

INTERSTATE 5 COLUMBIA RIVER CROSSING

Economics Technical Report for the Final Environmental Impact
Statement



May 2011



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Cover Sheet

Interstate 5 Columbia River Crossing

Economics Technical Report for the Final Environmental Impact Statement:

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ACRONYMS

BNSF	Burlington Northern Santa Fe Railroad
CD	collector-distributor
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CRC	Columbia River Crossing
C-TRAN	Clark County Public Transportation
CTR	Commuter Trip Reduction (Washington)
DEIS	Draft Environmental Impact Statement
DLCD	Department of Land Conservation and Development
DOT	United States Department of Transportation
ECO	Employee Commute Options (Oregon)
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FTE	full-time equivalent
GTEC	Growth and Transportation Efficiency Center
I-5	Interstate 5
IAMP	Interchange Area Management Plan
LOS	level-of-service
LPA	Locally Preferred Alternative
LRV	light rail vehicle
MAX	Metropolitan Area Express
mph	miles per hour
MPO	Metropolitan Planning Organization
MSA	metropolitan statistical area
MTP	Metropolitan Transportation Plan
NAVD88	North American Vertical Datum 1988
NEPA	National Environmental Policy Act of 1969
NRM	natural resources and mining
ODOT	Oregon Department of Transportation
OTC	Oregon Transportation Commission
PDC	Portland Development Commission
PMSA	primary metropolitan statistical area
ROD	Record of Decision

RTC	Regional Transportation Council
RTP	Regional Transportation Plan
SPUI	single-point urban interchange
SR	state route
SWRTC	Southwest Washington Regional Transportation Council
TAZ	traffic analysis zone
TDM	transportation demand management
TOD	Transit-oriented development
TriMet	Tri-County Metropolitan Transportation District
TSM	transportation system management
TSP	Transportation System Plan
UGB	urban growth boundary
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
v/c	volume-to-capacity ratio
VCCV	Vancouver City Center Vision
WSDOT	Washington State Department of Transportation
WTC	Washington Transportation Commission
WTU	wholesale trade, transportation, and utilities

1. Summary

1.1 Introduction

This technical report evaluates the CRC project's locally preferred alternative (LPA) and the No-Build Alternative. If funding availability does not allow the entire LPA to be constructed in one phase, then some roadway elements of the project would be deferred to a future date. This technical report identifies several elements that could be deferred, and refers to that possible initial investment as Phase I of the LPA. The LPA Phase I option would build most of the LPA in the first phase, but would defer construction of specific elements of the project. The LPA and the No-Build Alternative are described in this section.

1.2 Description of Alternatives

This technical report evaluates the CRC project's locally preferred alternative (LPA) and the No-Build Alternative. The LPA includes two design options: The preferred option, LPA Option A, which includes local vehicular access between Marine Drive and Hayden Island on an arterial bridge; and LPA Option B, which does not have arterial lanes on the light rail/multi-use path bridge, but instead provides direct access between Marine Drive and the island with collector-distributor (CD) lanes on the two new bridges that would be built adjacent to I-5. In addition to the design options, if funding availability does not allow the entire LPA to be constructed in one phase, some roadway elements of the project would be deferred to a future date. This technical report identifies several elements that could be deferred, and refers to that possible initial investment as LPA with highway phasing. The LPA with highway phasing option would build most of the LPA in the first phase, but would defer construction of specific elements of the project. The LPA and the No-Build Alternative are described in this section.

1.2.1 Adoption of a Locally Preferred Alternative

Following the publication of the Draft Environmental Impact Statement (DEIS) on May 2, 2008, the project actively solicited public and stakeholder feedback on the DEIS during a 60-day comment period. During this time, the project received over 1,600 public comments.

During and following the public comment period, the elected and appointed boards and councils of the local agencies sponsoring the CRC project held hearings and workshops to gather further public input on and discuss the DEIS alternatives as part of their efforts to determine and adopt a locally preferred alternative. The LPA represents the alternative preferred by the local and regional agencies sponsoring the CRC project. Local agency-elected boards and councils determined their preference based on the results of the evaluation in the DEIS and on the public and agency comments received both before and following its publication.

In the summer of 2008, the local agencies sponsoring the CRC project adopted the following key elements of CRC as the LPA:

- A replacement bridge as the preferred river crossing,
- Light rail as the preferred high-capacity transit mode, and
- Clark College as the preferred northern terminus for the light rail extension.

The preferences for a replacement crossing and for light rail transit were identified by all six local agencies. Only the agencies in Vancouver – the Clark County Public Transit Benefit Area Authority (C-TRAN), the City of Vancouver, and the Regional Transportation Council (RTC) – preferred the Vancouver light rail terminus. The adoption of the LPA by these local agencies does not represent a formal decision by the federal agencies leading this project – the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) – or any federal funding commitment. A formal decision by FHWA and FTA about whether and how this project should be constructed will follow the FEIS in a Record of Decision (ROD).

1.2.2 Description of the LPA

The LPA includes an array of transportation improvements, which are described below. When the LPA differs between Option A and Option B, it is described in the associated section. For a more detailed description of the LPA, including graphics, please see Chapter 2 of the FEIS.

1.2.2.1 Multimodal River Crossing

Columbia River Bridges

The parallel bridges that form the existing I-5 crossing over the Columbia River would be replaced by two new parallel bridges. The eastern structure would accommodate northbound highway traffic on the bridge deck, with a bicycle and pedestrian path underneath; the western structure would carry southbound traffic, with a two-way light rail guideway below. Whereas the existing bridges have only three lanes each with virtually no shoulders, each of the new bridges would be wide enough to accommodate three through-lanes and two add/drop lanes. Lanes and shoulders would be built to full design standards.

The new bridges would be high enough to provide approximately 95 feet of vertical clearance for river traffic beneath, but not so high as to impede the take-offs and landings by aircraft using Pearson Field or Portland International Airport to the east. The new bridge structures over the Columbia River would not include lift spans, and both of the new bridges would each be supported by six piers in the water and two piers on land.

North Portland Harbor Bridges

The existing highway structures over North Portland Harbor would not be replaced; instead, they would be retained to accommodate all mainline I-5 traffic. As discussed at the beginning of this chapter, two design options have emerged for the Hayden Island and Marine Drive interchanges. The preferred option, LPA Option A, includes local vehicular access between Marine Drive and Hayden Island on an arterial bridge. LPA Option B does not have arterial lanes on the light rail/multi-use path bridge, but instead provides direct access between Marine Drive and the island with collector-distributor lanes on the two new bridges that would be built adjacent to I-5.

LPA Option A: Four new, narrower parallel structures would be built across the waterway, three on the west side and one on the east side of the existing North Portland Harbor bridges. Three of the new structures would carry on- and off-ramps to mainline I-5. Two structures west of the existing bridges would carry traffic merging onto or exiting off of I-5 southbound. The new structure on the east side of I-5 would serve as an on-ramp for traffic merging onto I-5 northbound.

The fourth new structure would be built slightly farther west and would include a two-lane arterial bridge for local traffic to and from Hayden Island, light rail transit, and a multi-use path

for pedestrians and bicyclists. All of the new structures would have at least as much vertical clearance over the river as the existing North Portland Harbor bridges.

LPA Option B: This option would build the same number of structures over North Portland Harbor as Option A, although the locations and functions on those bridges would differ, as described below. The existing bridge over North Portland Harbor would be widened and would receive seismic upgrades.

LPA Option B does not have arterial lanes on the light rail/multi-use path bridge. Direct access between Marine Drive and the island would be provided with collector-distributor lanes. The structures adjacent to the highway bridge would carry traffic merging onto or exiting off of mainline I-5 between the Marine Drive and Hayden Island interchanges.

1.2.2.2 Interchange Improvements

The LPA includes improvements to seven interchanges along a 5-mile segment of I-5 between Victory Boulevard in Portland and SR 500 in Vancouver. These improvements include some reconfiguration of adjacent local streets to complement the new interchange designs, as well as new facilities for bicyclists and pedestrians along this corridor.

Victory Boulevard Interchange

The southern extent of the I-5 project improvements would be two ramps associated with the Victory Boulevard interchange in Portland. The Marine Drive to I-5 southbound on-ramp would be braided over the I-5 southbound to the Victory Boulevard/Denver Avenue off-ramp. The other ramp improvement would lengthen the merge distance for northbound traffic entering I-5 from Denver Avenue. The current merging ramp would be extended to become an add/drop (auxiliary) lane which would continue across the river crossing.

Potential phased construction option: The aforementioned southbound ramp improvements to the Victory Boulevard interchange may not be included with the CRC project. Instead, the existing connections between I-5 southbound and Victory Boulevard could be retained. The braided ramp connection could be constructed separately in the future as funding becomes available.

Marine Drive Interchange

All movements within this interchange would be reconfigured to reduce congestion for motorists entering and exiting I-5 at this location. The interchange configuration would be a single-point urban interchange (SPUI) with a flyover ramp serving the east to north movement. With this configuration, three legs of the interchange would converge at a point on Marine Drive, over the I-5 mainline. This configuration would allow the highest volume movements to move freely without being impeded by stop signs or traffic lights.

The Marine Drive eastbound to I-5 northbound flyover ramp would provide motorists with access to I-5 northbound without stopping. Motorists from Marine Drive eastbound would access I-5 southbound without stopping. Motorists traveling on Martin Luther King Jr. Boulevard westbound to I-5 northbound would access I-5 without stopping at the intersection.

The new interchange configuration changes the westbound Marine Drive and westbound Vancouver Way connections to Martin Luther King Jr. Boulevard and to northbound I-5. These two streets would access westbound Martin Luther King Jr. Boulevard farther east. Martin Luther King Jr. Boulevard would have a new direct connection to I-5 northbound.

In the new configuration, the connections from Vancouver Way and Marine Drive would be served, improving the existing connection to Martin Luther King Jr. Boulevard east of the interchange. The improvements to this connection would allow traffic to turn right from Vancouver Way and accelerate onto Martin Luther King Jr. Boulevard. On the south side of Martin Luther King Jr. Boulevard, the existing loop connection would be replaced with a new connection farther east.

A new multi-use path would extend from the Bridgeton neighborhood to the existing Expo Center light rail station and from the station to Hayden Island along the new light rail line over North Portland Harbor.

LPA Option A: Local traffic between Martin Luther King Jr. Boulevard/Marine Drive and Hayden Island would travel via an arterial bridge over North Portland Harbor. There would be some variation in the alignment of local streets in the area of the interchange between Option A and Option B. The most prominent differences are the alignments of Vancouver Way and Union Court.

LPA Option B: With this design option, there would be no arterial traffic lanes on the light rail/multi-use path bridge over North Portland Harbor. Instead, vehicles traveling between Martin Luther King Jr. Boulevard/ Marine Drive and Hayden Island would travel on the collector-distributor bridges that would parallel each side of I-5 over North Portland Harbor. Traffic would not need to merge onto mainline I-5 to travel between the island and Martin Luther King Jr. Boulevard/Marine Drive.

Potential phased construction option: The aforementioned flyover ramp could be deferred and not constructed as part of the CRC project. In this case, rather than providing a direct eastbound Marine Drive to I-5 northbound connection by a flyover ramp, the project improvements to the interchange would instead provide this connection through the signal-controlled SPUI. The flyover ramp could be constructed separately in the future as funding becomes available.

Hayden Island Interchange

All movements for this interchange would be reconfigured. The new configuration would be a split tight diamond interchange. Ramps parallel to the highway would be built, lengthening the ramps and improving merging speeds. Improvements to Jantzen Drive and Hayden Island Drive would include additional through, left-turn, and right-turn lanes. A new local road, Tomahawk Island Drive, would travel east-west through the middle of Hayden Island and under the I-5 interchange, improving connectivity across I-5 on the island. Additionally, a new multi-use path would be provided along the elevated light rail line on the west side of the Hayden Island interchange.

LPA Option A: A proposed arterial bridge with two lanes of traffic, one in each direction, would allow vehicles to travel between Martin Luther King Jr. Boulevard/ Marine Drive and Hayden Island without accessing I-5.

LPA Option B: With this design option there would be no arterial traffic lanes on the light rail/multi-use path bridge over North Portland Harbor. Instead, vehicles traveling between Martin Luther King Jr. Boulevard/Marine Drive and Hayden Island would travel on the collector-distributor bridges that parallel each side of I-5 over North Portland Harbor.

SR 14 Interchange

The function of this interchange would remain largely the same. Direct connections between I-5 and SR 14 would be rebuilt. Access to and from downtown Vancouver would be provided as it is today, but the connection points would be relocated. Downtown Vancouver I-5 access to and from the south would be at C Street rather than Washington Street, while downtown connections to and from SR 14 would be made by way of Columbia Street at 4th Street.

The multi-use bicycle and pedestrian path in the northbound (eastern) I-5 bridge would exit the structure at the SR 14 interchange, and then loop down to connect into Columbia Way.

Mill Plain Interchange

This interchange would be reconfigured into a SPUI. The existing “diamond” configuration requires two traffic signals to move vehicles through the interchange. The SPUI would use one efficient intersection and allow opposing left turns simultaneously. This would improve the capacity of the interchange by reducing delay for traffic entering or exiting the highway.

This interchange would also receive several improvements for bicyclists and pedestrians. These include bike lanes and sidewalks, clear delineation and signing, short perpendicular crossings at the ramp terminals, and ramp orientations that would make pedestrians highly visible.

Fourth Plain Interchange

The improvements to this interchange would be made to better accommodate freight mobility and access to the new park and ride at Clark College. Northbound I-5 traffic exiting to Fourth Plain would continue to use the off-ramp just north of the SR 14 interchange. The southbound I-5 exit to Fourth Plain would be braided with the SR 500 connection to I-5, which would eliminate the non-standard weave between the SR 500 connection and the off-ramp to Fourth Plain as well as the westbound SR 500 to Fourth Plain Boulevard connection.

Additionally, several improvements would be made to provide better bicycle and pedestrian mobility and accessibility, including bike lanes, neighborhood connections, and access to the park and ride.

SR 500 Interchange

Improvements would be made to the SR 500 interchange to add direct connections to and from I-5. On- and off-ramps would be built to directly connect SR 500 and I-5 to and from the north, connections that are currently made by way of 39th Street. I-5 southbound traffic would connect to SR 500 via a new tunnel underneath I-5. SR 500 eastbound traffic would connect to I-5 northbound on a new on-ramp. The 39th Street connections with I-5 to and from the north would be eliminated. Travelers would instead use the connections at Main Street to connect to and from 39th Street.

Additionally, several improvements would be made to provide better bicycle and pedestrian mobility and accessibility, including sidewalks on both sides of 39th Street, bike lanes, and neighborhood connections.

Potential phased construction option: The northern half of the existing SR 500 interchange would be retained, rather than building new connections between I-5 southbound to SR 500 eastbound and from SR 500 westbound to I-5 northbound. The ramps connecting SR 500 and I-5 to and from the north could be constructed separately in the future as funding becomes available.

1.2.2.3 Transit

The primary transit element of the LPA is a 2.9-mile extension of the current Metropolitan Area Express (MAX) Yellow Line light rail from the Expo Center in North Portland, where it currently ends, to Clark College in Vancouver. The transit element would not differ between LPA and LPA with highway phasing. To accommodate and complement this major addition to the region's transit system, a variety of additional improvements are also included in the LPA:

- Three park and ride facilities in Vancouver near the new light rail stations.
- Expansion of Tri-County Metropolitan Transportation District's (TriMet's) Ruby Junction light rail maintenance base in Gresham, Oregon.
- Changes to C-TRAN local bus routes.
- Upgrades to the existing light rail crossing over the Willamette River via the Steel Bridge.

Operating Characteristics

Nineteen new light rail vehicles (LRV) would be purchased as part of the CRC project to operate this extension of the MAX Yellow Line. These vehicles would be similar to those currently used by TriMet's MAX system. With the LPA, LRVs in the new guideway and in the existing Yellow Line alignment are planned to operate with 7.5-minute headways during the "peak of the peak" (the two-hour period within the 4-hour morning and afternoon/evening peak periods where demand for transit is the highest) and 15-minute headways during off-peak periods.

Light Rail Alignment and Stations

Oregon Light Rail Alignment and Station

A two-way light rail alignment for northbound and southbound trains would be constructed to extend from the existing Expo Center MAX station over North Portland Harbor to Hayden Island. Immediately north of the Expo Center, the alignment would curve eastward toward I-5, pass beneath Marine Drive, then rise over a flood wall onto a light rail/multi-use path bridge to cross North Portland Harbor. The two-way guideway over Hayden Island would be elevated at approximately the height of the rebuilt mainline of I-5, as would a new station immediately west of I-5. The alignment would extend northward on Hayden Island along the western edge of I-5, until it transitions into the hollow support structure of the new western bridge over the Columbia River.

Downtown Vancouver Light Rail Alignment and Stations

After crossing the Columbia River, the light rail alignment would curve slightly west off of the highway bridge and onto its own smaller structure over the Burlington Northern Santa Fe (BNSF) rail line. The double-track guideway would descend on structure and touch down on Washington Street south of 5th Street, continuing north on Washington Street to 7th Street. The elevation of 5th Street would be raised to allow for an at-grade crossing of the tracks on Washington Street. Between 5th and 7th Streets, the two-way guideway would run down the center of the street. Traffic would not be allowed on Washington between 5th and 6th Streets and would be two-way between 6th and 7th Streets. There would be a station on each side of the street on Washington between 5th and 6th Streets.

At 7th Street, the light rail alignment would form a couplet. The single-track northbound guideway would turn east for two blocks, then turn north onto Broadway Street, while the single-track southbound guideway would continue on Washington Street. Seventh Street will be converted to one-way traffic eastbound between Washington and Broadway with light rail operating on the north side of 7th Street. This couplet would extend north to 17th Street, where the two guideways would join and turn east.

The light rail guideway would run on the east side of Washington Street and the west side of Broadway Street, with one-way traffic southbound on Washington Street and one-way traffic northbound on Broadway Street. On station blocks, the station platform would be on the side of the street at the sidewalk. There would be two stations on the Washington-Broadway couplet, one pair of platforms near Evergreen Boulevard, and one pair near 15th Street.

East-west Light Rail Alignment and Terminus Station

The single-track southbound guideway would run in the center of 17th Street between Washington and Broadway Streets. At Broadway Street, the northbound and southbound alignments of the couplet would become a two-way center-running guideway traveling east-west on 17th Street. The guideway on 17th Street would run until G Street, then connect with McLoughlin Boulevard and cross under I-5. Both alignments would end at a station east of I-5 on the western boundary of Clark College.

Park and Ride Stations

Three park and ride stations would be built in Vancouver along the light rail alignment:

- Within the block surrounded by Columbia, Washington 4th and 5th Streets, with five floors above ground that include space for retail on the first floor and 570 parking stalls.
- Between Broadway and Main Streets next to the stations between 15th and 16th Streets, with space for retail on the first floor, and four floors above ground that include 420 parking stalls.
- At Clark College, just north of the terminus station, with space for retail or C-TRAN services on the first floor, and five floors that include approximately 1,910 parking stalls.

Ruby Junction Maintenance Facility Expansion

The Ruby Junction Maintenance Facility in Gresham, Oregon, would need to be expanded to accommodate the additional LRVs associated with the CRC project. Improvements include additional storage for LRVs and other maintenance material, expansion of LRV maintenance bays, and expanded parking for additional personnel. A new operations command center would also be required, and would be located at the TriMet Center Street location in Southeast Portland.

Local Bus Route Changes

As part of the CRC project, several C-TRAN bus routes would be changed in order to better complement the new light rail system. Most of these changes would re-route bus lines to downtown Vancouver where riders could transfer to light rail. Express routes, other than those listed below, are expected to continue service between Clark County and downtown Portland. The following table (Exhibit 1-1) shows anticipated future changes to C-TRAN bus routes.

Exhibit 1-1. Proposed C-TRAN Bus Routes Comparison

C-TRAN Bus Route	Route Changes
#4 - Fourth Plain	Route truncated in downtown Vancouver
#41 - Camas / Washougal Limited	Route truncated in downtown Vancouver
#44 - Fourth Plain Limited	Route truncated in downtown Vancouver
#47 - Battle Ground Limited	Route truncated in downtown Vancouver
#105 - I-5 Express	Route truncated in downtown Vancouver
#105S - I-5 Express Shortline	Route eliminated in LPA (The No-Build runs articulated buses between downtown Portland and downtown Vancouver on this route)

Steel Bridge Improvements

Currently, all light rail lines within the regional TriMet MAX system cross over the Willamette River via the Steel Bridge. By 2030, the number of LRVs that cross the Steel Bridge during the 4-hour PM peak period would increase from 152 to 176. To accommodate these additional trains, the project would retrofit the existing rails on the Steel Bridge to increase the allowed light rail speed over the bridge from 10 to 15 mph. To accomplish this, additional work along the Steel Bridge lift spans would be needed.

1.2.2.4 Tolling

Tolling cars and trucks that use the I-5 river crossing is proposed as a method to help fund the CRC project and to encourage the use of alternative modes of transportation. The authority to toll the I-5 crossing is set by federal and state laws. Federal statutes permit a toll-free bridge on an interstate highway to be converted to a tolled facility following the reconstruction or replacement of the bridge. Prior to imposing tolls on I-5, Washington and Oregon Departments of Transportation (WSDOT and ODOT) would have to enter into a toll agreement with U.S. Department of Transportation (DOT). Recently passed state legislation in Washington permits WSDOT to toll I-5 provided that the tolling of the facility is first authorized by the Washington legislature. Once authorized by the legislature, the Washington Transportation Commission (WTC) has the authority to set the toll rates. In Oregon, the Oregon Transportation Commission (OTC) has the authority to toll a facility and to set the toll rate. It is anticipated that prior to tolling I-5, ODOT and WSDOT would enter into a bi-state tolling agreement to establish a cooperative process for setting toll rates and guiding the use of toll revenues.

Tolls would be collected using an electronic toll collection system: toll collection booths would not be required. Instead, motorists could obtain a transponder that would automatically bill the vehicle owner each time the vehicle crossed the bridge, while cars without transponders would be tolled by a license-plate recognition system that would bill the address of the owner registered to that license plate.

The LPA proposes to apply a variable toll on vehicles using the I-5 crossing. Tolls would vary by time of day, with higher rates during peak travel periods and lower rates during off-peak periods. Medium and heavy trucks would be charged a higher toll than passenger vehicles. The traffic-related impact analysis in this FEIS is based on toll rates that, for passenger cars with transponders, would range from \$1.00 during the off-peak to \$2.00 during the peak travel times (in 2006 dollars).

1.2.2.5 Transportation System and Demand Management Measures

Many well-coordinated transportation demand management (TDM) and transportation system management (TSM) programs are already in place in the Portland-Vancouver Metropolitan region and supported by agencies and adopted plans. In most cases, the impetus for the programs is from state-mandated programs: Oregon's Employee Commute Options (ECO) rule and Washington's Commute Trip Reduction (CTR) law.

The physical and operational elements of the CRC project provide the greatest TDM opportunities by promoting other modes to fulfill more of the travel needs in the project corridor. These include:

- Major new light rail line in exclusive right-of-way, as well as express bus and feeder routes;
- Modern bicycle and pedestrian facilities that accommodate more bicyclists and pedestrians, and improve connectivity, safety, and travel time;
- Park and ride lots and garages; and
- A variable toll on the highway crossing.

In addition to these fundamental elements of the project, facilities and equipment would be implemented that could help existing or expanded TSM programs maximize capacity and efficiency of the system. These include:

- Replacement or expanded variable message signs or other traveler information systems in the CRC project area;
- Expanded incident response capabilities;
- Queue jumps or bypass lanes for transit vehicles where multi-lane approaches are provided at ramp signals for entrance ramps;
- Expanded traveler information systems with additional traffic monitoring equipment and cameras, and
- Active traffic management.

1.2.3 LPA Construction

Construction of bridges over the Columbia River is the most substantial element of the project, and this element sets the sequencing for other project components. The main river crossing and immediately adjacent highway improvement elements would account for the majority of the construction activity necessary to complete this project.

1.2.3.1 Construction Activities Sequence and Duration

The following table (Exhibit 1-2) displays the expected duration and major details of each element of the project. Due to construction sequencing requirements, the timeline to complete the initial phase of the LPA with highway phasing is the same as the full LPA.

Exhibit 1-2. Construction Activities and Estimated Duration

Element	Estimated Duration	Details
Columbia River bridges	4 years	<ul style="list-style-type: none"> Construction is likely to begin with the bridges. General sequence includes initial preparation, installation of foundation piles, shaft caps, pier columns, superstructure, and deck.
Hayden Island and SR 14 interchanges	1.5 - 4 years for each interchange	<ul style="list-style-type: none"> Each interchange must be partially constructed before any traffic can be transferred to the new structure. Each interchange needs to be completed at the same time.
Marine Drive interchange	3 years	<ul style="list-style-type: none"> Construction would need to be coordinated with construction of the southbound lanes coming from Vancouver.
Demolition of the existing bridges	1.5 years	<ul style="list-style-type: none"> Demolition of the existing bridges can begin only after traffic is rerouted to the new bridges.
Three interchanges north of SR 14	4 years for all three	<ul style="list-style-type: none"> Construction of these interchanges could be independent from each other or from the southern half of the project. More aggressive and costly staging could shorten this timeframe.
Light rail	4 years	<ul style="list-style-type: none"> The river crossing for the light rail would be built with the bridges. Any bridge structure work would be separate from the actual light rail construction activities and must be completed first.
Total Construction Timeline	6.3 years	<ul style="list-style-type: none"> Funding, as well as contractor schedules, regulatory restrictions on in-water work, weather, materials, and equipment, could all influence construction duration. This is also the same time required to complete the smallest usable segment of roadway – Hayden Island through SR 14 interchanges.

1.2.3.2 Major Staging Sites and Casting Yards

Staging of equipment and materials would occur in many areas along the project corridor throughout construction, generally within existing or newly purchased right-of-way or on nearby vacant parcels. However, at least one large site would be required for construction offices, to stage the larger equipment such as cranes, and to store materials such as rebar and aggregate. Suitable sites must be large and open to provide for heavy machinery and material storage, must have 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 must have roadway or rail access for landside transportation of materials by truck or train.

Three sites have been identified as possible major staging areas:

1. Port of Vancouver (Parcel 1A) site in Vancouver: This 52-acre site is located along SR 501 and near the Port of Vancouver's Terminal 3 North facility.

2. Red Lion at the Quay hotel site in Vancouver: This site would be partially acquired for construction of the Columbia River crossing, which would require the demolition of the building on this site, leaving approximately 2.6 acres for possible staging.
3. Vacant Thunderbird hotel site on Hayden Island: This 5.6-acre site is much like the Red Lion hotel site in that a large portion of the parcel is already required for new right-of-way necessary for the LPA.

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

Two sites have been identified as possible casting/staging yards:

1. Port of Vancouver Alcoa/Evergreen West site: This 95-acre site was previously home to an aluminum factory and is currently undergoing environmental remediation, which should be completed before construction of the CRC project begins (2012). The western portion of this site is best suited for a casting yard.
2. Sundial site: This 50-acre site is located between Fairview and Troutdale, just north of the Troutdale Airport, and has direct access to the Columbia River. There is an existing barge slip at this location that would not have to undergo substantial improvements.

1.2.4 The No-Build Alternative

The No-Build Alternative illustrates how transportation and environmental conditions would likely change by the year 2030 if the CRC project is not built. This alternative makes the same assumptions as the build alternatives regarding population and employment growth through 2030, and also assumes that the same transportation and land use projects in the region would occur as planned. The No-Build Alternative also includes several major land use changes that are planned within the project area, such as the Riverwest development just south of Evergreen Boulevard and west of I-5, the Columbia West Renaissance project along the western waterfront in downtown Vancouver, and redevelopment of the Jantzen Beach shopping center on Hayden Island. All traffic and transit projects within or near the CRC project area that are anticipated to be built by 2030 separately from this project are included in the No-Build and build alternatives. Additionally, the No-Build Alternative assumes bridge repair and continuing maintenance costs to the existing bridge that are not anticipated with the replacement bridge option.

1.3 Summary of Long-term Direct Effects

1.3.1 Locally Preferred Alternative

This section summarizes the impacts of a new, 10-lane I-5 bridge crossing of the Columbia River, with a variable tolling structure based on time of day with a light rail transit alignment operating between Expo Center in Portland and Clark College in Vancouver. Exhibit 1-3 provides a side-by-side comparison of the corridor-wide impacts of the No-Build Alternative, the LPA Option A, the LPA Option A with highway phasing, the LPA Option B, and the LPA Option B with highway phasing.

Exhibit 1-3. Summary of Economic Effects (Corridor-Wide)

Type of Impact	No-Build Alternative	Locally Preferred Alternative			
		Option A (Full Build)	Option A with highway phasing	Option B (Full Build)	Option B with highway phasing
Number of Businesses Displaced - LPA	0	52 in Oregon 17 in Washington 69 Total	Same as Full Build	53 in Oregon 17 in Washington 70 Total	Same as Full Build
Number of Employees Impacted by Displacements - LPA	0	747 in Oregon 169 in Washington 916 Total	Same as Full Build	768 in Oregon 169 in Washington 937 Total	Same as Full Build
Annual Sales Impacts from Displacements - LPA	0	\$85.6 Million in Oregon \$18.1 Million in Washington \$103.7 Million Total	Same as Full Build	\$86.4 Million in Oregon \$18.1 Million in Washington \$104.5 Million Total	Same as Full Build
Property Tax Impacts	0	\$262,000 in Oregon (0.12% total) \$15,000 in Vancouver (<0.01% total)	Same as Full Build	\$294,000 in Oregon (0.14% total) \$15,000 in Vancouver (<0.01% total)	Same as Full Build
Parking Impacts	0	Parking at the Expo Center and the Jantzen Beach SuperCenter would be reduced due to extension of light rail transit to the north. Large amount of parking available, impact of parking loss not substantial. On-street parking and some off-street parking in downtown Vancouver would be removed due to the new light rail transit alignment. However, current parking is underutilized and ample on- and off-street parking exists downtown. Three park and rides with 3,108 parking stalls would be added to accommodate parking near transit.	Same as Full Build	Parking at the Expo Center and the Jantzen Beach SuperCenter would be reduced due to extension of light rail transit to the north. Large amount of parking available, impact of parking loss not substantial. On-street parking and some off-street parking in downtown Vancouver would be removed due to the new light rail transit alignment. However, current parking is underutilized and ample on- and off-street parking exists downtown. Three park and rides with 3,108 parking stalls would be added to accommodate parking near transit.	Same as Full Build

Type of Impact	No-Build Alternative	Locally Preferred Alternative			
		Option A (Full Build)	Option A with highway phasing	Option B (Full Build)	Option B with highway phasing
Access/Circulation Impacts	Access and Circulation same as existing.	Access and circulation greatly improved for majority of freight traffic in vicinity of Marine Drive interchange. Some out-of-direction travel required to access a small number of businesses located between Marine Drive and North Portland Harbor. Access to Hayden Island would be improved by the local arterial bridge over the North Portland Harbor. In Vancouver, access modifications would occur along the new light rail transit alignment, most prominently along Washington and Broadway Streets, where accesses directly adjacent to light rail transit are closed, and along 17th Street, where accesses are modified to right-in/right out. Businesses could see an increase of “pass-by” business due to the addition of transit.	Access and circulation would be similar to the LPA Full Build. However, movement eastbound on Marine Drive to northbound I-5 would not be free flow as in the full build LPA. This would make it less direct for freight to access I-5. The existing Victory Boulevard on-ramp would be retained forcing a short weave for freight accessing I-5 from Marine Drive.	Access and circulation greatly improved for majority of freight traffic in vicinity of Marine Drive interchange. Some out-of-direction travel required to access a small number of businesses located between Marine Drive and North Portland Harbor. In Vancouver, access modifications would occur along the new light rail transit alignment, most prominently along Washington and Broadway Streets, where accesses directly adjacent to light rail transit are closed, and along 17th Street, where accesses are modified to right-in/right out. Businesses could see an increase of “pass-by” business due to the addition of transit.	Access and circulation would be similar to the LPA Option B Full Build. However, movement eastbound on Marine Drive to northbound I-5 would not be free flow as in the full build LPA. This would make it less direct for freight to access I-5. The existing Victory Boulevard on-ramp would be retained forcing a short weave for freight accessing I-5 from Marine Drive.
Travel Patterns/Volumes Impacts	Duration of congestion increases over current levels. Travel time reliability is worse than current levels.	Travel time reliability for freight is improved, in particular from the improvements at Marine Drive due to interchange design focus on addressing freight needs. More direct access for freight along Martin Luther King Jr. Boulevard, Marine Drive, and from both the Rivergate and Airport industrial areas.	The flyovers at Marine Drive and Victory Boulevard are the main highway phasing components. Without the Marine Drive flyover, the configuration of the interchange is a full four-legged SPUI. All intersections near the interchange operate within the congestion standards for the City of Portland.	Travel time reliability for freight is improved, in particular from the improvements at Marine Drive due to interchange design focus on addressing freight needs. More direct access for freight along Martin Luther King Jr. Boulevard, Marine Drive, and from both the Rivergate and Airport industrial areas.	The flyovers at Marine Drive and Victory Boulevard are the main highway phasing components. Without the Marine Drive flyover, the configuration of the interchange is a full four-legged SPUI. All intersections near the interchange operate within the congestion standards for the City of Portland.

Note: CRC Acquisitions Technical Report, InfoUSA Data, 2009, Clark and Multnomah County Tax Assessor Data.

The loss of parking on both sides of the river is not anticipated to significantly affect the existing businesses. In Downtown Vancouver, there is adequate on- and off-street parking available to accommodate those who choose to drive and park in downtown. The addition of light rail transit could also decrease the demand for parking as it is anticipated that some trips could shift to transit. Parking losses on the Oregon side would be mainly to large existing parking lots, and the loss represents a small fraction of existing parking.

The LPA Option A and Option A with highway phasing would increase connectivity and mobility for the API by providing local connections, and would reduce some of the congestion that currently exists on the I-5 corridor by providing local access on an arterial bridge over north Portland Harbor to Hayden Island. This would benefit existing businesses within the region by reducing the travel time for freight and providing more travel time reliability, thus reducing the cost of transportation.

1.3.1.1 Oregon Impacts

In the Marine Drive interchange area, four marine related businesses would be displaced by the LPA that are dependent upon a location close to the river. Finding an adequate location for boat sales and a boat dock and repair may be difficult as much of the Columbia River area in the vicinity of freeway access is built up for either residential or industrial/commercial use. However, the Oregon Department of Transportation (ODOT) would provide relocation assistance to these businesses.

ODOT land leased to Diversified Marine would be acquired for the project to construct the proposed Expo Center Drive, a stormwater retention pond, and to realign the existing Marine Drive. This parcel is currently used by Diversified Marine for vehicle storage. Both Options A and B would modify the connection between Martin Luther King Jr. Drive and Vancouver Way, and both would provide a new connection to N Marine Drive east, west, and to the highway.

In the Hayden Island interchange area over three dozen businesses would be displaced by the project. Most important from an economic standpoint would be the displacement of businesses that serve mainly local clientele. ODOT would work with affected business owners to provide relocation assistance, although relocation on the island may be difficult for Safeway, the only grocery store on the island. It is located on a parcel that is 4.66 acres in size with 300 parking stalls. The CRC project may suggest replacement sites for the relocation of Safeway, but it is entirely up to the store owners to choose their replacement location, if any. Officials representing the Jantzen Beach SuperCenter initiated a site plan review with the City Portland. The SuperCenter plans a significant rebuilding effort that will include an expansion of the Target store. Early indications suggest the SuperCenter will include a pharmacy and drugstore in a new location.. Groceries in North Portland could be more accessible under the LPA Option A, with the local arterial bridge providing access to North Portland. The LPA Option B would require Hayden Island residents to use the I-5 Collector Distributor lanes to travel off the island to access a grocery store.

The Ruby Junction Maintenance Facility expansion would require full acquisition of eight businesses with estimated annual sales of approximately \$12.2 million and employing an estimated 79 people. The business uses are a mixture of service and industrial, and some parcels appear to be a unique live/work arrangement with both residences and businesses located on one parcel. There are other industrial and commercial lands that could accommodate these businesses within the Portland Metro area, as the displaced businesses do not have special requirements or

overly large area needs. However, finding areas with zoning that would allow for the live/work situation may be more difficult than simply finding comparable industrially zoned parcels.

1.3.1.2 Washington Impacts

In Vancouver, access to businesses along 17th Street would be modified to right-in/right-out only with the construction of light rail transit. This means that customers looking to reach a business may need to go out of direction or around a block to access the location. Left turns would be allowed at intersections west of C Street (at Washington Street, Main Street, Broadway Street, and C Street) but would not be allowed east of C Street (at D Street, E Street, F Street, or G Street).

Construction of light rail transit along 17th Street would limit accesses between Washington and I-5 to right-in, right-out only for the residential parcels with access currently onto 17th Street, however, since 17th Street is mainly residential, few economic impacts are associated with the alignment.

1.3.2 Transit-Oriented Development Potential

Transit-oriented development (TOD) potential by station is summarized in Exhibit 1-4 below.

Exhibit 1-4. Summary of TOD by Station

Station	Rating of TOD Potential
Oregon	
Expo Center Station	Low
Hayden Island Station	High
Washington	
5th Street Station	Moderate
9th Street Stations	Moderate to High
15th Street Stations	High
Clark College Station (Terminus)	Low to Moderate

The potential for TOD at the proposed Hayden Island station is rated as high, because the long-range plan for the area is to increase housing, create a walkable grid system, and provide commercial development closer to the proposed transit station.

The stations north of 15th Street on both Broadway and Washington Streets have zoning which is very conducive to TOD. Mixed use, commercial (the predominant land use), and high-density residential developments already exist in the vicinity of the station. There are many vacant parcels and lower valued buildings in the vicinity. The area immediately east of the station on Washington Street is currently used informally as a surface parking lot, and would be developed as a park and ride.

1.3.3 Marine Impacts

Most impacts to marine commerce are positive: the LPA would allow most vessels currently using the river to pass beneath the bridges without requiring bridge lifts, and would eliminate some of the zig-zag movements that some barges currently make between the I-5 bridges and the downstream BNSF railroad swing span bridge. However, the vertical clearance of the LPA bridges would be lower than the raised lift span clearance on the current bridges. A study of river

users, conducted in coordination with the Army Corps of Engineers (USACE), showed that a very small number of vessels would be affected by the change in vertical clearance.

1.3.4 Tolling

The proposed toll options would have a variable toll structure, charging different toll amounts for peak and the non-peak periods. Variable priced tolling schemes have the potential to reduce overall congestion and regulate traffic flows. This is because, in part, persons with greater schedule flexibility and more sensitivity to out-of-pocket costs would choose to travel during the non-peak period to pay a lower toll, and persons with less flexible schedules, and/or are carrying valuable or time-sensitive goods, would be less sensitive to the out-of-pocket cost of the toll and would travel during whatever period is dictated by their schedules. Depending on specific tolling schemes and transit fare structures, some persons most sensitive to out-of-pocket costs may shift to transit.

Variable tolls would likely be beneficial for freight-dependent businesses and businesses that rely on just-in-time deliveries, because the predictability of travel would also increase. However, the greater the variable toll, the higher the operating costs for truck movements during peak-charge periods, although the peak truck hour is the noon hour. Truck volumes are highest between the hours of 9 a.m. and 3 p.m. meaning 42 percent of daily truck traffic on the bridge occurs during this period because truck drivers prefer to travel during uncongested conditions.

1.3.5 Impacts of LPA with Highway Phasing

Phasing of the LPA would defer construction of the Marine Drive flyover, and construction of the Victory Braid. Deferring the Marine Drive flyover would require traffic travelling eastbound on Marine Drive to I-5 northbound to travel through the signalized SPUI intersection instead of having free-flow movement provided by the flyover. This is a reduced benefit to freight traffic from the Rivergate Industrial Area, but still provides a benefit over the No-Build Alternative. Phasing would also retain the existing Victory Boulevard configuration, with the short weaving distance for the Marine Drive eastbound to I-5 southbound movement. The deferral of this improvement reduces the safety and efficiency benefits for freight vehicles accessing I-5 southbound, and results in a movement not very different from the No-Build Alternative. Mobility benefits from the I-5 improvements would be retained for freight under the highway phasing option.

1.3.6 No-Build Alternative

Under the No-Build Alternative, no businesses within Oregon or Washington would be displaced by right-of-way acquisition and there would be no resulting decrease in property or sales tax revenues or jobs lost. There would be no additional employment or added sales tax associated with project construction. Economic development planned for this area may occur more slowly as business owners may be more reluctant to locate in an area with poor access and mobility for employees and customers. Freight reliability would decrease as congestion spreads beyond the peak hour, into times when trucks tend to travel. Customers may elect to shop in other areas with easier access and mobility.

1.4 Temporary Effects

Construction of the LPA has the potential to cause negative economic effects by blocking visibility and access to businesses, causing traffic delays, and rerouting traffic on detours that increase travel times and make access to some locations difficult. Traffic congestion is already a

common occurrence within the corridor during peak hours and adjacent construction activities and temporary detours could extend the peak duration, negatively impacting businesses whose employees commute using the corridor. Likewise, freight, goods, and services travel could be negatively affected if construction activities make travel times more difficult to determine.

Construction temporary effects in Downtown Vancouver associated with the construction of light rail along city streets will impact on-street parking and/or access to businesses along Washington Street, Broadway Street, and 17th Street. There would be a loss of approximately 300 on street parking spaces associated with light rail. Increased levels of noise, dust and vibrations in downtown is also expected due to construction. Construction of the LPA is expected to require some temporary detours, and is expected to relocate some on-street parking. This reduced visibility and access to downtown businesses could result in temporary reduced sales for affected businesses. Mitigation and coordination with affected businesses throughout construction would lessen these impacts.

Construction of the LPA is also expected to result in increased employment and spending in the project area during construction. The extent of these effects depends on the source of project funding and the makeup of work crews used during project construction. Funds from local or regional sources are transfers, meaning money spent on the project that would otherwise be spent by residents and businesses on other economic activities within the region. Federal or state funds that are new to a region can have a measurable economic effect on employment and income gains resulting from project construction. The federal government and the states of Oregon and Washington would provide the funds for the CRC project, thus resulting in some income and job benefits in the region that would otherwise not occur.

Estimated employment impacts due to project expenditures are shown in Exhibit 1-5.

Exhibit 1-5. Employment Impacts of Project Construction (2014 dollars)

	Full-Time Equivalent Employment				Ave Annual Regional Jobs
	Direct Jobs	Indirect Jobs	Induced Jobs	Total Regional Jobs	
FEIS	151	101	80	332	30
ROW	0	0	0	0	0
Highway Construction and Bridge Removal	9,687	2,089	4,319	16,095	1,463
Transit Construction^a	2,583	775	1,190	4,548	413
Total In-region Construction	12,421	2,964	5,589	20,975	1,907

^a 2014 Transit construction cost is 80% of \$885 million, which excludes estimated out-of-region purchases of light rail vehicles and track, and less \$30 million for ROW and \$12 million for design through preliminary engineering.

As shown, approximately 20,975 total person-year jobs would be expected for design and construction of the LPA. These estimates are based on 2009 CRC project cost estimates, expenditure per employee estimates from FHWA (2003) and CH2M HILL (2009), and employment multipliers from the Minnesota IMPLAN Group, Inc. (2007).

1.4.1 Marine Impacts

Construction of the proposed crossing is expected to occur over a 4-year period. Some likely effects to marine commerce during construction include the following:

- Various navigation channels would be closed throughout the construction of the proposed I-5 bridges, but it is assumed that at least one navigable channel would remain open for marine traffic at all times.
- Commercial vessels may be provided with towing assistance at times when navigation is difficult due to construction activities.
- A vertical clearance restriction may be put in place on the primary navigation channel for up to 6 months. This would limit navigation under the bridges for commercial vessels with heights greater than 60 feet.
- Temporary river travel restrictions are anticipated as barges are used to ferry materials to and from work sites.

1.5 Proposed Mitigation

The LPA would result in positive economic impacts in the API by reducing congestion on I-5 and facilitating the movement of traffic, particularly freight truck traffic, between the Marine Drive corridor and I-5. The bulk of potential negative economic impacts identified in this report result from business displacements, losses in parking, or changes in access to businesses. This section identifies several measures that could be considered to avoid or mitigate the potential impacts.

Business displacements from right-of-way, losses in parking, and changes in access identified in this report are based on preliminary engineering level design. More detailed design will seek to reduce the amount of land that must be acquired for right-of-way and to avoid acquiring businesses where possible. For those businesses displaced by the project, ODOT and Washington State Department of Transportation (WSDOT) would provide a relocation assistance program. The federal “Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970” and the “Uniform Relocation Assistance Amendments of 1987” ensure the fair and equitable relocation and reestablishment of persons, businesses, farms, and nonprofit organizations displaced as a result of federal or federally assisted programs. This is done so that displaced persons would not suffer disproportionate impacts as a result of projects designed for the benefit of the public as a whole.

Construction of the project would be carefully planned to phase construction of project components in a way that reduces or avoids complete closure of affected roadways and access points to nearby businesses. Detours would be carefully routed to minimize impacts to overall travel times, and would be signed to avoid or reduce confusion. Final staging plans would provide for the following, to the greatest extent practicable:

- Minimizing traffic delays and disruptions by scheduling lane and road closures during the evening and weekend periods.
- Providing continued access to properties during construction.
- Constructing new elements outside of the existing road system to minimize closures and disruptions.
- Minimizing construction-related impacts such as traffic, noise, and decreased air quality on neighborhoods.
- Clear signage to available parking areas that customers can use to access downtown businesses.

Mitigation strategies to minimize impacts to businesses during light rail construction would include, to the greatest extent possible: coordinating the schedule, pace, and order of construction to minimize its impacts to nearby businesses; staging construction so that it does not disrupt any single area for an extended period of time; maintaining access for motorists, delivery and service vehicles, cyclists, and pedestrians during business hours; providing visible, temporary, easy-to-read signage to alert customers that businesses are open during construction; a “buy local” campaign that encourages potential customers to patronize local businesses along the corridor during construction; and a 24-hour, 7-days-a-week emergency construction hotline for businesses and property owners/managers to resolve issues during an emergency.

The provision of alternate access in the vicinity of the Marine Drive interchange would be important to keep freight moving during construction. Outreach to the businesses to determine access and site circulation needs would be helpful. Without the provision of alternate access, loss of access to Marine Drive may prevent the firms from doing business.

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2. Methods

2.1 Introduction

This section describes the methods used to collect data and evaluate economic impacts of the CRC project. The economics evaluation identified potential significant adverse impacts and beneficial effects on the local and regional economy. The local economy was defined as businesses located within the API while the regional economy is defined as the Portland-Vancouver Primary Metropolitan Statistical Area (PMSA), which includes the counties of Clackamas, Columbia, Multnomah, Washington, and Yamhill in Oregon, and Clark County in Washington. The impact analysis included a discussion of construction-related impacts, operational impacts, and cumulative and indirect impacts associated with the LPA. The analysis was developed to comply with the National Environmental Policy Act of 1969 (NEPA), applicable state environmental policy legislation, and local and state planning policies.

The economic impacts evaluation employed two study areas for environmental effects: the primary and secondary APIs. These are described below.

2.1.1 Primary API

The primary API (Exhibit 2-1) addressed direct economic impacts associated with the LPA, including business displacements as well as impacts to business access, parking, and visibility. The primary API is defined as a 0.25-mile buffer along I-5, and extends approximately 5 miles from north to south. It starts north of the I-5/SR 500 interchange in Washington, and runs south towards the I-5/Columbia Boulevard interchange in Oregon. North of the river, the API expands west into downtown Vancouver, and east near Clark College to include the footprint of a light rail transit alignment, stations, 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.

The primary API is the area most likely to experience direct impacts from construction and operation of the LPA. Most physical project changes were determined to occur in this area.

2.1.2 Secondary API

The secondary API represents the area where indirect impacts, including traffic and construction staging, are expected to occur from the LPA (Exhibit 2-2).

The secondary API is comprised of the six-county Portland-Vancouver PMSA. This larger region was analyzed because the project is expected have far-reaching economic effects outside the immediate project area.

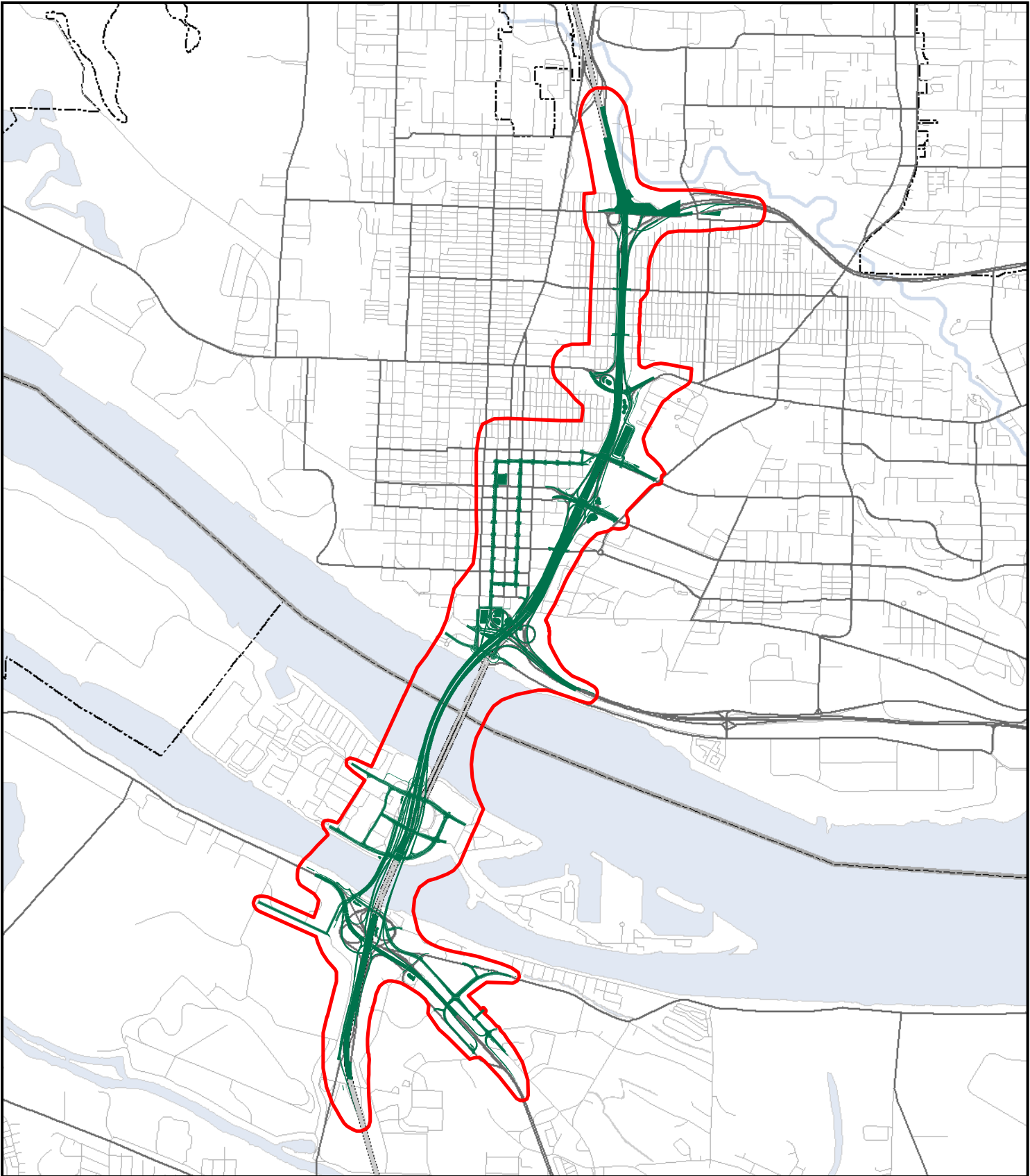
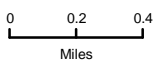


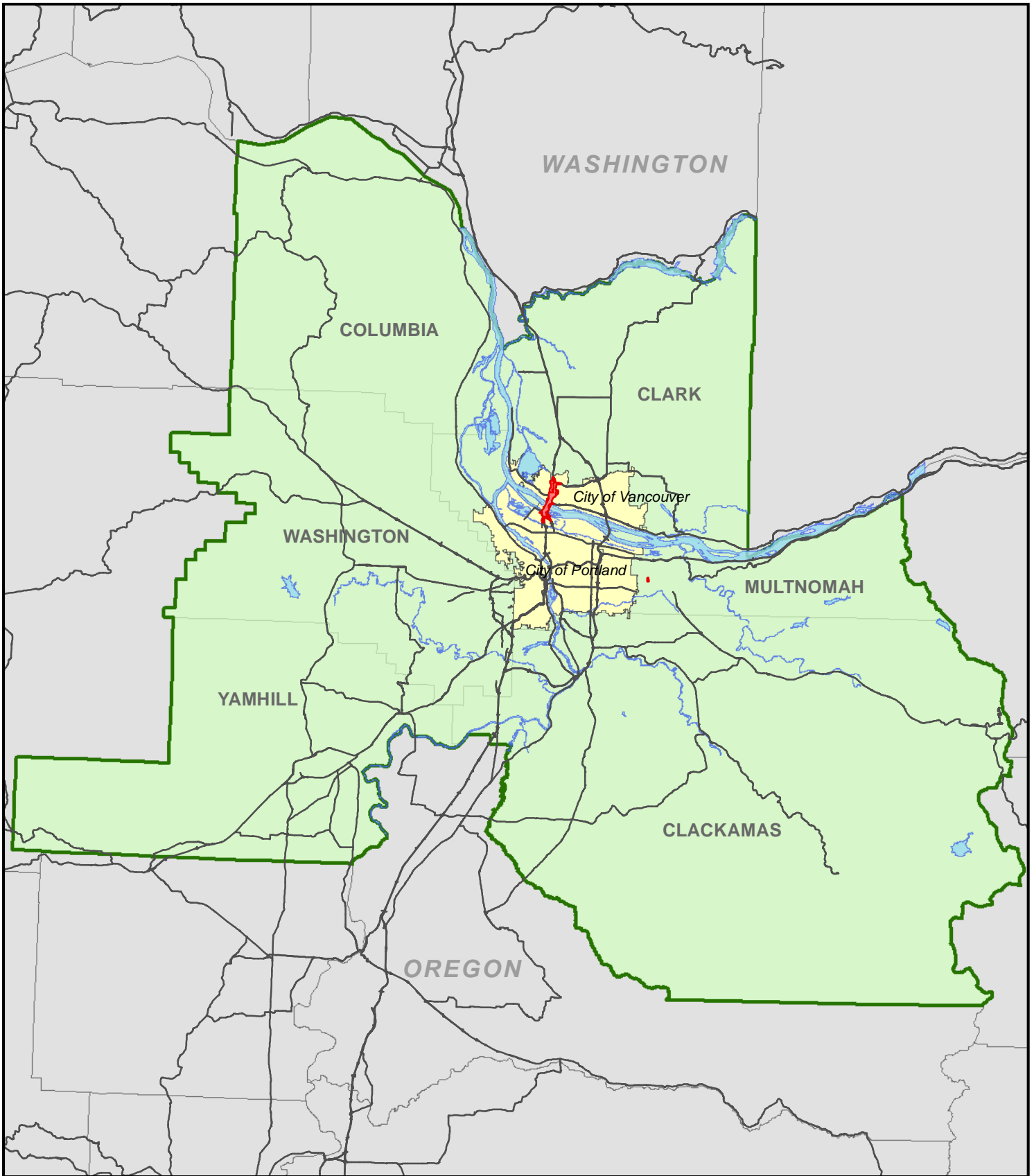


Exhibit 2-1. Primary Study Area



-  Primary API
-  Project Footprint





WASHINGTON

COLUMBIA

CLARK

City of Vancouver

WASHINGTON

City of Portland

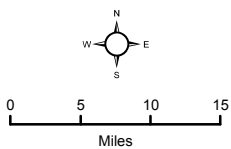
MULTNOMAH

YAMHILL

CLACKAMAS

OREGON

Exhibit 2-2. Secondary Study Area



- Primary API
- Secondary API
- Portland-Vancouver PMSA
- Major Roads



2.2 Effects Guidelines

Relevant laws and regulations include federal, state, and local plans and laws governing economic development, land use, and transportation planning adopted by jurisdictions within the Portland-Vancouver Metropolitan Area. Local policies and goals related to economic development depend on the implementation of certain transportation policies. For this reason, the major transportation plans of the region were reviewed.

2.1.3 Federal

- U.S. Department of Transportation (DOT), Federal Highway Administration (FHWA). FHWA's Guidance for Preparing and Processing Environmental and Section 4(f) Documents (DOT FHWA 1987) was used to guide the economic analysis. According to FHWA, the analysis should discuss the following for each alternative commensurate with the level of impacts:
 - The economic impacts on the regional and local economy such as the effects of the project on development, tax revenues and public expenditures, employment opportunities, accessibility, and retail sales.
 - The impacts on the economic vitality of existing highway-related businesses (e.g., gasoline stations, motels, etc.) and the resultant impact, if any, on the local economy.
 - Impacts of the proposed action on established business districts, and any opportunities to minimize or reduce such impacts by the public or private sectors.
- U.S. Department of Transportation (DOT), Federal Transit Administration (FTA). FTA's Resource Information Section (DOT FTA 2007) discusses social and economic externalities that should be addressed in environmental documents. For economic impacts, it states that: "Proposed transit projects may have economic impacts that should be included in environmental impact documents. In particular, projects may create direct and indirect taxation changes, cause substantial displacement of businesses and individuals, disrupt business activities, and influence regional construction costs. If a proposed project is small, contained on a single site, does not involve displacements, and is compatible with surrounding land uses, there will probably be few economic impacts and extensive analysis is not needed. If a project is costly, covers a wide area, and will cause extensive displacement of businesses and individuals, there is a greater chance that it will cause economic impacts. In such cases, a detailed economic impact analysis should be included in environmental documentation."

2.1.4 State

- Oregon Department of Transportation (ODOT 2002). Draft Environmental Procedures Manual (Socioeconomics).

ODOT has developed guidelines for conducting environmental analysis for highway projects. The guidelines for socioeconomics are consistent with the recommendations made by the FHWA, as discussed above.

- Department of Land Conservation and Development (DLCD 1974, amendments through 2006). Oregon Statewide Planning Goals.

Goal 9 includes guidance for economic development. Goal 12 includes guidance for transportation.

- Washington State Department of Transportation (WSDOT 2005). Environmental Procedures Manual (Economics).

WSDOT has developed guidelines for conducting environmental analysis for highway projects. Like the ODOT manual, the guidelines for economics follow closely the recommendations made by the FHWA.

2.1.5 Local

- Metropolitan Transportation Plan (MTP) for Clark County. Updated December 2007 (including amendments through July 2008).

The Southwest Washington Regional Transportation Council (SWRTC 2007) updated the regional MTP to provide mobility and accessibility for personal travel and movement of goods within Clark County. The plan has a 20-year planning horizon; it identifies future needs, recommends policies and strategies, and identifies an implementation program to meet the region's needs. The plan provides two lists of projects: one that is considered to be reasonably funded, and the other (referred to as the strategic plan) that is not currently funded. The CRC project is listed in the fiscally constrained MTP and is considered an important project for continuing economic success within the region.

- Clark County Comprehensive Plan, 2003-2023.

The Clark County Comprehensive Plan (Clark County 2005, Map adopted September 25, 2007) establishes policies and land uses in rural, agricultural and timber lands within the unincorporated portion of the county. Chapter 9 (Economic Development Element) of the plan discusses how economic vitality depends on land use policies, transportation planning, and capital facility investments. Goals and policies to encourage economic development in the county are presented.

- City of Vancouver Comprehensive Plan, Chapter 2: Economic Development. City of Vancouver. 2004.

The City of Vancouver's Comprehensive Plan (City of Vancouver 2004) includes higher density and transit-supportive development regulations for areas along the defined high-capacity transit corridors. These economic development policies aim to efficiently utilize land designated for employment through more intensive development and redevelopment. The plan also recognizes the importance of major transportation system investments that support freight mobility, job creation, and revenue growth.

- City Center Vision Plan. City of Vancouver. 2006.

The Vancouver City Center Vision (VCCV) Plan for Vancouver (City of Vancouver 2006) was developed to foster and guide development of a city center area. It provides a vision and guiding principles for six areas within downtown Vancouver. The revitalization and development plan relies on improved infrastructure; it attempts to ensure that I-5 improvements and the CRC project improve access to the downtown area and minimize potentially adverse impacts to the city.

- **Columbia Gateway Master Plan. Port of Vancouver, 2006.**

The Columbia Gateway, a piece of undeveloped property at the Port of Vancouver, includes nearly 1,100 acres of industrial-zoned land. The purpose of the proposed Columbia Gateway project (Port of Vancouver 2006) is to develop a strategic master plan that meets the long-term economic, infrastructure, marine, and industrial land needs of the Port of Vancouver, City of Vancouver, Clark County, and the region.
- **The Columbia River Economic Development Council Strategic Plan (Columbia River Economic Development Council Strategic Plan 2005).**
- **City of Portland Comprehensive Plan, Goals and Policies. City of Portland, 2006.**

The City of Portland's Comprehensive Plan (City of Portland 2006a) provides a coordinated set of guidelines for decision-making to guide future growth and development in the City of Portland. Its goals and policies provide the context and guidance for future City programs, major capital projects, and other funding decisions. The plan also provides a map and a set of regulations for development, including a revised zoning code to carry out the policies, a guide for the major public investments required to implement the plan, and a process for plan review and amendment.

The plan includes policies that generally pertain to and support the CRC project. These goals generally support multimodal transportation and mobility, economic development, and cost-effective, safe, and efficient freight movement. The plan also discusses inter-jurisdictional planning for improvements to the I-5 trade corridor.
- **Regional Transportation Plan (RTP), Metro, 2004 and Draft 2009.**

The RTP (Metro 2004) is a 20-year blueprint for the Portland metropolitan region's transportation system. The RTP establishes policies and priorities for all forms of transportation and anticipates the region's current and future transportation needs. These policies focus on ensuring that the region's transportation system works in the most effective way, and recognizes the importance of the movement of goods and services for the regional economy.

The draft 2009 update of the RTP (Metro 2009b), titled "2035 RTP Update," lists three projects related to the CRC project under the 2008-2017 timeframe and as a Federal Priority. These are the river crossing improvements, the extension of light rail transit northward into Vancouver, and upgrades to the Ruby Junction Maintenance Facilities Base.
- **Metro Regional Framework Plan and 2040 Growth Concept (Metro 1995).**

The 2040 Growth Concept is the 50-year growth strategy for the Metro region. One of its stated goals is to "promote a transportation system that includes all types of travel." The plan seeks to focus transit and highway improvements around regional centers such as Multnomah County and Vancouver. Areas of future development also include Portland central city, industrial areas and freight terminals, station communities along the light rail system, and corridors. The Regional Framework Plan is the integrating and current document that includes both land use (Growth Concept) and overall transportation policies for the region. It serves as the guiding policy document for the RTP.
- **Portland Transportation System Plan (Portland Department of Transportation 2007)**

The City of Portland Transportation System Plan (TSP) is the long-range plan to guide transportation investments in Portland. The TSP meets State and regional planning requirements and addresses local transportation needs for cost-effective street, transit,

freight, bicycle, and pedestrian improvements. The objective of the TSP is to provide a balanced transportation system to support neighborhood livability and economic development.

- High Capacity Transit Plan (Metro 2009a).

The Metro High Capacity Transit Plan describes the Portland metropolitan region's vision for future bus rapid transit, light rail transit, and commuter rail within the area's Urban Growth Boundary (UGB). The timeframe for this vision is 20 years (2030). The extension of light rail transit to Vancouver was considered as "under development" in the High Capacity Transit plan.

- Costs of Congestion Study (EDR 2005).

The Study analyzed the impacts of congestion on economic development in the Portland area. The study's findings conclude:

- Congestion currently threatens economic growth in the Portland region.
- Congestion problems are already reducing profits for local businesses.
- Failure to invest in the region's transportation system could create an \$844 million annual value loss.

According to this study, increasing regional transportation investment would create a \$2.00 benefit for every dollar spent. Interviews conducted for this report found that local businesses have shifted work shifts and deliveries to the early morning to avoid congestion, but as the period of congestion increases, businesses are left with an ever decreasing window. Some businesses have increased their internal inventories to reduce disruption from missed deliveries; and others pass transportation cost increases to the consumer. Some have relocated outside the region.

- Other Portland/Vancouver Area Plans.

Several plans were reviewed for consistency with alternatives and of those reviewed the following were relevant for this technical report:

- Albina Community Plan (City of Portland Bureau of Planning 1993).
- Interstate Corridor Urban Renewal Area (PDC 2001).
- Freight Master Plan, (City of Portland 2006b).
- The Historic Reserve Plan (Vancouver National Historic Reserve 2006).

2.3 Data Collection Methods

This section explains the general methodology and data sources used to describe the current conditions in the project area, and discusses the potential impacts associated with the construction and operation of the project.

2.1.6 General Methods

Data sources include a combination of secondary data, field surveys, and purchased information. The FEIS technical memorandum has used some material produced in 2007 for the DEIS, updating information where appropriate and using it to determine benefits and impacts from the LPA Options A and B with and without highway phasing and the No-Build Alternative. The

paragraphs below describe what material was used from the DEIS and what was collected specifically for the FEIS analysis.

2.3.1.1 Material from the Draft Environmental Impact Statement

Published studies evaluating the relationship between transportation investment and economic growth were reviewed and summarized for the DEIS. This review was updated to include material published since 2007. A literature search was conducted and the results summarized to gain insight into the relative effect that light rail transit stations may have on economic development trends around station areas. Published reports on the impact of congestion in the project area and reports on the economy of the project area were reviewed, and relevant conclusions were summarized. Research into the effects of tolling and transportation investment on retail sales, property values and public revenue sources were summarized, and a qualitative discussion of the potential for such impacts from this project was presented.

The comprehensive plans of the cities of Portland and Vancouver and plans from local neighborhoods have not been updated since the development of the DEIS. Interviews by the CRC project team with business owners along the alignment, and summaries from working group meetings, were reviewed. No interviews were conducted directly by the economics team.

2.3.1.2 Analysis Updated from the DEIS

An updated input/output analysis was created to estimate the impact of construction spending on the six-county regional economy. The analysis was based on mutually acceptable assumptions on use of local labor and materials and other factors, as well as updated construction cost estimates. Updated data files were purchased from the Minnesota IMPLAN Group, including IMPLAN multipliers for the six-county area, which were used to estimate direct, indirect, and induced effects associated with construction spending.

Estimates of retail sales and employment of businesses displaced by the project and of the potential for employment and sales impacts to businesses districts that may be affected by the project were updated. These estimates were prepared using the best available information from the following sources:

- Updated marketing data purchased from a private vendor;
- Updated estimates for businesses not in vendor database based on similar establishments;
- Updated employee-per-square-foot ratios for business types using data from the results of a literature search of reported ratios;
- Updated tax assessment information on the square footage of properties;
- Updated windshield surveys to verify business name, type, and addresses; and
- Stakeholder interviews conducted by the CRC team with key businesses along the alignment.

The results of the FEIS Transit, Land Use, and Transportation technical reports, and published economic and demographic data, were used to estimate the economic effects of the No-Build Alternative, the LPA Option A Full Build, the LPA Option A with highway phasing, the LPA Option B Full Build, and the LPA Option B with highway phasing on the trucking industry, the two states, and the ports.

2.3.2 Analysis Methods

There are few formal guidelines on measuring economic impacts from projects similar to CRC. Some states, such as California, provide general guidelines but no specific thresholds. For example, the California Environmental Quality Act (CEQA Title 14.3.5) states that “Economic and social changes resulting from a project shall not be treated as significant effects on the environment. Economic or social changes may be used, however, to determine that a physical change shall be regarded as a significant effect on the environment.”

This analysis considered both context and intensity (who or what is affected and to what degree) when determining the type and importance of economic impacts. In terms of context, the project action was considered in several contexts, such as society as a whole, the affected region, the affected interests, and the locality, for both the short- and the long-term. In terms of intensity, the project was analyzed to consider the degree to which the effects on the quality of the human environment (including population, housing, and employment) were likely to be highly controversial.

While recognizing that there does not appear to be any specific, relevant agency guidance regarding the determination of economic impacts, the economics team considered the following questions when assessing impacts:

1. Would the proposed action directly result in a substantial short-term loss of tax revenues for the local jurisdictions?
2. Would the proposed action change access that would adversely affect the profitability of a substantial number of businesses in a local business district, or the marketability of a substantial number of non-residential properties?
3. What are the economic development implications of the proposed action?
4. What indirect impacts might be associated with the proposed action?

The last question is not addressed in this report, but is included as part of the CRC Indirect Effects Report (CRC 2009a).

2.4 Long-term Operational Impacts Approach

Long-term economic impacts include the acquisition of a business, a change in property taxes, or economic impacts that result from a change in access or mobility patterns.

Estimates of the net loss of taxable property due to project right-of-way acquisitions were prepared. Assessed property values reported by Multnomah County and Clark County tax assessors were used to estimate the assessed value of lost property. The portion of each property affected by the project and the average property tax levies for Multnomah and Clark counties were used to estimate the amount of property tax revenue that would be removed as a result of the project. Total parcel area and the estimated acquired area were obtained from the project right-of-way acquisition databases.

Localized effects on businesses were estimated by reviewing the design drawings for each alternative, site visits, and information about transportation effects from the Transportation Technical Report (CRC 2009f). The potential risk of lost retail sales and employment from businesses acquired by the project and business districts affected by the project were estimated using a variety of sources, discussed earlier in this section.

For broader regional effects, research into the links between transportation infrastructure improvements, mobility, congestion, and economic growth helped address how the LPA Options A and B Full Build and Options A and B with Highway Phasing alternatives may have different effects on the regional economy. Vehicle miles of travel and average speeds for different travel modes from the Transportation Technical Report were used to estimate the direct user benefits to the trucking industry.

2.5 Short-term Construction Impacts Approach

Short-term construction impacts that affect the economy can result from access changes to local businesses, parking changes, and short-term construction activities that contribute to noise, vibration, and visibility changes.

Construction-related traffic delays, increased noise and dust, restricted access, and reduced parking may impact the revenues of firms located in the project area. For this report, analysis of these effects were based on a review of construction techniques, a review of aerial photos, site visits, and information about transportation effects from the Transportation Technical Report.

One potential benefit from a highway or transit project is the potential for a temporary increase in jobs and income in the region resulting from construction spending. Expenditures during construction would result in demand for construction materials and jobs. These expenditures are considered direct effects. These direct effects lead to indirect effects as firms in other industries provide goods and services to the construction industry. Finally, wages paid to workers in construction trades or supporting industries are spent on other goods and services; these are referred to as induced effects. Input/output analysis was conducted to estimate the impact of construction spending on the six-county regional economy. Data files were purchased from the Minnesota IMPLAN Group and the IMPLAN multipliers for the six-county area were used to estimate direct, indirect, and induced effects.

It will be noted that not all of the construction spending on the project results in benefits over and above what would have occurred without the project. As stated in a guidebook on transportation economic effects (Forkenbrock and Weisbrod 2001), “indirect and induced effects represent additional economic growth to a region only if, 1) the labor and facility resources for those additional business activities are available in the region or can come into the region and 2) those additional business activities do not take away jobs or resources from other existing activities in the region”. To the extent those conditions do not exist, the estimates of jobs and income provided below would be overstated.

The long-term effects of project spending will depend on how the project is financed. If a project is financed by local taxes or tolls, consumers and businesses would have less discretionary income to spend on other goods and services, which would counteract beneficial effects that may result from increased mobility and access provided by the project. However, if a project is financed by federal or state sources that otherwise would not have been spent in the region, there is not likely to be a noticeable negative effect on economic activity in the region. Both long-term and short-term effects of construction spending are discussed in the Construction Impacts section of this report.

Temporary economic impacts that may result from restrictions placed on marine traffic during construction would be assessed by obtaining and analyzing data on:

- Duration of in-water construction,
- Closures of lift span channel and 300-foot channel,

- Any necessary assistance through channel required during construction, and
- Likely restrictions on river traffic.

2.6 Coordination

The economics analysis technical report was prepared under *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*, Technical Advisory T6640.8A (DOT FHWA 1987) and consistent with guidance from the FTA, resource information section. Data collection and analyses were conducted in the manner outlined in Section 2 of this report.

The economics team coordinated with several other environment technical report teams. Right-of-way acquisition data were obtained and joined with Multnomah and Clark County tax assessor data to determine tax implications of the LPA Options A and B Full Build and LPA Options A and B with highway phasing. Right-of-way acquisition data were also joined with purchased market research data to determine the numbers of businesses, employees, and sales impacted by the LPA Options A and B Full Build and LPA Options A and B with highway phasing. Coordination occurred to ensure consistency between impacts reported in the Economics Technical Report and those reported in the Acquisitions Technical Report. Research on affected on-street and off-street parking, as well as indirect impacts from major transportation improvements, was performed in coordination with the land use analysis team. Data from the transportation team informed the identification of impacts related to traffic flows, travel times, and shifts in travel patterns for the LPA.

Economic impacts were analyzed in accordance to the Council on Environmental Quality (CEQ) regulations (40 CFR §§ 1500-1508), which provide guidance on determining scale of impacts as a function of *context* and *intensity*. To determine significance, the severity of the impacts was examined in terms of the type, quality, and sensitivity of the resource involved; the location of the proposed project; the duration of the effect (short- or long-term) and other considerations of context.

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3. Affected Environment

3.1 Introduction

This section describes the current conditions of the economics analysis API. For this analysis, the API consists of both local and regional areas. The local API includes a 0.25-mile buffer on all sides of the project area footprint. This area, which generally extends from the Columbia Slough in Oregon to SR 500 in Washington, includes all of downtown Vancouver and extends beyond 15th Street on the east, as illustrated in Exhibit 2-1. The regional impacts area, referred to in this section as the Portland-Vancouver region, is the Portland-Vancouver OR-WA PMSA. The U.S. Census Bureau defines the Portland-Vancouver OR-WA PMSA as consisting of six counties, including Multnomah, Washington, Clackamas, Yamhill, and Columbia counties in Oregon and Clark County, Washington, as illustrated in Exhibit 2-2. Some information not published for the Portland-Vancouver PMSA was available for the seven county Portland-Vancouver Metropolitan Statistical Area (MSA), which includes the six PMSA counties and Skamania County in Washington. In such instances, data from the MSA was used.

3.2 Regional Conditions

The Portland-Vancouver region is located at the confluence of two navigable rivers, the Columbia and the Willamette, and is served by the Burlington Northern Santa Fe (BNSF) and Union Pacific Railroad (UPRR) intercontinental rail lines, Portland International Airport, and marine terminals at the Ports of Portland and Vancouver. The region's competitiveness is largely dependent on its role as a gateway and distribution center for domestic and international markets. Because most of the region's industries depend on the movement of freight, transportation access must be maintained in order for the region to stay competitive locally and internationally.

This section describes the historical and forecast conditions of the Portland-Vancouver regional economy.

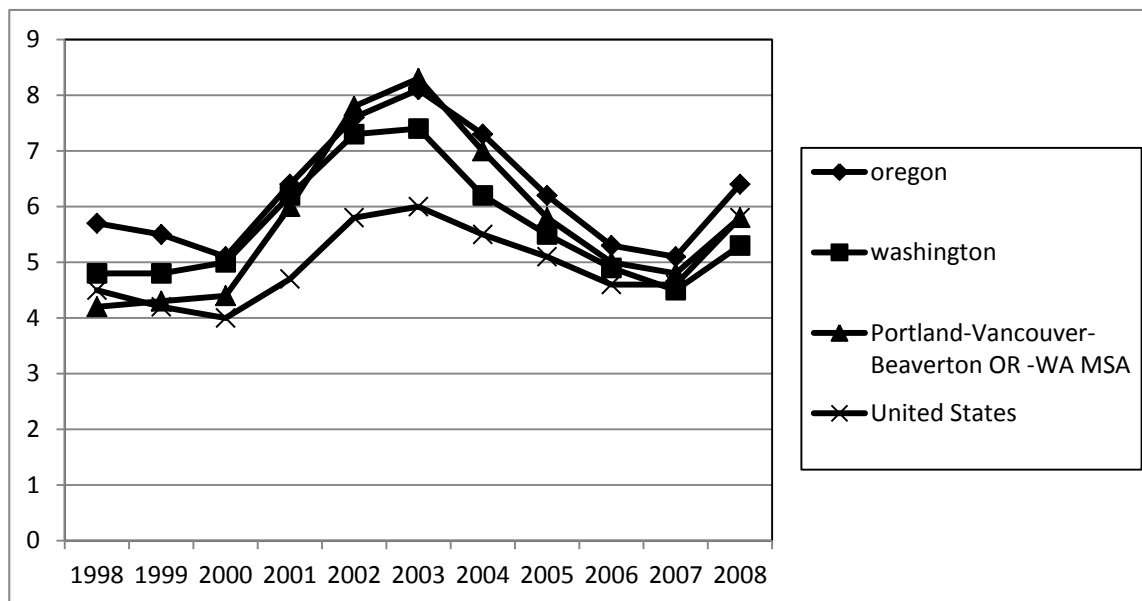
3.2.1 Unemployment

Exhibit 3-1 presents unemployment rates for the Portland-Vancouver PMSA, the states of Oregon and Washington, and the United States over the most recent ten-year period for which data are available (1998-2008). From 1998 to 1999, the Portland-Vancouver PMSA unemployment rate trended lower than rates overall in Washington, Oregon, and the nation. By 2002, the regional unemployment rate was greater than rates in each state and the nation. The relatively greater increase in the region's unemployment rate was partially caused by the region's reliance on electronic and computer manufacturing, which was greatly impacted by the international economic downturn in those employment sectors. Slow job growth continued through 2003. In 2004 job growth increased, and the Portland-Vancouver MSA unemployment rate dropped below Oregon's average, but this was still larger than the Washington State average. This lower unemployment rate continued through 2007, but jumped dramatically between the years of 2007 and 2008. This rise in unemployment is consistent with a global change in economic conditions.

The most recent unemployment information (October 2009) shows an 11.3 percent unemployment rate for the State of Oregon and a 9.3 percent unemployment rate for the State of

Washington. The nation's unemployment rate for this same period is 10 percent, and the unemployment rate for the MSA is 10.7 percent.

Exhibit 3-1. Unemployment Rate 1998 through 2008



3.2.2 Employment

Exhibit 3-2 presents the Portland-Vancouver MSA cross-border commute patterns of residents working in Clark and the Oregon PMSA counties. These data are from the 2000 Decennial Census. As shown, 82 percent of I-5 bridge commuters are residents living in Clark County and working in the Oregon PMSA counties. Conversely, 18 percent of I-5 bridge commuters are Oregon PMSA residents working in Clark County.

Exhibit 3-2. Portland-Vancouver MSA Cross-Border Commute Patterns

Area	Total	Percent
Oregon PMSA County ^a Residents Working in Clark County	11,532	18%
Clark County Residents Working in Other PMSA Counties	51,255	82%

Source: U.S. Census, 2000.

a Clackamas, Columbia, Multnomah, Washington, and Yamhill counties.

The Portland-Vancouver MSA has a larger concentration of Distribution and Logistics businesses than the West Coast states of California, Oregon, and Washington average. Representing 6 percent of all West Coast employment in Distribution and Logistics, the Portland-Vancouver MSA had an estimated 77,544 employees in the industry in 2001. As shown in Exhibit 3-3, by 2005, employment had declined by an annual average rate of 0.5 percent per year to 76,138 employees. Between 2001 and 2005 the largest decrease in employment occurred in the Air Transportation industry while the largest increase occurred in the Electronic Markets & Agents & Brokers industry. Over the same time period average annual wages increased at a rate of 3.5 percent from \$45,940 to \$52,700. The smallest increase in annual wage occurred in the Air

Transportation industry while the largest increase occurred in the Merchant Wholesalers, Nondurable Goods industry.

Exhibit 3-3. Distribution and Logistics Employment and Wage Estimates in the Portland-Vancouver MSA

NAICS Code	Industry	2001		2004		2005		Percent Change 2001-2005	
		Empl	Avg Wage	Empl	Avg Wage	Empl	Avg Wage	Empl	Avg Wage
	Wholesale	50,408	\$51,462	50,088	\$57,525	49,928	\$60,086	-1%	17%
423	Merchant Wholesalers, Durable Goods	25,409	\$50,267	23,240	\$52,055	23,277	\$56,605	-8%	13%
424	Merchant Wholesalers, Nondurable Goods	18,950	\$49,711	20,198	\$60,661	19,799	\$59,930	4%	21%
425	Electronic Markets & Agents & Brokers	6,050	\$61,956	6,648	\$67,135	6,852	\$72,362	13%	17%
	Transportation	18,429	\$38,737	17,970	\$38,720	17,675	\$40,662	-4%	5%
481	Air Transportation	4,694	\$39,603	3,681	\$38,511	3,470	\$40,584	-26%	2%
484	Truck Transportation	8,856	\$37,922	9,467	\$37,780	9,362	\$40,656	6%	7%
488	Support Activities for Transportation	4,879	\$39,384	4,822	\$40,726	4,843	\$40,730	-1%	3%
	Warehousing, storage & couriers	8,707	\$31,283	8,329	\$34,687	8,535	\$34,419	-2%	10%
	Total	77,544		76,387		76,108			

Source: PDC, 2007.

3.2.3 Major Employers

Exhibit 3-4 lists the largest 25 private sector employers in the Portland-Vancouver MSA (as of November 2009). The diversity of the companies on this list is representative of the region's economy. Each of these businesses depends on the region's transportation system to provide reliable movement of goods and services, customers, and employees to and from their business locations. The I-5 corridor is one of the most critical components of the region's transportation network as it provides the only uninterrupted north-south freeway corridor connecting Oregon and Washington with Mexico, California, and British Columbia.

Exhibit 3-4. Largest Private Sector Employers in the Portland – Vancouver MSA

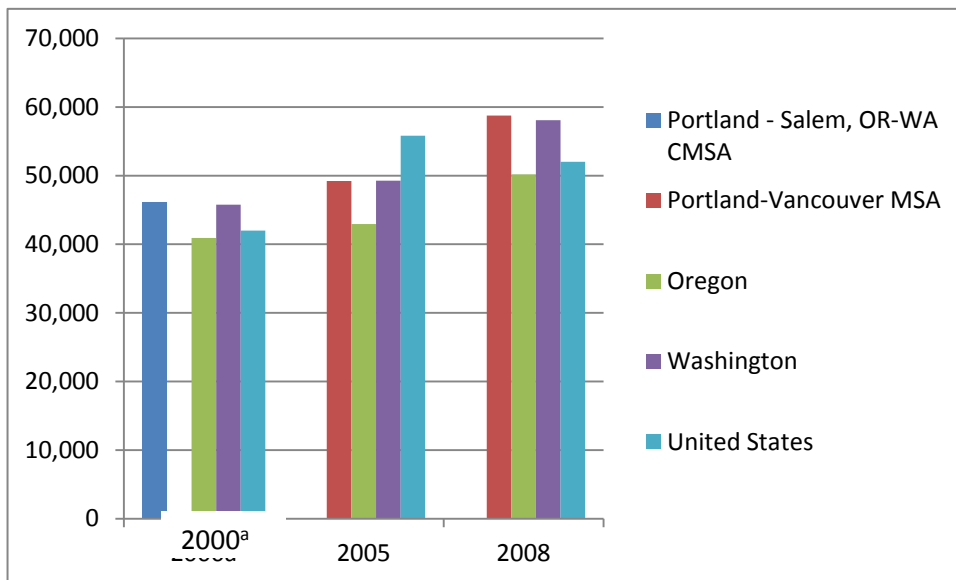
Employer	No. of Employees
Intel Corp	16,740
Providence Health System	14,639
OHSU	11,500
Fred Meyer, Inc.	8,500
Kaiser Foundation	8,221
Legacy Health System	8,196
Nike, Inc.	7,648
Wells Fargo Bank	4,873
Greenbrier Cos. Inc.	3,972
Freightliner Corp.	3,500
Columbia Forest Products	3,500
United Postal Service (UPS)	3,400
Southwest Washington Medical Center	3,268
Bonneville Power Administration	2,959
Portland General Electric	2,750
Pope and Talbot	2,500
Standard Insurance Company	2,500
Regence BlueCross BlueShield of OR	2,495
Target Corporation	2,387
PacifiCorp	2,372
Tektronix, Inc.	2,000
Cascade Corp.	1,900
Xerox Corp	1,700
Oregon Steel Mills	1,680
Nautilus Group, Inc.	1,550
Merix Corp.	1,533

Source: Portland Development Commission, 2009.

3.2.4 Median Household Income

Exhibit 3-5 presents median household incomes for the Portland-Vancouver MSA, the states of Oregon and Washington, and the United States. In 2000, the median household income of the Portland-Salem Consolidated MSA was approximately \$46,000 and was slightly above state and national averages. By 2005, the regional median household income was just under \$50,000 and the same as the Washington state average (still above the national and the Oregon state average). By 2008 the regional and the State of Washington median household income had risen to just under \$60,000. Although both Oregon state income and national income had also risen during this time period, the difference between them had grown.

Exhibit 3-5. Median Household Income 2000 through 2008



Source: US Census: 2000 Decennial Census, American Community Survey (2005 and 2008 data).

a The Portland-Vancouver MSA level of analysis did not exist during the 2000 Census, therefore the Portland-Salem Consolidated MSA (CMSA), which extends from north of Vancouver to south of Salem, was used.

3.2.5 Retail Sales

Exhibit 3-6 presents historical annual retail sales growth within the Portland-Vancouver MSA. From 1997 to 2005, retail sales increased by \$10.1 billion, from \$19.3 billion per year to \$29.2 billion per year. Overall, the Portland-Vancouver MSA experienced growth in retail sales of 51 percent over the 8-year period. The City of Vancouver experienced the largest percent increase in retail sales, growing 91 percent from 1997 to 2005. Only Clackamas and Yamhill counties experienced total growth lower than the regional average growth in retail sales. The economic importance of Portland and Vancouver to the region is illustrated by the combined percent of total retail sales that the two communities accounted for (39 percent in 1997 and 41 percent in 2005).

Exhibit 3-6. Portland-Vancouver MSA Taxable Retail Sales (thousands)

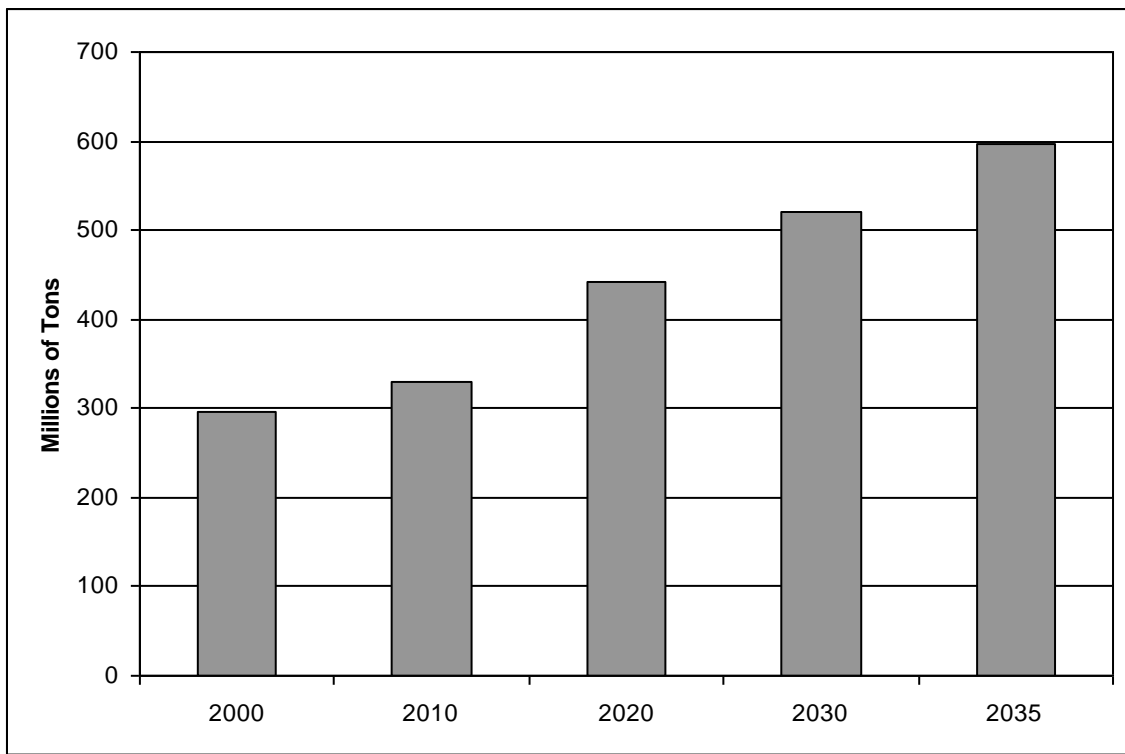
County/City	Retail Sales		% Change
	1997	2005	1997-2005
Multnomah County, OR	\$7,334,500	\$11,522,730	57%
City of Portland	\$6,190,396	\$9,623,453	55%
Washington County, OR	\$5,453,519	\$8,545,246	57%
Clackamas County, OR	\$3,448,259	\$3,909,661	13%
Clark County, WA	\$2,214,708	\$3,975,013	79%
City of Vancouver	\$1,298,357	\$2,481,175	91%
Yamhill County, OR	\$627,196	\$869,747	39%
Columbia County, OR	\$199,808	\$356,653	79%
Total:	\$19,277,990	\$29,179,050	51%
Cities of Portland-Vancouver as Percent of Total	39%	41%	

Source: Washington State Department of Revenue, 2005 Portland Development Commission, 2007.

3.2.6 Transportation and Freight Mobility

The ports of Portland and Vancouver are critical to the economic growth and prosperity of the region. In order for the ports to remain competitive with other West Coast ports, efficient and cost-effective multimodal transportation systems must be available. Reducing freight travel times by investing in transportation infrastructure improvements that improve access and decrease congestion helps maintain the area's competitiveness. Exhibit 3-7 presents the projected commodity growth for the ports of Portland and Vancouver. The total annual tonnage moving through the two ports is expected to double from approximately 300 million tons in 2000 to almost 600 million tons in 2035. This growth has implications for the transportation network as products move to and from the regional marketplace.

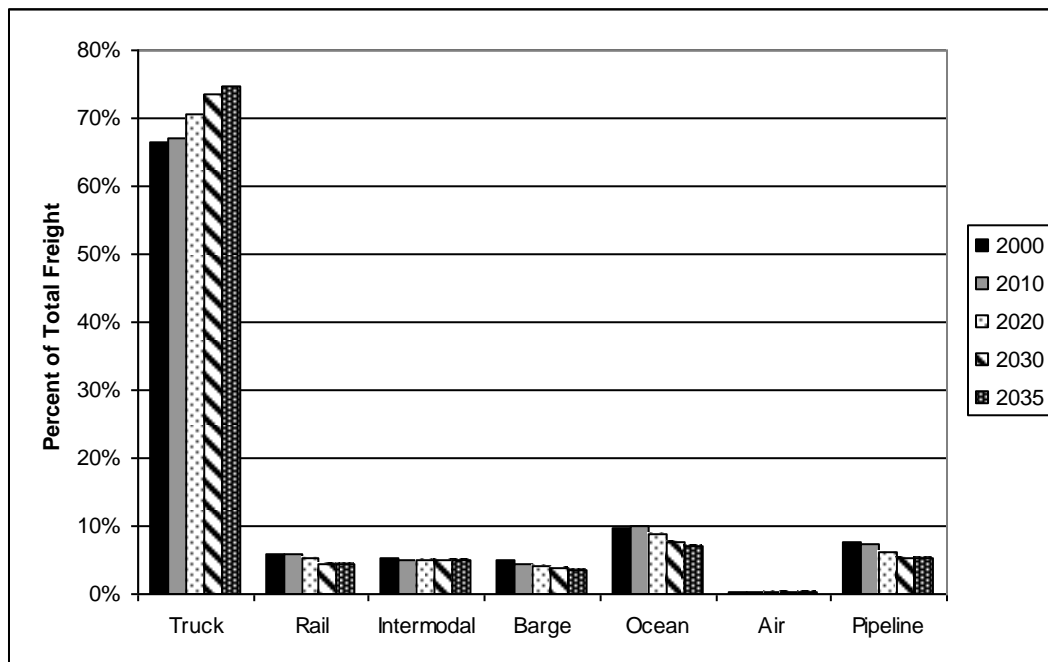
Exhibit 3-7. Ports of Portland-Vancouver Projected Commodity Growth (millions of tons)



Source: Metro, 2006.

Exhibit 3-8 presents the percent of commodities moved through the region by transportation mode. Currently, the largest volume of goods moved in and out of the Portland-Vancouver MSA is via commercial truck. This is not expected to change over the next 25 years. Commodities moved by trucks are expected to grow from 67 percent of total freight in 2000 to 75 percent in 2035. Rail and air cargo are the only other modes that are anticipated to see increases in tonnage moved by 2030, although the tonnage moved by air is relatively small. The projected growth in trucking has implications for the road network, as efficient and safe movement of products to and from the ports will be needed to maintain the ports' competitiveness. The increase in truck traffic will have to compete for highway capacity with the expected increase in passenger travel.

Exhibit 3-8. Ports of Portland-Vancouver Commodity Flow Forecast by Mode



Source: Metro, 2006.

3.3 Local Conditions

Local population, household, and employment data were calculated based on Traffic Analysis Zone (TAZ) data provided by Metro, the Metropolitan Planning Organization (MPO) for the Portland region. Specific TAZs were selected if the proposed alignments crossed through that TAZ. TAZs that would not be impacted directly by the proposed alignments were not used for this analysis.

3.3.1 Population and Households

Exhibit 3-9 presents historical and forecast population data for the API, broken down by state, along with total population forecasts for the Portland – Vancouver MSA. Between 2005 and 2030, Metro forecasts that the MSA will grow by an annual 1.5 percent, far higher than the projected growth for the Oregon section of the API of 0.16 percent/year, but slightly below the Washington section of the API average of 1.8 percent/year.

Exhibit 3-9. Population Forecast

Area	2005	2030	Average Annual Growth Rate
Oregon (area within API only)	3,627	3,779	0.16%
Washington (area within API only)	9,788	15,350	1.8%
Portland-Vancouver MSA	1,945,452	2,857,631	1.5%

Source: Metro, 2009c.

Exhibit 3-10 presents historical and forecast housing data for the API in Oregon, the API in Washington, and the Portland–Vancouver MSA. Between 2005 and 2030, the number of households per year in the PMSA is forecast to grow approximately 1.6 percent. This is much higher than the Oregon area growth rate of 0.06 percent/year, but not as high as the Washington State area growth rate of 2.4 percent/year. Also, the household growth in the metropolitan region is forecast to grow similar to population. This means that the number of persons per household will remain the same (assuming no change in housing vacancy rates). This is relevant because travel demand typically correlates more closely to household formation than to population.

Exhibit 3-10. Housing Forecast

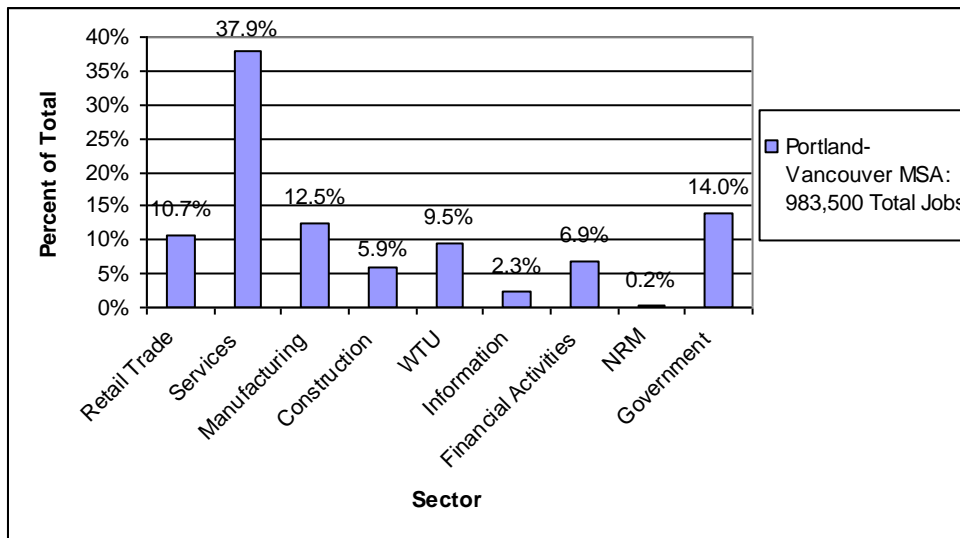
Area	No. of Households		Average Annual Growth Rate
	2005	2030	
Oregon (area within API only)	1,779	1,808	0.06%
Washington (area within API only)	4,422	8,126	2.4%
Portland-Vancouver MSA	824,990	1,231,560	1.6%

Source: Metro, 2009c.

3.3.2 Employment

Exhibit 3-11 presents historical employment by sector, in total, and on a percentage basis, for the Portland–Vancouver MSA for 2000 (the last Decennial Census). The sector with the largest share of total employees in 2000 was the “services” sector, which accounted for 38 percent of all jobs in the region. Government, manufacturing, and retail trade had the next largest shares of employees with 14.0, 12.5, and 10.7 percent, respectively.

Exhibit 3-11. Historical (2000) Employment by Sector



Source: Oregon Employment Department, 2007.

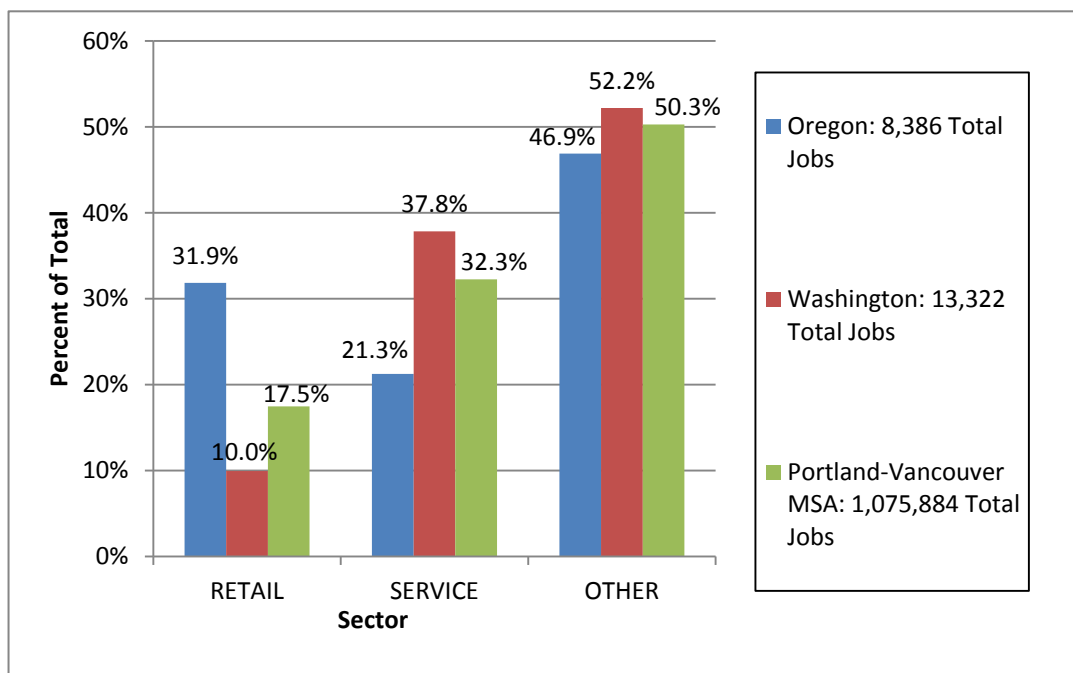
Notes: WTU = Wholesale Trade, Transportation, and Utilities; NRM = Natural Resources and Mining

Exhibit 3-12 and Exhibit 3-13 present historic and forecast employment by sector, in total, and on a percentage basis, for the area of the API in Oregon, for the area of the API in Washington and the Portland–Vancouver MSA as a whole, for 2005 and 2030. Only three employment sectors

(Retail, Services, and Other) are presented because retail and service businesses generate more trips per employee than other sectors and are more relevant for this analysis. The sector classified as “Other” is composed of manufacturing, construction, wholesale trade, transportation, and utilities (WTU), information, financial activities, natural resources and mining (NRM), and government.

In 2005, as presented in Exhibit 3-14, the sector with the largest share of total employees in Oregon and the Portland-Vancouver MSA sections is classified as Other. The Services sector had the largest share of employees in the area of the API in Washington. The Oregon area also had the largest share of Retail sector employees; approximately twice as many employees compared to the area in Washington and the region.

Exhibit 3-12. Percent of Total Employment by Industry for Each Area and the Region – 2005

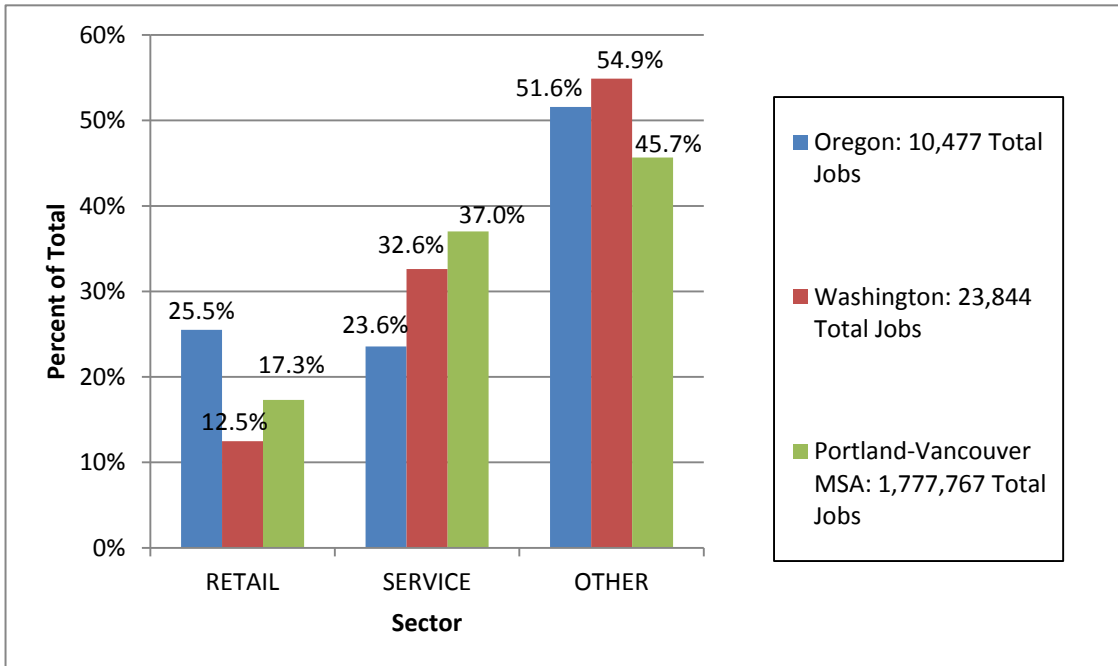


Source: Metro, 2009c.

Note: Total jobs for the Portland-Vancouver MSA presented in this exhibit do not match those in Exhibit 3-10 because two different sources were used to gather this information. Each source has its own definition of each sector; therefore, the amount of employment in each sector will be slightly different between each source.

In the services and other sectors, the 2030 share of total employees within areas and the region should continue trends from 2005. However, by 2030, the share of employees in the Retail sector is forecast to be similar across areas and the region, rather than differing as it does currently (Exhibit 3-13).

Exhibit 3-13. Percent of Total Employment by Industry for Each Area and the Region – 2030

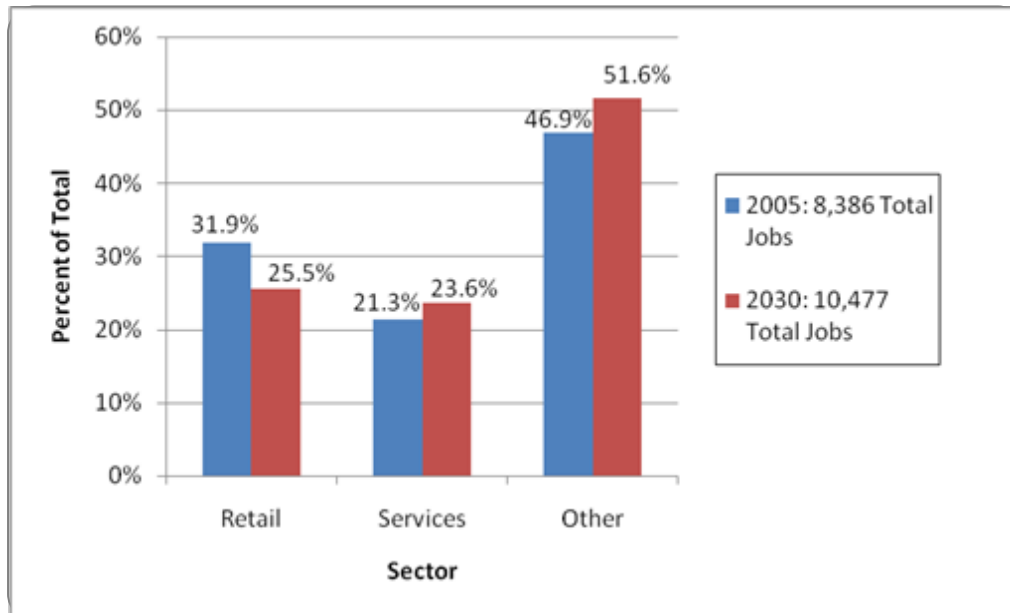


Source: Metro, 2009c.

Exhibit 3-14 and Exhibit 3-15 present historic, and forecast, employment by sector, in total, and on a percentage basis, for the Oregon and Washington areas, for the years 2005 and 2030.

As presented in Exhibit 3-14, the sector with the largest share of total employees in the Oregon area is Other. In 2005, the Other sector accounted for 46.9 percent of all jobs in the area of the API located in Oregon. Metro forecasts that the percent of total jobs in the Retail sector in Oregon's area in 2030 will decline and the percent of total jobs in the Services and Other sectors will increase.

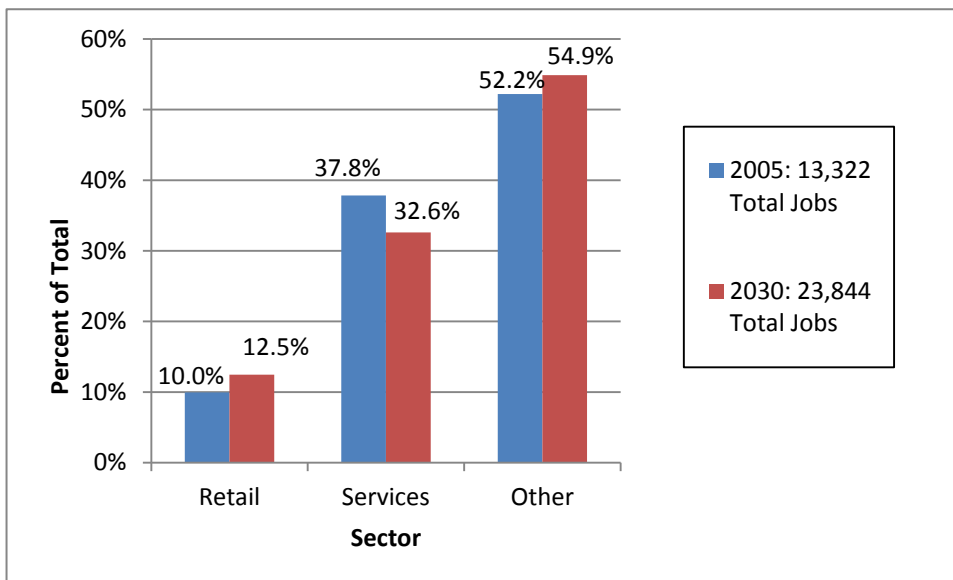
Exhibit 3-14. Percent of Total Employment by Industry – Oregon



Source: Metro, 2009c.

As presented in Exhibit 3-15, the area of the API located in Washington is similar to that in Oregon in that its largest share of total employees is the Other sector, which accounted for 52.2 percent of all jobs in 2005. Unlike the Oregon area, Metro forecasts that the percent of total jobs in the Retail sector in the Washington area in 2030 will increase and the percent of total jobs in the Services and Other sectors will decrease.

Exhibit 3-15. Percent of Total Employment by Industry – Washington



Source: Metro, 2009c.

3.3.3 Revenue Sources

Both the City of Portland and the City of Vancouver rely heavily on tax revenues to fund general services to their respective jurisdictions.

Portland and Vancouver General Fund revenue sources are presented in Exhibit 3-16 and Exhibit 3-17, respectively. Both Portland and Vancouver's largest source of revenue is property taxes, which account for 39 and 30 percent, respectively, of each City's total revenues. Total tax revenue to Portland is estimated to account for 42 percent of its total revenues while total tax revenue to Vancouver is estimated to account for almost 79 percent of its total revenues. Revenues collected by each City, other than taxes, consist of funding from state and local sources, internal transfers, and various types of fees collected from government operated facilities and issuing licenses and permits. For the City of Portland, internal revenues consist of overhead billings, other cash transfers, federal grants transfers, and interagency reimbursements. For the City of Vancouver, intergovernmental service revenues mainly consist of payments from Clark County for parks and recreation services provided to Clark County by the City under the provisions of an interlocal agreement.

Exhibit 3-16. City of Portland General Fund Revenue Sources

Source	2008 (Thousands)	2009 Projected (Thousands)
Property Tax ^a	\$174,955	\$181,020
Lodging Tax	\$16,079	\$15,674
Licenses & Permits	\$120,982	\$111,924
Service Charges and Fees	\$18,587	\$19,264
Grants	\$17	\$0
State Sources	\$12,075	\$12,306
Local Sources	\$16,366	\$15,184
Miscellaneous	\$10,023	\$6,022
Total	\$369,084	\$361,394

Source: City of Portland, 2009.

a Property tax excludes Prior Year Property Taxes and Payment in Lieu of Taxes.

Exhibit 3-17. City of Vancouver General Revenue Sources

Source	2008 (Thousands)	2009 Projected (Thousands)
Property Tax	\$37,586	\$38,552
Sales Tax	\$27,580	\$27,402
Business Tax	\$20,800	\$23,554
Other Tax ^a	\$10,397	\$13,964
Business Licenses	\$837	\$1,052
Grants & Entitlements	\$1,458	\$368
State Shared Revenues	\$3,163	\$3,027
Intergovernmental Service Revenues	\$2,290	\$1,472
Goods and Services	\$17,281	\$18,253
Fines & Penalties	\$1,758	\$1,822
Miscellaneous	\$2,217	\$1,603
Total	\$125,367	\$131,069

Source: City of Vancouver, 2009.

a Includes Excise and Gambling Tax.

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4. Long-term Effects

4.1 Introduction

This chapter describes the long-term economic effects that are expected from the LPA and from the No-Build Alternative. The LPA includes highway, transit, bicycle, pedestrian, and other components. The API has been divided at the state line; impacts and benefits have been analyzed for Oregon and Washington separately.

Each of the subsections below contains an analysis of business displacements, property tax impacts to Multnomah and Clark counties, and estimated parking losses associated with the LPA. This section also includes an assessment of the economic effects of changes in the availability of parking, changes in traffic volumes and travel patterns, and access.

This section addresses direct long-term effects. Temporary (construction) impacts are discussed in Section 5. Indirect effects are described in separate technical memorandum.

4.2 No-Build Alternative

The No-Build Alternative retains the existing I-5 bridges and makes only minor preservation improvements to the highway within the API. Projects included in the No-Build Alternative are generally consistent with the Metro and the Clark County RTC fiscally-constrained Regional Transportation Plans (RTPs). The Transportation Technical Report contains a list of all projects considered as part of the No-Build Alternative (CRC 2009f). Portland Metro's RTP includes several capacity and safety projects at the Rivergate Industrial Area, as well as along Columbia Boulevard and Marine Drive west of I-5. These are designed to improve safety and mobility for commercial trucks traveling between Rivergate and I-5. The project list for the No-Build Alternative includes many projects from the RTC that improve access between I-5 and regional centers in the North Vancouver area, and along local collectors and arterials.

Making no improvements to the highway itself would increase the severity of the existing bottleneck at the I-5 bridges, lengthening the periods of congestion (spreading the peak). Under the No-Build Alternative, the hours of congestion increase in the southbound direction from 2 hours to 7.25 hours and in the northbound direction from 4 hours to 7.75 hours. Increased congestion is assumed to also increase the potential for crashes (especially rear-end crashes).

Improvements along Lombard Street and Marine Drive will generally improve conditions for commercial trucks. These improvements will improve travel times along the local arterial network, but travel times once on I-5 are expected to increase under the No-Build Alternative from 16 minutes to 19 minutes in the southbound and 12 to 14 minutes in the northbound direction between SR 500 and Columbia Boulevard (CRC 2009f, comparison is between years 2005 (existing) and 2030 (future)). Similarly, travel times for commercial trucks traveling along I-5 through the region (between areas south of Portland and north of Vancouver) increase despite capacity projects to be constructed north of Vancouver and south of Marine Drive. According to the CRC Traffic report travel times are expected to increase from 31 to 46 minutes in the southbound direction between 179th Street and I-84, and from 38 to 44 minutes in the northbound direction.

Trucks traveling along I-5 in the project vicinity tend to travel outside the peak. The peak hour for trucks is between 12:00 p.m. and 1:00 p.m. (in both the northbound and southbound direction), with the second highest truck volumes between 11:00 a.m. and noon in the southbound direction and between 9:00 a.m. and 10:00 a.m. in the northbound direction. Forty-two percent of daily truck travel occurs between the hours of 9:00 a.m. and 2:00 p.m. Under the No-Build Alternative, the congested time period spreads by 2030, especially in the southbound direction. In the southbound direction traffic slows to between 20 and 35 miles per hour between Fourth Plain Boulevard and I-405 between 11:00 am and noon, and between 20 and 40 miles per hour between the Columbia River and I-405 between noon and 1:00 p.m. Traffic congestion is less noticeable during the two highest travel hours for trucks in the northbound direction.

At the Marine Drive interchange, freight traffic is a higher percentage of overall traffic than it is elsewhere in the corridor, because of the many industrial uses and zoning along Marine Drive and at the Rivergate Industrial Area. At the Marine Drive interchange location, freight volumes comprise between 11 and 32 percent of overall traffic (CRC 2009f).

Under the No-Build Alternative, no businesses within Oregon or Washington would be displaced by right-of-way acquisition and there would be no resulting decrease in property or sales tax revenues or jobs lost. There would be no additional employment or added sales tax associated with project construction. Economic development planned for this area may occur more slowly as business owners may be more reluctant to locate in an area with poor access and mobility for employees and customers. Freight reliability decreases as congestion spreads beyond the peak hour, into times when trucks tend to travel. Customers may elect to shop in other areas with easier access and mobility.

4.3 LPA Long-term Effects in Oregon

The project would acquire additional rights-of-way from taxable property within the City of Portland to construct the project. This taxable property would be removed from each city's tax base, with the potential for decreasing property tax revenues or requiring a tax rate increase for a given level of expenditure. The estimated property tax impact includes partial encroachments. The tax effect of the partial encroachments was calculated by multiplying the actual 2008 property tax collected for the parcel by an estimate of the percentage of the parcel taken for the project.

Note that each table presents only a partial picture of potential long-term impacts. Other economic impacts may result from the acquisition of local businesses if neighboring businesses that remain find it difficult to attract or retain customers because part of a complementary group of businesses (agglomeration economies) no longer exists. The long-term magnitude of this impact would depend on the potential to relocate acquired businesses in the same neighborhood and the extent and types of infill and redevelopment that takes place in those areas. This in turn depends on a number of factors such as regional economic trends and market conditions, the willingness of businesses to relocate, available building space for lease during the relocation process, and community and city support for redevelopment.

4.3.1 Oregon Mainland

The Oregon Mainland segment encompasses north Portland, from the south end of the API to the North Portland Harbor. There are impacts to two interchanges in this segment: Marine Drive and Victory Boulevard.

The LPA at the Marine Drive interchange optimizes truck mobility. The Marine Drive interchange configuration is a SPUI with a flyover ramp serving the critical east to north

movement. With this configuration, three legs of the interchange would converge at a point on Marine Drive over the I-5 mainline. This configuration would allow the highest volume movements to move freely without being impeded by stop signs or traffic lights.

4.3.1.1 Business Acquisitions

Exhibit 4-1 provides an estimate of the number of businesses, employees, and annual sales located on properties that would be acquired by the project in the Oregon Mainland section.

Exhibit 4-1. Business Effects on the Oregon Mainland

Area	No. Businesses Displaced	No. Employees Impacted	Affected Annual Sales (Millions)
Oregon Mainland LPA Options A and B	5	25	\$10.6

Source: CRC Acquisitions Technical Report and InfoUSA, 2009.

The five businesses acquired by the project in the Marine Drive area are a boat sales business, a boat repair business with an auxiliary boat dock, a billboard operated as a business, and two marine businesses with a total of 25 staff and approximately \$10.6 in annual sales revenues. The boat sales business and two marine related businesses are dependent upon a location close to the river. Finding suitable locations for boat sales, a boat dock, and the repair and marine-related businesses may be difficult because much of the Columbia River area in the vicinity of freeway access is built up for either residential or industrial/commercial use. ODOT would provide relocation assistance to displaced businesses.

4.3.1.2 Property Tax Impacts

Exhibit 4-2 presents the estimated property tax impacts associated with the LPA Options A and B on the Oregon Mainland.

Exhibit 4-2. Tax Impacts from the LPA (Mainland Oregon)

Area	Estimated Assessed Value of Right-of-Way (Millions)	Property Tax Impact (Thousands)	% of Multnomah County Budgeted 2008 Property Tax Revenues
Oregon Mainland LPA Option A	\$4.1	\$27	0.01%
Oregon Mainland LPA Option B	\$4.3	\$25	0.01%

Source: CRC Acquisitions Technical Report and Multnomah County Tax Assessor.

4.3.1.3 Parking

Parking impacts are summarized in Exhibit 4-3 below. There would not be impacts to on-street parking in this area. However, the Expo Center parking lot would be reduced by either 220 parking spaces (Option B) or 280 parking spaces (Option A) parking spaces, or reductions of 11 to 13 percent of the total parking. This area would be used for landscaping and the realignment of both Marine Drive and the new Expo Center Drive. Expo Center seldom requires the use of all 2,100 parking stalls and any impacts that could be observed during peak events would likely be offset by the new light rail transit service provided connecting Expo Center with Vancouver.

For both LPA Options A and B, the realignment of Marine Drive and the new Expo Center Drive would eliminate parking spaces in a parking lot located on ODOT land, which is currently leased

by Diversified Marine for equipment storage. Currently there are approximately 20 unstriped parking spaces in this parking lot.

For Option A, two existing freight and truck storage businesses would experience impacts to their parcels from construction of the Delta Park to Vancouver Way connection over Martin Luther King Jr. Boulevard, and a connection between Martin Luther King Jr. Boulevard and N Haney Drive via Vancouver Way. These new connections could require relocation of existing access for both parcels. This portion of the LPA would reduce the parking capacity on the truck storage parcel south of Vancouver Way by approximately 55 to 60 vehicles, out of a total capacity of around 200 vehicles. Typical utilization is approximately 80 percent. This limits the number of vehicles able to park in the lot and could impact the viability of business at this location. The new roadway alignment bisects the existing storage lot, requiring a new access to be added for the northeastern segment cut off by the new road connecting to Marine Drive. The truck storage and distribution business north of Vancouver Way would lose approximately 50 truck parking spots, out of a total capacity of approximately 400 total spaces. The business could also lose some employee parking in one lot, though there is adequate room to relocate the displaced parking. Additionally, two fuel storage tanks and a refueling area located on the parcel would need to be relocated, potentially impacting existing parking configuration and reducing the number of available parking spaces.

Only one truck storage business would be affected by the new roadway alignment associated with Option B, reducing the parking capacity on the parcel by approximately 100 to 115 vehicles, out of a total capacity of around 200 vehicles. This limits the number of vehicles able to park in the lot and could impact the viability of business at this location. It is assumed that the business would be able to continue operations with the reduced size and reconfiguration of the lot.

Exhibit 4-3. Parking Displacements for Businesses on the Oregon Mainland LPA Options A and B

Business	Parking Displaced
Truck Storage Lot south of Vancouver Way – Option A	This property would be impacted at both the northwest and southeast ends of the parcel, reducing capacity for truck storage by approximately 55 to 60 semi-trucks. The current access to the lot may need to be relocated due to the proximity of the existing access to the proposed new intersection.
Truck Storage Lot south of Vancouver Way – Option B	This property would be impacted at both the northwest and southeast ends of the parcel, reducing capacity for truck storage by approximately 100 to 115 semi-trucks. The current access to the lot would need to be relocated due to the proximity of the existing access to the proposed new intersection.
Freight Storage Business north of Vancouver Way – Option A	This property would be impacted by a new driveway into the business from Vancouver Way, potentially displacing approximately 50 truck parking spots, and potentially more due to the displacement of the fuel storage tanks and the need to reconfigure the fueling area.
Expo Center – Option A	Expo Center parking lot would be reduced by approximately 280spots permanently out of a total of 2,100 (13 percent).
Expo Center – Option B	Expo Center parking lot would be reduced by approximately 220 spots permanently out of a total of 2,100 (11 percent).
ODOT Land (leased)	Parking and equipment storage area. Currently has 20 unstriped parking spots.

The impacts to the ODOT land would not affect its owner though its leasee has stated its importance for storage of vehicles. There is potential for identifying new space on the leasee’s property or along property remainders for vehicle storage.

4.3.1.4 Changes in Travel Patterns

At the Marine Drive and I-5 interchange, intersection level-of-service (LOS) would improve from F for the No-Build Alternative to B for the LPA, with a volume-to-capacity ratio (v/c) changing from 0.83 under the No-Build Alternative to 0.42 for the LPA. This indicates an improvement in mobility and access to this freight and employment corridor during the morning peak. Similar findings were observed during the afternoon peak.

4.3.1.5 Access and Circulation Impacts

Access and circulation changes associated with the LPA are summarized in Exhibit 4-4. The roadway realignments and extensions in the vicinity of the Marine Drive interchange associated with the LPA would improve access and circulation overall, with specific benefit for commercial vehicles accessing the freeway from Marine Drive. The realignment of Marine Drive would still provide circulation to I-5, Vancouver Way, and Martin Luther King Jr. Boulevard. Accessing the existing area of Marine Drive northeast of I-5 would require a minimum level of out of direction travel, but access would remain with the development of a new underpass that crosses through Werner Enterprise to Vancouver Way and on to Marine Drive.

With Option A, a tire business would need to relocate its main entrance off of Vancouver Way to an existing access from N Haney Drive. A freight storage business south of Vancouver Way would need to relocate its entrance between N Haney Drive and the new connection to Marine Drive. Access would be kept open for the manufacturing facilities north of Marine Drive and west of I-5; however a local road would be constructed to preserve access to two businesses. The new Anchor Way extension under I-5 would allow traffic to circulate back onto the major roadways east of I-5 and would provide improved access to the west of I-5 for the businesses along this roadway.

With the LPA Option A, the local arterial bridge connection between North Portland and Hayden Island would provide one lane in each direction over the North Portland Harbor, allowing residents and those accessing Hayden Island from the Oregon mainland an additional access option between the two areas, creating a local connection that currently does not exist. Local traffic near the arterial bridge and the Anchor Way extension could increase as drivers have the option to avoid the highway.

Option B would change traffic flow between western Marine Drive and Vancouver Way. Vehicles would transition from western Marine Drive to Vancouver Way by making a right turn onto a new road and a left turn on to Vancouver Way. This movement would not require a turn with Option A.

Exhibit 4-4. Access and Circulation Impacts for Businesses along Marine Drive with LPA Options A and B

Business	Access and Circulation Changes Associated with the LPA
Truck Storage Lot – both options	The size of this property would be reduced by acquisitions at either end of the parcel. This could require driveway relocation.
Expo Center – both options	Access and circulation within the parking lot and the parking toll booth would need to be relocated.
Sign Business – both options	All accesses would be retained.
Motorcycle Salvage and Machine Business – both options	All accesses would be retained.
Freight Storage business north of Vancouver Way – Option A	Access would be relocated closer to the middle of the existing employee parking lot, and would require reconfiguring of the lot to accommodate the new access.

Business	Access and Circulation Changes Associated with the LPA
Tire sales business – Options A and B	Access would be removed from Vancouver Way; however, the business already has an alternate access on N Haney Drive. May require reconfiguration and signage to direct customers to the new entrance.
Aggregate Gravel Business – Option A	Access to this parcel would be modified to the east, and would be the only access to the parcel. Some out of direction travel is expected, and would need to reconfigure the lot to allow trucks to circulate around the heavy machinery located on the lot.
Aggregate Gravel Business – Option B	Accesses to this parcel would be modified to the east and west ends of the parcel but kept open. Some out of direction travel is expected.
Shipbuilding Business – both options	Accesses would be modified but kept open and relatively direct through local road circulation system.

The aggregate gravel business’s access and circulation would be modified. The access to the site would be via a driveway from the Anchor Way connection under I-5. Currently vehicles accessing I-5 from the site turn left directly onto Marine Drive. With the LPA, traffic accessing I-5 north from the site would go south on the new access road, travel along the east side of the Expo Center parking lot, would turn right on Expo Road and right again on N Force Avenue, and would finally turn right on Marine Drive, accessing I-5 via the SPUI (phased highway option) or the flyover in the Full Build option. This is illustrated in Exhibit 4-5.

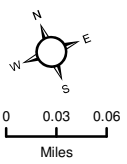
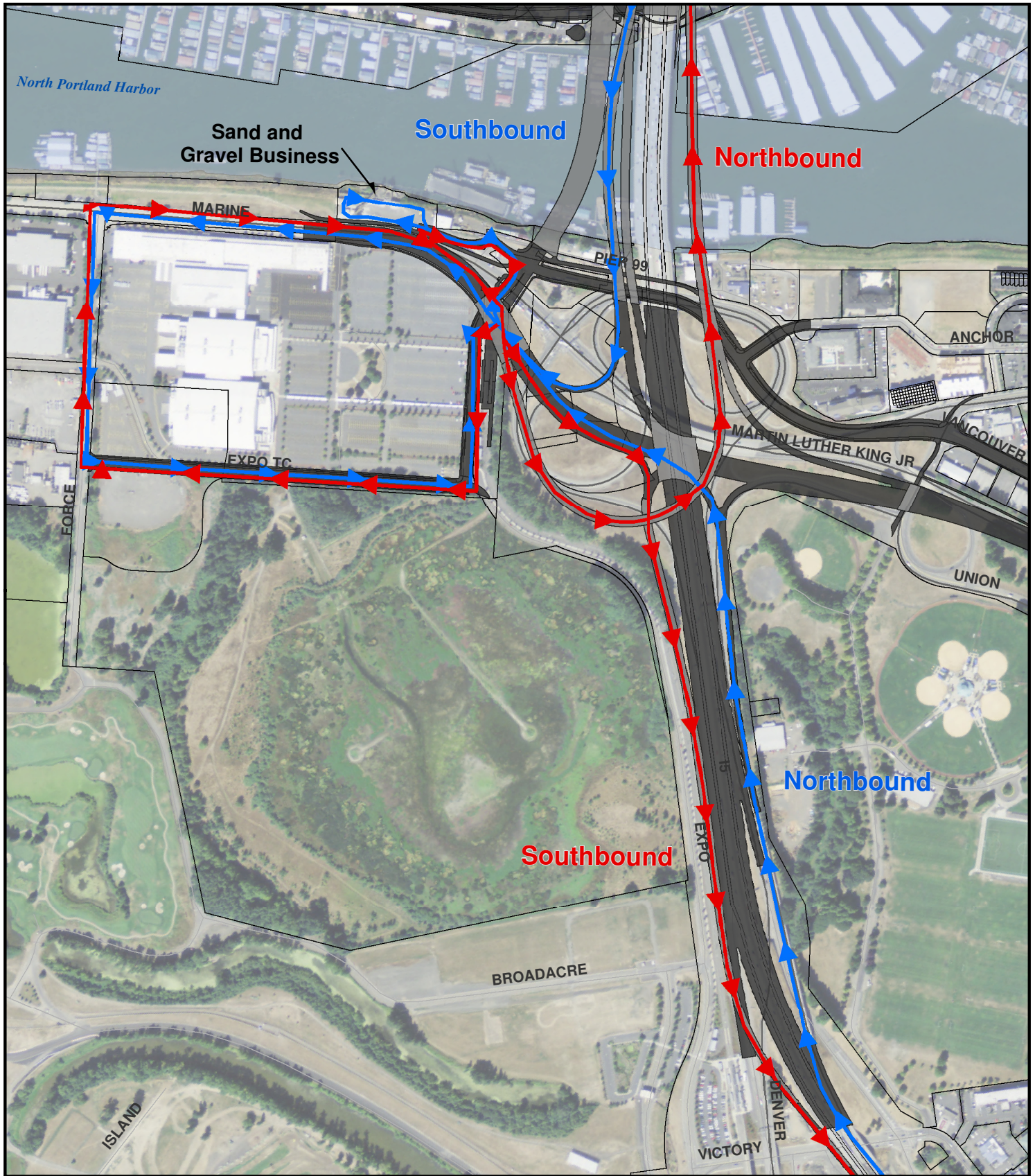
The option of constructing the Bridgeton Trail between Marine Drive and the Columbia River would require a partial acquisition of multiple industrial parcels though no displacements would occur, and no economic impacts are anticipated. Design of the trail would need to consider the potentially conflicting users of freight and recreational bicyclists and pedestrians.

Internal circulation within the aggregate gravel business is currently difficult. Some backing of vehicles onto Marine Drive is needed to access certain areas of the site. Left turns are currently allowed onto Marine Drive directly from the business but can be difficult when traffic flows are heavy.

4.3.1.6 Economic Development and TOD Potential

A universal definition for TOD does not currently exist, reflecting the highly complex and specific nature of economic development climates in individual areas. However, the Transportation Research Board (TRB) provides several definitions of TOD that emphasize high-quality walking environments, mixed land uses, and high-density developments linked to transit (TCRP 2004). Generally, transit agencies agree that what constitutes a TOD is a pattern of dense, diverse, pedestrian-friendly land uses, near transit nodes, that under the right conditions translate into higher transit patronage (TCRP 2004).

There are a number of factors that affect and influence private development, including local and regional market conditions and trends, zoning and other land use regulations, accessibility of credit, and interest rates. Experience around the United States, however, indicates that development of new transit facilities has often occurred concurrent with major changes in development near station areas (typically within a quarter-mile of the station) (TCRP 1996). It has been shown that jurisdictions with supportive policies, land use controls, and direct incentives can substantially increase the amount of development occurring proximate to transit stations.



- Project Footprint, Road Surface
- Project Footprint, New Bridges
- Tax Lot Boundaries

- Vehicles Exiting Business to I-5
- Vehicles Accessing Business from I-5

Exhibit 4-5a. Access in Vicinity of Marine Drive Interchange - LPA Option A



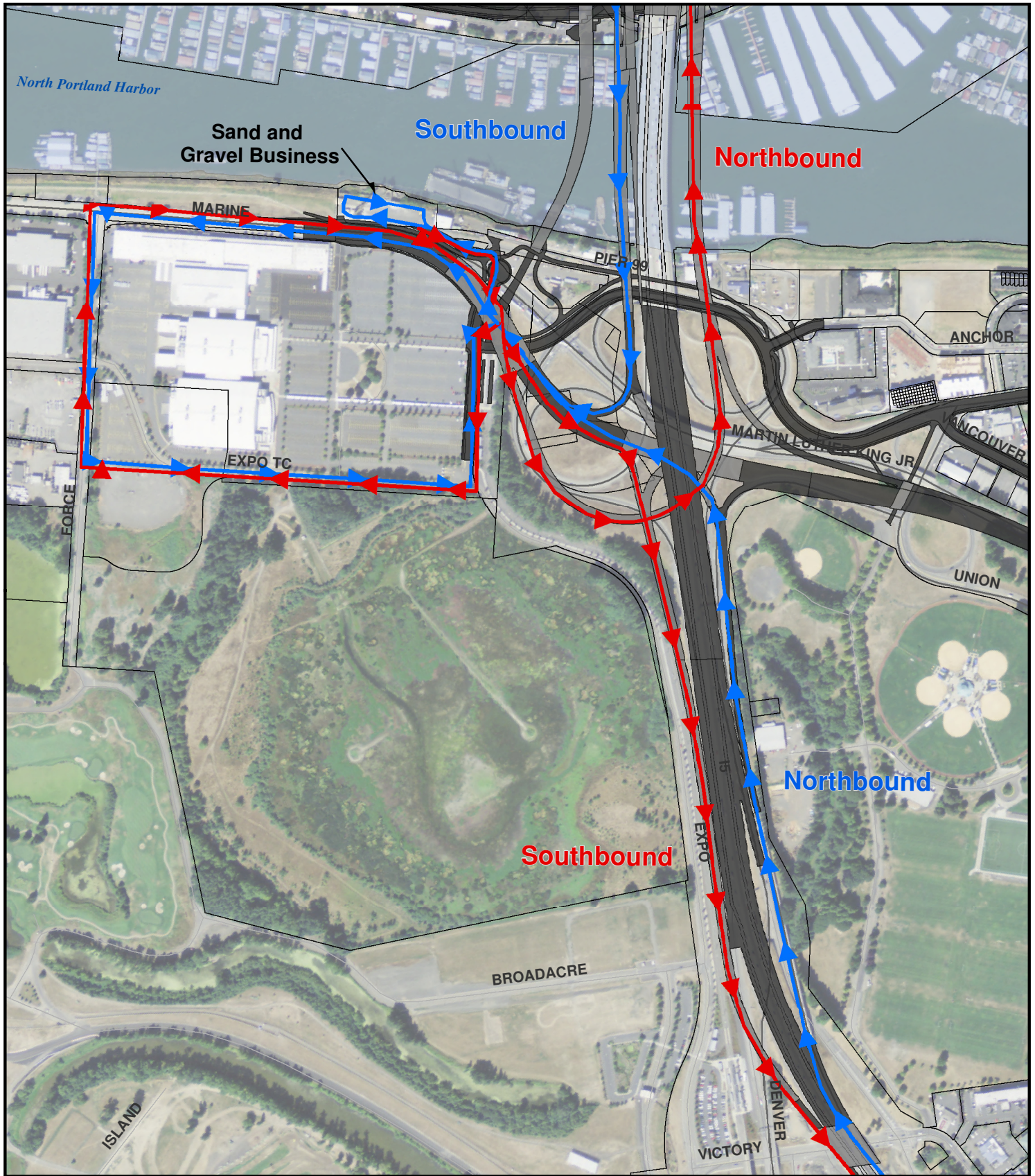
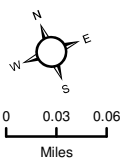


Exhibit 4-5b. Access in Vicinity of Marine Drive Interchange - LPA Option B



- Project Footprint, Road Surface
- Project Footprint, New Bridges
- Tax Lot Boundaries

- Vehicles Exiting Business to I-5
- Vehicles Accessing Business from I-5

In such circumstances, the type of development in a station area tends to be more intense, mixed-use development that supports high-density residential uses and commercial employment. In a number of cases, transit station areas have provided an opportunity for local jurisdictions to focus redevelopment activities. Concentrations of mixed-uses connected by high quality transit services can result in further shifts in travel away from automobile use (particularly single-occupant vehicles) and towards use of transit, walking and bicycling. Again, the success of such development depends to a considerable degree on supportive policies designed to make areas around transit stations relatively more attractive for development than other areas.

TOD generally occurs under three conditions:

1. When stations are located in prime regional and community nodes of activity attractive to typical market forces.
2. When regional and local real estate markets are active.
3. When public policies and regulations permit or encourage intensive development in station areas.

In addition to these conditions, case study research indicates that other elements usually are in place when transit-oriented development occurs, including:

- A strong statewide and regional land use vision, such as is expressed in the State of Oregon's Transportation Planning Rule (State of Oregon 2005), Metro's 2040 Growth Concept (Metro 1995), and the RTC's Metropolitan Transportation Plan (Clark County RTC 2007).
- Political leadership, such as that provided by the Bi-State Coordination Committee (Portland-Vancouver Transportation and Trade Partnership 2001).
- Adequate development sites.
- Strong local and regional economies (i.e., residential and job growth).
- Supportive local land use and development policies such as the Vancouver City Center Vision Plan, 2006.

The experience of other U.S. communities has demonstrated that although light rail transit will not by itself create new development, with supportive plans and policies in place it can influence where development goes and what it looks like. Not all communities have had success with development around light rail stations, however. In areas where TOD has been successful, a number of market conditions and policy tools first had to be present. For those jurisdictions, the benefits of successful TOD have included improved mobility, access and environmental conditions; increased supplies of affordable housing; increased income to transit agencies; more efficient urban form; and urban redevelopment (City of Seattle 1998).

A number of implementation tools have been successfully used to foster TOD. These include: comprehensive station area planning; provision of pedestrian amenities and access; infrastructure improvements, including drainage, water systems, and undergrounding of utilities and lighting; shared parking and/or parking management; expedited permits and reviews; zoning; land assembly; direct public investment; and local transit service design. Additional tools may be needed to foster development in areas where weak market conditions exist.

For the CRC project, TOD potential was estimated for each station along the alignment by analyzing policies and land uses within a 0.25-mile radius of each station area. This analysis

considers existing zoning and comprehensive plan designations; existence of transit-oriented overlay zones; existing land uses; ownership; ratio of building value to property value (a proxy for redevelopment potential); and amount of vacant, developable area around each station. The table below provides a rating of the potential for TOD within 0.25 mile of station areas, characterized as low, moderate or high.

The area in the vicinity of the Expo Center station is largely zoned industrial, and much of the land in the direct vicinity of the station is either built out, or is city or state right-of-way for the I-5 highway and local road network, Expo Center parking, or wetlands. Exhibit 4-6 shows the TOD Rating for the Mainland Oregon light rail transit station.

Exhibit 4-6. TOD Potential for Expo Center Light Rail Transit Station

Station Name	TOD Rating
Expo Center	Low

The existing land uses and zoning do not suggest TOD potential.

4.3.1.7 Differences with the LPA with Highway Phasing

Phasing the project would not impact tax revenues or businesses over the LPA, as the deferred acquisition involves Portland City- and ODOT-owned land and roadway.

Phasing of the LPA for both Options A and B would defer construction of the Marine Drive flyover, and construction of the Victory Braid. Deferring the Marine Drive flyover would require traffic travelling eastbound on Marine Drive to I-5 northbound to travel through the signalized SPUI intersection instead of having free-flow movement provided by the flyover. This is a reduced benefit to freight traffic from Rivergate Industrial Area, but still provides a benefit over the No-Build Alternative.

Phasing would also retain the existing Victory Boulevard configuration, with the short weaving distance for the Marine Drive eastbound to I-5 southbound movement. The deferral of this improvement reduces the safety and efficiency benefits for freight vehicles accessing I-5 southbound, and results in a movement not very different from the No-Build Alternative. Mobility benefits from the I-5 improvements would be retained for freight under highway phasing.

4.3.2 Hayden Island

The Hayden Island project segment traverses the entire island, from North Portland Harbor to the Columbia River. There is one affected interchange on this segment, referred to as the Hayden Island interchange.

This section describes positive and negative impacts associated with the LPA Options A and B on Hayden Island. I-5 would be expanded from the existing 6 lane configuration with a partial cloverleaf interchange design to a tight urban diamond interchange design with additional highway capacity but with a reduced highway footprint. The light rail station would be located adjacent to and west of I-5, and the transit alignment would be elevated on a structure, while the highway would be elevated on fill. Numerous bicycle, pedestrian, and local roadway improvements are included in the LPA, providing increased connectivity for vehicles and non-motorized modes. North Jantzen Drive east of I-5 would be modified, and future development at

the Jantzen Beach SuperCenter would be served by new local roadways both east-west and north-south to and through the development.

4.3.2.1 Business Displacements

Exhibit 4-7 shows an estimated 39 businesses displaced on Hayden Island that would be acquired as part of the LPA Option A, as well as 643 employees affected and an impacted approximately \$62.7 million in annual sales revenues. Business acquisitions would be comprised of a variety of commercial, service and retail establishments. Impacts associated with the LPA Option B are very similar, though 40 businesses would be displaced, affecting 664 employees, and approximately \$63.5 million in annual sales.

Exhibit 4-7. Business Effects on Hayden Island

Area	No. Businesses Impacted	No. Employees Impacted	Affected Annual Sales (Millions)
Hayden Island LPA Option A	39	643	\$62.7
Hayden Island LPA Option B	40	664	\$63.5

Source: CRC Acquisitions Technical Report and InfoUSA, 2009.

The business displacements caused by the LPA Options A and B are comprised of retail, services, and restaurant uses. This includes a section of restaurant and bar establishments currently between the existing freeway and N Center Drive; a restaurant and an office supply store west of N Center Drive; eateries and a cellular services store north of N Hayden Island Drive; fast food and service establishments along N Jantzen Beach Drive; two cellular arrays run as businesses both east and west of I-5; and the Safeway store east of I-5 between the existing freeway and N Jantzen Drive. The LPA Option A preserves one fast food establishment on the west side of N Jantzen Drive, while the LPA Option B results in a full acquisition. All other impacts are similar.

Hayden Island is a regional draw because of the numerous big box retail establishments located west of the freeway and the Jantzen Beach SuperCenter. Although the extent of displacements caused by the LPA is great, these regional attractors would not be directly affected. The City of Portland has, however, documented a vision for this area in the Hayden Island Plan (City of Portland, adopted August 2009). This plan assumes redevelopment of the SuperCenter property into a Regional Retail Center (called a “Lifestyle Center”) with mixed use and transit-oriented residential to the south. Redevelopment of the property is of interest to its current owners, who have entered into a design process, but put plans on hold because of current economic conditions. Even without redevelopment of the property, the retail uses west of the freeway could be assumed to draw regional traffic in the long run unless other regional centers locate nearby.

More important from an economic standpoint is the effect of the project on island residents as customers and/or employees of displaced businesses. The majority of businesses displaced by the LPA serve mainly local clientele. These include a series of delis and bars west of the freeway; local fast food and sit-down restaurants; retail; and services. The LPA displaces one of the two banking establishments and the only grocery store on the island. ODOT would work with affected business owners to provide relocation assistance.

The Safeway Grocery Store is the only grocery store on Hayden Island since another grocery store (Zupan’s) closed several years ago. The CRC project may suggest replacement sites for the relocation of Safeway, but it is entirely up to the store owners to choose their replacement location, if any. Officials representing the Jantzen Beach SuperCenter here initiated a site plan review with the City Portland. The SuperCenter plans a significant rebuilding effort that will

include an expansion of the Target store. Early indications suggest the SuperCenter will include a pharmacy and drugstore in a new location.

Relocation of Safeway to the north would mean a permanent loss in tax revenues for the City of Portland. Relocation to either the north or south would mean required travel on I-5 or the local arterial bridge between Hayden Island and North Portland for the LPA Option A for all customers and employees currently living on the island. Added to this is that movement to another location could reduce the viability of other Safeway stores nearby. Currently there are six other Safeway stores within 5 miles of the store on Hayden Island. Four of these are in Vancouver and two are in Portland.

4.3.2.2 Property Tax Impacts

Exhibit 4-8 presents the estimated property tax impacts associated with the LPA Options A and B on Hayden Island.

Exhibit 4-8. Tax Impacts from the LPA Options A and B (Hayden Island)

Area	Estimated Assessed Value of Right-of-Way (Millions)	Property Tax Impact (Thousands)	% of Multnomah County Budgeted 2008 Property Tax Revenues
Hayden Island LPA Option A	\$33.3	\$219	0.10%
Hayden Island LPA Option B	\$39.1	\$253	0.12%

Source: CRC Acquisitions Technical Report and Multnomah County Tax Assessor.

4.3.2.3 Parking Impacts

There is currently no on-street parking in this area. However, parking lot impacts would be experienced for the following properties adjacent to I-5 (Exhibit 4-9).

Exhibit 4-9. Parking Displacements for Businesses on Hayden Island

Business	Number of Parking Stalls Removed	Current Number of Parking Stalls
Large Hotel on North Hayden Island Drive	10	Approx. 700
Hotel on North Jantzen Drive	8	185
Parking Lot for Floating Homes	40	200
Jantzen Beach Super Center	930	1300+

The Jantzen Beach Super Center parking lot would have 175 spots permanently removed, but because of the high number of overall parking spaces in the area, the effect of this change would be small – a sufficient supply of parking would remain at the SuperCenter to serve anticipated future need most of the year, and the addition of light rail transit adjacent to the SuperCenter would help offset the small reduction in on-site parking.

4.3.2.4 Changes in Travel Patterns

Operational analysis conducted for the FEIS shows a similar mobility level at the Hayden Island interchange for the No-Build Alternative as it does for the LPA during the AM peak hour. The future No-Build would operate at a level-of-service (LOS) A at the Hayden Island Drive ramp and at an LOS B for the Center Avenue ramp, with a v/c of a 0.32 and a 0.35, respectively. This

indicates that the existing interchange configuration provides sufficient mobility in the AM peak hour. As the focus of traffic towards Hayden Island is centered on its retail uses, it is anticipated that the AM peak hour would not be of concern. In the PM peak hour, however, the future No-Build Alternative would operate at a LOS E at Hayden Island Drive ramp and at a LOS C at the Center Avenue ramp, with a v/c of a 0.67 and a 0.80, respectively. In the LPA, this would drop to a LOS B with a v/c of 0.42. Both Options A and B would have similar traffic impacts on Hayden Island, with a LOS A at the intersections with the local arterial bridge under Option A.

4.3.2.5 Access and Circulation Impacts

Access and circulation impacts of the LPA are summarized in Exhibit 4-10 below. Overall, access to Hayden Island would be improved by the LPA. The extension of the Yellow MAX Line would provide direct transit service for residents, employees, and customers between the island and both downtown Portland and Vancouver. The two lane arterial bridge between Hayden Island and North Portland would also provide an off-highway option for travelers between the island and mainland Oregon. The LPA includes widening two east-west local streets, extending N Tomahawk Drive under I-5, and widening N Jantzen Drive. Subsequent plans for the Jantzen Beach Super Center include rearranging the buildings around an extension of N Tomahawk Drive and the development of a new road connecting N Jantzen Drive to N Hayden Island Drive.

Exhibit 4-10. Access and Circulation Impacts for Businesses on Hayden Island with LPA Options A and B

Business	Access and Circulation
Large Hotel Property on North Hayden Island Drive	Access would be reduced from three entrances to one entrance opposite N Jantzen Drive.
Hotel on N Jantzen Drive	Right-in/right-out only from N Jantzen Drive, possible impacts to guest pull-up canopy.
Parking Lot for Floating Homes	Access only to N Tomahawk Drive and right in on N Jantzen Drive. Access preserved to the floating homes and slips.
Jantzen Beach SuperCenter	Widened N Jantzen Avenue, N Tomahawk Island Drive, and N Hayden Island Drive west of I-5 would improve circulation to the Super Center.

The widened N Jantzen Drive under Option A between the underpass with I-5 and N Hayden Island Drive to the north would acquire all the existing properties except for a fast food restaurant on the west and the hotel on the east side of N Jantzen Drive. The Project would restrict access to both the hotel and the restaurant to right-in/right-out only movements. The hotel and restaurant along N Jantzen Beach Drive could experience circulation impacts, because the entrances and areas adjacent to the road are currently the primary access and circulation for the businesses. Under Option B, only the hotel on the east side of N Jantzen Drive would remain, while the restaurant would be displaced by the project. Under both options, the expansion of the sidewalk along N Jantzen Drive to the east would require reconstruction of the guest canopy and load/unload area currently facing the street. This is the primary entrance for guests to the hotel, and alterations to the canopy could impact business operations. Access to the large hotel along N Hayden Island Drive would be reduced from three points to one new access opposite the widened N Jantzen Drive. This entrance would also serve banquet services and restaurants located on the property. All four businesses could experience slightly impaired circulation in the parking lot and increased congestion at the entrance. However, the design for N Jantzen Drive extends into the parking lot of the hotel, and could cause internal circulation issues, as the guest loading/unloading canopies and the principal entrance to the hotels would be difficult to maintain with the extension of the street.

4.3.2.6 Economic Development and TOD Potential

The transit station on Hayden Island could improve economic development in the area. The Hayden Island Plan (City of Portland, adopted Aug 2009) calls for the redevelopment of the Jantzen Beach SuperCenter. The existing mall would be demolished and replaced with new retail outlets in an urban grid street pattern. Building on the grid pattern, the Hayden Island Plan specifically cites the transition to a TOD over the life of the plan. Over time, the demand for residences on the island is expected to be accommodated in the redevelopment of a mixed use, mid-rise center with residences, business and commercial. An anticipated 1,000 new dwelling units may be constructed in the development. The potential for TOD at the Hayden Island station as summarized in Exhibit 4-11 below is high, realizing that the long-range plan for the area is to increase housing, create a walkable grid system, and provide commercial development closer to the proposed transit station.

Exhibit 4-11. TOD Potential for Hayden Island Light Rail Transit Station

Station Name	TOD Rating
Hayden Island	High

The transit alignment and station on Hayden Island would be elevated and create minimal to no disruptions to circulation within Hayden Island. However, if TOD potential were realized access and congestion could remain critical issues. The City of Portland has imposed a moratorium on any development on Hayden Island that would increase automobile trips to and from the highway. An Interchange Area Management Plan (IAMP) currently underway will assess mobility, access, and circulation issues related to existing and planned transportation facilities and land development. Metro's 2040 Growth Plan and the City of Portland TSP both reference development of a potential container port terminal by the Port of Portland west of I-5. For these development plans to be realized, good access between this facility and the highway would be considered necessary.

4.3.2.7 Differences with the LPA with Highway Phasing

The highway phasing option of the LPA contains no changes to Hayden Island.

4.3.3 Ruby Junction Maintenance Facility

This section describes impacts associated with the maintenance base impacts at the TriMet Ruby Junction Maintenance Facility located in Gresham, Oregon. TriMet currently owns and operates this rail storage and maintenance facility, which would be expanded to accommodate the additional rail vehicles. All impacts are related to the light rail transit portion of the project.

Although an expansion of the Ruby Junction Maintenance Facility would occur under both the build and No-Build Alternatives, the light rail transit alternative would require a larger expansion of the facility than would be necessary for the No-Build Alternative. This is because only 50 percent of the impacts associated with the light rail vehicle maintenance facility expansion at Ruby Junction would be attributable to the CRC project. Other impacts are attributable to other regional needs, specifically the Portland-Milwaukie Light Rail Project.

Exhibit 4-12 summarizes the business effects of the TriMet maintenance facility in Ruby Junction.

Exhibit 4-12. Business Effects on Ruby Junction

Area	No. Businesses Impacted	No. Employees Impacted	Affected Annual Sales (Millions)
Ruby Junction LPA Options A and B	8	79	\$12.3

Source: CRC Acquisitions Technical Report and InfoUSA, 2009.

The Ruby Junction Maintenance Facility expansion would require full acquisition of eight businesses employing an estimated 79 people, with estimated annual sales of approximately \$12.3 million. The affected area includes a mix of service and industrial businesses, some of whose owners live and work in the same physical location. There are other industrial and commercial lands that could accommodate these businesses; however, finding land that could accommodate owners that live and work at the same location could be more difficult than finding industrial or commercial land within the Portland Metro area suitable for work only. The displaced businesses do not have overly large land needs, and ODOT would provide relocation assistance to each affected property owner.

Exhibit 4-13 presents the estimated property tax impacts associated with the LPA at Ruby Junction.

Exhibit 4-13. Tax Impacts from the LPA Options A and B (Ruby Junction)

	Estimated Assessed Value of Right-of-Way (Millions)	Property Tax Impact (Thousands)	% of Multnomah County Budgeted 2008 Property Tax Revenues
Ruby Junction LPA Options A and B	\$2.4	\$15.8	<0.01%

Source: CRC Acquisitions Technical Report and Multnomah County Tax Assessor.

As shown in Exhibit 4-12, the property tax impacts from the eight business displacements in the area of the Ruby Junction Maintenance Facility represent less than 0.01 percent of the total annual 2008 property tax revenues for Multnomah County.

4.3.3.1 Differences with the LPA with Highway Phasing

The highway phasing option of the LPA contains no changes at the Ruby Junction Maintenance Facility.

4.3.4 Washington

4.3.4.1 Downtown Vancouver

The Downtown Vancouver area starts at the northern bank of the Columbia River and extends north to McLoughlin Boulevard. Impacts and benefits associated with both light rail transit and the roadway improvements are described in this section. The LPA Options A and B in this area would include the construction of two park and ride facilities:

- Columbia Park and Ride located west of the I-5 and SR 14 interchange on-ramp, and
- Mill Park and Ride comprising the city block between 15th and 16th Streets and Washington and Main Streets.

Within Downtown Vancouver, light rail would run two-way along Washington Street from the new bridge structure to 7th Street, and from there northbound light rail travels east on 7th Street,

turning north onto Broadway. Between 7th Street and 17th Street, light rail transit would run down the east side of Washington Street (southbound) and the west side of Broadway Street (northbound). Broadway would be converted to one-way car travel, and Washington is currently one-way southbound. Vehicular accesses to driveways on the east side of Washington Street and the west side of Broadway Street would be closed.

Employment, annual sales, and property tax impacts of acquisitions for the project in Downtown Vancouver are described in the sections that follow.

Business Displacements

Exhibit 4-14 provides an estimate of the number of businesses that would be displaced by the project in Downtown Vancouver, as well as the number of employees and the annual sales revenues that would be affected. Three of the business displacements would be located west of the I-5/SR 14 interchange, and one funeral home business would be displacement due to the closure of access vital to the business along Broadway Street.

Exhibit 4-14. Business Displacements in Downtown Vancouver

Area	No. Businesses Impacted	No. Employees Impacted	Affected Annual Sales (Millions)
Downtown Vancouver LPA Options A and B	17	169	\$18.1

Source: CRC Acquisitions Technical Report and InfoUSA, 2009.

Displaced businesses include an electrical contractor, an automotive repair business, a construction business, professional service-oriented businesses, a funeral business, and a large hotel that in total employ 169 people with approximately \$18.1 million annual sales revenues. WSDOT would provide relocation assistance to each affected property owner.

Property Tax Impacts

Exhibit 4-15 presents the estimated property tax impacts associated with the LPA within Downtown Vancouver.

Exhibit 4-15. Tax Impacts from the LPA Options A and B (Downtown Vancouver)

	Estimated Assessed Value of Right-of-Way (Millions)	Property Tax Impact (Thousands)	% of Clark County Budgeted 2008 Property Tax Revenues
Downtown Vancouver LPA Options A and B	\$5.2	\$12	<%0.01

Source: CRC Acquisitions Technical Report and Clark County Tax Assessor.

Parking Impacts

The LPA through Downtown Vancouver would reduce available on-street parking along the entire transit line, as illustrated in Exhibit 4-16 below. Approximately 32 percent of existing on-street parking would remain on Washington Street and 34 percent would remain on Broadway Street.

Exhibit 4-16. Permanent On-Street Parking Impacts

Streets	No. Parking Existing (both sides of street)	No. Parking Remaining (both sides of street)	Percentage Remaining
5th Street	27	0	0%
Washington Street	143	46	32%
7th Street	110	9	8%
Broadway Street	123	42	34%
17th Street	123	15	12%
McLoughlin Boulevard	129	20	16%

On-street parking would remain available within Downtown Vancouver on streets not affected by light rail transit, and parking utilization data (CRC 2009b) indicate that sufficient remaining parking is located within a two block radius of businesses to meet demand. The addition of light rail transit in Downtown Vancouver would provide an alternative to driving and parking, and the Columbia Park and Ride (718 stalls) is located in close proximity to Downtown Vancouver, providing an option to commuters who are also interested in accessing downtown for shopping or services.

One unofficial parking lot with approximately 150 unmarked spots is located on the block that would become the Mill Park and Ride. The 150 displaced spots would be replaced by 531 stalls provided by the park and ride.

The Vancouver City Center Vision Parking Policy (Policy 7) requires on-street parking lost to development to be replaced within 750 feet from where it was removed. The project has acknowledged this policy and will attempt to meet it wherever possible in downtown Vancouver, however parking will be offset by park and rides and light rail in downtown Vancouver. The Land Use technical report (CRC 2009b) provides a more detailed assessment of the Project's consistency with this policy.

Exhibit 4-17 provides a more detailed look at parking impacts along 17th Street in Downtown Vancouver. These are provided on a block-by-block basis.

Exhibit 4-17. On-street Parking Impacts along 17th Street (by block)

Blocks	No. Existing Parking Spaces (both sides of street)	No. Planned Parking Spaces (both sides of street)	Percentage Remaining
Washington to Main	17	9	53%
Main to Broadway	19	0	0%
Broadway to C	11	0	0%
C to D	13	0	0%
D to E	16	0	0%
E to F	18	0	0%
F to G	16	0	0%
Totals:	110	9	8%

The Project would remove the majority of existing on-street parking along 17th Street. The total reduction in parking on 17th Street associated with the light rail transit element of the LPA is 110 spaces removed (92 percent). The light rail transit design along 17th Street would require

acquisition of the on-street parking due to the center-running trackway alignment and the reconstruction of sidewalks.

Existing businesses along 17th Street are clustered at the west end, near Washington Street. All have off-street parking lots and/or access to other on- and off-street parking, and nine on-street parking spaces would be retained between Washington and Main Streets. Existing off-street lots range between 5 and 15 stalls and are located either in front of, along the side of, underneath, or in the rear of each business. The access to these off-street lots would become right-in, right-out. The zoning along 17th Street is CX (City Center) which promotes bicycle, pedestrian, and transit use, however no light rail transit stops would be located along 17th Street. The loss in on-street parking along 17th Street could have a minor impact on current and future businesses; but this impact is not expected to be severe as parking would be available nearby in off-street parking lots and via side streets and businesses would benefit from increased visibility from potential customers using light rail transit service along 17th Street. Exhibit 4-18 summarizes off-street parking impacts to businesses along 17th Street.

Exhibit 4-18. Off-street Parking Impacts along 17th Street

Address (Business)	Impacts
Southwest corner of Broadway Street and 17th Street	Approximately 5 spaces impacted in the bank parking lot, mostly from the need to reconfigure the parking lot for circulation with the anticipated access changes.
Southeast corner of Washington and 17th Street	Approximately 3 spaces impacted due to the turning radius of the light rail vehicle.
Community Center	Turn lane and sidewalk along west side permanently removes 7 parking spaces.

A total of 14 off-street parking lot stalls would be removed by the light rail transit element of the LPA concentrated at two locations (a community center east of I-5, and two off-street lots along 17th Street, off of Broadway and Washington Streets. Both lots appear to have adequate space for customers and would be both located close to a light rail transit stop (in one case immediately adjacent to, and in the other case within two blocks).

Changes in Travel Patterns

Vehicle demands and speed profiles reported in the Traffic Analysis Technical Report (CRC 2009e) were used to determine effects to the overall I-5 corridor, defined as Pioneer Street to Marquam Bridge, a 23-mile corridor. The LPA would result in increased vehicle demands for southbound I-5 north of SR 14 during the morning peak period. Between SR 14 and Alberta Street, I-5 would show minimal increases in vehicle demands, less than 5 percent compared to the No-Build Alternative conditions, because of the tolling of the bridge and downstream congestion near the vicinity of I-405/Alberta. South of Alberta Street to the Marquam Bridge, I-5 would show minimal increases and decreases (plus or minus 5 percent compared to the No-Build Alternative).

The increased vehicle demands north of SR 14 would result from improvements included north of the I-5 bridges in the LPA, which are expected to improve access to the Port of Vancouver, downtown Vancouver, and businesses along Officers Row. Speeds on the I-5 between Pioneer Street and Main Street during the morning peak would generally be greater than 50 mph; however, downstream bottlenecks would continue to cause congestion for points upstream to Main Street and key freight corridors, such as Columbia Boulevard.

The LPA would increase local connectivity and mobility along local streets in downtown Vancouver. At the intersection of 5th and Washington Streets, the intersection would improve from LOS B under the No-Build in 2030 to LOS A in all four of the LPA Options A and B Full Build and LPA Options A and B with highway phasing scenarios. Similarly, the intersection at 6th and Washington Streets would improve from LOS C to LOS B in the afternoon peak. At the 9th and Columbus intersection, there would be a substantial improvement from LOS F to LOS C for the eastbound left and through movements. The peak hour delay for this movement would improve (decline) from 80 seconds under the No-Build Alternative to 21 seconds under all four of the LPA Options A and B Full Build and LPA Options A and B with highway phasing options.

Converting Broadway Street from a two-way street into a one-way northbound street would have a minor impact for customers and employees to access businesses along the street. Some out of direction travel and changes in parking locations could initially make it more difficult. Further, converting the street to one way could reduce visibility to businesses along Broadway, as autos in the southbound direction would no longer be traveling directly in front of business. This is most important for businesses that rely heavily on drive-by traffic, such as gas stations or fast-food restaurants. Current businesses along Broadway are small retail, restaurant, and service-oriented. The reduced visibility due to conversion to one-way traffic is expected to be countered by increased visibility through the addition of light-rail service and three stops along Broadway Street. For this reason, net visibility for businesses along Broadway is expected to be improved.

This improved connectivity and mobility would help businesses in downtown Vancouver by making travel more convenient for potential customers. In addition, the proximity of the park and ride locations to downtown Vancouver would increase the number of trips that would be attracted to the area, increasing visibility of local businesses for pedestrians (to and from the light rail transit station), transit riders, and motorists.

In the northern section of Downtown Vancouver, additional intersection improvements would occur at 11th and Main Streets, at the intersections with Mill Plain Boulevard between Washington Street and C Street, and at the intersections of 15th Street with Columbia and Washington Streets. However, LOS would decline in the afternoon peak along the Evergreen Boulevard intersections with Columbia, Washington, Main, and C Streets. The intersection of Evergreen Boulevard and Main Street would decline from LOS B under the No-Build to LOS D under the LPA. Other areas where the LOS would decrease between the 2030 No-Build and LPA in the afternoon peak include 8th Street and Esther Street and Columbia Streets, and 15th and Broadway and C Streets. However, even with these declines, these intersections would still meet local roadway mobility standards.

For the LPA, the single-point urban interchange (SPUI) at Mill Plain Boulevard and I-5 would function at LOS F, with over 100 seconds of delay during the peak hour. Thus, this interchange would not meet the standard for operations in Vancouver. Under 2030 No-Build conditions, the Mill Plain Boulevard I-5 southbound on- and off-ramps would also operate at LOS F, but with slightly shorter delays. Under 2030 No-Build conditions, the northbound on- and off-ramps at Mill Plain Boulevard at I-5 would operate at LOS D. These reductions in mobility are not anticipated to substantially impact businesses that draw customers locally or from the broader region in the vicinity of the interchange, but they could have negative impacts to businesses because of increased congestion.

During the morning peak hours, the LPA would result in more improvements between the 2030 No-Build and the LPA; however, there is typically less traffic during the morning peak than the afternoon peak. Thus, the afternoon peak was used to represent the most congested times.

Access and Circulation Impacts

Access in Downtown Vancouver would be affected by the structures associated with the new light rail system, in addition to the touchdown point of the new bridge. Most access changes would take place along Washington and Broadway Streets because of the addition of side-running light rail. Access to businesses opposite the light rail tracks along these streets would be restricted to right-in/right-out only on the side without the rails, and accesses adjacent to the rails would have permanent access closures. There is one permanent street closure on 5th Street west of Washington Street to allow the transit alignment to touch down. This could impact access to businesses within the area, though there are relatively few in the immediate vicinity. The impact of closing 5th Street west of Washington is not expected to impact circulation within downtown as it is not a heavily used connection within downtown and not pivotal for east-west travel within Vancouver as a whole. The closure is not a severe impact for business access and circulation. The parking lot for one auto-oriented business would have all its accesses removed. This could result in the business not being able to perform its existing functions because it would close the access to the garage door where cars are pulled into the garage for repairs.

Exhibit 4-19 describes specific access and circulation changes on a block by block basis in Downtown Vancouver, while Exhibit 4-20 shows access modifications.

There is one permanent street closure on 5th Street west of Washington Street to allow the transit alignment to touch down. This could impact access to businesses within the area, though there are relatively few in the immediate vicinity. The impact of closing 5th Street west of Washington is not expected to impact circulation within downtown as it is not a heavily used connection within downtown and not pivotal for east-west travel within Vancouver as a whole. The closure is not a severe impact for business access and circulation. The parking lot for one auto-oriented business would have all its accesses removed. This could result in the business not being able to perform its existing functions because it would close the access to the garage door where cars are pulled into the garage for repairs.

Exhibit 4-19. Access and Circulation Impacts for Businesses in Downtown Vancouver

Road	Extent	Driveways
5th Street	Between Columbia and Washington Streets	The driveway on 5th Street near Columbia would remain open. The mid-block driveway will be closed potentially cutting off access to an auto repair business garage.
5th Street	Between Washington and Main Streets	On the north side of 5th, there are two existing driveways to an existing parking lot. The driveway closest to Washington will be closed.
Washington Street	Between 5th and 6th Streets	Two driveways would be removed from the west side of Washington Street. One driveway is the only access to a small parking lot with approximately 8 spaces adjacent to a bar/lounge business and a guitar studio.
Washington Street	Between 8th and 9th Streets	One driveway that accesses a building garage would be removed on the east side of Washington Street. This is the only driveway for the building.
Washington Street	Between Evergreen Blvd and 11th Street	Two driveways would be removed on the east side of Washington Street. Each driveway accesses its own parking lot. The northern driveway is the only access to its parking lot while the southern parking lot has two accesses. The northern parking lot is currently vacant.

Road	Extent	Driveways
Washington Street	Between 11th and 12th Streets	Two driveways would be removed on the east side of Washington Street. The southern driveway accesses an alley that leads to a small parking area with approximately 12 spaces. This parking area has a second access point on 11th Street. The northern driveway accesses a larger parking lot that has a second access on 12th Street.
Washington Street	Between 12th and 13th Streets	Two driveways on the east side of Washington Street with access to a parking ramp would be removed. These are the only two access points to the parking ramp. Solutions include relocation of driveways to 13th Street, modification of garage structure to allow for access to side streets, or construction of a signalized track crossing to allow for entrance off and exit onto Washington Street.
Washington Street	Between 13th Street and Mill Plain Boulevard	Two driveways would be removed on the east side of Washington Street. The southern driveway is the only access for a small parking lot set off street that serves the historic Foster Hidden House and a recording studio. The northern driveway is one of three access points for a larger parking lot.
Washington Street	Between Mill Plain Boulevard and 15th Street	Two driveways on the east side of Washington Street with access to a large parking lot would be removed. The parking lot has two additional access points, one on 15th Street and one on Mill Plain Boulevard.
Washington Street	Between 15th and 16th Streets	One driveway on the west side of Washington street would be removed. This is one of two driveways for the current business.
Broadway Street	Between 7th and 8th Streets	Three driveways would be removed on the west side of Broadway Street. The two southernmost driveways access the vacant C-Tran building's parking/loading area and are the only means of access to the area. The northern driveway accesses another property's parking lot which consists of approximately 20 spaces and is the only access point to the lot.
Broadway Street	Between 8th and 9th Streets	One driveway would be removed on the west side of Broadway Street. The removed driveway is one of four access points to a large parking lot.
Broadway Street	Between Evergreen Boulevard and 11th Street	One driveway on the west side of Broadway Street with access to an approximately 25-space parking lot would be removed. The parking lot has two other access points on 11th Street.
Broadway Street	Between 11th and 12th Streets	One driveway on the west side of Broadway Street with access to a parking garage would be removed. The parking garage has two additional access points on 12th Street.
Broadway Street	Between 12th and 13th Streets	Four driveways would be removed: three on the west side of Broadway Street, and one on the east side. The southernmost driveway on the west side of the street is the only access point to the Vancouver Funeral Chapel's basement. The middle driveway is one of two points of access to Vancouver Funeral Chapel's first level, the other access point is on 12th Street. The northern driveway is one of two access points to a parking lot on the corner of 12th and 13th Streets, the other access point is on 13th Street. The driveway on the east side of Broadway Street is one of three driveways accessing the parking lot. The other two driveways are located on C Street and 12th Street, and would remain open.
Broadway Street	Between Mill Plain Boulevard and 15th Street	Two driveways would be removed on the west side of Broadway Street. The southern driveway accesses a parking lot that has two additional accesses, one on Mill Plain Boulevard and one on Main Street. The northern driveway is the only access to an automotive shop's parking lot. The automotive shop has an additional parking lot on the corner of 15th Street and Main Street with two access points.

Road	Extent	Driveways
Broadway Street	Between 15th and 16th Streets	Three driveways would be removed: two on the west side of Broadway Street, and one on the east side. The southern driveway on the west side accesses the garage of a building that contains a geotechnical engineering firm and a product design/development firm. The building has a second garage access on 15th Street however this may be a separate garage. The northern driveways accesses an alley that leads to parking lot that has an additional access point on 16th Street. The driveway on the east side accesses a parking lot that has alternate access on C Street, and could have additional access on 15th.
Broadway Street	Between 16th and 17th Streets	Two driveways would be removed. The southern driveway accesses a parking lot that has three additional access points, two on 16th Street and one on Main Street. The northern driveway accesses a bank drive-through that has an additional access point on Main Street. Reconfiguration of the bank's parking lot would be required for proper circulation.

Exhibit 4-20. Access Modifications

Road	Extent	Driveways
Washington Street	Between 5th and 6th Streets	Access would be restricted to right-in/right-out only for the 2 driveways into the Smith Tower following construction. The current configuration is left-in/left-out only.
Washington Street	Between 7th and 8th Streets	Access would be restricted to right-in/right-out only for 2 driveways, one into a parking lot and the other into a building garage. The current configuration is left-in/left-out only.
Washington Street	Between 9th and 16th Streets	Access would be restricted to right-in/right-out only for 10 driveways following construction. Washington Street is currently one-way in this area, so the restriction would not be a large change from what exists.
Broadway Street	Between 7th and 16th Streets	Access would become right-in/right-out only for 8 driveways following construction. Broadway Street is currently two-way through this area.

Eighteen accesses along 17th Street between Washington Street and G Street would be modified to right-in/right-out only movements. Westbound to southbound left turns would be allowed at Main Street and 17th Street and eastbound to northbound left turns would be allowed at Broadway Street. All other left turn movements along 17th Street would not be allowed. Businesses west of C Street include banks, business centers, mail/packaging services, salons, dance studios, and physical therapy clinics. These businesses do not rely heavily on drive-by traffic. Any access impacts associated with circulation constraints would be offset by increased visibility from the addition of light rail transit.

Additionally, the 17th Street light rail would acquire portions of three parcels owned by a bank, including two accesses on Broadway Street (one access for the drive-through banking services, and one access for the general parking lot). The sections of the parcels that are acquired would require the bank to change the internal circulation pattern of their drive-through service.

While Downtown Vancouver is currently comprised of one-way and partially one-way streets (streets that transition from two-way to one-way), the new street system is expected to improve circulation by creating greater consistency through Downtown. Light rail would travel down the side of the street with one-way traffic in two lanes on the other side. Customers and employees

would need to change their travel patterns to accommodate the two-way to one-way conversion on Broadway Street (Washington Street is currently one way).

Access to and from the two proposed park and rides in Downtown Vancouver would add traffic to the local street system, especially in the vicinity of 5th Street and Main Street near the Columbia Park and Ride, and in the vicinity of Mill Plain Boulevard and 15th Streets and a variety of north-south streets near the Mill Park and Ride. The addition of hundreds of vehicles to the local street circulation system in the peak hour could diminish mobility along the network but as an economic impact this is expected to be offset by the increase in visibility from auto and pedestrian traffic along these same streets.

Economic Development and TOD Potential

The economic development and TOD potential for the three light rail transit stations located in Downtown Vancouver is summarized in Exhibit 4-21 and described in the paragraphs below.

Exhibit 4-21. TOD Potential for Downtown Vancouver Light Rail Transit Stations

Station Name	TOD Rating
5th Street Station	Moderate
9th Street Stations	Moderate to High
15th Street Stations	High

5th Street Station Light Rail Station

The area in the immediate vicinity and blocks north of the 5th Street station is already built up with higher-quality, higher-density infill development comprised of a mixture of condominiums, apartments, offices, and retail. The station area includes Esther Short Park, the Vancouver Convention Center, the Columbia Park and Ride, and I-5. There is potential for economic development associated with the City of Vancouver's goal to provide ground-floor retail in park and ride structures, and there are pockets of vacant land and some parcels currently dedicated to surface and garage parking that could be developed into high rise, mixed-use developments. The existing uses suggest very high transit ridership potential, and TOD development potential in this station area is considered moderate (not high because of the limitations to new development cited above).

9th Street Light Rail Stations

The proposed alignment for light rail is on Washington and Broadway Streets, and the station locations would be north of 9th Street. The stations would be separated by two blocks, but have very similar zoning and development patterns.

These two areas have a TOD potential rating of medium to high. There are several factors that led to this rating. The City of Vancouver and C-TRAN own several vacant parcels within 0.25 mile of the station. The dominant zoning category CX (City Center) is conducive to infill and redevelopment. Current development is lower density than what is allowed under zoning. Public ownership could be supportive of development or redevelopment into TODs in the future. The station area on Broadway Street is constrained by I-5 to the east, with little connectivity across the highway, except Evergreen Boulevard to the north, and a connection under the I-5/SR 14 interchange that would be constructed as part of the LPA.

Commercial businesses could be attracted to the area following the construction of light rail due to the increase of “pass-by” traffic from transit which would allow for a potential increase in customers. Economic development potential exists because of the underutilized and lower-density development in this area.

15th Street Light Rail Stations

The stations north of 15th Street on Broadway and Washington Streets would also be separated by two blocks, and have similar zoning, which is very conducive to TOD. Mixed use, commercial (the predominant land use), and high density residential developments already exist in the vicinity of the station. There are many vacant parcels and lower valued buildings in the vicinity, making the 15th Street Station areas highly conducive for TOD development. Additionally, the area immediately east of the station on Washington Street is currently used informally as a surface parking lot, and would be developed as a park and ride.

The City of Vancouver has plans for ground-floor retail in parking structures created by the project, and so the economic development potential of the area is rated as high.

Differences with Highway Phasing of the LPA

The highway phasing option of both LPA Options A and B contains no changes in Downtown Vancouver.

4.3.4.2 Upper Vancouver

Upper Vancouver encompasses the area between McLoughlin Boulevard north to SR 500. Employment, annual sales, and property tax impacts of acquisitions associated with the LPA in Upper Vancouver are described in the following sections.

Business Displacements

Exhibit 4-22 summarizes the number of businesses displaced by the project in Upper Vancouver for the 17th Street alignment, along with the number of employees and annual sales revenues that would be affected.

Exhibit 4-22. Business Effects on Upper Vancouver

Area	No. Businesses Impacted	No. Employees Impacted	Affected Annual Sales (Millions)
Upper Vancouver	0	0	\$0

Source: CRC Acquisitions Technical Report and InfoUSA, 2009.

No businesses would be acquired in upper Vancouver from the project.

Property Tax Impacts

Exhibit 4-23 presents the estimated property tax impacts associated with the LPA in Upper Vancouver.

Exhibit 4-23. Tax Impacts from the LPA Options A and B (Upper Vancouver)

Area	Estimated Assessed Value of Right-of-Way (Millions)	Property Tax Impact (Thousands)	% of Clark County Budgeted 2008 Property Tax Revenues
Upper Vancouver	\$1.4	\$3	<%0.01

Source: CRC Acquisitions Technical Report and Clark County Tax Assessor.

For both potential alignments, the acquisitions referenced in Exhibit 4-19 would be small encroachments to structures on a parcel. Some impacts would be temporary transit easements where the remaining land is considered economically viable. The largest acquisition for the park and ride is not taxed as it belongs to the College.

Economic Development and TOD Potential

One light rail transit station would be built in Upper Vancouver, which is the Clark Park and Ride located on McLoughlin Boulevard east of I-5 at the southwest edge of Clark College. Exhibit 4-24 summarizes the TOD potential for this station.

Exhibit 4-24. TOD Potential for Clark Park and Ride

Transit Station Name	TOD Rating
Clark Park and Ride	Low

Currently, no businesses are located around the proposed park and ride. The dominant zoning is low-density residential and the highway and the college are major uses within 0.25 mile. For these reasons, the station was rated as having low TOD potential. TOD could occur time if the College chooses to focus future campus-related development closer to the light rail transit station.

Differences with Highway Phasing of the LPA

The phased construction would defer the construction of the north legs of the SR 500 and I-5 interchange and retain the existing freeway to freeway connection. This would lessen the impacts to the school and residential area west of I-5 in the northern part of the study area. However, there would be no changes to the tax impacts between the LPA and the LPA with highway phasing as the impacts to the taxable areas would be simply easements, and the larger tax impacts occur on the school property, which is not taxed. No businesses are impacted in this area.

Deferring the north legs of the I-5/SR 500 interchange could slow the expected industrial and commercial development east of I-5. This is described in more detail as part of the indirect effects report.

4.4 Impacts to Regional Economic Sectors

The I-5 corridor is the backbone of a series of roads that provide access to the greater Vancouver and Portland regional areas for freight, employees, and personal trips. A trade capacity analysis (Global Insight et al. 2006) forecasts an increase in commodities transported by truck in the Portland-Vancouver region from 197.2 million tons in 2000 to 390.0 million tons in 2030, nearly doubling in 30 years. The Oregon Commodity Flow Forecast (Global Insight 2005) projects an 81 percent increase in tonnage moving to, from, and through the state by 2030. The trade capacity analysis study concluded further that while all modes are important, the roadway system links all

of the others and links land uses critical to business. Roadway congestion increases the cost of doing business for those activities that are transportation dependent.

As noted in a study about the cost of congestion to the local economy (EDR Group 2005), the Portland-Vancouver region is more susceptible to long-term economic losses from congestion than other areas of the country because its economy is relatively highly dependent on manufacturing, transportation/port distribution, and services that serve broader regional, national and global markets. These firms bring new money into the region by selling their products and services nationally and internationally. They could locate elsewhere, but choose the Portland-Vancouver region for its attractiveness and competitiveness for their operations. These industries are particularly vulnerable to costs imposed by increased congestion and have the option of moving their operations elsewhere if transportation conditions compromise the viability of the region as a base for their operations. A conclusion of this study was that an inadequate transportation system would negatively impact regional competitiveness, if not addressed.

According to a study of the regional economic effects of transportation choke points (Cambridge Systematics, et al. 2003), five industries are particularly sensitive to road and rail congestion in the Portland-Vancouver region (mainly in the I-5 and I-205 corridors); lumber/wood/paper, distribution/wholesale trade, transportation equipment/steel, farm and food products, and high-tech (electronics and scientific instruments). These five industries account for approximately 70 percent of commodity tonnages crossing the I-5 and I-205 bridges by large truck, and accounted for 31 percent of Oregon and Washington's gross regional output in 2000. Thus, these industries are particularly vulnerable to delay and decreased travel time reliability resulting from roadway congestion in the I-5 corridor. According to a study of the regional economic effects of transportation choke points (Cambridge Systematics et al. 2003), congestion at the I-5 bridge will increase the cost of delay to trucks by 140 percent, from \$14 million in 2000 to \$34 million in 2020. The project would result in user benefits to the trucking industry by reducing labor costs, improving safety, potentially improving vehicle operating costs, and reducing scheduling uncertainty.

The main sources of regional truck traffic are the Port of Portland, the Columbia Corridor, the Port of Vancouver, and the Columbia Industrial Park in Washington. Existing conditions analysis in the Traffic Technical Report (CRC 2009e) states the highest truck demands occur in the vicinity of Columbia Boulevard and Marine Drive. In Washington, the important regional truck movements occur east-west from SR 14 to Mill Plain Boulevard via I-5. On I-5, the truck volume peak hour is between noon and 1 p.m. in both the northbound and southbound direction.

In the No-Build Alternative, I-5 in the southbound direction at Columbia Boulevard would be congested between noon and 1 p.m., meaning speeds are 30 miles per hour (mph) or less for the majority of the hour. Congested conditions at I-405 would cause congestion at upstream interchanges up to Interstate Avenue, but Marine Drive is forecasted to have un-congested conditions for the majority of the peak truck hour, noon to 1 p.m., because it is further upstream from I-405. All other intersections of truck routes identified in the previous paragraph with I-5 would have speeds at 50 mph or greater for the majority of the hour in both directions. Under the LPA, Columbia Boulevard in the southbound direction would have speeds of 50 mph or greater for the majority of the noon to 1 p.m. hour, which would be a benefit to businesses along the Columbia Corridor. Improved access resulting from the project would reinforce economic growth and development that is already occurring in both regions, based on the many factors that drive growth. The project would support this growth by reducing the roadway congestion experienced by freight and other vehicles going to and from the two cities. Additionally, transit connections would improve travel time accessibility and broaden the pool of labor available to downtown firms within a given commute time.

4.5 Tolling

ODOT commissioned a series of papers to address the concept of tolling within Oregon. These Tolling White Papers addressed 7 different topics on tolling and associated effects, one of which, *Economic Evaluation of Improved Reliability*, is applicable to the CRC project. Generally, the paper found that process and methods to measure the economic effects of reliability are difficult and current methods do not accurately determine reliability for major arterials or primary and secondary modes. These techniques have only been applied to limited-access highways. The paper goes on to explain that if the data on reliability are available for all affected roadways, it is relatively straightforward to measure the direct effects. The indirect effects, however, are more difficult because how overall travel is constrained or expanded by improved (or reduced) reliability remains largely unaddressed within the research.

Three classes of measurement were identified by the paper:

- Lost utility of activity participation (personal and commercial travel);
- schedule delay costs (personal and commercial travel); and
- Operational analysis (commercial travel).

The paper suggested that these issues need to be addressed to determine the full economic effects of improved transportation system reliability, as improved reliability may change the ways that people travel, their access to employment, shopping and cultural activities, and their choices of transportation modes.

The LPA assumes a variable-price toll using the scenarios outlined in Exhibit 4-25 below. Currently these scenarios are being explored with the public.

Exhibit 4-25. Tolling Scenarios under Consideration

North and Southbound Toll	Variable Toll Rate Range ^a
Base Toll	\$1.00 to \$2.00
Directional Toll (rates differ by travel direction)	\$1.00 to \$3.00
2x Base Toll	\$2.00 to \$4.00
3x Base Toll	\$3.00 to \$6.00
Southbound Toll Only	Variable Toll Rate Range ^a
Base Toll	\$2.00 to \$4.00
2x Base Toll	\$4.00 to \$8.00

a Tolls are in 2006 dollars.

The application of a variable toll pricing scheme to the new I-5 bridges would add an out-of-pocket cost to trips over the bridges, and would result in an overall reduction of bridge crossings compared to the LPA with no toll and the No-Build Alternative.

Although traffic analysis identifying bridge crossings for tolling scenarios under the LPA are not yet available, the Traffic Technical Report (CRC 2007e) prepared for the DEIS provides a comparison of tolling effects on total bridge crossings. Compared to the No-Build Alternative conditions, provision of a toll on Alternative 3 of the DEIS (closest to the current LPA) would decrease overall river crossings by 19,000 vehicles per day, with I-5 traffic volumes decreasing by 32,000 vehicles but I-205 volumes increasing by 13,000 vehicles (CRC 2007).

Travel times for these tolling scenarios have not yet been forecasted, but presumably a toll on I-5 would reduce travel times and improve travel time reliability (Metro 2000), as some potential vehicle travelers would avoid making a river crossing or switch to transit instead. For many, the value of time saved from reduced congestion would be greater than the out-of-pocket cost of the toll, creating a user benefit which would translate into greater efficiency and increased business productivity. Increased business productivity can make a location more attractive for business and residential development, and improve opportunities for trade (Clower and Weinstein 2005).

The proposed toll options would have a variable toll structure, charging different toll amounts for the peak and the non-peak periods. Variable priced tolling schemes have the potential to reduce overall congestion and regulate traffic flows. This is because, in part, persons with greater schedule flexibility and more sensitivity to out-of-pocket costs will choose to travel during the non-peak period to pay a lower toll, and persons with less flexible schedules, carrying valuable or time-sensitive goods, would be less sensitive to the out-of-pocket cost of the toll and would travel during whatever period dictated by their schedules. Depending on specific tolling schemes and transit fare structures, some persons most sensitive to out-of-pocket costs may shift to transit.

Variable tolls are likely to be beneficial for freight-dependent businesses and businesses that rely on just in time deliveries, because the predictability of travel would also increase. However, the greater the variable toll, the higher the operating costs for truck movements during peak-charge periods, although the peak truck hour is the noon hour. Truck volumes are highest between the hours of 9 a.m. and 3 p.m.: 42 percent of daily truck traffic on the bridge occurs during this period because truck drivers prefer to travel during uncongested conditions.

4.6 Marine Commerce on the Columbia River

The CRC project would have a positive effect on marine commerce on the Columbia River. The existing I-5 bridge structures each have nine piers which result in navigation “channels” between the piers. Three such channels are used for navigation:

- a wide span with approximately 60 feet mid-span vertical clearance,
- a high span with approximately 70 feet of mid-span vertical clearance, and
- a lift span with approximately 40 feet mid-span vertical clearance when closed and 180 feet when open.

The wide span is the main channel used for navigation, but during high-water many barges need to use the high span, or require bridge lifts at the lift span. In 2004, there were 604 bridge openings. The proposed I-5 bridges would be high enough to allow the vast majority of vessels to pass without bridge openings. With the exception of a small number of specialized vessels that use the river infrequently, the majority of vessels require vertical clearances of less than 90 feet from the surface of the water to the bottom of the bridge deck. The project team, in consultation with the Coast Guard, established a 95-foot minimum vertical clearance for structures built without a lift span. Vertical clearances greater than 95 feet would raise the bridge structure into restricted airspace for flight navigation.

Currently, bridge openings are restricted to non-peak roadway commute hours. Thus, the new spans would provide more flexibility in operating schedules for marine commerce. The new spans would also eliminate some of the “zig-zag” marine movements currently required for marine traffic to pass under the highway and railroad bridge structures at their highest elevation.

In the LPA, the structures would be supported by six piers, three fewer piers than exist on the current bridges, thus widening the horizontal clearance of navigation channels. The bridge span

length would be 465 feet, with 390 feet of clearance for marine travel between the pile caps, which would be an increase over the width of the “main channel” by 127 feet and a decrease of the “barge channel” width by 121 feet. The current main channel width is 263 feet, and the barge channel has a horizontal clearance of 511 feet. The longer span lengths in the main channel would provide more room for boat captains to maneuver between the piers and improve the inherent safety of marine navigation.

4.7 Rail Traffic

The Burlington Northern Santa Fe (BNSF) railroad mainline operates on an east-west alignment north of the Columbia River in Vancouver, between the river and downtown Vancouver. During discussions between the CRC project team and railroad personnel, no long-term impacts to rail traffic operations were identified. No long-term interface would exist between the LPA and the railroad, although the project provides a better line up with the swing span. Short-term impacts are discussed in Chapter 5.

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5. Temporary Effects

5.1 Introduction

This section evaluates the positive and negative economic impacts that may occur during construction of the project. Construction of the LPA has the potential to cause negative economic effects by blocking visibility and access to businesses, causing traffic delays, and rerouting traffic on detours that increase travel times and make access to some locations difficult. Traffic congestion is already a common occurrence within the corridor during peak hours and adjacent construction activities and temporary detours could extend the peak duration, negatively impacting businesses whose employees commute using the corridor. Likewise, freight, goods, and services travel could be negatively affected if construction activities make travel times more difficult to determine.

Yet, construction of the LPA could also result in increased employment and spending in the project area during construction. The extent of these effects depends on the source of project funding and the makeup of work crews used during project construction. Funds from local or regional sources are transfers, which could be spent by residents and businesses on other economic activities. Federal or state funds that are new to a region can have a measurable economic effect on employment and income gains resulting from project construction. The federal government and the states of Oregon and Washington would provide the funds for the CRC project, thus, resulting in some income and job benefits in the region that would otherwise not occur.

The general time frame for the entire project, as well as specific project construction sequence and duration, can be found in section 1.3. Final staging plans would provide for the following, to the greatest extent practicable:

- Minimizing traffic delays and disruptions by scheduling lane and road closures during the evening and weekend periods.
- Providing continued access to properties during construction.
- Constructing new elements outside of the existing road system to minimize closures and disruptions.
- Minimizing construction-related impacts such as traffic, noise, and decreased air quality on neighborhoods.

5.2 Regional Temporary Effects

Input-output analysis was used to measure the economic impacts associated with construction of the build alternatives on the six-county regional economy using data purchased from the Minnesota IMPLAN Group. IMPLAN multipliers for the six-county area and project construction cost estimates were used to estimate direct, indirect, and induced effects. Input-output analysis is an analytical framework that allows an analyst to quantify the multiple economic effects that result from a change in final demand for a particular product or service. Note that this framework does not provide an analysis of user costs and benefits, economic development, or other perspectives that could be taken when considering the economics of the project.

Expenditures on construction result in demand for construction materials and jobs. These expenditures are referred to as direct impacts. Direct impacts lead to indirect impacts as the output of firms in other industries increases to supply the demand for inputs to the construction industry. Finally, wages paid to workers in construction trades or supporting industries are spent on other goods and services; these are referred to as induced impacts. The sum of direct, indirect, and induced impacts represents the total economic impact of the project to the region.

For this analysis, cost estimates are organized into three categories:

- Right-of-way
- Road construction
- Transit construction

It was assumed that 80 percent of transit construction would occur locally, and 20 percent (presumably the development of transit vehicles) would occur elsewhere. A large project such as the CRC typically attracts labor from other regions, and/or may involve outsourcing more kinds of fabrication. In that sense it may generate a different number of jobs within the region than might occur with another type of construction project.

In estimating employment effects, mid-year construction costs in 2014 dollars were deflated to 2009 dollars using estimates from financing work conducted for the project (Kitchen 2009). The IMPLAN multipliers (jobs per dollar of expenditure) were estimated in 2004 dollars. Those estimates were inflated to 2009 dollars using the average of WSDOT and ODOT price inflation from 2004-2006 and cost estimates. The result was estimated project costs and jobs per dollar of project costs, both in 2009 dollars. Finally, the project costs and resulting jobs estimates account for both full- and part-time workers. Those jobs were converted to full-time equivalent (FTE) by multiplying the initial estimates by 80 percent (ODOT 2009).

It should be noted that not all of the spending on the project would result in benefits over and above what would have occurred without the project. As stated in a recent guidebook on transportation economic effects (Forkenbrock and Weisbrod 2001), “indirect and induced effects represent additional economic growth to a region only if 1) the labor and facility resources for those additional business activities are available in the region or can come into the region and 2) those additional business activities do not take away jobs or resources from other existing activities in the region.”

In the long run, there would be some additional employment benefits not included in the jobs estimates that would result from cost savings to businesses that may result from improved mobility and other effects. This positive benefit would be countered by the effects of repaying any debts issued to pay for construction. When a project is financed by local taxes or tolls, those taxes and tolls result in consumers and businesses having less discretionary income to spend on other goods and services. However, if a project is financed by federal or state sources that otherwise would not have been spent in the region, there is not likely to be a noticeable negative long-term effect on economic activity in the region. For CRC, about 25 to 30 percent of project funding is federal. The rest is either from state funds, tolls, or “unfunded.” Thus, the project would result in additional long-term economic effects in the region.

Project construction is anticipated to take 6.3 years. During construction, some construction products would be purchased locally and some local firms and workers would be involved in construction. However, firms located outside the API would provide most of the workers and supplies, thus lessening the beneficial effects in the API compared to what would occur if those inputs were provided locally.

Exhibit 5-1 presents total direct expenditures for the project and an estimate of the positive regional economic impacts that would result from these expenditures.

Exhibit 5-1. Regional Economic Impacts of Project Construction

	IMPLAN Sector	Construction Cost (Million \$) ^a		Type Social Accounting Matrix (SAM) Value Added Multiplier ^b	Total Indirect and Induced Impacts (Million 2009\$)	Total Impacts to Regional Economy (Million 2009\$)
		2014\$	2009\$			
FEIS	445	\$50	\$41	2.00	\$41	\$83
ROW	N/A	\$100	\$83	1.42	\$35	\$118
Highway Construction and Bridge Removal	39	\$2,560	\$2,118	1.72	\$1,526	\$3,645
Transit Construction ^c	41	\$672	\$556	1.80	\$445	\$1,001
Total In-region Construction Cost:		\$3,382	\$2,799		\$2,047	\$4,846
Total Construction Cost:		\$3,550				

a 2014 deflated to 2009 dollars using HDR construction price forecast.

b Minnesota IMPAN Group, Inc. 2007.

c 2014 Transit construction cost is 80% of \$885 million, which excludes estimated out-of-region purchases of light rail vehicles and track, and less \$30 million for ROW and \$12 million for design through PE.

Estimated employment impacts due to project expenditures are shown in Exhibit 5-2. Approximately 20,975 total person-year jobs are expected for design and construction of the LPA. These estimates are based on 2009 CRC cost estimates and expenditure per employee estimates from FHWA (2003) and CH2M HILL (2009).

Exhibit 5-2. Employment Impacts of Project Construction (2014 dollars)

	IMPLAN Sector	Construction Cost (Million \$) ^a		Direct, Indirect, Induced Employment per Million 2004\$	Direct, Indirect, Induced Employment per Million 2009\$ ^b	FTE per Job ^c	Full-Time Equivalent Employment				
		2014\$	2009\$				Direct Jobs	Indirect Jobs	Induced Jobs	Total Regional Jobs	Ave Annual Regional Jobs
FEIS	445	\$50	\$41	16.7	10.0	80%	151	101	80	332	30
ROW	N/A	\$100	\$83	0.0	0.0	80%	0	0	0	0	0
Highway Construction and Bridge Removal	39	\$2,560	\$2,118	15.8	9.5	80%	9,687	2,089	4,319	16,095	1,463
Transit Construction ^d	41	\$672	\$556	17.0	10.2	80%	2,583	775	1,190	4,548	413
Total In-region Construction Cost:		\$3,382	\$2,799				12,421	2,964	5,589	20,975	1,907
Total Construction Cost:		\$3,550									

a 2014 deflated to 2009 dollars using 10/29/09 construction price forecast.

b 2004 jobs per million dollars inflated to 2009 dollars using HDR construction price forecast (2006-09) and average ODOT/WSDOT escalation from 2004-06.

c Jobs are full- and part-time. Conversion factor to full-time equivalent (FTE) from Oregon Department of Transportation (David Kavanaugh, personal communication, February 12, 2009).

d 2014 Transit construction cost is 80% of \$885 million, which excludes estimated out-of-region purchases of light rail vehicles and track, and less \$30 million for ROW and \$12 million for design through PE.

5.3 Temporary Effects to Marine Commerce

According to the U.S. Army Corps of Engineers (USACE), nearly 10 million tons of freight in over 9,500 movements passed under the I-5 bridge in 2005 (USACE 2005). Construction of the proposed crossing is expected to occur over a four year period, with a general sequence of activities including initial preparation, installation of foundation piles, shaft caps, pier columns, superstructure, and deck. Construction barges would be anchored in the river, and support barges traveling to and from supply points would potentially create conflicts with freight. Some likely effects to marine commerce follow:

- Duration of in-water construction is projected to be four years.
- Various navigation channels would be closed throughout the construction of the proposed I-5 bridges, but it is assumed that at least one navigable channel would remain open at all times for marine traffic.
- Commercial vessels may be provided with towing assistance during times where navigation may be made difficult due to construction activities.
- A vertical clearance restriction may be put in place on the primary navigation channel for up to six months. This would limit navigation under the bridges for commercial vessels with heights greater than 60 feet.
- Temporary river travel restrictions are anticipated as barges are used to ferry materials to and from work sites.

5.4 Oregon Temporary Effects

5.4.1 Oregon Mainland

5.4.1.1 Staging

One parcel that houses businesses east of I-5 near the North Portland Harbor would be used as a temporary construction easement, however the businesses would be displaced permanently (see Section 4 for affected businesses, employees and revenue) by proposed roadway construction, and the remaining land could be resold after construction. There is an additional temporary construction easement in Delta Park, but it would not impact any businesses due to the location and the small area required.

5.4.1.2 Roadway Closures

No closures are currently expected on the Oregon mainland; however, detour alignments would occur during Marine Drive interchange construction, making access to area businesses more difficult for employees and deliveries – most of the affected businesses do not rely on pass-by traffic and sales impacts are expected to be small.

5.4.1.3 Other impacts

The construction of the Marine Drive interchange is projected to take three years. Visibility could be impacted during this time but businesses in the vicinity of the Marine Drive interchange are not dependent upon drive-by traffic. Widening I-5 and rebuilding interchanges in this location would entail many different activities, some of which could disrupt traffic.

Marine Drive east and west and Martin Luther King Jr. Boulevard north and south would serve as the major corridors in and out of the construction areas. North Portland is home to a large number of manufacturers on both sides of I-5, particularly in the Rivergate and Airport industrial districts. Marine Drive is a key commercial and industrial route. Routing construction traffic on the major corridors, and having construction related detours on Marine Drive would make operations of these businesses more difficult.

For both Options A and B, approximately 180 parking spaces would be temporarily impacted during construction at the Expo center site. The Expo Center currently has approximately 2,100 spaces, and the reduced parking capacity is not expected to have an impact on Expo Center operations.

5.4.2 Hayden Island

5.4.2.1 Staging

Six parcels total in the vicinity of the Hayden Island interchange would be used for construction staging: the currently vacant Thunderbird Hotel, a parcel with a mailing and cigar business, part of two parcels that make up the Jantzen Beach SuperCenter, a road right-of-way parcel, and a leased parcel owned by the state that supports a floating home and marina. Additionally, during construction, 500 parking spaces would be temporarily displaced due to construction activities. The leased land with the marina and floating home is the only parcel that is solely a temporary effect: all other impacts are also permanent effects and are discussed in Section 4.

5.4.2.2 Roadway Closures

The Hayden Island interchange would be built at the same time as the SR 14 interchange to move traffic to the new southbound lanes and allow construction of the remaining northbound lanes and ramps. Construction of the Hayden Island interchange would be approximately 1.5 years for the southbound approaches needed to allow traffic onto the new southbound I-5 bridge, and another 2.5 years for completion of the full interchange.

There is one temporary road closure associated with the Project – Jantzen Drive between the Stateline Liquor Store east of I-5 and the Newport Bay Restaurant to the west of I-5 would be closed for approximately eight months to allow for utility work. This section of roadway does not include any direct business accesses other than those permanently displaced by the project. Access would remain open along N Hayden Island Drive and Center Avenue but some out of direction travel could be required to continue to access businesses in the immediate vicinity of the closure.

5.4.2.3 Other impacts

The marina and floating home area would be impacted by over-water work. Access would be retained, but some floating homes boat slips would be impacted. This is an impact on the moorage, though slips may be reoccupied after project completion. However the tenants would be displaced more than a year and are considered permanently displaced.

The commercial businesses on Hayden Island are quite dependent upon drive-by traffic, and construction could negatively impact sales. Hayden Island is often a stop for visitors from out of state taking advantage of the lack of sales tax in Oregon. If businesses lose visibility and construction makes it difficult to reach the stores, customers could continue on into Oregon and bypass Hayden Island altogether. Business impacts on Hayden Island could be substantial during

construction unless carefully mitigated. The majority of businesses on Hayden Island are commercial and could be impacted by construction noise and dust but are of sufficient distance that this is not perceived to be of issue.

5.5 Washington

5.5.1 Downtown Vancouver

5.5.1.1 Staging Areas

One full parcel would be acquired for transit staging; it is located along Washington Street between 8th and 9th Streets, just north of the Vancouver Convention Center. This lot is currently vacant, and its use for transit staging is expected to have minimal to no impact on the surrounding businesses, which include restaurants, a coffee shop, and a bank. Any minimal impact would be associated with noise from construction and additional construction vehicles accessing the site. Mitigation for the staging sites is included in Section 6.3 below. See the Noise and Vibrations Technical Report for additional information.

The transit staging area would be accessed using existing roads. It could be used up to 24 hours a day, seven days a week. Activities at the staging site include storage of materials and equipment, lay-down areas, preassembly areas and employee parking. Noise, dust, and congestion from the staging site would be expected, however, construction best management practices would be employed to mitigate expected impacts. Roadway staging areas have also been identified at the Red Lion Hotel site, and two parcels north of the hotel associated with the railroad right-of-way. These staging sites are would have only a negligible impact on businesses, as the Project would acquire the hotel parcel completely and there are few adjacent businesses. Impacts are limited to an increase in construction related traffic accessing the sites, and a minor increase in noise and vibration. As these sites are also adjacent to the railroad, the increase in noise and vibration is not greater than what is currently experienced.

The areas near the SR 14 interchange construction have suitable room to stage a substantial portion of construction activities, which would limit impacts to adjacent parcels. The Red Lion Hotel west of I-5 is identified as a staging area, as part of the hotel is acquired by construction. The remainder of the parcel would be used for staging, and reused after construction.

5.5.1.2 Roadway Closures

The SR 14 interchange would need to be completed before the existing I-5 bridges are decommissioned, and the northbound bridge and northbound off-ramp to SR 14 must be completed and opened before traffic can be routed to the new bridges. The Mill Plain interchange could be completed independently of the Marine Drive, Hayden Island, and SR 14 interchanges. It would be most efficient to complete Mill Plain along with the two interchanges further north – Fourth Plain and the SR 500/39th Street interchanges.

The ramp closures would primarily affect traffic from downtown Vancouver to points east (SR 14), and the connection between Northern Oregon and downtown Vancouver on I-5. Alternate routes would be available to travel to these areas, but it would be more difficult and less direct. These could affect businesses in downtown Vancouver by increasing delivery times for goods and making it more difficult for employees and customers to reach businesses in downtown.

Roadway closures and re-routing could affect drive-by visibility for businesses in downtown Vancouver. Drive-by visibility is important to certain classifications of businesses such as gas

stations, fast food restaurants, and convenience stores. However most of the businesses in downtown Vancouver do not rely on pass-by traffic to attract customers. Many of the service and retail establishments in downtown attract customers because they provide specialized services and goods, and customers will continue to patronize these businesses during construction. Thoughtful staging and sequencing can minimize the impacts to adjacent businesses – additional mitigation measures are included in Section 6.3. Exhibit 5-3 summary of the closures in downtown Vancouver is included in the table below.

Exhibit 5-3. Downtown Roadway Closures - Vancouver, Washington

Roadway Section/Ramp Closures	Closure Duration	Explanation
Washington Street to eastbound SR 14	8 months	Would serve as a temporary alignment from Columbia Street.
Washington Street to eastbound SR 14	1 month	Would open as the final 4th Street to eastbound SR 14.
Washington Street to southbound I-5	4 years and 9 months	To create the connection between C Street to I-5 southbound.
I-5 northbound to City Center (C Street) and westbound SR 14 to C Street	4 years and 9 months	To create the final connection from northbound I-5 to City Center. Westbound SR 14 to C Street would be recreated as westbound SR 14 to would be recreated as westbound SR 14 to 4th Street with an option to Washington Street
Evergreen Boulevard Overpass	9 months	This project and the associated closure could occur separately from the CRC.

Light rail on streets through downtown Vancouver could be constructed before the new I-5 bridges to shorten the overall construction period for the corridor. Overall, the light rail is projected to require 4 years for construction. Temporary street closures are expected during light rail construction; but access to businesses will be maintained throughout. Construction scheduling would be coordinated to minimize impacts on businesses.

The LPA would at times require detours from I-5 into Downtown Vancouver from the south and east at the SR 14 interchange. Mitigation described in section 5.5.1.4 would seek to minimize impacts, nonetheless, businesses depending on customers, clients, goods and employees from the south and east may experience less patronage, and could lose sales during construction activities that prohibit access or make it more difficult.

Exhibit 5-4 shows ramp detours and potential timing for the detours.

Exhibit 5-4. Downtown Roadway Detours - Vancouver, Washington

Detour	Detour		Duration	Comment
	Opens	Closes		
Southbound I-5 to eastbound SR 14	March 2014	December 2018	3 years, 9 months	This detour would wrap around the existing SR 14 western loop ramp, and would open as the final alignment.
Northbound I-5 to Mill Plain/4th Plain	February 2017	October 2018	1 year, 8 months	This would be used as a detour route for the closure of I-5 northbound to C Street, and would open as the final alignment.

Detour				
Detour	Opens	Closes	Duration	Comment
Columbia House Boulevard	Feb 2017	Oct 2018	1 year, 8 months	Used as a detour for Hayden Island to I-5 northbound. Traffic would use existing I-5 bridges, exit at SR 14 eastbound, exit at Columbia House Boulevard, make a U-turn to head westbound on SR 14, and continue on northbound I-5.
Columbia House Boulevard/Columbia Way and/or Mill Plain	Aug 2014	June 2019	4 years, 9 months	Used as possible detour routes for SR 14 westbound to City Center.
Mill Plain Boulevard	Timing uncertain		9 months	Used as detour route for closed Evergreen Boulevard.
Mill Plain Boulevard to southbound I-5 (and eastbound SR 14)	Aug 2014	June 2019	4 years, 9 months	Used as detour during Washington Street to southbound I-5 closure (also during 8 month closure of Washington Street to SR 14 eastbound).

Most current directional movements would be accommodated in the staging scenarios. However, some movements may need to be closed on occasion for durations of a week to a month in order to complete a phase of construction. SR 14 into and out of downtown Vancouver would need to be closed, and traffic would be rerouted (most likely to Columbia Way) for the duration of much of this interchange construction. SR 14 eastbound and Columbia Way would serve as the major corridors into and out of construction areas. Columbia Way would become the main access into an industrial area that could be used for staging purposes. As such, Columbia Way could become a heavily used haul route, more so than other local roadways. Since Columbia Way may also be used as a detour route, the combination would contribute to congestion on this route and may make access to adjacent parcels more difficult. Adjacent businesses on Columbia Way would be negatively affected by the congestion and difficulty in access. These businesses include restaurants and a motel/restaurant that may be redeveloping at the time of construction.

Approximately 140 businesses would be affected, although mostly with temporary access and sidewalk closures related to access to parking lots during sidewalk and curbing reconstruction. This could make it more difficult for employees and customers of the adjacent businesses to access office buildings. Most of the businesses are financial and professional services, which do not rely heavily on pass-by traffic. Construction may make it harder for first time customers to access a business location if they are not sure where it is located.

5.5.1.3 Other Impacts

The parcels impacted temporarily by construction are all related to the transit alignment along Washington and Broadway Streets, save one parcel used for parking at the south end of downtown and located adjacent to the railroad tracks.

Downtown Vancouver is the commercial center of the city, so these impacts would be mostly to commercial and retail properties, though no parcels with current businesses would be completely acquired for staging. The range of services include banking, finance, law offices, chiropractors, some medical offices, restaurants and cafes, jewelers, real estate, and a movie theater.

Additionally, during BNSF's busiest time of the year, construction rail traffic over the BNSF rail line north of the riverbank and south of SR 14 could be limited to periods when the rails are not heavily used. No impacts are anticipated to the BNSF lines or service frequency; construction schedules would be designed to minimize impacts.

5.5.2 Upper Vancouver

5.5.2.1 Staging Areas

There would be no parcels acquired for staging, and therefore no impacts on businesses due to staging.

5.5.2.2 Roadway Closures

The two interchanges in Upper Vancouver could be built, along with the Mill Plain interchange, independent of the bridge and southern interchanges, and independent of each other, though it is most efficient to construct all three at the same time. Detours of I-5 near the SR 500/39th Street interchange would facilitate efficient construction, and the detours would be limited to nights and weekends. The three interchanges north of SR 14, Mill Plain, Fourth Plain and SR 500/39th Street, could be constructed in 4 years. Construction closures in Upper Vancouver are included in Exhibit 5-5.

Exhibit 5-5. Upper Vancouver Roadway Detours - Vancouver, Washington

Roadway section/Ramp closures	Closure duration	Explanation
29th Street Overpass	9 months	This project and the associated closure could occur separately from the CRC, and would not occur at the same time as the closure on the 33rd Street overpass.
33rd Street Overpass	9 months	This project and the associated closure could occur separately from the CRC, and would not occur at the same time as the closure on the 29th Street overpass.
39th Street to southbound I-5	16 months	This closure would allow for construction of the cut and cover tunnel and rebuilding of the off ramp.
29th Street Overpass	1 year	This would allow for the demolition of the old structure and building of the new overpass.

5.5.2.3 Other Impacts

Upper Vancouver Transit Temporary Impacts – 17th Street Alignment

The 17th Street alignment is included as part of “Downtown Vancouver.” Temporary business impacts associated with construction are discussed in the previous section on Downtown Vancouver.

Upper Vancouver Transit Temporary Impacts – McLoughlin Alignment

Slivers of approximately 40 business properties would be affected by temporary transit construction along McLoughlin Boulevard; businesses include financial services and banks, chiropractic offices and other health clinics, car/motorcycle repair, law offices, and property management/real estate offices. Most of these businesses are not likely to be substantially affected by construction because they don’t rely heavily on drive-by traffic.

5.6 Staging Areas and Casting Yards

In addition to construction easements, there are five staging areas and casting yards identified for bridge construction. Those impacts are discussed here.

The two potential casting yard sites are outside of the immediate API, one in Vancouver at the Alcoa/Evergreen West site, and one in Troutdale, Oregon, at the Sundial site. The Sundial site would be used for both staging and casting. Both of the potential casting yards are currently zoned industrial and are in areas that would not impact additional businesses or residences. The areas adjacent to these sites would see an increase in traffic related to casting and could experience increased levels of dust and noise, though business impacts are expected to be negligible.

There are three potential sites for staging, two in Vancouver at the Red Lion at the Quay hotel site directly adjacent to the bridge, and on Port of Vancouver parcels west of I-5. The third potential staging area is located on Hayden Island at the vacant Thunderbird Hotel site west of I-5.

The hotel sites would be both partially acquired by the project, and it is assumed that the remainder of those sites would be used during construction for staging. Both sites are zoned commercial and are located near other businesses. These sites would increase construction traffic, noise and dust in existing commercial areas, but since they would both be near the construction area for the project, these would have slight increases over project construction.

The Port of Vancouver site west of I-5 is zoned industrial and is adjacent to other similar uses, and while the project could increase construction traffic, noise and dust, business impacts are expected to be negligible.

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6. Proposed Mitigation for Adverse Effects

6.1 Introduction

The LPA would provide positive economic impacts in the API by reducing congestion on I-5 and facilitating the movement of traffic, particularly freight truck traffic between the Marine Drive corridor and I-5. The bulk of potential negative economic impacts identified in this report result from business displacements, losses in parking, or changes in access to businesses. This section identifies several measures that could be considered to avoid or mitigate the potential impacts.

6.2 Proposed Mitigation for Long-term Adverse Effects

Business displacements from right-of-way, losses in parking, and changes in access identified in this report are based on a preliminary engineering level of design. More detailed design will seek to reduce the amount of land that must be acquired for right-of-way and to avoid acquiring businesses where possible.

For those businesses displaced by the project, ODOT and WSDOT will provide a relocation assistance program. The federal “Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970” and the “Uniform Relocation Assistance Amendments of 1987” ensure the fair and equitable relocation and reestablishment of persons, businesses, farms, and nonprofit organizations displaced as a result of federal or federally assisted programs. This is done so that displaced persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole.

The CRC project team has coordinated with the City of Portland Office of Transportation, Bureau of Planning, the PDC, and business owners on Hayden Island (through the development of the Hayden Island Plan and Interchange Area Management Plan), to identify an adequate local circulation system, access spacing, and land use policies to manage demand on the interchange. Coordination is expected to occur around provision of adequate businesses to serve needs of residents on the island.

6.3 Proposed Mitigation for Adverse Effects during Construction

Construction of LPA would be carefully planned to phase construction of project components in a way that reduces or avoids complete closure of affected roadways and access points to nearby businesses. To the extent that detours could be necessary, these detours will be carefully routed to reduce travel times and signed to reduce confusion. Final staging plans will provide for the following, to the greatest extent practicable:

- Minimizing traffic delays and disruptions by scheduling lane and road closures during the evening and weekend periods.
- Providing continued access to properties during construction.
- Constructing new elements outside of the existing road system to minimize closures and disruptions.

- Minimizing construction-related impacts such as traffic, noise, and decreased air quality on neighborhoods.

To the extent that construction occurs in front of business access points, construction will be planned to keep these access points open as much as possible and will provide signage to identify the location of these access points and the businesses served.

Outreach to businesses affected by construction and assistance programs could help mitigate potential negative construction related effects. Programs to help affected businesses could include business planning assistance, low-interest loans, marketing and retail consulting, business-oriented workshops, and special promotions to generate patronage in construction areas.

Coordinating the schedule, pace, and order of construction to minimize its impacts to nearby businesses, staging construction so it does not disrupt any single area for an extended period of time, maintaining access for motorists, delivery and service vehicles, cyclists, and pedestrians during business hours, providing visible, temporary, easy-to-read signage to alert customers that businesses are open during construction, a “buy local” campaign that encourages potential customers to patronize local businesses along the corridor during construction, and a 24-hour, 7 days-a-week emergency construction hotline for businesses and property owners/managers to resolve issues during an emergency.

Outreach to businesses affected by construction and assistance programs could help mitigate potential negative construction related effects. The City of Vancouver is planning to establish a Growth and Transportation Efficiency Center (GTEC). The GTEC could develop a construction communication plan to tell drivers, transit riders, cyclists, and pedestrians about detours and road closures, and provide directions to downtown businesses. The Project could work with GTEC, the City of Vancouver, and C-Tran to educate affected employees about travel options, work with employers on teleworking opportunities, shortened work weeks, traveling outside the peak hours, and other transportation demand management strategies.

A construction communication plan could be developed to tell drivers, transit riders, cyclists, and pedestrians about detours, road closures, and direct them to downtown businesses.

Coordination with the Port of Portland and businesses located in the Rivergate and Airport industrial areas will be conducted to identify ways to minimize delays for commercial freight vehicles during construction. Signs would be posted to encourage commercial freight vehicles not serving the Portland-Vancouver region to shift from I-5 onto I-205 during construction.

The provision of alternate access in the vicinity of the Marine Drive interchange will be important to keep freight moving during construction. Outreach to the businesses to determine access and site circulation needs will be helpful. Without the provision of alternate access, loss of access to Marine Drive may prevent the existing establishments from doing business.

To mitigate impacts associated with construction staging sites, the Project would secure noise variances as required by the City of Vancouver, and noise levels would be monitored on a regular basis during construction near potentially affected sensitive receptors. Construction hours could also be adjusted to minimize impacts during restaurant operating hours and other sensitive times.

To mitigate impacts associated with light rail construction on Vancouver City Streets, the Project would work with local jurisdictions to mitigate for dust, noise, and vibration resulting from construction activities, and specific mitigation techniques would depend on the regulations of the jurisdiction. Work activities would be scheduled and managed to minimize community disruption as much as possible.

7. Permits and Approvals

7.1 Federal

No federal permits due to economic impacts are anticipated.

7.2 State

No state permits due to economic impacts are anticipated.

7.3 Local

No local permits due to economic impacts are anticipated.

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