INTERSTATE 5 COLUMBIA RIVER CROSSING

DRAFT - Troutdale Sole Source Aquifer Technical Report

Columbia River CROSSING

August 2009

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Cover Sheet

Interstate 5 Columbia River Crossing

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Submitted By:

Eric Roth, RG, LHG

Signature _____ Date _____

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TABLE OF CONTENTS

List of Exhibits

Appendices

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ACRONYMS

Acronym	Description
API	Area of Potential Impact
bgs	below ground surface
BMP	best management practices
BRT	Bus Rapid Transit
CMMP	Contaminant Media Management Plan
COV	City of Vancouver
CPU	Clark Public Utilities
CRBG	Columbia River Basalt Group
CRC	Columbia River Crossing
C-TRAN	Clark County Public Transportation Benefit Area
CU 1	Confining Unit 1
CU 2	Confining Unit 2
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
EDR	Environmental Data Resources
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
gpd/ft	gallons per day per foot
gpm	gallons per minute
GPTIA	Groundwater Pump and Treat Interim Action
HASP	Health and Safety Plan
HRM	Highway Runoff Manual
I-5	Interstate 5
IRA	Interim remedial action
IWW	in-water work window
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
MTCA	Model Toxics Control Act
MTDL	Maximum Total Daily Limit
NEPA	National Environmental Policy Act
NEPA	National Environmental Policy Act
NOAA	National Oceanic & Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
ODOT	Oregon Department of Transportation
PCE	tetrachloroethene
PGIS	pollution-generating impervious surface
REC	recognized environmental condition
RTC	Regional Transit Commission
SAP	Sampling and Analysis Plan
SCPPP	Spill Control and Prevention Plan
SDWA	Safe Drinking Water Act
SGA	Sand and Gravel Aquifer
SR 14	State Route 14
SR 500	State Route 500

Acronym	Description
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TDA	Threshold Drainage Area
TDM	Transit Demand Management
TGA	Troutdale Gravel Aquifer
TSA	Troutdale Sand Aquifer
TSM	Transit System Management
TSSA	Troutdale Sole Source Aquifer
USA	Unconsolidated Sedimentary Aquifer
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
USGS	United States Geologic Survey
VMC	City of Vancouver Municipal Code
VOCs	volatile organic compounds
WAC	Washington Administrative Code
WS	Water Station
WSDOT	Washington State Department of Transportation

Executive Summary

The Troutdale Sole Source Aquifer (TSSA) constitutes the primary supply of drinking water to, and provides a significant economic resource for, the City of Vancouver and the greater Clark County area. Because of its importance, the U.S. Environmental Protection Agency (EPA) requested that information be gathered regarding potential future impacts to the TSSA from the Columbia River Crossing project (CRC). Specifically, EPA is concerned with the potential for exacerbation of contamination into the TSSA from CRC construction activities.

The purpose of this report is to:

- Provide relevant and applicable information regarding: the hydrogeologic conditions and beneficial use of the TSSA; proposed subsurface project construction activities; and identified hazardous material sites which could act as contaminant sources.
- Evaluate potential adverse effects to the TSSA as a result of project construction activities.
- Recommend mitigation measures to help ensure the TSSA is protected during project construction.

Findings

The Unconsolidated Sedimentary Aquifer (USA) and the Troutdale Gravel Aquifer (TGA) are the most accessible and most utilized sources of groundwater in the TSSA. Groundwater in these units is thought to discharge locally to the Columbia River and to Burnt Bridge Creek. Within the study area the City of Vancouver extracts groundwater for drinking water from the USA at Water Stations (WS) WS-1 and WS-3. Groundwater at these stations is treated to meet drinking water quality standards. Groundwater in the study area is also utilized locally for industrial and agricultural purposes.

Proposed project construction within the study area is composed of five general bridge areas: the Columbia River Crossing Bridge, the SR-14 Bridge, the Evergreen Bridge, the Mill Plain to 33rd Street Bridges, and the SR-500 and 39th Street Bridges. Significant below-grade construction activities for these bridge areas include: the installation of piles and shafts to support piers, foundations, and retaining walls; the excavation and grading of soil material to support roadways, transit, and utility corridors; and the installation of stormwater conveyance and management systems.

Search of federal and state regulatory environmental databases identified 122 potential hazardous material sites within the study area. Of these sites, 25 were determined to be higher priority sites because they had a known or suspected release of a hazardous substance or petroleum product. However, almost all of these higher priority sites had an inactive status or were granted a no further action determination by the Washington State

Department of Ecology (Ecology). In addition, an Ecology file review was conducted on eight of the higher priority sites to gather further information on the nature and extent of contamination. These sites were:

- Site ID No. 9, Boise Cascade White Paper
- Site ID No. 11, Hanna Motor Company
- Site ID No. 12, USDOT Federal Highway Administration
- Site ID No. 19, Vancouver Barracks
- Site ID No. 93, Department of Veterans Affairs
- Site ID No. 111, Washington Department of Transportation Maintenance Facility
- Site ID No. 120, Special Events and Convention Center

Evaluation of Potential Adverse Affects

Potential adverse effects to the TSSA were evaluated for each of the five bridge areas. The evaluation took into consideration the type, intensity, and depth of construction; the depth to groundwater; proximity to water supply wells, and the number and proximity of higher priority hazardous material sites. Based on available information:

- A moderate rating for potential adverse effects was determined for the Columbia River Crossing, SR-14 Bridge, and the Mill Plain to 33rd Street Bridges, and
- A low rating for potential adverse effects to the TSSA was determined for the Evergreen Bridge and the SR-500 and 39th Street Bridge.
- A high rating for potential adverse effects was not determined because no recognized source of contamination was identified in proximity to proposed bridge areas.

Construction activities that could potentially exacerbate contamination or affect water quality were evaluated. These include: drag down of contamination during pile installation; the formation of conduits during pile installation; subsurface concrete work; scour of contaminated sediments around piers; excavation work in contaminated soil or sediment; and infiltration of stormwater in contaminated soil. Because no recognized source of contamination was identified, the likelihood of contaminant exacerbation from these activities is low. However, if contamination is encountered, then exacerbation of contamination could be realized by one or all of these activities. The greatest likelihood of exacerbation of contamination is thought to occure from drag down during drilling, excavation work, and stormwater infiltration. As such, a series of mitigation measures are recommended to help ensure the TSSA is protected from potential impacts from construction activities.

Avoidance and Mitigation Measures

Recommended mitigation measures include:

- Conducting Phase I Environmental Site Assessments or equivalent on all properties that will be potentially acquired. Phase I activities may include, but are not limited to site inspection, interview with owner or manager, review of fire historic insurance maps, and environmental database search.
- Conducting Phase II Environmental Site Assessments on all properties that have been determined to have recognized environmental conditions identified during the Phase I assessments. Phase II activities may include, but are not limited to geophysical survey, asbestos and lead survey, environmental sampling and analysis of effected media. Information from the Phase II assessments will be used to help implement an avoidance strategy or conduct site cleanup.
- Conducting focused environmental assessments in areas where significant construction activities will occur or where stormwater facilities will be placed. Focused assessments may include collection of reconnaissance soil, sediment and/or groundwater samples to characterize subsurface conditions. Information from the focused assessments will be used to help implement an avoidance strategy or conduct cleanup prior to construction or apply engineering controls.
- Prepare and implement a Contaminated Media Management Plan (CMMP) to properly characterize, manage, store, and dispose of contaminated waste generated by construction activities including but not limited to dredging, drilling, and excavation work.
- Treatment and monitoring of drinking water supply wells. In the event that contaminant exacerbation occurred, groundwater at water stations (WS) WS-1 and WS-3 is currently treated for microbiological constituents by chlorination, and groundwater at WS-1 is treated for volatile organic compounds by aeration. Groundwater at these stations is monitored to ensure that water quality meets drinking water standards.
- Implement an approved Spill Control and Prevention Plan (SCPP) during construction.
- Implement construction stormwater pollution prevention and erosion control plans (SWPPPs) and obtain an approved NPDES general construction stormwater permit.
- Update permanent stormwater conveyance system and treatment facilities. Existing stormwater conveyance system has limited ability to control flow and treat stormwater from pollutant generating impervious surfaces (PGIS) associated with roadways and bridges. Updates and modifications to the stormwater conveyance system will improve stormwater quality generated from PGIS. Improved stormwater quality is thought to help improved surface water and groundwater quality overtime.

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1. Introduction

This section presents the purpose and objectives of the report. It also provides project background, the basis for taking action, and a description of the study area.

1.1 Background

A sole source aquifer is defined by the U.S. Environmental Protection Agency (EPA) as "an aquifer or aquifer system which supplies at least 50 percent of the drinking water consumed to the area overlying the aquifer and for which there is no alternative source or combination of drinking water sources which could physically, legally and economically act to supply those dependent upon the aquifer" (EPA 2006). The EPA designated the Troutdale Aquifer System as a sole source aquifer (TSSA), Clark County, Washington, in July 2006 (EPA 2006) (see Exhibit 1-1).

EPA requested that additional information be gathered regarding potential impacts to the TSSA as a result of short-term construction activities from the Interstate 5 Columbia River Crossing project (CRC). This request was made to the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) in a letter dated July 1, 2008 (see Appendix A). EPA was particularly interested in 1) the potential exacerbation of contaminants from future pile driving activities in areas potentially containing contaminated sediments, soils or groundwater; and 2) significant below-grade construction activities in areas in proximity of known or suspected hazardous materials sites (EPA 2008).

EPA's inquiry is based on their review of the Draft Environmental Impact Statement (DEIS) and Draft Section 4(f) Evaluation in accordance with the National Environmental Policy Act (NEPA). Specifically, EPA found that the DEIS had limited information on groundwater in the federally designated TSSA within the project area.

The Safe Drinking Water Act states that:

"...no commitment for federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into for any project which the [EPA] Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health, but a commitment for federal assistance may, if authorized under another provision of law, be entered into to plan or design the project to assure that it will not so contaminate the aquifer."

As part of the NEPA review process, EPA rated the each of its alternatives in the DEIS as an EC-2. This rating indicates that environmental concerns and insufficient information were identified.

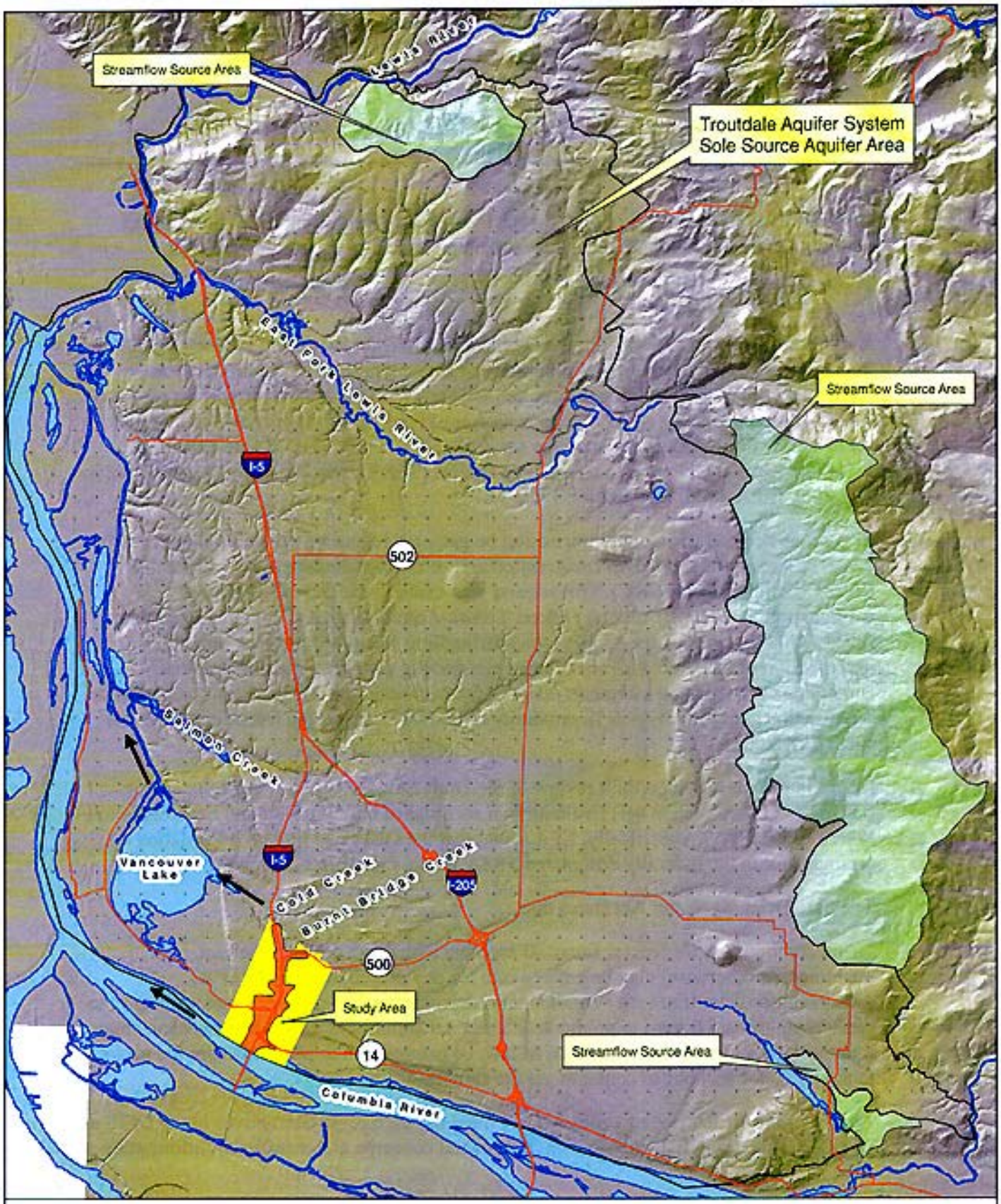

Exhibit 1-1: Boundaries of the Troutdale Sole Source Aquifer
Troutdale SSA Evaluation

Columbia River CROSSING

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1.2 Purpose

The purpose of this report is to evaluate potential adverse impacts to groundwater resources in the TSSA as a result of short-term construction activities associated with the CRC project, and to provide mitigation strategies to help ensure the protectiveness of the TSSA during construction.

1.3 Objectives

The objectives of this report are to:

- Define the study area (Section 1)
- Describe the physical, geological, and hydrological setting of the TSSA (Section 3)
- Describe and discuss significant subsurface construction activities (Section 4)
- Summarize information on environmental impacts from identified hazardous material sites within the study area (Section 5)
- Evaluate potential adverse affects to the TSSA resource from construction activities associated with bridge structures (Section 6)
- Provide potential mitigation measures to help ensure protectiveness of the TSSA (Section 7)

Adverse effects to the TSSA are considered effects from construction that would diminish groundwater quality, or alter the physical characteristics of the groundwater resource.

This report does not take the place of relevant sections in the Final Environmental Impact Statement (FEIS) or applicable technical reports. However, as recommended by EPA, background information and findings from this evaluation will be incorporated into these reports to the extent practical.

The analysis, conclusions, and recommendations in this evaluation are based on existing geologic and hydrogeologic information, data provided in current environmental databases, and the proposed design for the Columbia River Crossing and other structures associated with the bridge replacement.

1.4 Study Area

Establishing a study area is necessary because it places constraints on the active area in which the evaluation will be conducted. The study area encompasses the Locally Preferred Alternative (LPA) and Area of Potential Impact (API) for the CRC Project.[1]

[1] The Area of Potential Impact (API) defines the area most likely to have direct impacts from construction and operation of the CRC project. The API is based on the designs of the alternatives evaluated in the DEIS. This area

The lateral boundaries of the study area are displayed in Exhibit 1-2. For the purposes of this report the lateral boundaries of the study area are based on identified internal hydrologic boundaries within the TSSA system. The use of hydrologic boundaries places constraints on the extent of groundwater resources that could be potentially impacted by construction activities. As such, groundwater resources outside of the study area are less likely to be affected by construction activities than those within the study area. Further discussion on internal hydrologic boundaries is presented in Section 3.5.

1.4.1 Boundary Description

The southern hydrologic boundary of the study area is the centerline of the Columbia River, as defined by TSSA designation. The northern boundary of the study area is Burnt Bridge Creek drainage, an established local groundwater drainage boundary at the northern extent of the project improvement.[2] The eastern and western hydrologic boundaries of the study area are local flow divides identified using published simulated groundwater flow modeling (Parametrix 2008)(Parametrix and S.S. Papadopulos 2008). The eastern and western flow divides result from the City of Vancouver municipal Water Stations (WS) WS-1 and WS-3. WS-1 and WS-3 consists of several high-yielding, large-diameter water supply wells completed in the TSSA (see Exhibit 1-2).

The vertical boundary of the study area is the contact between the upper and lower sedimentary subsystems. The upper sedimentary subsystem is comprised of the Unconsolidated Sedimentary Aquifer (USA) and the underlying Troutdale Gravel Aquifer (TGA). The basis of this vertical boundary is that the USA and TGA provide a majority of the groundwater beneficial use within the study area, and that project construction activities are not anticipated to encounter the lower sedimentary subsystem. Further discussion is presented in Section 3.5 of the hydrologic characteristics and beneficial groundwater use of the TSSA.

extends five miles from north south between the I-5/Main Street interchange in Vancouver and the I-5 Columbia Boulevard interchange in North Portland. North of the river, the API extends west into downtown Vancouver, and east near Clark College to include potential transit alignments and park and ride locations. Around the actual river crossing, the eastern and western sides each extend 0.25 mile from the I-5 right-of-way. South of the river crossing, this width narrows to 300 feet on each side of I-5.

[2] Note: Data from the U.S. Geological Survey indicates that groundwater discharges into Burnt Bridge Creek suggest that it is a discharge boundary (U.S. Geological Survey, 1990). However, Burnt Bridge Creek drainage does not likely intercept all groundwater flow within the TSSA, and should only be considered a local boundary condition.

Exhibit 1-2: Study Area Location Map
Troutdale SSA Evaluation

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Analysis by Marshall; Plot Date: 8/27/09; File Name: H:\Projects\CRC\3012-004-I-5 CRC\09_Planning\MXD_PDF\LocMAP_REQUEST\CRC_AppendEx_1-2.mxd

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2. Columbia Crossing Project Description

The Columbia River Crossing (CRC) project is a bridge, transit, and highway improvement project proposed by the Oregon and Washington Departments of Transportation (ODOT and WSDOT), Southwest Washington Regional Transportation Commission (RTC), Metro, Clark County Public Transportation Benefit Area (C-TRAN), and Tri-County Metropolitan Transportation District (TriMet) to improve safety and mobility in the I-5 corridor between Portland, Oregon, and Vancouver, Washington.

This project seeks to improve safety, reduce congestion, and increase mobility of motorists, freight, transit riders, bicyclists, and pedestrians along a 5-mile section of the I-5 corridor connecting Vancouver, Washington, and Portland, Oregon. The project area stretches from State Route 500 (SR 500) in northern Vancouver, south through downtown Vancouver and over the I-5 bridges across the Columbia River to just north of Columbia Boulevard in north Portland.

A Draft Environmental Impact Statement (DEIS) was published on May 2, 2008, evaluating four alternatives and a No Build alternative. The four alternatives included highway improvements throughout the project corridor, either a replacement crossing or a supplemental bridge and improvements to the existing bridges, and either bus rapid transit or light rail through the project area. These alternatives also included the option to toll the I-5 bridges.

Following the publication of the Draft EIS, the local agencies sponsoring the CRC project adopted a locally preferred alternative (LPA). Each of these agencies' elected or appointed boards/councils held separate public hearings and ultimately voted to adopt a replacement bridge and light rail as the LPA. C-TRAN, the City of Vancouver, and RTC also specified the Clark College terminus as the preferred location to end the light rail alignment.

This regional consensus was informed by the environmental, financial, and engineering analysis presented in the DEIS, and on public and agency input.

2.1 Project Benefits

Project benefits are expected to include:

- No bridge lifts,
- Less congestion,
- Improved freight mobility,
- Fewer collisions,
- More travel choices and community connections,

- Improved facilities and connectivity for pedestrians and bicyclists,
- Stormwater treatment, and
- Seismic improvements

2.2 Project Elements

Following is a description of the key elements of the LPA. Section 4 provides information about the construction of the CRC project.

2.2.1 Crossing

Two new bridges positioned downstream (west of) the existing bridges would accommodate I-5 traffic: one northbound with an incorporated multi-use (bicycle/pedestrian) path, and one southbound with the light rail below the bridge deck. The new bridges would carry three through-travel lanes and up to three auxiliary lanes for entering and exiting the highway in each direction. The structures would be approximately 99 feet wide each, and the gap between the structures would be approximately 15 feet. The length of the new bridges would be approximately 2,700 feet over the Columbia River. The existing bridges would be removed once the new bridges are opened to traffic.

The height of the new bridges must accommodate both river traffic below and flights from Pearson Field above. The top of deck of the new bridge will range in elevation from 100 to 135 feet North American Vertical Datum 1988 (NAVD88) over the Columbia River. The new structures over the Columbia River would not include lift-spans.

Five new bridge structures will replace the existing two structures over North Portland Harbor. Starting from the east, these structures would carry northbound I-5 and a collector-distributor ramp, southbound I-5 and a collector-distributor ramp, and Light Rail Transit (LRT) combined with a multi-use path. The total width of these structures would be between 300 and 450 feet. The length of each structure would range between 800 and 1,000 feet, depending on its location and skew relative to the channel.

2.2.2 Highway and Interchanges

Interchanges within the 5-mile project area would be improved for safety and mobility through significant rebuilding, including moving or improving highway connections, adding auxiliary lanes, and lengthening on- and off-ramps. The following interchanges (from north to south) would be improved: Victory Boulevard, Marine Drive, Hayden Island/Jantzen Beach, State Route 14 (SR 14)/City Center, Fourth Plain, Mill Plain, and SR 500. Construction of interchanges and bridges will require widening of I-5.

2.2.3 Light Rail Alignment

Light rail would extend from the Expo Center MAX Station in Portland to a station and park-and-ride at Clark College in Vancouver. The alignment on Hayden Island would be adjacent to I-5. After crossing over the Columbia River under the deck of the southbound I-5 bridge, LRT would touch down in downtown Vancouver on Washington Street

around the intersection at 4th Street. At 7th Street, the alignment would split into a couplet, with southbound trains using Washington and northbound transit traveling on Broadway. At McLoughlin Boulevard, the light rail alignment would become two-way, travel under I-5, and connect to the terminus station at Clark College.

2.2.4 Light Rail Stations and Park-and-Rides

New light rail stations would be located on Hayden Island, in downtown Vancouver at 5th, 9th, and 15th Streets, and at the terminus at Clark College. Park-and-ride structures would be located at Clark College, at East 15th and Washington Streets, and at the SR 14/I-5 interchange.

2.2.5 Bus Improvements

The project includes future express and local bus systems that would expand access between Vancouver and Portland. Express buses would continue to serve long-distance commuter markets by providing direct access between Clark County and downtown Portland during peak commute hours. Some local bus routes would be modified to connect to the new light rail stations.

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