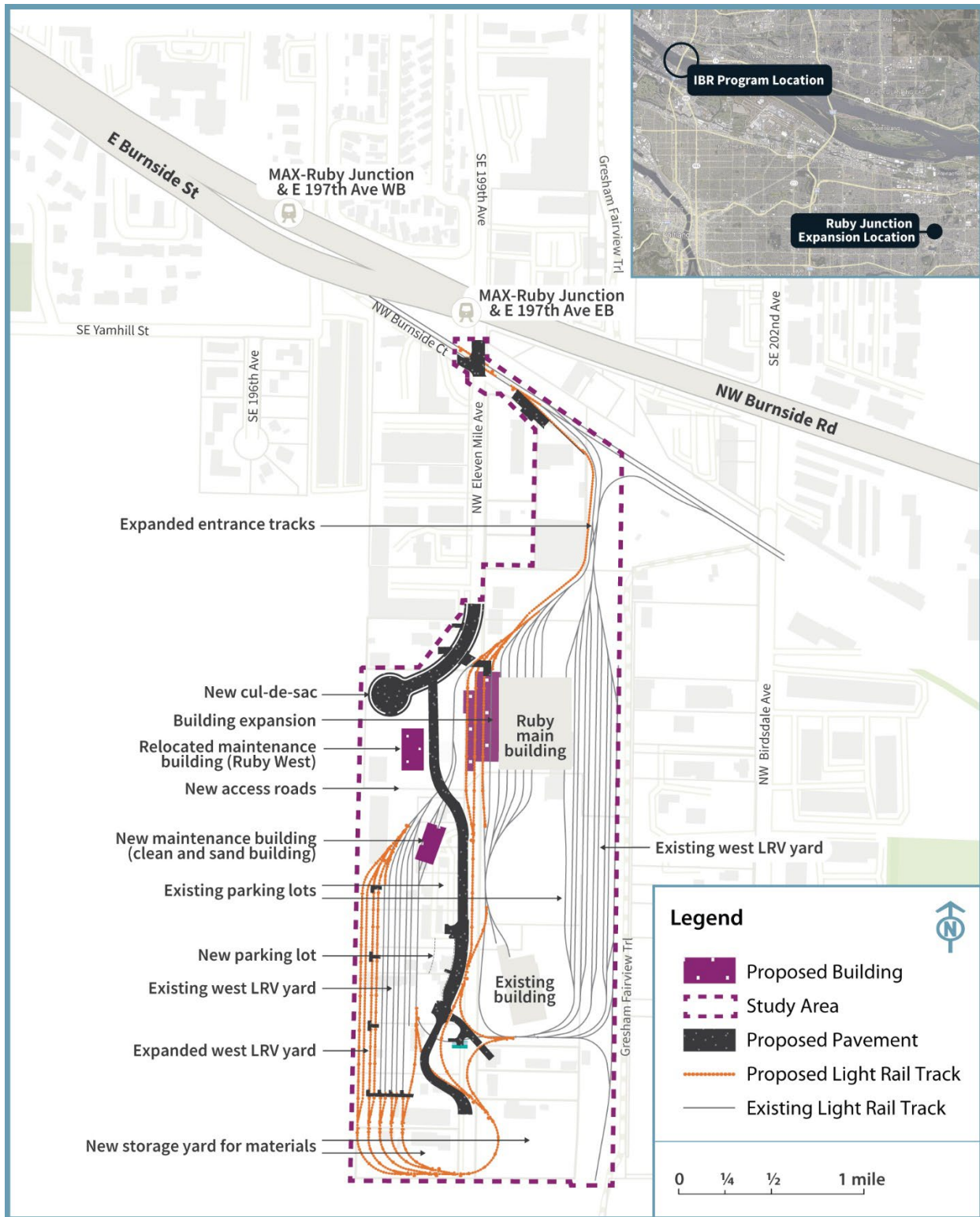
1.1.6.1 Ruby Junction Light-Rail OMF Expansion

The TriMet Ruby Junction Light-Rail OMF 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 1-28). Improvements would include additional storage tracks for LRVs and maintenance materials and supplies; expanded LRV maintenance bays; expanded parking and employee support areas for additional personnel; an additional maintenance building for daily cleaning and periodic weather-dependent treatments for LRV maintenance, demolition, and relocation of a maintenance building (Ruby West); tenant improvements and new structures for affected operations; and a third lead track at the northern entrance to the Ruby Junction Light-Rail OMF. Adjacent parcels would be acquired to accommodate maintenance and storage needs required for or impacted by the Modified LPA. Figure 1-28 shows the proposed footprint of the expansion.

The existing main building would be expanded west to provide additional maintenance bays. Today, Eleven Mile Avenue extends from NW Burnside Road and dead ends at the southern limits of the existing OMF. To make space for the building expansion, the existing Eleven Mile Avenue public right of way would be vacated and would terminate in a new cul-de-sac west of the main building. A new cul-de-sac would be required to meet City of Gresham code requirements for fire access and turnaround. New internal/nonpublic access roads would be constructed to maintain access to TriMet buildings south of the cul-de-sac; these would impact an existing maintenance building (Ruby West), which would be demolished and rebuilt within Ruby Junction Light-Rail OMF.

The existing western 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 southeastern corner of the campus. Immediately east of the storage yard, a double track LRV maintenance building would be constructed impacting existing parking. Various other surface parking areas in the west yard would also be relocated north of the cul-de-sac.

Figure 1-28. Ruby Junction Light-Rail Operations and Maintenance Facility Study Area



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

All tracks in the west LRV storage yard would also be extended southward to connect to the proposed runaround track. The runaround track would connect to existing and proposed tracks adjacent to the existing Ruby Junction building located to the south. The connections to the runaround track would require partial demolition of an existing TriMet building and, full demolition of one existing building and partial demolition of another building on the adjacent private property to the south. These affected functions would be housed in a new replacement building on site.

A third track would be needed at the north entrance to the Ruby Junction Light-Rail OMF 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 southwest corner of the Expo Center property (as shown on Figure 1-29). The inclusion of the Expo Overnight Facility allows TriMet the ability to maintain current service and maintenance operations on their Blue Line system and reduce deadheading between Ruby Junction and the northern terminus of the MAX Yellow Line extension. Deadheading occurs when LRVs travel without paying passengers to move the vehicles to and from service. Currently, Blue Line is maintained through a limited nighttime work window. With the inclusion of the Expo Overnight Facility, trains originating service at Evergreen have substantially less deadhead time, reducing Yellow Line operating costs, and Blue Line maintenance windows are retained.

The facility would provide a yard access track, storage tracks for approximately 13 LRVs, one building for light LRV maintenance and operator facilities, a TPSS, a sand silo, a parking lot for operators and facility staff, space for security personnel, and other associated facilities. This facility and the lead tracks connecting to it would necessitate relocation and reconstruction of the internal circulation road from the Expo Road entrance to approximately 100 feet west of Building E of the Expo Center (including southern areas of the parking lot, including gates and booths). However, it would not affect existing Expo Center buildings.

The overnight facility lead track 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 TPSS building and potentially the existing signals/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 existing C-TRAN OMF located at 2425 NE 65th Avenue in Vancouver. These additional bus bays, which would not require the acquisition of any new property, would provide maintenance capacity for the additional express bus service on I-5 (Section 1.1.7, Transit Operating Characteristics). Modifications to the facility would accommodate new vehicles as well as maintenance equipment.

Figure 1-29. Expo Center Overnight LRV Facility



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 including all design options, LRT service in the new and existing portions of the Yellow Line in 2045

would operate with 6.7-minute average headways¹⁴ during the 2-hour morning peak period. Midday and evening headways would be 15 minutes, and late-night headways would be 30 minutes. LRT 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 I-5 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: the 99th Street Transit Center and downtown Vancouver. This route currently provides weekday service with 20-minute peak and 60-minute off-peak headways.

In 2045, for both the No-Build Alternative and Modified LPA, C-TRAN Route 105 would be revised to only provide direct service from the Salmon Creek Park and Ride and 99th Street Transit Center to downtown Portland with no intermediate stops in downtown Vancouver. Under the Modified LPA with all design options, this route would operate at 5-minute peak headways with no service in the off-peak, compared to 10-minute peak headways under the No-Build Alternative. Under both the No-Build Alternative and the Modified LPA, 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 and would operate at 15-minute peak and 30-minute off-peak headways and 10-minute peak and 30-minute off-peak headways, respectively.

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 during the peak and 30 minutes during the off-peak. These two routes provide the same routing and frequencies in both the No-Build Alternative and the proposed Modified LPA.

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 (approximately 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

¹⁴ Headways are defined as gaps between arriving transit vehicles.

shoulder widths at the north and south ends of the corridor. Figure 1-6, Figure 1-10, Figure 1-23, and Figure 1-27 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 double-decker or articulated buses would be purchased.

With the C Street ramps design option, C-TRAN Route 101 would use bus on shoulder south of the SR 14 interchange but would not use the full extent of bus-on-shoulder lanes that would be included in the Modified LPA because the route would need to begin merging over early to use the C Street off-ramp to access downtown Vancouver. Without the C Street ramps design option, C-TRAN Route 101 would be rerouted to use the Mill Plain interchange to access downtown Vancouver. Under this design option, the Route 101 would also not use the full extent of bus-on-shoulder lanes that would be included in the Modified LPA but would use the bus on shoulder south of Mill Plain Boulevard and begin merging over early to use the Mill Plain off-ramp.

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

Two TriMet bus routes would be adjusted to accommodate the transit improvements associated with the Modified LPA. TriMet Line 6 bus route would be changed to terminate at the Expo Center MAX Station instead of Hayden Island, where it terminates currently and in the No-Build Alternative. The new Line 6 route would require passengers to transfer to the new LRT connection to access Hayden Island. TriMet Line 6 is anticipated to travel from Delta Park MAX Station north along Expo Road to the Expo Center MAX Station. Table 1-3 shows the existing service and anticipated future changes to TriMet Line 6. In addition to Line 6, TriMet Route 11 could require slight modifications to maintain transfers to the Expo Center MAX Station, depending on the final design of the station and surrounding area.

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 at the proposed 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 may move service from Broadway to C Street.

For both TriMet and C-TRAN detailed service planning analysis, including obtaining public feedback for service changes associated with the Modified LPA, would be conducted prior to the start of revenue service.

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 the Delta Park MAX Station, north along Expo Road to connect via facilities on the west side of I-5 with the Expo Center MAX Station.
TriMet Line 11	Connects East Columbia, Expo Center, Smith/Bybee lakes, Rivergate and St. Johns via Marine Drive, Lombard, Columbia, Fessenden, and Ivanhoe.	Stops along Marine Drive would be relocated or the line would be rerouted slightly to connect via facilities on the west side of I-5 with the Expo Center MAX Station.
C-TRAN Fourth Plain and Mill Plain bus rapid transit (The Vine)	Runs between downtown Vancouver and the Vancouver Mall Transit Center via Fourth Plain Boulevard, with a second line along Mill Plain Boulevard. In the study area, service currently runs along Washington and Broadway Streets through downtown Vancouver.	Route would be revised to begin/end near the Evergreen Station in downtown Vancouver and provide service along Evergreen Boulevard to Fort Vancouver Way, where it would travel to or from Mill Plain Boulevard or Fourth Plain Boulevard depending on clockwise/counterclockwise operations. The Fourth Plain Boulevard route would continue to serve existing Vine stations beyond Evergreen Boulevard.
C-TRAN #2 Lincoln	Connects the 99th Street Transit Center to downtown Vancouver via Lincoln and Kaufman Avenues. Within the study area, service currently runs along Washington and Broadway Streets between 7th and 15th Streets in downtown Vancouver.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #25 St. Johns	Connects the 99th Street Transit Center to downtown Vancouver via St. Johns Boulevard and Fort Vancouver Way. Within the study area, service currently runs along Evergreen Boulevard, Jefferson Street/Kaufman Avenue, 15th Street, and Franklin Street in downtown Vancouver.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.

Bus Route	Existing Route	Changes with Modified LPA
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

Consistent with the CRC LPA, 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 provide different mode, time, and destination choices for trips across the Columbia River. The sections below describe the tolling authority and tolling operations.

1.1.8.1 Tolling Authority

Federal and state laws provide authority to toll the I-5 crossing. The IBR Program plans to toll the new Columbia River bridges under the federal tolling authorization program codified in 23 U.S. Code (U.S.C.) § 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 on the Interstate Bridge in 2013 and gave the Oregon Transportation Commission (OTC) the authority to set toll rates and policies. Subsequently, in January 2025, the OTC reviewed and approved the I-5 tollway project application that designated the IBR Program as a “tollway project” and the facility (the I-5 bridge)

Tolling Equipment

Below are the key types of equipment used to collect data for billing purposes.

Transponders: Small tags affixed to vehicles that communicate with tolling equipment as the vehicle passes.

Antenna/Readers: As a vehicle with a transponder enters a toll zone, an antenna transmits a signal between the transponder and the reader. The reader then transmits pertinent information to the toll zone controller.

Automatic Vehicle Classification: Various roadway devices installed overhead and/or in pavement to detect and identify the vehicle type (e.g., truck, bus, personal vehicle, etc.).

License Plate Image Capture Cameras: Cameras and software that capture images of license plates as vehicles pass.

Digital Video Audit System: Various types of cameras monitor traffic flow and equipment locations.

as a tollway for construction as defined in Oregon Revised Statutes (ORS) 383.003(8) and pursuant to ORS 383.015.

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, which consists of two commissioners each from the OTC and WSTC, and tasked the subcommittee with developing toll rate and policy recommendations for joint consideration and adoption by each state's commission. At the direction of the commissions, all toll scenarios being analyzed in the next round of tolling analysis (referred to as a level 3 toll traffic and revenue study) for the IBR Program assume a low-income discount. Formal action is still needed by the commissions to implement rates and policies, including discounts and exemptions.

In December 2024, a memorandum of understanding was executed by both states that outlined their shared understanding of tolling operations, including cooperation between the state Departments of Transportation and roles and responsibilities for the IBR Program. Toll collection would be managed by WSDOT, including drivers' option to use *Good To Go!* accounts for paying tolls. In addition to the memorandum, 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.

1.1.8.2 Tolling Operations

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 evaluated multiple toll scenarios with two different variable toll schedules by time of day. For purposes of this National Environmental Policy Act (NEPA) analysis, the lowest toll schedule was analyzed, with tolls assumed to range between \$1.50 and \$3.15 (state fiscal year 2026 dollars) for passenger vehicles and light trucks (i.e., vehicles with two axels) with a *Good To Go!* account. The assumed toll range and other assumptions are documented in the IBR Program Level 2 Toll Traffic and Revenue Study (IBR 2023). Medium and heavy trucks (i.e., vehicles with more than two axels) would be charged a higher toll than passenger vehicles and light trucks. Passenger vehicles and light trucks without a *Good To Go!* 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.

It is assumed that tolling would begin on the existing Interstate Bridge, referred to as "pre-completion tolling," in 2027, allowing time after receiving a Record of Decision to hire a contractor, install tolling equipment, and conduct the rate-setting process. The purpose of pre-completion tolling would be to generate initial capital construction funding on a pay-as-you-go basis. Later, toll revenue would be used to secure a portion of Program financing to pay back bonds or loans. Pre-completion tolling would also help pay current interest on the debt to minimize interest costs. Once the new Columbia River bridges are completed, the traffic and tolling operations would shift from the existing Interstate Bridge over to the new bridges, and 24-hour tolls would be implemented; this is referred to as "post-completion tolling."

The start dates for pre-completion tolling would be determined based on the IBR Program environmental and construction timelines; placeholders for tolling start dates were used in this NEPA analysis. This NEPA analysis assumed that pre-completion tolling on the existing Interstate Bridge would be toll-free overnight between 11 p.m. and 5 a.m. (IBR 2023). The OTC and WSTC are also considering this as an option during the level 3 toll traffic and revenue study; however, a decision has not been made on whether these toll-free hours would be implemented. This toll-free period could help avoid situations where users would be charged during lane or partial bridge closures when construction delays may occur.

Tolls would be collected using an all-electronic toll collection system using transponder pass readers and license plate cameras mounted to structures over the roadway. Each traffic lane and shoulder would have a pass reader and license plate camera to ensure accurate detection of vehicles. Toll collection booths would not be required. Instead, motorists could obtain a pass and set up a *Good To Go!* account that would automatically bill the account holder associated with the pass each time the vehicle crossed the bridge. Customers without passes would be tolled by a license plate recognition system that would bill the address of the owner registered to that vehicle's license plate.

There would be two separate "toll zones," which are the area in which the tolling system would detect and classify passing vehicles and then transmit pertinent information to the toll zone controller (Figure 1-30). There would be one zone for northbound traffic and one zone for southbound traffic. During pre-completion tolling, the toll zones would be located on I-5 in Vancouver, between the Interstate Bridge and the BNSF Railway. The location of the post-completion toll zones would be determined at a later date, but it is anticipated that both toll zones would remain in Vancouver.

One gantry (i.e., overhead structure) would be located in each toll zone (Figure 1-30). Generators and equipment cabinets would be located nearby, which would house various equipment needed to support toll operations. Additional equipment cabinets would be placed throughout the Program area to support tolling operations, such as near the toll rate signage (see below).

As previously noted, a key element of tolling would be variable-rate pricing, where toll rates would differ based on the time of day a vehicle uses the bridge. To accomplish this, toll rate signs would be installed at route decision points on local roads, I-5 on-ramps, and on I-5, including locations north and south of the bridges where drivers make informed route decisions (e.g., I-5/Interstate 205 junction and I-5/Interstate 84 junction). The intent of the toll rate signs is to provide both static and variable pricing information. The static sign would contain details such as direction, wayfinding, or other information. These signs would also include a variable message sign panel that would show toll rate(s) in effect at that time.

Figure 1-30. Toll Zone



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 rides.
- A variable-rate toll on the new Columbia River bridges.

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

- Replacement or expanded variable message signs in the primary 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.

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.

- 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 strategies including ramp metering and dynamic speed limits. These strategies are intended to manage congestion by controlling traffic flow.

1.1.10 Off-Site Mitigation Sites

The IBR Program will provide off-site mitigation for unavoidable impacts to natural resources, including fish and wildlife species and their habitats, wetlands, surface waters, floodplains, and other regulated habitat features (refer to the Final SEIS, Sections 3.14, Water Quality and Hydrology; 3.15, Wetlands; and 3.16, Ecosystems).¹⁵ Applicable federal, state, and local regulatory frameworks require mitigation sequencing that includes avoidance and minimization of impacts, and compensatory mitigation to achieve “no net loss” of the resource or its functions. Mitigation must fully offset the impacts of the Modified LPA and achieve this “no net loss” standard. The Modified LPA would result in unavoidable impacts to natural resources, which would require mitigation under one or more regulatory frameworks. Mitigation plans and mitigation bank use plans will be prepared to provide compensation for any such unavoidable impacts to regulated resources (wetlands, waters, floodplain, sensitive habitats) and to demonstrate that the IBR Program will achieve “no net loss” of function of these resources. The IBR Program is preparing functional assessments and coordinating with regulatory agencies to quantify the amount and type of compensatory mitigation required to offset Program impacts and achieve “no net loss.”

It is anticipated that compensatory mitigation for unavoidable impacts to aquatic and terrestrial habitats and species in Washington will be provided through the purchase of credits from the proposed Wapato Valley Mitigation and Conservation Bank (Figure 1-31). The bank is approximately 876 acres and is located in the Columbia River floodplain at the mouth of the Lewis River, approximately 19 river miles downstream of the Interstate Bridge. Approval of the bank is expected in 2026.

It is anticipated that compensatory mitigation for unavoidable impacts to wetlands, and aquatic and terrestrial habitats and species in Oregon will be provided partially through the purchase of advance mitigation credits at ODOT’s proposed Columbia Bottomlands Advance Mitigation/Conservation Site, and partially through the purchase and protection under conservation easement of a site on West Hayden Island (shown on Figure 1-31). The Columbia Bottomlands Advanced Mitigation/Conservation site is located in Scappoose Bay, a slough of Multnomah Channel, in Columbia County, Oregon. The site is located approximately 1 mile upstream of where the Multnomah Channel meets the Columbia River and approximately 20 river miles downstream of the Interstate Bridge. The site has been designed to provide advance mitigation credits for impacts to wetlands and aquatic and terrestrial habitats and species for future ODOT projects. All impacted wetlands and other water features would be mitigated in accordance with current USACE mitigation policies, and the conditions of the Section 404 Permit. All compensatory mitigation plans would be developed in coordination with the USACE

¹⁵ On-site mitigation is identified and analyzed in relevant subsections of Chapter 3, Existing Conditions and Environmental Consequences of the Final SEIS.

and other appropriate agencies as part of the Section 404 permitting process. The USACE and other appropriate agencies would determine the appropriate level of mitigation based upon the functions lost or adversely affected as a result of impacts to aquatic resources.

The proposed site on West Hayden Island is approximately 65 acres in size and is located approximately 2.5 river miles downstream of the Interstate Bridge, on the south side of the island adjacent to North Portland Harbor. The site is currently owned by the Oregon Department of State Lands, but ODOT has proposed to purchase this site and place it under a conservation easement. One or more compensatory mitigation projects may also be conducted on the site. The specific activities to be conducted at this site would be developed in coordination with the applicable regulatory agencies for each of the various permit applications.

In addition to the compensatory wetland and habitat mitigation described above, the IBR Program may need to excavate material from within the 100-year floodplain to address the compensatory excavation requirements of the City of Portland's recently updated floodplain ordinance. If such activity is required, it is anticipated that this material would be removed from upland portions of the 65-acre parcel on West Hayden Island described above or from aquatic areas adjacent to this parcel. If such excavation activities are conducted, excavated materials will be disposed of at a location approved to receive that type of material.

Figure 1-31. Potential Compensatory Mitigation Sites



1.2 Modified LPA Construction

Construction of the IBR Program would be sequenced in accordance with many factors, such as the scale of improvements, different types of infrastructure and associated construction specialties required, timing of funding received, maintenance of traffic on I-5, navigation on the Columbia River, seasonal and weather constraints, permit conditions, and other considerations. Multiple construction packages are anticipated to be developed and delivered by different agencies—WSDOT, ODOT, TriMet, and C-TRAN—that will use various delivery methods (e.g., design-bid-build, design-build, progressive design-build, construction manager/general contractor).

The first construction packages are anticipated to be the new Columbia River bridges and approaches. Subsequent construction packages would be sequenced throughout the Program area. Early construction activities may occur in the Program area to prepare for the bridge replacement work. Demolition of the existing Interstate Bridge would take place after the new Columbia River bridges were opened to traffic. Construction of other components of the Modified LPA would be sequenced during and after the construction of the new Columbia River bridges begins.

Electronic tolling infrastructure for the existing Interstate Bridge would be constructed and operational near the start of construction on the new Columbia River bridges and would be constructed and operational for the new Columbia River bridges in time for their opening. The toll rates and policies for tolling (including pre-completion tolling) would be determined by the OTC and WSTC (refer to Section 1.1.8, Tolling).

1.2.1 Construction Components, Packaging Plan, and Duration

Table 1-4 lists the main construction components of the Modified LPA along with the estimated construction durations and descriptions of the associated work. Construction packages are also listed in Table 1-4 and illustrated in Figure 1-32. These main construction components would be defined by some functional improvement to the Program corridor; for example, construction of the new bridges would be coordinated with the construction of the connections to the existing I-5, enabling use of the new bridges while other components of the Program are constructed. Each listed component would require multiple construction packages—small and large, general and specialty. As construction progresses, interim connections may be in place while subsequent components are built and final connections and finishes are completed. This preliminary construction plan may change as the Program advances toward construction. Construction packages may further be combined or separated throughout delivery of the Program. Construction of all components identified in the Program could last more than 10 years.

The estimated durations are shown as ranges to reflect the potential for Program funding to be sequenced over time. In addition to funding, contractor schedules, regulatory restrictions on in-water work, 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 most periods of construction, three travel lanes in each direction on I-5 (accommodating personal vehicles, freight, and buses) would remain open during peak hours. Off-peak and weekend restrictions and closures could be required during construction. Active transportation connections would be maintained throughout construction. Advanced coordination and public notice would be given for restrictions, intermittent or longer-term closures, and detours for highway, local roadway, transit, and active transportation users via accessible facilities and wayfinding (refer to the Final SEIS, Section 3.1, Transportation, for additional information, including for local street and ramp or interstate access closures). At least one Columbia River navigation channel would remain open to shipping throughout construction. Advanced coordination and notice would be given for restrictions or intermittent closures to navigation channels as required (refer to the Final SEIS Section 3.2, Navigation, for additional information).

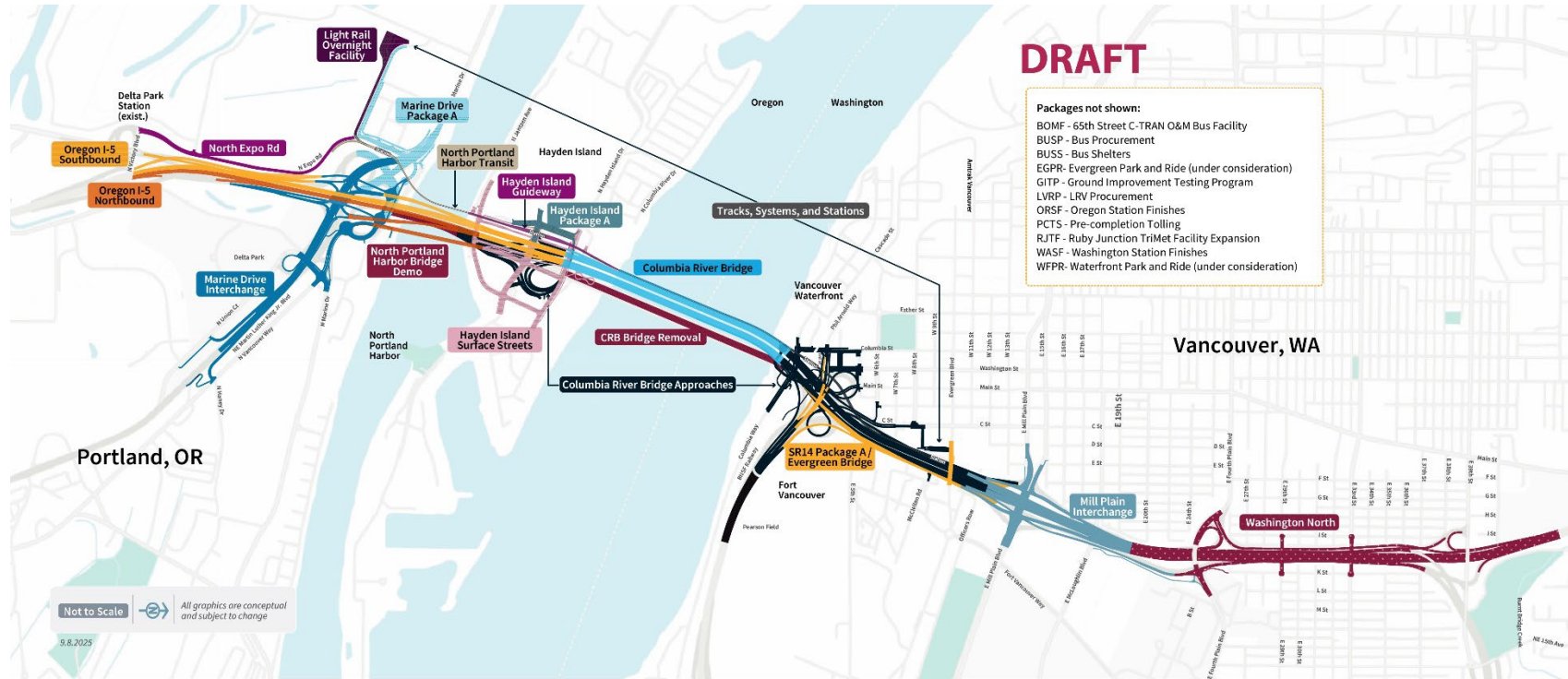
Table 1-4. Preliminary Construction Packaging Plan

Component and General Location	Estimated Duration	Description	Construction Packages
Columbia River bridges, approaches, and demolition of Interstate Bridge <i>Hayden Island to Evergreen Boulevard</i>	6 to 8 years	<ul style="list-style-type: none"> General sequence for new bridges would include initial preparation and installation of foundation piles, shaft caps, pier columns, superstructure, and deck elements, followed by systems and finish work. SR 14 interchange would be constructed in a separate construction package and must be completed before all traffic could be transferred to the new Columbia River bridges. Demolition of the existing Interstate Bridge could begin only after traffic is transferred to the new Columbia River bridges. 	<ul style="list-style-type: none"> Columbia River Bridges^a Approaches^a Pre-completion Tolling Signage and Equipment Installation SR 14 A Evergreen Bridge Interstate Bridge Demolition
Light-rail and bus-on-shoulder transit <i>Expo Station to Evergreen Station; Ruby Junction</i>	4 to 7 years	<ul style="list-style-type: none"> The light-rail alignment would be partially supported by the southbound Columbia River bridge and approach structure guideways. Light-rail construction would include all infrastructure associated with light-rail elements of the Transit Packages construction package (e.g., overhead catenary system, tracks, stations, and park and rides). Bus on shoulder would include corresponding bus elements of the Transit Packages construction package. 	<ul style="list-style-type: none"> North Portland Harbor Transit Bridge Marine Drive A (supports transit improvements) Hayden Island A (supports transit improvements) Light-rail Overnight Facility Transit Packages Ruby Junction

Component and General Location	Estimated Duration	Description	Construction Packages
Marine Drive and Hayden Island interchanges and North Portland Harbor bridges <i>Marine Drive to Hayden Island</i>	4 to 10 years	<ul style="list-style-type: none"> Hayden Island interchange construction duration would not necessarily entail continuous active construction. The North Portland Harbor bridges could include sequenced construction of southbound bridges, northbound bridges, and demolition of the existing North Portland Harbor bridge to maintain traffic mobility during construction. Hayden Island and Marine Drive interchanges could be broken into several contracts, which could spread work over a longer duration. 	<ul style="list-style-type: none"> Hayden Island Surface Streets Hayden Island Interchange North Portland Harbor Bridges Oregon I-5 Southbound Oregon I-5 Northbound North Portland Harbor Bridge Removal Marine Drive Interchange North Expo Road
Mill Plain Boulevard, Fourth Plain Boulevard, and SR 500/39th Street interchanges <i>Mill Plain Boulevard to SR 500</i>	3 to 4 years	<ul style="list-style-type: none"> Construction of these interchanges could be independent from each other. 	<ul style="list-style-type: none"> Mill Plain Boulevard Interchange Washington North

a The Columbia River Bridges and Approaches construction packages include light-rail guideway from the Hayden Island Bridge Approach, the Columbia River bridges, north to Evergreen Boulevard.

Figure 1-32. Preliminary Construction Packages



1.2.2 Potential Staging Sites and Casting Yards

Equipment and materials would be staged in the primary 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 parcels. However, at least one large site could be required for construction offices, equipment maintenance and storage, maintenance of traffic equipment, employee parking, and construction material storage and other needs. 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 1-6). Both sites are located on Hayden Island on the west side of I-5. A large portion of both parcels would be required for new right of way for the Modified LPA. 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 to 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, USCG, and the Federal Aviation Administration 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. Such a site would likely be between approximately 50 and 100 acres. As with the staging sites, casting yards would be identified during the design process or by the contractor and would be subject to the same contract and permit requirements to implement the best management practices described in Appendix M to the Final SEIS unless more stringent permitting requirements and conditions are required at the time of identification.

All material staging, equipment staging areas, equipment fueling areas, and casting yards would be contained and located outside of environmentally and culturally sensitive areas. To the extent practicable, these sites would be located in upland locations, on areas that are already or have been previously disturbed. These activities would be conducted consistent with the impact minimization best management practices described in Appendix M to the Final SEIS. Construction of the Modified LPA would also include revegetating temporarily disturbed areas consistent with federal, state, and local regulations, and the net result would be no net loss of habitat function in the long term. 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* (RTP) adopted in December 2018 by the Metro Council (Metro 2018) and in March 2019 (RTC 2019) by the Southwest Washington Regional Transportation Council Board of Directors (referred to collectively as the 2018 RTP in this report).¹⁶ 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 planning stage, permitting stage, or partway through phased development. They include the Waterfront Vancouver 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.

¹⁶ The 2018 RTP was the adopted regional transportation plan available when the IBR Program initiated the SEIS. In 2023, Oregon Metro and Southwest Washington Regional Transportation Council updated their respective RTPs as part of their five-year update cycle, as required under 23 CFR § 450.324. The 2023 RTP was adopted by Oregon Metro in 2023 and RTC in 2024, several years after the IBR Program Draft SEIS analysis was initiated in early 2021. To use the regional travel demand model supporting the 2023 RTP, additional refinement and coordination would be necessary for it to be ready for use in a facility-specific study, such as the IBR Program. This refinement and coordination process is lengthy and can take up to a year and a half for a complex project with numerous partner agencies, like the IBR Program. Therefore, the NEPA lead agencies exercised their discretion and determined, based on their technical expertise, that the 2018 RTP and Travel Demand Model continued to be the most appropriate base tool for the purposes of comparing the No-Build Alternative to the Modified LPA and design options in the Final SEIS.

2. METHODS

2.1 Introduction

This chapter describes the study area, relevant laws and regulations, and methods for collecting data, assessing impacts, and evaluating possible mitigation measures for public and private utilities within the Modified LPA footprint. The analysis was designed to comply with NEPA and relevant federal, state, and local laws. These methods build on those developed for the CRC project, which completed the NEPA process with a signed Record of Decision in 2011. NEPA reevaluations were completed in 2011 to address a change in Interstate Bridge height and in 2013 to address phasing of project construction. The CRC project was discontinued in 2014; the IBR Program is evaluating what changes in regulations, policy, and physical conditions have occurred since the completion of the Record of Decision.

Methods to identify the impacts on publicly and privately owned utilities remain largely unchanged from those used for the CRC project. The analysis for the IBR Program has updated the previous information to reflect more accurately the current locations of existing utilities and Program impacts. Because the Modified LPA is in an early phase of design, it is not possible to identify all potential impacts to utility systems, such as specific disruptions to local distribution networks. As a result, the analysis in this Final SEIS is focused on impacts to critical utilities (further defined in Section 3.1) that are within the anticipated limits of disturbance for Modified LPA construction. The information presented in the Draft SEIS has been updated for the Final SEIS based on updated design information and coordination with utility providers. The analysis in this report is intended to identify the impacts with the greatest potential for significance.

The IBR study area includes both public and private utilities and private telecommunications infrastructure. Public utilities would be improved or relocated by the IBR Program as part of construction contracts. Typically, the cost for private utility relocation for facilities that are in the public right of way is borne by the private utility owner. This is based on franchise agreements between the private utility companies and the jurisdiction that owns the right of way.

2.2 Study Area

The study area runs along a 5-mile segment of I-5, between approximately the SR 500 interchange in Washington and the I-5/Columbia Boulevard interchange in Oregon. Most physical changes associated with the Program would occur in this area, though mitigation could still occur outside of it. Temporary construction easements would be established directly adjacent to the proposed construction areas, while larger staging areas and casting yards could be located upstream or downstream of the Interstate Bridge. The CRC LPA and the IBR Modified LPA also include expansion of the Ruby Junction Light-Rail OMF in Gresham, Oregon, and an overnight LRV facility south of the Expo Center in Portland.

Figure 2-1 shows the study area for utilities. For clarity, the study area is separated into three sub-study areas: the Oregon sub-study area, the Downtown Vancouver sub-study area, and the North Vancouver sub-study area. Chapter 1 of this report provides more information on the Modified LPA. In

general, the impact of the Modified LPA on utilities would be limited to the immediate proximity of the Modified LPA footprint.

Figure 2-1. Utilities Study Area



2.3 Relevant Laws and Regulations

NEPA requires the evaluation of impacts to the built environment, including utility systems. In addition, many federal, state, and local laws regulate the construction, operation, and maintenance of utility facilities. State and local regulations also require the issuance of permits or franchises for utilities that are placed within public right of way including roads and highways.

2.4 Effects Guidelines

Effects were identified by determining whether a specific utility would need to be relocated or modified to facilitate construction or operation of the Modified LPA. This includes both temporary and permanent impacts. The analysis in this report is focused on critical utilities, which are defined in Section 3.1.

2.5 Data Collection Methods

The mapping and engineering data that was developed using MicroStation (a computer-aided drafting software program) for the CRC project was confirmed and updated with new information collected for the IBR Program. The base maps used to show the utility data included color aerial photography, existing highways and streets, transit facilities, surface utility features such as manholes and poles, and property boundaries.

The following utilities were identified during the CRC project effort within and close to the project footprint:

- Water (Portland Water Bureau and City of Vancouver).
- Sanitary sewers (Portland Bureau of Environmental Services and City of Vancouver).
- Storm sewers (Portland Bureau of Environmental Services, City of Vancouver, ODOT, WSDOT).
- Power (Portland General Electric [PGE], Pacific Power, and Clark Public Utilities).
- Natural gas (NW Natural).
- Communications (telephone, cable television, fiber optic, etc.). See Sections 3.2.4 and 3.3.4 below for detailed lists.
- Other (street and highway illumination, ramp meters, signalization, etc.). Information is not available at this phase of the project.

The list of utility owners that was compiled and developed for the CRC project was used for the initial utility owner review for the Draft SEIS. Updates to the Draft SEIS analysis are based upon current design information and coordination with utility providers. The list of utility owners will continue to be updated and recompiled based on coordination and contacts as design of the Modified LPA advances. The updated IBR utility owners list is based on the resources and collection methods listed below:

- Discussions with WSDOT and ODOT staff.
- Review of permits and franchise agreements for utilities located within the I-5 right of way.

- CRC project permits provided by the U.S. Army Corps of Engineers.
- Internet searches.
- Information provided by One-Call organizations in Washington and Oregon.

Work, adjustments, field visits, or permit investigations performed during the CRC project to fit the data to existing features (such as poles and manholes) on the base map were used as a starting point for the IBR Program. Composite utility drawings prepared previously were used for the current phase of the Program. Supplemental subsurface utility engineering was performed to expand on the original CRC survey limits to include the additional areas in the Modified LPA footprint. More detailed information will be compiled during subsequent phases of design development.

Since the Draft SEIS was published, a subsurface utility company has begun working to update and complete the utility base maps. Once all utilities have been recorded, a conflict analysis will be performed to determine specific conflicts between the utilities and the project design, including at the local distribution level. This work will continue after the NEPA process is complete. Consistent with the commitments described in Section 7 of this report, which will be incorporated into the NEPA Record of Decision, the IBR Program and the subsurface utility company will work with utility owners and designers to minimize impacts, determine relocation needs, and assist in creating agreements between each utility owner and the appropriate Program sponsor.

3. AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes existing utilities within the Modified LPA footprint. There are a substantial number of utilities that could be affected by the Modified LPA (for example, the plethora of overhead and underground lines and pipes located on Hayden Island and in downtown Vancouver).

The IBR Program is in an early stage of design development; therefore, discussion in this report focuses on critical utility infrastructure. Critical utility infrastructure has the greatest potential effect on and risk to the Program budget, schedule, and the environment, while minor utility infrastructure is considered standard construction. Detailed planning for the protection and/or relocation of minor utilities during construction will take place during later phases of project design, after the NEPA process is complete.

For purposes of this technical report, critical utilities were defined based on utility sizes and/or facilities critical to the utility network's function, such as utility lines that are the sole source of service to a particular area or needed for fire and safety. The following utility sizes and types were defined as critical utilities:

- Water lines 12 inches or larger.
- Sanitary sewer lines 21 inches or larger.
- Storm sewer lines 21 inches or larger.
- High-pressure gas lines or steel pipe 8 inches or larger.
- High-voltage transmission lines.
- All other utility infrastructure that is time-consuming or expensive to relocate or that is essential to the function of the utility network, such as pump stations, water supply well facilities, etc.
- All communications infrastructure.

In general, transportation agencies prefer that utilities not be located parallel to and under high-use corridors such as a freeway or light-rail guideway due to the potential for lane or track closure when maintenance is required. Most utilities owners also do not want their facilities located under such corridors because they would be difficult and expensive to maintain, repair, and replace. Additional concerns include the potential effect of stray currents from a light-rail electrification system.

Within the study area, most private and public utilities typically cross under rather than run parallel to the existing I5 alignment, with one notable exception: Hayden Island and the bridges across North Portland Harbor and the Columbia River. This is because much of Hayden Island is privately owned, and most utilities cross the state line on the existing bridges. In addition, storm collection and conveyance facilities run within and parallel to the existing I-5 alignment because they provide drainage for the corridor.

Although there are utilities on the Interstate Bridge, the Oregon-Washington state line (about mid-river) provides a logical place to separate how the affected environment and potential impacts are presented. This is because other than NW Natural (natural gas provider) and some communication companies, there are no other shared private utilities between the two states. Existing utilities in Oregon and Washington are described below.

3.2 Existing Utilities – Oregon

Existing utilities in Oregon are shown on Figure 3-1. The information shown for utility owners is based on information from the CRC project and GIS data supplied by utility providers. As mentioned above, the presence of bridges across North Portland Harbor and the Columbia River, combined with the narrow 2,200-foot width of Hayden Island at this location, focuses utilities along the I-5 right of way. Utilities identified in the Oregon portion of the study area include the following:

- Portland Water Bureau water transmission mains in North Portland that cross the North Portland Harbor bridge.
- A Portland Bureau of Environmental Services sewer main from North Portland to Hayden Island with a pump and storage station located on Hayden Island.
- ODOT storm sewers along the east side of I-5 from the I-5 off-ramp underpass at the Marine Drive interchange to an outfall into a drainage channel along Delta Park.
- Two storm sewer systems on Hayden Island that convey transportation-related runoff to outfalls under the existing North Portland Harbor bridge.
- A NW Natural main gas feed line across the North Portland Harbor bridge.
- A PGE underwater power cable and Lumen telephone lines located under the bed of North Portland Harbor, immediately west of the I-5 bridges.
- Communication cables that cross the Columbia River on the North Portland Harbor bridge and the Interstate Bridge.
- An additional trunk line that crosses the Columbia River 500 feet east of the Interstate Bridge. The trunk line includes telephone, television, data, and fiber optic from multiple utility providers.
- Underground communication cables throughout the study area within North Portland and on Hayden Island.

Figure 3-1. Existing Major Utilities in Oregon Study Area



3.2.1 Water and Sanitary Sewer

Within the Oregon portion of the study area, water and sanitary sewer services are provided by the City of Portland. The Portland Water Bureau is the water utility provider and the Bureau of Environmental Services is the sanitary sewer provider. Sewage from this part of the study area is conveyed to the Columbia Boulevard Wastewater Treatment Plant. The plant is outside of the study area, several miles west of I-5.

A 16-inch water transmission main crosses under I-5 south of the Marine Drive interchange. The water main then runs north, parallel to N Expo Road, toward Marine Drive. At Marine Drive, it splits to provide water service on both sides of the TriMet light-rail tracks. The northern branch of the water main, which crosses the east side of the northbound bridge over North Portland Harbor, serves as one of two primary water supplies to Hayden Island. This branch of the main is the only source of water for the island's homes, businesses, and fire and safety protection systems. The southern branch of the water main intersects with a second 16-inch water main that runs parallel to Marine Drive, passing under the I-5 North Portland Harbor bridge.

Within Hayden Island, the 16-inch water main from North Portland splits into a 12-inch water main that loops the island within the Jantzen Drive/Hayden Island Drive/Center Avenue right of way, crossing under I-5 at Jantzen Drive and again on Hayden Island Drive. This water main loop supplies the island with drinking water and also supplies the fire and safety system.

A sewage force main, composed of one 20-inch pipe and one 30-inch pipe, crosses I-5 south of the Marine Drive interchange. On the east side of I-5, the two force mains combine into a single 36-inch force main near the southeast quadrant of the interchange. This 36-inch force main runs north toward Marine Drive on the east side of the freeway.

While not shown on Figure 3-1, a smaller-diameter sewage force main is located immediately north of Jantzen Drive and east of I-5. Although it does not reach the critical size limit, the force main is critical in that it serves all Hayden Island properties east of I-5.

3.2.2 Storm Sewer

Within the Oregon portion of the study area, the major storm sewers are owned by ODOT. The sewers convey runoff from I-5 and adjacent ramps and roads. On the east side of I-5, a storm pipe system conveys stormwater from the northbound I-5 off-ramp from the freeway underpass to a 30-inch outfall that discharges into drainage channels on the west side of Delta Park. On the west side of I-5, a 24-inch outfall pipe extends under the on-ramp from the Expo Center to southbound I-5. On Hayden Island, 21-inch and 24-inch outfall pipes are located under the North Portland Harbor bridge. These pipes convey runoff from I-5, adjacent ramps, and local streets for discharge to the harbor.

Critical outfalls in Oregon include the 21-inch and 24-inch ODOT outfalls located under the existing Columbia River bridge, an 18-inch outfall to North Portland Harbor from Hayden Island just east of the bridge, a 12-inch City of Portland outfall from Hayden Island to North Portland Harbor located directly below the bridge, an 18-inch City of Portland outfall to North Portland Harbor from Marine Drive east of the Expo Center entrance, and 24-inch and 30-inch outfalls to drainage channels within the Urban Flood Safety & Water Quality District.

3.2.3 Power and Natural Gas

South of the Oregon-Washington state line, PGE and Pacific Power provide electricity to the area. PGE provides service west of I-5 and south of North Portland Harbor and to all of Hayden Island. The City of Portland provides street lighting along Jantzen Drive on the west side of Hayden Island. Pacific Power serves the area east of I-5 and south of North Portland Harbor.

South of North Portland Harbor, electrical utilities comprise overhead primary distribution systems with a voltage of 13 kilovolts (kV) or less. An underwater power cable located immediately west of the North Portland Harbor bridge connects the Delta Park and Hayden Island distribution systems; this cable also has a voltage of 13 kV or less. The location of the underwater cable is such that several main feed lines and primary switches for Hayden Island are located adjacent to I-5. On Hayden Island, electrical services within and close to the study area are typically underground, except for an overhead line located on the north bank of North Portland Harbor and west of the highway.

NW Natural provides natural gas service to the Oregon portion of the study area. Existing infrastructure generally comprises low- or medium-pressure distribution and feed pipes. Of note is a critical major feed pipe that is located on the North Portland Harbor bridge; it is the sole supply of natural gas to Hayden Island.

3.2.4 Communications

There are six communications service providers with infrastructure within the Oregon portion of the study area. One of those providers, Lumen, has “long-haul” fiber optic cables that pass through the area in addition to providing local service. This makes for seven separate utility providers that have communication cables within the Oregon study area:

- Astound
- AT&T Local
- Comcast
- Lumen Local
- Lumen (National) Long Haul
- Verizon
- Zayo

The infrastructure of all these providers is concentrated along the I-5 corridor from the Marine Drive interchange south of North Portland Harbor to the SR 14 interchange north of the Columbia River. Most providers consider this infrastructure to be part of their major trunk systems. The trunk systems for AT&T, Comcast, Lumen (local and long-haul), Verizon, and Zayo cross on the North Portland Harbor bridge and the Interstate Bridge.

One communications trunk system crosses the Columbia River approximately 500 feet east of the Interstate Bridge and is beyond the expected direct influence of construction activities. On Hayden Island, local communications services are located underground. South of North Portland Harbor, communications infrastructure is frequently co-located on power poles.

One communications service provider has additional underwater cables immediately west of the North Portland Harbor bridge that provide local service to Hayden Island. One provider also has a large controlled-environment vault on Hayden Island.

There is an existing cell-phone tower located west of the existing North Portland Harbor bridge on Hayden Island. The cell tower is on private property north of Jantzen Street and south of Jantzen Avenue.

Verizon has a cell site backup diesel fuel generator located just east of the northbound I-5 bridge footing near the JayBee's Chicken Palace parking lot. There is a power transformer located within the same area. The generator is a critical backup unit for Verizon cell service in the area.

In addition to the privately owned communication service providers described above, there is an ODOT communications system in this area, as well as a Cooperative Telecommunications Infrastructure Committee network that allows ODOT, WSDOT, TriMet, the City of Portland, and other municipalities within the metropolitan area to facilitate fiber builds and sharing. Figures and composite plans do not show this network for security reasons.

3.3 Existing Utilities – Washington

Existing utilities in Washington are shown on Figure 3-2 and Figure 3-3. As with the Oregon portion of the study area, the information shown for utility owners is based on information from the CRC project and GIS data supplied by utility providers. Several critical utility lines and facilities either cross or are adjacent to I-5 within the study area in Vancouver. These utilities include the following:

- Water transmission and distribution mains crossing I-5 at SE Columbia Way, E 5th Street, Mill Plain Boulevard, McLoughlin Boulevard, E 27th Street, E 29th Street, E 32nd Street, E 39th Street, and E 40th Street.
- Water lines running parallel to I-5 along the western right of way line between McLoughlin Boulevard and E 16th Street and between Evergreen Boulevard and E 8th Street.
- A City of Vancouver sanitary sewer pump station located west of I-5 at N Columbia Street.
- A major WSDOT storm sewer trunk system that extends from north of E 33rd Street to an outfall to the Columbia River, a WSDOT storm sewer trunk extending north from E 39th Street, and City of Vancouver conveyance pipes adjacent to I-5 that discharge to the Columbia River.
- Four sewer mains that cross the study area, including a large-diameter gravity sanitary interceptor that crosses near E 5th and E 6th Streets.
- Clark Public Utilities high-voltage transmission lines that cross I-5 near E 7th Street and E 33rd Street.
- Low-to-medium pressure main gas lines (NW Natural).
- A gas line under the I-5 bridge along the Columbia Way right of way, which supplies properties between the BNSF Railway rail line and the river.

Utilities Technical Report

- A trunk of communication cables disembarking from the existing I-5 bridge (telephone, television, data, and fiber optic multiple utility providers) that splits into separate trunks running parallel to and crossing the study area. The communication utility providers cross the I-5 corridor at the following locations: E 33rd Street, south of Fourth Plain Boulevard, E 12th Street/Officers Row, McLoughlin Boulevard, Evergreen Boulevard, and between the riverfront and Columbia Way/Columbia Street.

Figure 3-2. Existing Major Utilities in Downtown Vancouver Study Area

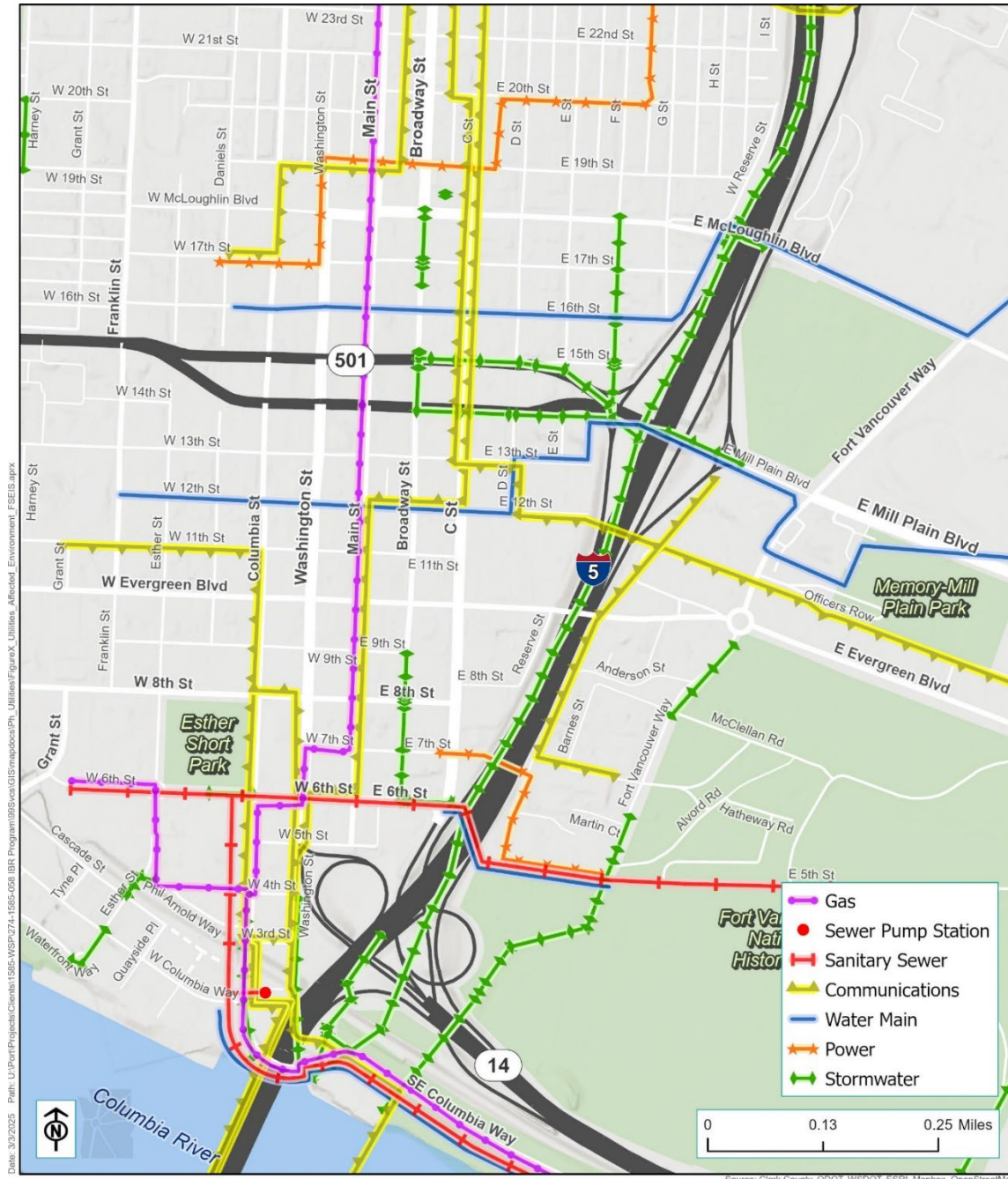
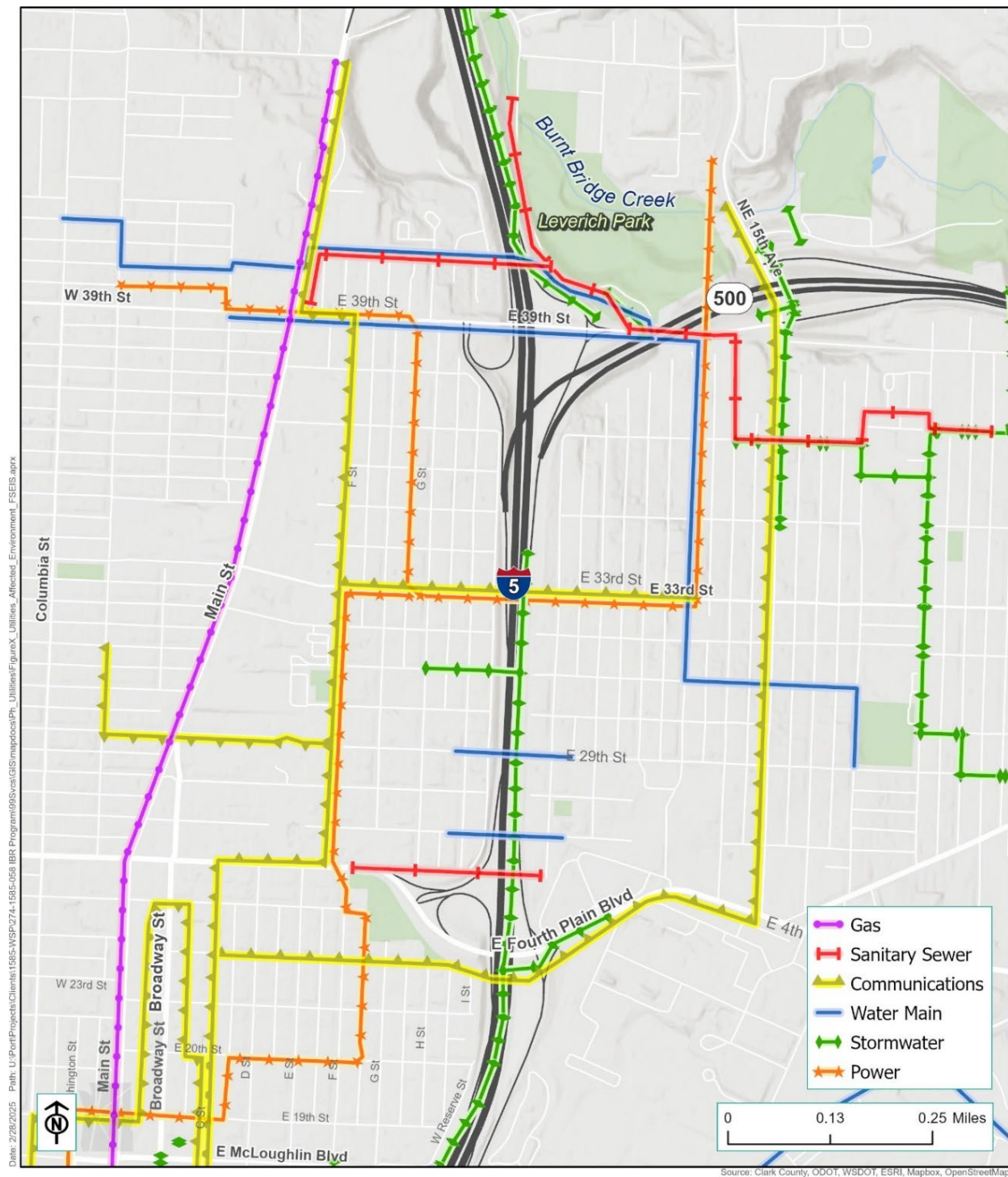


Figure 3-3. Existing Major Utilities in North Vancouver Study Area



3.3.1 Water and Sanitary Sewer

North of the Oregon-Washington state line, the City of Vancouver provides water and sanitary sewer services. Within the study area, there are multiple major water transmission and distribution mains, two major gravity sanitary sewage mains, and a City of Vancouver sanitary sewer pump station.

Although there are numerous water and sanitary sewage pipes located under downtown Vancouver streets, they mostly consist of smaller-diameter distribution and collection systems. There is a 12-inch water main and an 8-inch sewer main located at the northeast corner of Columbia Street and Columbia Way. The full extent of these mains is not shown in the figures due to constraints in the size of the figures. These mains are the only sources of potable water, fire flows, and sewer service to businesses adjacent to Columbia Way and immediately east of I-5.

3.3.2 Storm Sewers

Within the Washington portion of the study area, the major storm sewers are owned by WSDOT and the City of Vancouver. A major WSDOT trunk system extends south from E 33rd Street, starting as 30-inch pipe and increasing to a 60-inch pipe that ends at an outfall to the Columbia River just east of the existing Interstate Bridge. This trunk conveys runoff from I-5 in addition to local road drainage systems that connect at various locations along its route. Adjacent to the WSDOT trunk are City of Vancouver pipe systems that extend to the river along the west side of the freeway. Some of the City systems discharge into the WSDOT trunk, and some extend separately and terminate at City outfalls near the existing bridge. These critical trunk systems provide conveyance for an expansive area on both sides of I-5.

Critical storm sewer infrastructure in the northern portion of the project includes a 24-inch WSDOT conveyance pipe extending north from E 39th Street to a 30-inch outfall into a WSDOT-owned treatment facility that ultimately discharges to Burnt Bridge Creek.

Critical outfalls in Washington include the 60-inch WSDOT trunk system described above, a 24-inch WSDOT outfall located just west of the 60-inch outfall, a 72-inch outfall crossing SR 14 east of I-5, and a City of Vancouver outfall located west of the existing bridge.

3.3.3 Power and Natural Gas

Clark Public Utilities provides electrical service in the Washington portion of the study area. Some of the Clark Public Utilities overhead power lines are also used by other communication utilities to carry fiber optic cables used for both private and public purposes. With the exception of a 69 kV transmission line that crosses I-5 at E 33rd Street, electrical utilities within this part of the study area consist of overhead feed and distribution systems with a voltage of 13 kV or less.

NW Natural provides natural gas service to the entire Washington portion of the study area. Existing infrastructure generally consists of low- or medium-pressure distribution and feed pipes. The one exception is a high-pressure pipe located on Columbia Way and Columbia Street. This pipe is considered critical for maintaining gas pressure to customers in downtown Vancouver. A smaller gas

line that crosses I-5 at McLoughlin Boulevard is also considered important for maintaining gas pressure to downtown Vancouver.

Businesses that are adjacent to Columbia Way and immediately east of I-5 are serviced by utility lines in the Columbia Way right of way.

3.3.4 Communication

The same communication companies that provide service in the Oregon portion of the study area also have infrastructure in Washington. These utility companies use underground cables and are also co-located on Clark Public Utilities power poles. Multiple communication trunk systems, as described for the Oregon portion of the study area, cross the Columbia River on the west side of the southbound Interstate Bridge.

One service provider has a large controlled-environment vault located in downtown Vancouver. The same provider has an underground trunk line located on Washington Street, trunk lines running east-west that cross I-5 at the Fourth Plain interchange and McLoughlin Boulevard, and a combination aerial and underground communication line that is parallel to I-5 and Anderson Street.

Two service providers have fiber optic cables that cross I-5 at the E 12th Street and E 33rd Street overpasses.

Almost all of the communication utility providers have underground vaults, lines, and pull-boxes between the waterfront and the Interstate Bridge footings. This is because most of the communications lines disembark from the bridge in this area and use the vaults and pull-boxes to integrate into the communication system in Vancouver. These lines cross under the Interstate Bridge near Columbia Way/Columbia Street.

In addition to the privately owned communication service providers described above, there are two publicly owned networks within this portion of the study area: the WSDOT communication system and the Vancouver Area Smart Trek system. The Vancouver Area Smart Trek system is a cooperative effort by public transportation agencies in Clark County, including WSDOT, and is hosted on an intelligent transportation system that coordinates information for transportation management, transit operation and management, and closed-circuit television. Figures and composite plans do not show these networks for security reasons.

4. LONG-TERM EFFECTS

Long-term utility effects are defined as consequences of the Modified LPA, including adverse and beneficial effects, that could affect the operation of utilities in the study area. Long-term effects on utilities could include direct impacts to infrastructure, elements of the as -constructed project impairing access for maintenance, and reductions in the level of service.

The effects presented in this chapter focus on changes that could have a major impact on a utility's operation or level of service. Although there are numerous utilities within or near the study area, most of them are part of local distribution systems and are not considered significant enough to warrant separate discussions.

The Modified LPA has the potential to affect a number of utilities within the study area. The presence of these utilities would be confirmed during final design, at which time their locations would be determined with a greater level of accuracy. As design progresses, coordination with utility providers will be conducted to confirm there are no changes in impacts since the CRC EIS was prepared. In general, affected utilities would either be relocated or protected to maintain existing levels of service. Either the IBR Program or the utility owner would perform and/or pay for such work. Relocated utilities would be repaired or replaced as necessary and would therefore be more robust and reliable due to new standards and/or equipment. Therefore, no long-term adverse impacts to utilities are expected.

4.1 No-Build Alternative

The No-Build Alternative would not involve any changes to existing utilities in the study area. However, damage to the Interstate Bridge from a seismic event could have adverse impacts on utilities located on or near the bridge and could hinder the provision of emergency services.

Failure of the North Portland Harbor bridge could result in a loss of natural gas and water on Hayden Island, and the underwater electrical cables and local telephone service to the island could also be severed. In addition, trunk communications cables could be damaged or severed if the North Portland Harbor bridge and the southbound Interstate Bridge failed, thus resulting in a loss of land-based communications within the Portland-Vancouver metropolitan area and beyond.

4.2 Modified Locally Preferred Alternative

Long-term effects on utilities could occur if the Modified LPA results in permanent changes to the location or operation of utility infrastructure. The IBR Program would work with utility providers as the design progresses to avoid impacts wherever feasible; the potential impacts noted below are in locations where it may be difficult for the proposed improvements to avoid modifying existing utility lines. If utilities must be relocated or otherwise modified, the IBR Program would work with the providers to ensure that existing infrastructure quality and service levels are maintained. As noted above, affected utilities would either be relocated or protected to maintain existing levels of service.

4.2.1 Potential Long-Term Effects – Oregon

The study area in Oregon is where the largest potential for utility impacts would occur, particularly in terms of coordination. As stated previously, utilities are concentrated in a relatively narrow corridor between the Marine Drive and SR 14 interchanges, and potential impacts are complicated by utilities being located parallel to and under I-5 (see Figure 4-1). The following major utilities in Oregon may be affected:

- Water supply main on the North Portland Harbor bridge. This main, which is vital for maintaining fire flows on Hayden Island, could be affected by construction of an additional span at the north end of the bridge to accommodate the realignment of Center Avenue and Jantzen Drive.
- Natural gas feed main on North Portland Harbor bridge. This main supplies natural gas to Hayden Island and would be affected by decommissioning of the existing North Portland Harbor bridge.
- Communication cables across the North Portland Harbor bridge, Hayden Island, and the southbound Interstate Bridge. Several of these are trunk lines and would be impacted by decommissioning of the existing North Portland Harbor bridge, reconstruction of the Marine Drive and Hayden Island interchanges, and realignment of Jantzen Drive and Center Avenue.
- Aerial communications cables and Pacific Power cables that run parallel to Vancouver Way and cross where Marine Drive and Vancouver Way intersect. Significant changes to the alignment of Vancouver Way, Marine Drive, and Martin Luther King Jr Boulevard could require relocation of power poles that carry these cables.
- Underwater communication and power cables west of the existing North Portland Harbor bridge would be affected by new ramp construction and possibly the new light-rail infrastructure.
- A 10-inch sewage force main located under Jantzen Drive/Center Avenue could be affected by the realignment of Jantzen Drive and the vacation of the southern section of Center Avenue, as the sewer main runs within these two streets' right of way.
- A sanitary sewer force main crossing Marine Drive east of I-5 would be affected by the depth of fill or proposed improvements above the pipe. The force main then crosses I-5 between Victory Boulevard and Marine Drive interchanges, but would likely not be affected at this location due to minimal changes in vertical profile.

Some of the above-mentioned utilities are the only links to Hayden Island. To maintain service, either temporary utility relocation and/or staging and sequencing provisions in the construction of new structures and demolition of the existing structures would need to be negotiated and mutually agreed to prior to start of construction.

Figure 4-1. Impacts to Existing Major Utilities in Oregon Study Area



Other potentially affected utilities include:

- Water, power, gas, and communications infrastructure within the Marine Drive interchange could be affected by reconstruction of the interchange, the addition of detention ponds and active transportation facilities, network and geometric changes to the surface streets, or potential ground improvements.
- Main electrical feeds and switches and the main gas feed adjacent to I-5 on Hayden Island would be affected by reconstruction of the Hayden Island interchange and by construction of the elevated light-rail guideway. The extent of the impact would also depend on the extent of potential ground improvements and whether right of way would be vacated due to realignment of existing streets.
- The existing cellular antenna array is supported on a wooden utility pole in the vicinity of Jantzen Drive. It may be affected by one or more of the following: reconstruction of the Hayden Island interchange, redesign of Jantzen Drive, and the new LRT track system.

There are a number of utilities under Jantzen Drive, Hayden Island Drive, and Center Avenue. Jantzen Drive and Hayden Island Drive currently provide the only through connections under I-5 between the east and west sides of the island. Major street network and geometric right of way adjustments are proposed for Jantzen Drive, Hayden Island Drive, Tomahawk Island Drive, Center Avenue, and Parker Street. This would require relocation of most or all of the utilities along these streets. Additionally, the proposed LRT tracks and station on Hayden Island would likely require utilities on both sides of the tracks to prevent utilities from crossing under the tracks and station.

The water main that crosses I-5 between the Victory Boulevard and Marine Drive interchanges is not likely to be affected by the Modified LPA. The vertical profile of the highway would not be substantially altered, and construction would be kept within the existing right of way.

The proposed TriMet overnight LRV facility at the southern end of the Expo Center would have limited impact on existing utilities. Some PGE overhead power lines and poles along Expo Road would probably need to be relocated. A Portland Water Bureau water line that supplies water to the eastern portion of the Expo Center and the existing TriMet transit station would need to be rerouted from Marine Drive to avoid running under the new light-rail tracks. Buried communication cables in the Expo Road right of way would be in conflict with the new light-rail tracks and would also require relocation.

Expansion of the existing TriMet Ruby Junction Light-Rail OMF would only involve the redevelopment of existing property and TriMet facilities. As such, utility impacts would be limited to infrastructure serving those facilities and located on the property being developed. The largest impact to utilities would be the conversion of Eleven Mile Road to a cul-de-sac at the northern project limit. All public utilities would terminate within the cul-de-sac; utilities south of the cul-de-sac would be privately owned and maintained by TriMet.

4.2.2 Potential Long-Term Effects – Washington

Within the Washington portion of the study area, the major existing utilities tend to cross rather than run parallel to the highway. The Modified LPA improvements may result in a change in the location or operation of some utilities (see Figure 4-2 and Figure 4-3). The major utilities that may be affected are as follows:

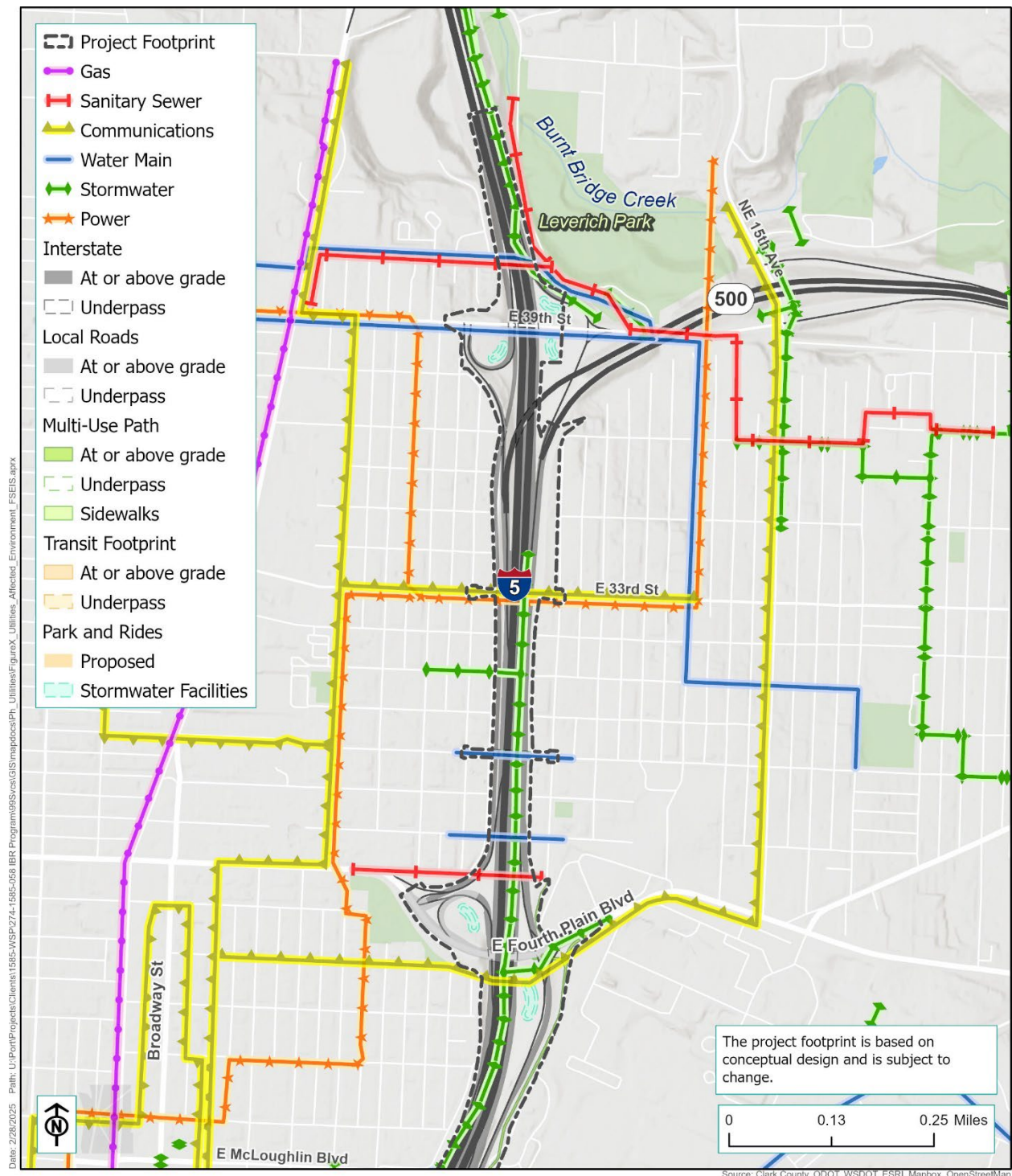
- A large-diameter gravity sanitary interceptor sewer crossing I-5 around E 5th and 6th Streets in downtown Vancouver—part of an in-progress capital improvement project by the City of Vancouver— could be affected by construction at the SR 14 interchange. The IBR Program is coordinating with the City of Vancouver to avoid impacts to this facility.
- Some segments of the major WSDOT- and City-owned storm trunk system are expected to be impacted by Modified LPA structures. The IBR Program would maintain the functionality of these systems. Connection of off-site drainage systems would also be maintained.
- Communications infrastructure, a sanitary sewer pump station and force main, and a high-pressure gas line between the SR 14 interchange and the Columbia River would be affected by the planned realignment of Columbia Way under I-5. The sanitary sewer pump station would be protected in place; however, ingress and egress to the sanitary sewer pump station would change. The communication infrastructure and gas line would need to be relocated or receive a design exemption due to the changes in the Columbia Way right of way.
- The water supply main crossing I-5 at Mill Plain Boulevard could be affected by changes in the vertical profile of the boulevard or by changes to the Mill Plain interchange and the 15th Street and Mill Plain Boulevard couplet.
- A water transmission main crossing I-5 at E 40th Street could be affected by construction of a new ramp near E 39th Street.
- Proposed stormwater detention ponds on the south side of E 39th Street could impact a water distribution main that crosses at this location.
- A water distribution main parallel to I-5 between Evergreen Boulevard and E 8th Street on the east side of I-5 would be affected by the construction of a park and ride, retaining wall, transit station, and freeway cap proposed in this location.
- A water distribution main within the E 8th Street right of way may be impacted by network changes to E 8th Street on the east side of the freeway.
- Water distribution mains of various sizes run within the right of way of most downtown Vancouver surface streets. Changes to these streets and the addition of park and rides could affect these water mains.
- A water distribution main that crosses I-5 at 32nd Street could be impacted by the widening of I-5 and retaining or noise walls.
- Communications trunk lines belonging to two service providers, located along Washington Street south of W 6th Street, could be affected by road improvements south of W 6th Street.
- A communications duct bank crossing I-5 at Fourth Plain Boulevard could be affected by the construction of additional lanes.

- Aerial and underground communications that run parallel to I-5 along the Anderson Street right of way and farther north crossing Evergreen Boulevard would be affected by the demolition of Anderson Street as part of the I-5 widening.
- An underground communications line that crosses under Mill Plain Boulevard near D Street could be affected by the changes to Mill Plain Boulevard on the west side of I-5.
- Three communication providers have overhead communication lines that cross I-5 at E 12th Street and Officers Row. These lines would be affected by changes to the Mill Plain Boulevard interchange.
- Two communication providers have underground communication lines within a shared trench and one overhead communication line crossing under the Interstate Bridge via Columbia Way and Columbia Street. These facilities would be impacted by the redesign of the Columbia Way-Columbia Street intersection and the realignment and redesign of Columbia Way.
- Aerial power transmission lines cross I-5 near E 5th Street and run parallel to Anderson Street towards E 5th Street. These lines supply power along E 5th Street within Fort Vancouver. The power poles along the Anderson Street right of way would be affected by the removal of Anderson Street as part of widening I-5 and installing noise and retention walls.

4.2.3 Design Options

All Modified LPA design options would have similar effects on utilities. Although variations among design options in the location of infrastructure elements would affect different components of some utility distribution systems, critical utilities (as defined in Section 3.1) would be affected similarly regardless of design option.

Figure 4-3. Impacts to Existing Major Utilities in North Vancouver Study Area



5. TEMPORARY EFFECTS

Temporary utility effects are defined as consequences of the Modified LPA that would occur during construction. These could include temporary rerouting of utility lines and work to reconnect relocated utilities to the system. Such activities may result in temporary service outages for limited periods of time. Generally, affected utilities would be restored to pre-construction conditions or better after construction is completed. More information on temporary utility changes will be developed during detailed design and construction planning; the facilities noted in this subsection are those determined to have the highest likelihood of experiencing temporary impacts due to their location and the type of construction activities anticipated.

5.1 Modified LPA

Temporary impacts on utilities during construction would result from the need to relocate the utilities or protect them in place to prevent damage from, or conflict with, new Modified LPA infrastructure. The largest temporary utility impacts would occur in the area near the bridge footings in Portland and Vancouver, and on Hayden Island. In these areas, the need for utilities to mount the bridge would result in utilities being concentrated in a relatively narrow corridor parallel to or under I-5; many utilities in this area would require temporary relocation during construction. Throughout the study area, utility providers would be contacted during detailed design regarding temporary utility relocations and/or staging and sequencing provisions, many of which could occur in the early phase of construction, prior to heavy civil construction phases.

Tying in relocated utilities could result in a temporary loss of services; these impacts are expected to have a short duration. However, for some utilities such as communications, tying into the existing trunk lines from the new relocated lines could take an extended period for splicing and connecting multiple cables.

Depending on the construction sequence, temporary relocations could be necessary before a utility is in its final location. Construction contracts for the IBR Program would include provisions to protect and maintain utilities. Such provisions could include providing duct banks, facilitating the attachment of utilities to new structures, and construction windows that provide adequate time for utilities to pull cables and to tie in relocated utilities.

Specific locations for staging areas or casting yards have not been identified outside of the project footprint. At this stage of project development, it is not known what sites may be used or the specifics of how a particular site might be developed. However, it is anticipated that sites used for these purposes would only contain utilities serving those parcels. Should this not be the case, the utility infrastructure would be protected in place or relocated.

5.1.1 Potential Temporary Effects – Oregon

The following major utilities in Oregon on the North Portland Harbor bridge may be temporarily affected:

- A water main that supplies water to Hayden Island, including for fire flows, would be affected by a new span to accommodate the Jantzen Drive realignment.
- A natural gas feed main serving Hayden Island would be affected by the new North Portland Harbor bridges.
- Communication cables across the North Portland Harbor bridge, on Hayden Island, and on the southbound Interstate Bridge, including several trunk lines, would be affected by the new North Portland Harbor bridges and improvements to the Marine Drive and Hayden Island interchanges.
- Underwater communication and power cables west of the North Portland Harbor bridge would be affected by construction of the new North Portland Harbor bridges and ramps. Sanitary sewer force mains crossing Marine Drive and Jantzen Drive could also be affected.

Other potentially affected utilities include the following:

- Water, power, gas, and communications infrastructure would be affected by Marine Drive interchange reconstruction.
- Electrical feeds and switches and the main gas feed adjacent to I-5 on Hayden Island would be affected by reconstruction of the Hayden Island interchange, construction of light-rail, and roadway realignments.
- The existing cellular antenna array in the vicinity of Jantzen Drive may be affected by reconstruction of the Hayden Island interchange.
- The existing cellular system backup diesel generator in the vicinity of Jantzen Drive may be affected by reconstruction of the Hayden Island interchange and/or realignment of Jantzen Drive and Center Street.

5.1.2 Potential Temporary Effects – Washington

The following major utilities that cross I-5 in Washington would be temporarily affected:

- Communications infrastructure, a sewage lift station and force main, and a high-pressure gas line between the SR 14 interchange and the Columbia River may be affected by bridge construction, improvements to SR 14, and local street improvements.
- A water supply main crossing I-5 at Mill Plain Boulevard would be affected by street reconstruction.
- Two north-south water distribution mains that pass through the right of way of K Street-E 32nd Street and I Street-E 32nd Street could be affected by the widening of I-5 or the addition of a retaining wall. This could temporarily affect water supplies and fire flows.

- Some segments of the major WSDOT- and City-owned storm trunk system are expected to be impacted by Modified LPA construction. The IBR Program would maintain the functionality of these systems at all times during construction. Connection of off-site drainage systems would also be maintained.
- A high-voltage electrical transmission line crossing I-5 at 33rd Street could be affected by overcrossing reconstruction. The proposed improvements at K Street-33rd Street and I Street-33rd Street could also affect the transmission line power pole.
- A communications cable and duct bank crossing I-5 at Fourth Plain Boulevard would be affected by construction in the interchange area.
- A water supply main crossing I-5 at McLoughlin Boulevard may be affected when the street is modified to allow for the widened highway and transit guideway, and by construction of the guideway S-curve between 17th Street and McLoughlin.
- A sanitary sewer pump station at Columbia Street is located adjacent to an area where new bridge foundations would be constructed. This sanitary sewer pump station would be protected in place while the foundations were being constructed.
- A water supply main crossing I-5 at E 40th Street would be affected by construction of a new ramp at NE 39th Street.
- Communication trunk lines on Washington Street south of W 6th Street would be affected by road reconstruction.

5.2 Design Options

Construction at the potential park and rides in downtown Vancouver could temporarily impact existing utilities located along local streets near the park and rides. This could include temporary service disruptions, utility relocation, and/or installation of new utility services. Otherwise, temporary effects would be similar among the design options.

6. INDIRECT EFFECTS

Indirect effects are reasonably foreseeable, projected, or unknown effects that may occur as a result of the Modified LPA but occur later in time or outside of the study area.

Public and private utilities—including water, sanitary sewer, storm sewer, electricity, natural gas, and communications service providers—could experience indirect effects from operation of the Modified LPA. These utilities generally plan for service based on forecast population and development patterns reflected in the long-range comprehensive plans of the jurisdictions they serve. Providers evaluate future population growth and calculate needed future service increases such as expanded treatment plants, new equipment, or new facility locations. As described in the Land Use Technical Report, the Modified LPA would facilitate growth in the study area, particularly in new light-rail station areas, in a manner consistent with local and regional land use plans. This, in turn, could result in increased demand for utilities in areas where growth occurred. The increased needs would be in urbanized areas where utilities are already present; it is not anticipated that any extension of service to new geographic areas would be required. Because anticipated density increases in downtown Vancouver and on Hayden Island are consistent with current long-range plans and growth assumptions, the Program is not expected to require changes to individual long-range service plans. To the extent that transit-oriented development occurs sooner as a result of constructing the Modified LPA, elements of individual service plans (such as changing service boundaries) could occur sooner than the long-range plans anticipated. Increased service provision would be made easier by the fact that transit-oriented development would occur in urbanized areas that are already well served by utility infrastructure. Depending on the utility, the costs of expanding service may be covered in whole or in part through an expanded customer base and/or development fees. Indirect effects would not differ among the design options.

7. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Table 7-1 lists temporary avoidance and minimization measures and Table 7-2 lists temporary and long-term mitigation measures. No long-term avoidance or minimization measures within control of the IBR Program were identified.

Table 7-1. Avoidance and Minimization Measures

Temporary or Long-Term	Impact Type	Avoidance and Minimization Measure
Temporary	Disruption to broadband/fiber services during construction	ODOT and WSDOT will coordinate with the contractor to comply with current federal Dig Once laws (23 Code of Federal Regulations 645.307) and associated state regulations and guidelines, which require advanced coordination with the broadband/fiber industry to invite these providers to participate in highway improvement projects.
Temporary	Temporary service disruptions when utilities are relocated or protected in place during construction	ODOT and WSDOT will contact utility providers during design to identify temporary facility needs and staging and sequencing provisions. Utilities will be protected in place where possible; where protection or preservation in place is not possible; the goal will be to relocate facilities only once to reduce service disruptions.
Temporary	Interruption to fire flow during construction	ODOT and WSDOT will sequence construction to avoid interruptions to fire flow (the volume of water needed to control and extinguish a fire) to the extent possible. ODOT and WSDOT will coordinate with the Vancouver Fire Department and Portland Fire and Rescue to develop a plan for ensuring fire flow is maintained throughout construction to the extent possible, using temporary provisions as needed.
Temporary	Disruption to sanitary sewer pump station at Columbia Street and Columbia Way during construction	ODOT and WSDOT will coordinate with the utility providers to protect or preserve in place, to the extent feasible, the sanitary sewer pump station located at Columbia Street and Columbia Way near the Vancouver waterfront.

Table 7-2. Mitigation Measures

Temporary or Long-Term	Impact Type	Mitigation Measure
Temporary	Interruption to fire flow during construction	If temporary interruptions to fire flows are unavoidable, ODOT and WSDOT will provide additional details on the anticipated locations and durations of the disruptions to Vancouver Fire Department and Portland Fire and Rescue as soon as that information is available.
Long-Term	Permanent relocation of utilities	If relocation of utilities is unavoidable, ODOT and WSDOT will develop or modify agreements with affected utility providers to specify the locations of utilities within the right of way, access and maintenance requirements, etc.

8. PERMITS AND APPROVALS

Use and occupancy agreements (permits and franchises) would be required from ODOT and WSDOT for utilities located within their right of way. The utility owners, however, would obtain these. The utility owner or contractor performing relocation work would also obtain any other permits and approvals specifically required for that work by federal, state, or local government agencies. Appendix A provides a list of existing permits and franchises issued by ODOT and WSDOT for utilities within the I-5 right of way.

9. REFERENCES

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Appendix A ODOT and WSDOT Permits and Franchises

Table A-1. Permits and Agreements Issued by ODOT, Oregon Highway Commission (OHC) and Others for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
(War Dept) 207-737	1941	Electricity	Portland General Electric	Portland General Electric	Power Poles and Line across east side Harbor Bridge
(Dept of The Army) Npp 800.6	1957	Electricity	Portland General Electric	Portland General Electric	Submarine cable across slough east of Harbor Bridge
(OHC) 4874	1956	Electricity	Portland General Electric	Portland General Electric	Pacific Hwy, Pacific Hwy West, and Swift #120 Power Poles and Lines.
(OHC) 5769	1935	Electricity	Portland General Electric	Portland General Electric	Crossing Roadway to Vancouver Power Poles and Lines
(OHC) 6367	1936	Electricity	Portland General Electric	Portland General Electric	Near Victory Blvd/Denver Ave (West of Pacific Hwy) Power Poles and Lines
(OHC) 6610	1964	Electricity	Portland General Electric	Portland General Electric	Near Victory Blvd/Denver Ave (West of Pacific Hwy) Power Poles and Lines
(OHC) 7464	1940	Electricity	Portland General Electric	Portland General Electric	Parallel to Dever Ave Power Poles and Lines ~ 1 Mile
(OHC) 7961	1941	Electricity	Portland General Electric	Portland General Electric	Parallel to Vancouver Ave to Pacific Hwy. Crossing to Hayden Island east of bridge. Power Poles and Lines

Table A-1. Permits and Agreements Issued by ODOT, Oregon Highway Commission (OHC) and Others for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
(OHC) 11973	1967	Electricity	Portland General Electric	Portland General Electric	Crossing Under Pacific Hwy Bridge at Hayden Island Dr UG 15-kv in 3" Duct
(OHC) 13956	1976	Electricity	Portland General Electric	Portland General Electric	DWG Illegible 57 kV & 13 kV Power
19017	1977	Gas	NW Natural	NW Natural	MP 308.15 - 308.17. 2-inch steel.
2BM35007	1990	Gas	NW Natural	NW Natural	MP 307.32-307.47 (Swift Interchange) Replace 8" Steel Pipe
20738	1979	Communication	Pacific Northwest Bell	-	MP 368.25. U/G cable. Mile Post is incorrect.
2BM30861	1990	Water	COP - Water Bureau	COP - Water Bureau	MP 308.16 - 308.21 12" DI
2BM30861	1990	Water	COP - Water Bureau	COP - Water Bureau	MP 308.06 - 308.08 12" DI
2BM30861	1990	Water	COP - Water Bureau	COP - Water Bureau	MP 308.15 - 308.31 12" DI
2BM35797	1997	Communication	TCI	AT&T	MP 307.99 - 308.38. Temporary permit for installing fiber-optic cable on Interstate Bridge. Extends onto Washington side.
2BM35800	1997	Communication	All Phase Communications	City of Portland	MP 307.80 - 307.99. U/G fiber-optic cable.
2BM35801	1997	Communication	All Phase Communications	City of Portland	MP307.99 - 308.38. PVC ducts on I-5 bridges for fiber-optic cable. Extends onto Washington side, and includes vault and pull boxes.
2BM35831	1997	Communication	All Phase Communications	City of Portland	MP 307.46 - 307.70. Fiber-optic cable suspended under Oregon Slough Bridge.
2BM36005	1998	Water	COP - Water Bureau	COP - Water Bureau	MP 307.45 8" DI

Table A-1. Permits and Agreements Issued by ODOT, Oregon Highway Commission (OHC) and Others for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
2BM36010	1998	Communication	Electric Light Wave	Zayo	MP 307.48. O/H fiber-optic line on PP&L poles
2BM36073	1999	Communication	Paragon	Charter Communications	MP 307.46 - 307.47. U/G fiber-optic & TV cable.
2BM36236	2000	Electricity	Portland General Electric	Portland General Electric	MP 308.00 U/G mainline backbone feeder.
2BM36242	2000	Electricity	Portland General Electric	Portland General Electric	MP 308.00 (Hayden Island Dr Xing) U/G (2) 4" & (2) 6" power conduit.
2BM36245	2000	Electricity	Portland General Electric	Portland General Electric	MP 307.93 (Jantzen Ave Xing) U/G (2) 4" & (2) 6" power conduit.
2BM36619	2002	Electricity	Portland General Electric	Portland General Electric	MP 2.61 (Swift Hwy) Pole w/ Anchor and 13 kV line. Xing Hwy at 90 degrees
2BM36829	2003	Communication	Qwest	Lumen	MP 307.71 U/G 2" service conduit. Service connections not shown on drawings.
2BM37005	2005	Communication	Qwest	Lumen	MP 307.71 (N Center St/Parker St) U/G telephone cable.
2BM37071	2005	Water	COP - Water Bureau	COP - Water Bureau	MP 307.92 UG (2) 6" DI
2BM40243	2015	Electricity	Portland General Electric	Portland General Electric	MP 306.64 (Victory Blvd/I-5) New Pole
2BM41753	2016	Electricity	Portland General Electric	Portland General Electric	Marine Dr/ Pier 99 St (2) Power Poles and Line. Xing Marine Dr.

Table A-1. Permits and Agreements Issued by ODOT, Oregon Highway Commission (OHC) and Others for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
2BM41965	2017	Communication	Qwest	Lumen	MP 308.15-308.31 (Tomahawk St) U/G 4" Duct, Cabinet, & 264T Handhole
2BM42476	2018	Communication	Qwest	Lumen	MP 308.31 (N Center Ave) 4" Duct & 17x30x24 inch Vault
2BM43013	2020	Electricity	Portland General Electric	Portland General Electric	MP 2.82 (Pacific Hwy Conn. No. 1 / 120) (Expo Rd @ Expo Ctr) Power Pole and Line. Xing from Expo Rd to I-5 Interchange.
2BM44054	2019	Communication	Comcast	Comcast	MP 308.28-308.31 (N Parker Ave/Jantzen Beach Conn No. 3) U/G (2) 2" Ducts U/G (2) 2" Ducts @ 308.31 Xing 90 degrees
2BM35356	1994	Communication	Columbia Cable of WA	Comcast	Columbia River Bridge Crossing 2" PVC w/ 96 Ct Fiber Optic
2BM44072	2019	Communication	MCI	Verizon	MP 2.81-2.82 (I-5/Marine Dr Interchange) U/G (2) 2" HDPE Duct 36x60 Handhole
2BM45297	2021	Communication	MCI	Verizon	MP 308.15-308.26 (2) 2" HDPE Duct
2BM45297	2021	Communication	MCI	Verizon	MP 308.10 (Under I-5 Bridge) 4" HDPE Duct & 36x60 Vault
2BM45297	2021	Communication	MCI	Verizon	MP 308.26-308.30 (2) 2" HDPE Duct
2BM45297	2021	Communication	MCI	Verizon	MP 308.30 (2) 2" HDPE Duct

Table A-1. Permits and Agreements Issued by ODOT, Oregon Highway Commission (OHC) and Others for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
2BM45297	2021	Communication	MCI	Verizon	MP 308.30-308.31 (2) 2" HDPE Duct
2BM45297	2021	Communication	MCI	Verizon	MP 308.26 36x60 Vault
2BM45297	2021	Communication	MCI	Verizon	MP 308.16 U/G (2) 2" HPDE Duct Xing @ 75 Degrees
2BM45731	2021	Communication	MCI	Verizon	MP 307.701-307.71 (Under I-5 Bridge @ Center Ave/Jantzen Dr) U/G (2) 2" HDPE Duct
2BM45824	2021	Communication	MCI	Verizon	MP 307.51-307.72 (CR Bridge Xing) 4" Steel Duct
2BM46093	2021	Communication	Wave	Astound	MP 307.25-307.30 OH FO from Union Ct/Marine Dr through Delta Park east towards I-5
2BM46308	2022	Electricity	Portland General Electric	Portland General Electric	Marine Dr/ Pier 99 St (2) Power Poles and Line. Parallel to Marine Dr & Pier St
2BM46332	2022	Communication	MCI	Verizon	MP 308.01-308.38 (CR Bridge Xing) 4" Steel Duct
2BM46423	2022	Communication	Astound	Astound	Hwy 99E (MLK) from N Hertz Rd to Harbor Bridge. New 1/4" strand w/ 48ct FO on east side of Hwy. Passes under Hwy at Union Ct, continues NW to Harbor Bridge passing under Swift Union Conn. No. 1

Table A-1. Permits and Agreements Issued by ODOT, Oregon Highway Commission (OHC) and Others for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
2BM46438	2022	Communication	Astound	Astound	MP 2.77-2.82 (Swift Union Conn. No. 1) U/G (2) 2" Ducts w/ 48ct FO (2) Vaults (1) J Box
2BM46439	2022	Communication	Astound	Astound	MP 307.69-307.72 (Under Harbor Bridge at Jantzen Dr/Center Ave) U/G Many 2" Ducts w/ 48ct FO (3) Vaults (1) J Box
2BM46424	2022	Communication	Astound	Astound	MLK Jr. Blvd and N Union Ct Interchange U/G 2" Duct (1) Vault (1) J-Box
2BM46546	2022	Communication	Comcast	Comcast	MP 308.26 (Tomahawk Island Dr/Center Ave) U/G 2" HDPE Duct
2BM47746	2023	Communication	Astound	Astound	MP 307.39-307.41 MP (-5.85)-(-5.82) (Hwy 99E) MP 2.81 (OR 120) OH 48ct FO Northside of Marine Dr under Swift Union Conn. No. 1 toward bridge
2BM41430	1999	Electricity	Pacific Power & Light	Pacific Power & Light	Anchor Way and Swift Interchange U/G 4" Power
(OHC) 15943	1973	Electricity	Pacific Power & Light	Pacific Power & Light	MP 5.44 11kV Aerial Power for East Delta Park Field #1

Table A-1. Permits and Agreements Issued by ODOT, Oregon Highway Commission (OHC) and Others for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
2BM47789	2023	Electricity	Portland General Electric	Portland General Electric	MP 2.82 (Pacific Hwy Conn. No. 1 / 120) Power Pole and Line. Xing from Expo Rd to I-5 Interchange.

Table A-2. Franchises and Permits Issued by WSDOT for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
8828	1983	Communication	Cox Cable	Unknown/No WA Service	MP 0.94 (South of Mill Plain Xing) OH (2) 0.75" OD TV Cable (Permit)
8842	1983	Communication	Cox Cable	Unknown/No WA Service	MP 1.84 (29th St Xing) OH (2) 0.75" OD TV Cable (Permit)
9278	1983	Communication	Cox Cable	Unknown/No WA Service	MP 0.79 (Parallel to Anderson St) OH & U/G 0.5" TV Cable Buried w/in 2" OVC (Permit)
9749	1988	Communication (For Traffic Signals)	City of Vancouver	City of Vancouver	MP 1.04 (Mill Plain Xing) Combo of 2" Steel and 2" PVC w/ 25 Pair Cable. (3) J Boxes (Permit)
10843	1994	Water	City of Vancouver	City of Vancouver	MP 2.43 (40th St Xing) U/G 24" CL. 52 DI Main w/in 36" Steel Casing (Permit)
11013	1994	Communication	City of Vancouver	City of Vancouver	MP 0.94 (12th St to Officers Row) OH FO 36ct w/in 1.5" PVC Duct (Permit)
11072	1995	Communication	Columbia Cable of WA	Comcast	MP 0.94 (12th St to Officers Row) OH FO 102ct w/ 1.25" MOD (Permit)

Table A-2. Franchises and Permits Issued by WSDOT for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
11466	1996	Communication	TCI	AT&T	MP 1.27-1.28 (McLoughlin) U/G 2" PVC Duct w/ 1/2" TV Cable U/G 2" PVC Duct Vacant Xing under over crossing structure. (Permit)
40025	1987	Water	City of Vancouver	City of Vancouver	MP 0.25 (Columbia Way) U/G 6" DI Water Main (Franchise - Expired 2012)
40025	1987	Water	City of Vancouver	City of Vancouver	MP 0.54 (5th St Xing) U/G 12" DI Water Main (Franchise - Expired 2012)
40025	1987	Water	City of Vancouver	City of Vancouver	MP 0.58 ("C" St Off-Ramp) U/G 8" DI Water Main
40025	1987	Water	City of Vancouver	City of Vancouver	MP 1.05 (Mill Plain Xing) U/G 12" DI Water Main (Franchise - Expired 2012)
40025	1987	Water	City of Vancouver	City of Vancouver	MP 1.30 (McLoughlin Xing) U/G 20" DI Water Main
40025	1987	Water	City of Vancouver	City of Vancouver	MP 1.68 (North of Fourth Plain Xing) U/G 6" Math w/in 36" Culvert (Franchise - Expired 2012)
40025	1987	Water	City of Vancouver	City of Vancouver	MP 1.83 (29th St Xing) U/G 12" DI w/in 42" Culvert

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Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
40025	1987	Water	City of Vancouver	City of Vancouver	MP 1.97 (32nd St Xing) U/G 10" DI w/in 42" Culvert (Franchise - Expired 2012)
40025	1987	Water	City of Vancouver	City of Vancouver	MP 2.34 (39th St Xing) U/G 8" DI w/in 36" Culvert (Franchise - Expired 2012)
40180	2001	Water	City of Vancouver	City of Vancouver	Various Water Lines Xing SR 500
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 0.26 (Columbia Way Xing) 8" Sanitary Line & Manhole (Franchise - Expired 2013)
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 0.43-0.45 (3) 8" Sanitary Line (2) Manholes (Franchise - Expired 2013)
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 0.56-0.58 (6th St Xing) 33" Sanitary Line & Manhole (Franchise - Expired 2013)
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 1.03 (Mill Plain/"E" St) 8" Sanitary Line & Manhole (Franchise - Expired 2013)
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 1.08 (15th St/"E" St) 8" Sanitary Line (Franchise - Expired 2013)

Table A-2. Franchises and Permits Issued by WSDOT for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 1.19-1.26 (16th St Xing) 10" Sanitary Line (Franchise - Expired 2013)
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 1.30-1.37 (East side Parallel I-5. McLoughlin Blvd north to Park Visitor Center) 8" Sanitary Line (2) Manholes (Franchise - Expired 2013)
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 1.68 (Fourth Plain/I-5 SB Off-Ramp) 14" Sanitary Line (Franchise - Expired 2013)
40058	1988	Sewer	City of Vancouver	City of Vancouver	MP 2.41-2.44 (40th St Xing) 12" Sanitary Line (Franchise - Expired 2013)
40118	1998	Communication	Columbia Cable of WA	Comcast	MP 0.00-0.26 4" PVC w/ (3) 1.25" Innerduct w/ 240ct FO. CR Bridge Xing. (2) Pull-boxes (Franchise - Expired 2019)
40151	1997	Communication	Electric Lightwave	Zayo	MP 0.23 (Columbia Way Xing) OH FO (2) 1.25" Subduct w/ 48ct (Franchise - Expired 2022)
40161	1998	Communication	GTE	Verizon	MP 1.82 (29th St Xing) OH FO 144ct (Franchise Cat 2 - Expired 2023)

Table A-2. Franchises and Permits Issued by WSDOT for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
40234	2008	Electricity	Clark PU	Clark PU	MP 0.27 Xing OH 12.5kV Power Line (Franchise - Expires 2032)
40234	2008	Electricity	Clark PU	Clark PU	MP 0.65 Xing OH 12.5kV Power Line (Franchise - Expires 2032)
40234	2008	Electricity	Clark PU	Clark PU	MP 0.66 U/G 12.5kV Power Line (Franchise - Expires 2032)
40234	2008	Electricity	Clark PU	Clark PU	MP 0.66-0.69 U/G 12.5kV Power Line (Franchise - 2032)
40234	2008	Electricity	Clark PU	Clark PU	MP 0.69 U/G 12.5kV Power Line (Franchise - Expires 2032)
40234	2008	Electricity	Clark PU	Clark PU	MP 0.93 Xing OH 12.5kV Power Line (Franchise - Expires 2032)
40234	2008	Electricity	Clark PU	Clark PU	MP 1.23 Xing U/G (2) 6" Ducts (Vacant) (Franchise - Expires 2032)
40234	2008	Electricity	Clark PU	Clark PU	MP 1.82 Xing OH 12.5kV Power Line (Franchise - Expires 2032)
40234	2008	Electricity	Clark PU	Clark PU	MP 2.02 Xing OH 69kV (3) Wire Power Line (Franchise - Expires 2032)

Table A-2. Franchises and Permits Issued by WSDOT for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
40234	2008	Electricity	Clark PU	Clark PU	MP 2.74 Xing OH 12.5kV Power Line (Franchise - Expires 2032)
40262	2011	Communication	NoaNet	NoaNet	MP 0.54 (12th St to Office Row Xing) OH FO 12ct (Franchise - Expires 2036)
40262	2011	Communication	NoaNet	NoaNet	MP 2.02 (33rd St Xing) OH FO 96ct (Franchise - Expires 2036)
40276	2012	Communication	Qwest	Lumen	MP 0.22-0.26 2" Duct w/ 150 Pair Cable Attached to CR Bridge (Franchise - Expires 2037)
40276	2012	Communication	Qwest	Lumen	MP 0.26 4" Duct w/ 50 Pair Cable (Franchise - Expires 2037)
40276	2012	Communication	Qwest	Lumen	MP 0.26 Xing (2) 4" Duct w/ 200 Pair Cable Under NB Bridge (Franchise - Expires 2037)
40276	2012	Communication	Qwest	Lumen	MP 0.26 (2) 4" Duct w/ 100 Pair Cable (Franchise - Expires 2037)
40276	2012	Communication	Qwest	Lumen	MP 0.29 Xing 60 & (2) 144ct FO w/in 12 Duct system & MH (Franchise - Expires 2037)

Table A-2. Franchises and Permits Issued by WSDOT for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
40276	2012	Communication	Qwest	Lumen	MP 0.29 24 & (2) 144 FO w/in 9 Duct System (Franchise - Expires 2037)
40276	2012	Communication	Qwest	Lumen	MP 0.29 60 FO Cable w/in 3 Duct System (Franchise - Expires 2037)
40276	2012	Communication	Qwest	Lumen	MP 0.86 (Evergreen Xing) 600 & 400 Pair Cable w/in (6) 4" Duct (Franchise - Expires 2037)
40276	2012	Communication	Qwest	Lumen	MP 1.55 (Mill Plain Xing) (3) 2400, (2) 1800, & (5) 1500 Pair Cable w/in (57) 4" Ducts & (2) 2" Ducts *Some of the ducts are w/in 30" Steel Casing (Franchise - Expires 2037)
40276	2012	Communication	Qwest	Lumen	MP 1.83 (29th St Xing) (6) 4" Ducts (Vacant) (Franchise - Expires 2037)
U1196	2001	Communication	City of Vancouver	City of Vancouver	MP 1.03-1.05 (Mill Plain Xing) 3" PVC w/ 48ct FO & 25 Pair Cable (Permit Cat 2)
U1271	2002	Communication	City of Vancouver	City of Vancouver	MP 0.85 (Evergreen Xing) Under Bridge FO 12ct w/in 4" PVC Duct (Permit Cat 1)

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Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
U1315	2002	Communication	City of Vancouver	City of Vancouver	MP 0.00 (Columbia Way Xing) OH FO 60ct w/in 4" PVC Duct (Permit Cat 1)
U1444	2005	Communication	City of Vancouver	City of Vancouver	MP 1.58 (Fourth Plain Interchange) U/G FO (2) 48ct w/in 3" Duct (1) Pull-Box (1) J Box (Permit Cat 1&3)
U1813	2013	Communication	Comcast	Comcast	MP 2.02 (33rd St Xing) OH FO 144ct onto CPU Pole. (Franchise - Expires 2039)
U1982	2017	Communication	Comcast	Comcast	MP 1.83 (29th St Xing) OH FO 48ct on Overpass (Permit Cat 2)
U2062	2018	Water	City of Vancouver	City of Vancouver	MP 2.34 (39th St Off Ramp West Side of I-5) U/G 8" DI (Permit Cat 1)
U2126	2019	Communication	Verizon	Verizon	MP 1.84 (29th St Xing) OH FO 432ct (Permit Cat 1)
U2154	2019	Communication	Verizon	Verizon	MP 1.31 (McLaughlin Xing) U/G FO (2) 2' HPDE Ducts w/ 864ct & 576ct (Permit Cat 1)
UP-SW-2020-019	2020	Communication	Wave	Astound	MP 0.93 (12th St Xing to Officers Row) OH FO 144ct w/ 1/4" Steel Strand (Permit Cat 2)
UP-SW-2021-007	2021	Communication	City of Vancouver	City of Vancouver	MP 1.84 (29th St Xing) OH FO 48ct (Permit)

Table A-2. Franchises and Permits Issued by WSDOT for I-5 Right of Way

Agreement No.	Year Issued	Utility Type	Applicant	Current Owner	Comments
UP-SW-2024-073	2024	Communication	Zayo	Zayo	MP 2.01 (33rd St Xing) OH FO 864ct (Permit Cat 1)(Expires - 10/2025)