INTERSTATE 5 COLUMBIA RIVER CROSSING

Traffic Technical Report

January 2008

Columbia River CROSSING

TO: Readers of the CRC Technical Reports

FROM: CRC Project Team

SUBJECT: Differences between CRC DEIS and Technical Reports

The I-5 Columbia River Crossing (CRC) Draft Environmental Impact Statement (DEIS) presents information summarized from numerous technical documents. Most of these documents are discipline-specific technical reports (e.g., archeology, noise and vibration, navigation, etc.). These reports include a detailed explanation of the data gathering and analytical methods used by each discipline team. The methodologies were reviewed by federal, state and local agencies before analysis began. The technical reports are longer and more detailed than the DEIS and should be referred to for information beyond that which is presented in the DEIS. For example, findings summarized in the DEIS are supported by analysis in the technical reports and their appendices.

The DEIS organizes the range of alternatives differently than the technical reports. Although the information contained in the DEIS was derived from the analyses documented in the technical reports, this information is organized differently in the DEIS than in the reports. The following explains these differences. The following details the significant differences between how alternatives are described, terminology, and how impacts are organized in the DEIS and in most technical reports so that readers of the DEIS can understand where to look for information in the technical reports. Some technical reports do not exhibit all these differences from the DEIS.

Difference #1: Description of Alternatives

The first difference readers of the technical reports are likely to discover is that the full alternatives are packaged differently than in the DEIS. The primary difference is that the DEIS includes all four transit terminus options (Kiggins Bowl, Lincoln, Clark College Minimum Operable Segment (MOS), and Mill Plain MOS) with each build alternative. In contrast, the alternatives in the technical reports assume a single transit terminus:

- Alternatives 2 and 3 both include the Kiggins Bowl terminus
- Alternatives 4 and 5 both include the Lincoln terminus

In the technical reports, the Clark College MOS and Mill Plain MOS are evaluated and discussed from the standpoint of how they would differ from the full-length Kiggins Bowl and Lincoln terminus options.

Difference #2: Terminology

Several elements of the project alternatives are described using different terms in the DEIS than in the technical reports. The following table shows the major differences in terminology.

DEIS terms	Technical report terms
Kiggins Bowl terminus	I-5 alignment
Lincoln terminus	Vancouver alignment
Efficient transit operations	Standard transit operations
Increased transit operations	Enhanced transit operations

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Difference #3: Analysis of Alternatives

The most significant difference between most of the technical reports and the DEIS is how each structures its discussion of impacts of the alternatives. Both the reports and the DEIS introduce long-term effects of the full alternatives first. However, the technical reports then discuss “segment-level options,” “other project elements,” and “system-level choices.” The technical reports used segment-level analyses to focus on specific and consistent geographic regions. This enabled a robust analysis of the choices on Hayden Island, in downtown Vancouver, etc. The system-level analysis allowed for a comparative evaluation of major project components (replacement versus supplemental bridge, light rail versus bus rapid transit, etc). The key findings of these analyses are summarized in the DEIS; they are simply organized in only two general areas: impacts by each full alternative, and impacts of the individual “components” that comprise the alternatives (e.g. transit mode).

Difference #4: Updates

The draft technical reports were largely completed in late 2007. Some data in these reports have been updated since then and are reflected in the DEIS. However, not all changes have been incorporated into the technical reports. The DEIS reflects more recent public and agency input than is included in the technical reports. Some of the options and potential mitigation measures developed after the technical reports were drafted are included in the DEIS, but not in the technical reports. For example, Chapter 5 of the DEIS (Section 4(f) evaluation) includes a range of potential “minimization measures” that are being considered to reduce impacts to historic and public park and recreation resources. These are generally not included in the technical reports. Also, impacts related to the stacked transit/highway bridge (STHB) design for the replacement river crossing are not discussed in the individual technical reports, but are consolidated into a single technical memorandum.

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Cover Sheet

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ACRONYMS

Acronym	Description
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
APM	Analysis Procedures Manual
BNSF	BNSF Railway Company
BRT	Bus Rapid Transit
CBD	Central Business District
CRC	Columbia River Crossing
DEIS	Draft Environmental Impact Statement
FHWA	Federal Highway Administration
HAC	High Accident Corridor
HAL	High Accident Location
HCT	High-Capacity Transit
HDM	Highway Design Manual
HOV	High Occupancy Vehicle
ICU	Intersection Capacity Utilization
LOS	Level of Service
LRT	Light Rail Transit
Metro	Metropolitan Service District
MOS	Minimum Operable Segment
MLK	Martin Luther King
MPO	Metropolitan Planning Organizations
MTP	Metropolitan Transportation Plan
MVMT	Million Vehicle Miles Traveled
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
ORT	Open Road Tolling
PDO	Property Damage Only
PDOT	Portland Department of Transportation
RTC	Regional Transportation Council
RTP	Regional Transportation Plan
RTPO	Regional Transportation Planning Organization
SPIS	Safety Priority Index System
SPUI	Single Point Urban Interchange
TDM	Transportation Demand Management
TSM	Transportation System Management
TPAC	Transportation Policy Alternatives Committee
TSP	Transportation System Plan
UP	Union Pacific Corporation
V/C	Volume-to-Capacity
VMT	Vehicle Miles Traveled
WSDOT	Washington Department of Transportation

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1. Project Purpose and Need

1.1 Project Description

The Columbia River Crossing (CRC) project is a bridge, transit, and highway improvement project for Interstate 5 between the states of Washington and Oregon. It is co-sponsored by the Oregon Department of Transportation (ODOT) and the Washington Department of Transportation (WSDOT), and is focused on addressing the congestion, mobility, and safety issues on I-5 between State Route (SR) 500 in Vancouver, Washington and Columbia Boulevard in Portland, Oregon.

This five-mile segment of I-5, referred to as the Bridge Influence Area or project area, includes seven interchanges. Interstate 5 in the Bridge Influence Area sustains recurrent congestion during the morning, midday and evening periods. The I-5 bridge is one of only two major interstate highway river crossings providing connectivity and mobility between Washington and Oregon in the Portland-Vancouver metropolitan region.

1.2 Project Purpose and Need

The purpose of the proposed action is to improve I-5 corridor mobility by addressing present and future travel demand and mobility needs in the CRC project area. Relative to the No-Build Alternative, the proposed action is intended to achieve the following objectives:

a) Improve travel safety and traffic operations on the Interstate 5 crossing's bridges and associated interchanges;

b) Improve connectivity, reliability, travel times, and operations of public transportation modal alternatives in the Bridge Influence Area;

c) Improve highway freight mobility and address interstate travel and commerce needs in the Bridge Influence Area;

d) Improve pedestrian and bicycle infrastructure and connections to regional trail networks; and

e) Improve the Interstate 5 river crossing's structural integrity.

The specific needs to be addressed by the proposed action include:

Growing Travel Demand and Congestion: Existing travel demand exceeds capacity in the CRC area on I-5 and associated interchanges. This corridor experiences heavy congestion and delay lasting 2 to 5 hours during both the morning and afternoon/evening peak travel periods and when traffic crashes, vehicle breakdowns, or bridge lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials, such as Martin Luther King Jr. Boulevard and Interstate Avenue increases local congestion. The two crossings currently carry over 280,000 trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by 40 percent during the next 25 years, with stop-and-go conditions increasing to at least 15 hours each day if no improvements are made.

Impaired freight movement: I-5 is part of the National Truck Network, and the most important freight highway on the West Coast. I-5 links international, national, and regional markets in Canada, Mexico, and the Pacific Rim with destinations throughout the western United States. In the center of the project area, I-5 intersects with the Columbia River's deep water shipping and barging channels as well as two transcontinental railroad mainlines. The I-5 crossing provides direct and important highway connection to the Port of Vancouver and Port of Portland facilities located on the Columbia River as well as the majority of the area's freight consolidation facilities and distribution terminals. Freight volumes moved by truck to and from the area are projected to more than double over the next 25 years. Vehicle-hours of delay on truck routes in the Portland-Vancouver area are projected to increase by more than 90 percent over the next 25 years. Growing demand and congestion will result in increasing delay, costs and uncertainty for all businesses that rely on this corridor for freight movement.

Limited public transportation operation, connectivity, and reliability: Due to limited public transportation options, a number of transportation markets are not well served. The key transit markets include trips between the Portland Central City and Vancouver or Clark County, trips between North/Northeast Portland and Vancouver or Clark County, and trips connecting Vancouver or Clark County with the regional transit system in Oregon. Congestion in the corridor adversely impacts public transportation service reliability and travel speed. Southbound bus travel times across the bridge are currently up to three times longer during parts of the morning peak compared to off peak. Travel times for public transit using general-purpose lanes on I-5 are expected to increase substantially by 2030.

Safety and Vulnerability to Incidents: The I-5 river crossing and its approach sections experience crash rates over twice that of statewide averages for comparable facilities. Incident evaluations generally attribute these crashes to traffic congestion and weaving movements associated with closely spaced interchanges. Without breakdown lanes or shoulders, even minor traffic crashes or stalls cause severe delay or more serious accidents.

Substandard bicycle and pedestrian facilities: The bike/pedestrian lanes on the I-5 bridge are generally no wider than 4 feet, narrower than the 14-foot standard, and are located extremely close to traffic lanes, thus impacting safety for pedestrians and bicyclists. Pedestrian and bicycle connectivity is poor in the Bridge Influence Area.

Seismic vulnerability: The existing I-5 bridges are located in a seismically active zone. They do not meet current seismic standards and are vulnerable to failure in an earthquake.

1.3 Project Vision and Values

The CRC project is being developed through an inclusive and collaborative process that builds upon the previous work of the I-5 Trade and Transportation Partnership. It seeks to deliver a financially-feasible solution that sustains and stimulates a healthy community by addressing its mobility and transportation needs, strengthening the economy, protecting natural resources, and enhancing quality of life.

The CRC project should reach this Vision through:

1.3.1 Mobility, Reliability, and Accessibility

Ensure mobility, reliability, and accessibility for all users, recognizing the requirements of local, intra-regional, and interstate movement now and in the future.

1.3.2 Modal Choice

Provide attractive opportunities to use transit, bicycle, and pedestrian modes for travel across the I-5 bridge.

1.3.3 Safety

Ensure safety for vehicles (trucks, autos, emergency, and transit), pedestrians, bicyclists, river users, and air traffic at the crossing.

1.3.4 Community Livability

Enhance community livability through:

- Support of a healthy and vibrant land use mix of residential, commercial, industrial, recreational, cultural, and historic areas.
- Consideration of air quality; aesthetic quality that achieves a regional landmark; community cohesion and avoidance of disruption; impacts of noise and light and glare; and parks and historic and cultural resources.

1.3.5 Freight Mobility

Support a sound regional economy by addressing the need to move freight efficiently and reliably through the I-5 Bridge Influence Area and allow for river navigational needs.

1.3.6 Natural Resource Stewardship

Respect and protect natural resources including fish, fish and wildlife habitat, and water quality.

1.3.7 Distribution of Impacts and Benefits

Ensure the fair distribution of benefits and adverse effects of the project for the region, communities, and neighborhoods adjacent to the project area.

1.3.8 Cost Effectiveness

Ensure cost effectiveness in design, construction, maintenance, and operation.

1.3.9 Financial Feasibility

Ensure a reliable funding plan for the project.

2. Project Alternatives

2.1 Description of the Alternatives

The alternatives being considered for the CRC project consist of a diverse range of highway, transit and other transportation choices. Some of these choices – such as the number of traffic lanes across the river – could affect transportation performance and impacts throughout the bridge influence area or beyond. These are referred to as "system-level choices." Other choices – such as whether to run high-capacity transit (HCT) on Washington Street or Washington and Broadway Streets – have little impact beyond the area immediately surrounding that proposed change and no measurable effect on regional impacts or performance. These are called "segment-level choices." This report discusses the impacts from both system- and segment-level choices, as well as "full alternatives." The full alternatives combine system-level and segment-level choices for highway, transit, pedestrian, and bicycle transportation. They are representative examples of how project elements may be combined. Other combinations of specific elements are possible. Analyzing the full alternatives allows us to understand the combined performance and impacts that would result from multimodal improvements spanning the bridge influence area.

Following are brief descriptions of the alternatives being evaluated in this report, which include:

- System-level choices,
- Segment-level choices, and
- Full alternatives.

2.1.1 System-Level Choices

System-level choices have potentially broad influence on the magnitude and type of benefits and impacts produced by this project. These options may influence physical or operational characteristics throughout the project area and can affect transportation and other elements outside the project corridor as well. The system-level choices include:

- River crossing type (replacement or supplemental)
- High-capacity transit mode (bus rapid transit or light rail transit)
- Tolling (no toll, I-5 only, I-5 and I-205, standard toll, higher toll)

This report compares replacement and supplemental river crossing options. A replacement river crossing would remove the existing highway bridges across the Columbia River and replace them with three new parallel bridges – one for I-5 northbound traffic, another for I-5 southbound traffic, and a third for HCT, bicycles, and pedestrians. A supplemental river crossing would build a new bridge downstream of the existing I-5 bridges. The new supplemental bridge would carry southbound I-5 traffic and HCT, while the existing I-5 bridges would carry northbound I-5 traffic, bicycles, and pedestrians. The replacement crossing would include three through-lanes and two auxiliary lanes for I-5 traffic in each direction. The supplemental crossing would include three through-lanes and one auxiliary lane in each direction.

Two types of HCT are being considered – bus rapid transit and light rail transit. Both would operate in an exclusive right-of-way through the project area, and are being evaluated for the same alignments and station locations. The HCT mode—LRT or BRT—is evaluated as a system-level choice. Alignment options and station locations are discussed as segment-level choices. BRT would use 60-foot or 80-foot long articulated buses in lanes separated from other traffic. LRT would use one- and two-car trains in an extension of the MAX line that currently ends at the Expo Center in Portland.

Under the efficient operating scenario, LRT trains would run at approximately 7.5 minute headways during the peak periods. BRT would run at headways between 2.5 and 10 minutes depending on the location in the corridor. BRT would need to run at more frequent headways to match the passenger-carrying capacity of the LRT trains. This report also evaluates performance and impacts for an increased operations scenario that would double the number of BRT vehicles or the number of LRT trains during the peak periods.

2.1.2 Segment-Level Choices

2.1.2.1 Transit Alignments

The transit alignment choices are organized into three corridor segments. Within each segment the alignment choices can be selected relatively independently of the choices in the other segments. These alignment design options generally do not affect overall system performance but could have important differences in the impacts and benefits that occur in each segment. The three segments are:

- Segment A1 – Delta Park to South Vancouver
- Segment A2 – South Vancouver to Mill Plain District
- Segment B – Mill Plain District to North Vancouver

In Segment A1 there are two transit alignment design options - offset from, or adjacent to, I-5. An offset HCT guideway would place HCT approximately 450 to 650 feet west of I-5 on Hayden Island. An adjacent HCT guideway across Hayden Island would locate HCT immediately west of I-5. The alignment of I-5, and thus the alignment of an adjacent HCT guideway, on Hayden Island would vary slightly depending upon the river crossing and highway alignment, whereas an offset HCT guideway would retain the same station location regardless of the I-5 bridge alignment.

With a replacement river crossing, HCT would touch down in downtown Vancouver at Sixth Street and Washington Street. A supplemental crossing would push the touch down location north to Seventh Street. Once in downtown Vancouver, there are two alignment options for HCT – a two-way guideway on Washington Street or a couplet design that would place southbound HCT on Washington Street and northbound HCT on Broadway.

Both options would have stations at Seventh Street, 12th Street, and at the Mill Plain Transit Center between 15th and 16th Streets.

From downtown Vancouver, HCT could either continue north on local streets or turn east and then north adjacent to I-5. Continuing north on local streets, HCT could either use a two-way guideway on Broadway or a couplet on Main Street and Broadway. At 29th Street, both of these options would merge to a two-way guideway on Main Street and end at the Lincoln Park and Ride located at the current WSDOT maintenance facility. Once out of downtown Vancouver, transit has two options if connecting to an I-5 alignment: head east on 16th Street and then through a new tunnel under I-5, or head east on McLoughlin Street and then through the existing underpass beneath I-5. With either option HCT would connect with the Clark College Park and Ride on the east side of I-5, then head north along I-5 to about SR 500 where it would cross back over I-5 to end at the Kiggins Bowl Park and Ride.

There is also an option, referred to as the minimum operable segments (MOS), which would end the HCT line at either the Mill Plain station or Clark College. The MOS options provide a lower cost, lower performance alternative in the event that the full-length HCT lines could not be funded in a single phase of construction and financing.

2.1.2.2 Highway and Bridge Alignments

This analysis divides the highway and bridge options into two corridor segments, including:

- Segment A – Delta Park to Mill Plain District
- Segment B – Mill Plain District to North Vancouver

Segment A has several independent highway and bridge alignment options. Differences in highway alignment in Segment B are caused by transit alignment, and are not treated as independent options.

The replacement crossing would remove the existing bridges and replace them with a new crossing downstream (west) of the current I-5 alignments. At the SR 14 interchange there are two basic configurations being considered. A traditional configuration would use ramps looping around both sides of the mainline to provide direct connection between I-5 and SR 14. A less traditional design could reduce right-of-way requirements by using a “left loop” that would stack both ramps on the west side of the I-5 mainline.

2.1.3 Full Alternatives

Full alternatives represent combinations of system-level and segment-level options. These alternatives have been assembled to represent the range of possibilities and total impacts at the project and regional level. Packaging different configurations of highway, transit, river crossing, tolling, and other improvements into full alternatives allows project staff to evaluate comprehensive traffic and transit performance, environmental impacts and costs.

Exhibit 2-1 summarizes how the options discussed above have been packaged into representative full alternatives.

Exhibit 2-1. Full Alternatives

Full Alternative	Packaged Options: River Crossing Type	HCT Mode	Northern Transit Alignment	TDM/TSM Type	Tolling Method[a]
1	Existing	None	N/A	Existing	None
2	Replacement	BRT	I-5	Aggressive	Standard Rate
3	Replacement	LRT	I-5	Aggressive	Two options[b]
4	Supplemental	BRT	Vancouver	Very Aggressive	Higher rate
5	Supplemental	LRT	Vancouver	Very Aggressive	Higher rate

[a] In addition to different tolling rates, this report evaluates options that would toll only the I-5 river crossing and options that would toll both the I-5 and the I-205 crossings.

[b] Alternative 3 is evaluated with two different tolling scenarios, tolling and non-tolling.

Modeling software used to assess alternatives' performance does not distinguish between smaller details, such as most segment-level transit alignments. However, the geographic difference between the Vancouver and I-5 transit alignments is significant enough to warrant including this variable in the model. All alternatives include Transportation Demand Management (TDM) and Transportation System Management (TSM) measures designed to improve efficient use of the transportation network and encourage alternative transportation options to commuters such as carpools, flexible work hours, and telecommuting. Alternatives 4 and 5 assume higher funding levels for some of these measures.

Alternative 1: The National Environmental Policy Act (NEPA) requires the evaluation of a No-Build or "No Action" alternative for comparison with the build alternatives. The No-Build analysis includes the same 2030 population and employment projections and the same reasonably foreseeable projects assumed in the build alternatives. It does not include any of the I-5 CRC related improvements. It provides a baseline for comparing the build alternatives, and for understanding what will happen without construction of the I-5 CRC project.

Alternative 2: This alternative would replace the existing I-5 crossing with three new bridges downstream of the existing crossing. These new bridges would carry Interstate traffic, bus rapid transit (BRT), bicycles, and pedestrians. There would be three through-lanes and two auxiliary lanes for I-5 traffic in each direction. Transit would include a BRT system that would operate in an exclusive guideway from Kiggins Bowl in Vancouver to the Expo Center station in Portland. Express bus service and local and feeder bus service would increase to serve the added transit capacity. BRT buses would turn around at the existing Expo Center station in Portland, where riders could transfer to the MAX Yellow Line.

Alternative 3: This is similar to Alternative 2 except that light rail (LRT) would be used instead of BRT. This alternative is analyzed both with a toll collected from vehicles crossing the Columbia River on the new I-5 bridges, and with no toll. LRT would use the same transit alignment and station locations. Transit operations, such as headways, would differ, and LRT would connect with the existing MAX Yellow Line without requiring riders to transfer.

Alternative 4: This alternative would retain the existing I-5 bridges for northbound Interstate traffic, bicycles, and pedestrians. A new crossing would carry southbound Interstate traffic and BRT. The existing I-5 crossing would be re-striped to provide two lanes on each bridge and allow for an outside safety shoulder for disabled vehicles. A new, wider bicycle and pedestrian facility would be cantilevered from the eastern side of the existing northbound (eastern) bridge. A new downstream supplemental bridge would carry four southbound I-5 lanes (three through-lanes and one auxiliary lane) and BRT. BRT buses would turn around at the existing Expo Station in Portland, where riders could transfer to the MAX Yellow Line. Compared to Alternative 2, increased transit service would provide more frequent service. Express bus service and local and feeder bus service would increase to serve the added transit capacity.

Alternative 5: This is similar to Alternative 4 except that LRT would be used instead of BRT. LRT would have the same alignment options, and similar station locations and requirements. LRT service would be more frequent (approximately 3.5 minute headways during the peak period) compared to 7.5 minutes with Alternative 3. LRT would connect with the existing MAX Yellow Line without requiring riders to transfer.

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3. Transportation Analysis Methodology

3.1 Study Area

Exhibit 3-1 at the end of this chapter shows the transportation study area for the CRC project. The five-mile segment of I-5 referred to as the Bridge Influence Area includes seven interchanges: State Route 500, Fourth Plain Boulevard, Mill Plain Boulevard, and City Center/State Route 14 in Vancouver; and Hayden Island, Marine Drive, and Interstate Avenue/Victory Boulevard in Portland. The Bridge Influence Area includes the Interstate Bridge and the North Portland Harbor bridge.

A larger, 23-mile-long study area inclusive of the Bridge Influence Area was used for analyzing traffic effects for the CRC project. The larger area was used to provide a more rigorous and inclusive approach to the traffic modeling and analysis. The northern boundary of this corridor is located at the Pioneer Street/SR 501 interchange in Ridgefield, Washington. In total, 11 interchanges are included in the 14 miles of the study area in Washington. In Oregon, the southern boundary is the Marquam Bridge, where I-5 crosses the Willamette River near downtown Portland. Twelve interchanges are located in the nine miles of the study area in Oregon.

To develop an understanding of the possible effects of tolling in conjunction with potential improvements to the bridge, highway and transit networks, a nine-mile segment of I-205 in Washington and Oregon was examined. The segment of highway includes the Glenn Jackson Bridge over the Columbia River. The northern boundary of the I-205 study area is at the SR 500 interchange with I-205 in Vancouver. The southern boundary of the nine-mile corridor is the I-84 interchange with I-205 in Portland. There are six I-205 interchanges included in the study area, three in Washington and three in Oregon.

Many local street intersections were evaluated. Signalized and unsignalized intersections in Vancouver and Portland were studied to determine the effects of potential improvements to the bridge, highway and transit networks would have on local street operations. The local street operations study included the ramp terminals at the I-5 highway interchanges located within the Bridge Influence Area. A total of 73 intersections in Vancouver and 25 intersections in Portland were examined.

3.2 Study Periods

The traffic analysis focused on existing conditions (generally in 2005 to 2007) and projected year 2030 conditions. Current traffic volumes within the study area are typically at their highest on weekdays between 6 and 10 a.m. and between 3 and 7 p.m. This trend is expected to continue into the future. The majority of the traffic performance analyses conducted for this report focuses on these two weekday peak periods, although certain data have been extrapolated to cover a 16-hour period from 5 a.m. to 9 p.m. In addition, some data are presented for a daily (24-hour) period.

Metro's regional travel demand model was used to report existing and future region-wide transportation measures. Metro's model is calibrated to year 2005 conditions and it is used to predict 2030 conditions.

3.3 Data Collection

The foundation of any traffic operations analysis is a clear and thorough understanding of existing conditions through the collection of detailed traffic data. The CRC project area contains a diverse transportation system with a highway system, a network of local area roads, and bicycle and pedestrian systems. The traffic composition within the study area is a very diverse mix with commuters, heavy truck traffic, transit users, local business and residential traffic, and bicycle and pedestrian users.

The traffic data used in this analysis were primarily collected during the fall of 2005. Supplemental data were collected during the summer of 2006 and during the spring and summer of 2007. Data included traffic volumes along the highway and at ramp terminals, local intersection turning movement counts, vehicle classification surveys, travel lane utilization surveys, travel speeds, vehicle occupancy counts, vehicle origin-destination data, and bicycle and pedestrian counts.

The various traffic counts and surveys collected for this study were collected at sites that were identified through discussions with ODOT, WSDOT, City of Vancouver, and the City of Portland staff.

3.4 Travel Demand Forecasting Overview

Travel demand models have been in use since the 1950s and use a market-based approach by considering both the transportation supply and travel demand for producing mobility characteristics such as roadway traffic volumes and transit ridership.

The two Metropolitan Planning Organizations (MPO) in the Portland-Vancouver metropolitan area are the Metropolitan Service District (Metro) and the Southwest Washington Regional Transportation Council (RTC). Both organizations have travel demand modeling capability and a long history of successfully coordinating their modeling activities. For the purposes of the analysis, it was determined that Metro would lead the modeling effort, supported closely by the RTC. The regional travel model at Metro was expanded to include population and employment forecasts from southwest Washington that were approved by Clark County and its cities.

The regional travel demand model uses a four-step process, shown in **Exhibit 3-2**, which includes the following components:

- **Trip generation** determines the location, magnitude, and purpose of trip-making based on land use and socioeconomic input data.
- **Trip distribution** identifies origin and destination travel patterns by calculating trip lengths and travel times from transportation system attributes.

- In **mode choice**, trips are sorted into the various vehicle, transit, and in some cases, walk and bike modes.
- Through **trip assignment**, routing paths for vehicle and transit trips are determined for several time periods throughout the day.

Various modeling tools were used to forecast travel demands and evaluate traffic operations. These are defined in the following sections.

3.4.1 EMME/2

The EMME/2 transportation modeling software program assigns regional travel demands to a transportation network using an equilibrium assignment. The assignment results in roadway link volumes where no traveler can achieve additional travel time savings by changing routes. The software program itself is used to edit highway networks, analyze data, display and plot results, and import and export data.

The transportation analysis used Metro's regional travel forecasting model to simulate highway and transit option packages to derive transportation performance measures. The highway and transit assignments were done using the EMME/2 software package.

3.4.2 VISUM

VISUM is a comprehensive, flexible software system for transportation planning, travel demand modeling, and network data management. Designed for multimodal analysis, VISUM integrates all relevant modes of transportation (i.e., car, car passenger, truck, bus, train, pedestrians, and bicyclists) into one consistent network model while providing a variety of assignment procedures. VISUM provides direct network linkage capabilities to VISSIM (see description below). This linkage facilitates network building and permits the use of dynamic path building (not fixed routes) in VISSIM.

Metro, RTC, and many agencies in the Portland-Vancouver region are currently transitioning from EMME/2 to the VISUM assignment software. Most of the outputs derived during the Draft Environmental Impact Statement (DEIS) analysis were prepared using EMME/2. However, auto assignment information was developed using VISUM for flow bundle analyses and traffic operations work.

3.4.3 VISSIM

VISSIM is a microscopic, behavior-based multi-purpose traffic simulation program. For many engineering disciplines, simulation has become an indispensable instrument to optimize complex technical systems. This is especially true for transportation planning and traffic engineering, where simulation is an invaluable and cost-reducing tool.

VISSIM offers a wide variety of urban and highway applications, integrating public and private transportation. The traffic simulation model is able to model complex traffic conditions and is capable of analyzing traffic operations under both uncongested and congested conditions. VISSIM is explained further in Section 3.5.1.

3.4.4 Synchro/SimTraffic

Synchro is a software application for optimizing traffic signal timing and performing roadway capacity analysis. The software optimizes traffic signal splits, offsets, and cycle lengths for individual intersections, an arterial, or a complete network. SimTraffic is a microscopic model that simulates individual vehicles using the roadway network.

As a microscopic model SimTraffic animates traffic flow based on input volumes and signal timing and is able to model congested conditions on arterials, including overcapacity operations at signalized intersections, unbalanced lane utilization and vehicle queue build up, and dissipation over morning and afternoon/evening peak periods. SimTraffic models signalized and unsignalized intersections, and roadway segments with automobiles, trucks, pedestrians, and buses. By basing the traffic analysis on driver behavior (driver reaction to the environment) rather than individual capacities, SimTraffic is able to model arterials as a traffic system, where congestion at one intersection influences operations both upstream and downstream of that intersection.

3.5 Traffic Operations Overview

3.5.1 I-5 and I-205 Operations

Simulation modeling is a useful tool for designing improvements and evaluating operations on a roadway system. Simulation models enable engineers to predict the outcome of a proposed change to the roadway before it is implemented and help to evaluate the merits and demerits of design options. Models are set up to predict system responses by calibrating to the model to reflect existing traffic conditions. Calibration is a process of adjusting model parameters so that simulated responses agree with measured field conditions.

Traffic simulation may be macroscopic or microscopic in nature. While macroscopic models describe the traffic process with aggregate quantities, such as flow and density, microscopic models describe the behavior of individual drivers as they react to their perceived environments. The aggregate response in the latter case is the result of interactions among many driver/vehicle entities. Microscopic models are helpful in capturing the more detailed aspects of the system (e.g., interacting bottlenecks, closely spaced intersections, and unusual lane utilization).

For the study of I-5 operations, VISSIM was selected as the environment for micro-simulation modeling. VISSIM was supplemented by VISUM, a macro-simulation model for providing traffic flow information as mentioned under **Section 3.4**.

VISSIM is a stochastic traffic simulator that uses the psycho-physical driver behavior model. VISSIM combines a perceptual model of the driver with a vehicle model. Every driver with his or her specific behavior characteristics is assigned to a specific vehicle. As a result, driver behavior corresponds to the technical capabilities of a vehicle. The behavior model for the driver involves a classification of reactions in response to the perceived relative speed and distance with respect to the preceding vehicle. Drivers can make the decision to change lanes that can either be forced by a routing requirement, or made by the driver in order to access a faster-moving lane. Four driving modes are defined: free driving, approaching, following, and braking. In each mode, the driver behaves differently, reacting either to his following distance, or trying to match a prescribed target speed.

VISSIM was selected for analysis due to its multimodal modeling capabilities that include cars, trucks, and buses. Another benefit of using VISSIM is that it can simulate unique operational conditions, high-occupancy vehicle (HOV) lanes, toll lanes, exclusive lanes, merging/diverging, and weaving areas. It also has visualization capabilities, which makes it easier to visualize design options.

3.5.2 Local Street Operations

At signalized intersections, level-of-service (LOS) is a function of control delay, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Delays and volume-to-capacity (V/C) ratios are calculated for all movements at a signalized intersection, since all movements are stopped at some time during the signal cycle. Some movements, particularly side street approaches or left turns onto side streets, may experience longer delays because they receive only a small portion of the green signal time during a signal cycle even though their V/C ratio may be relatively low. It is important to examine both factors – delay and V/C ratio – before drawing conclusions about operational performance. The intersection capacity utilization (ICU) value was also determined for each intersection. The ICU is the sum of time required to serve all movements at saturation given a reference cycle length, divided by the reference cycle length.

At stop sign-controlled intersections, level-of-service is also a function of control delay. In addition to calculating delay, the analysis calculates V/C ratio for all stopped movements at the intersection. Although delays can sometimes be long for some movements at stop sign-controlled intersections, the V/C ratio may indicate that there is adequate capacity to process the demand for that movement.

Key signal-controlled and stop-sign controlled intersections were evaluated with the Synchro/SimTraffic analysis software package, which uses methodology outlined in the *2000 Highway Capacity Manual* prepared by the Transportation Research Board. **Exhibit 3-3** summarizes the level-of-service criteria for both signalized and unsignalized intersections based on the manual’s criteria.

The level-of-service (LOS) for unsignalized intersections is somewhat different than the criteria used for signalized intersections. The primary reason for this is that drivers expect different levels of performance from different kinds of transportation facilities. In general, the expectation is that a signalized intersection is designed to accommodate higher traffic volumes than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to two-way stop sign-controlled intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, the total delay threshold for any given level-of-service is considered to be less for an unsignalized intersection than for a signalized intersection.

"Screenlines" are imaginary lines drawn across a series of parallel roadways and are used to evaluate traffic demand changes. This method involves measuring entering and exiting traffic volumes across key north-south and east-west axes. Comparison of screenline volumes yields information regarding the performance of local streets, including increased or decreased traffic volumes resulting from specific actions.

3.5.3 Development of Performance Standards

Local traffic impacts are measured by impacts to intersection LOS, delay, and queuing. WSDOT, ODOT, the City of Vancouver, the City of Portland, RTC, and Metro all have defined standards for intersection operations. A description of the development and application of these standards to local street operations is provided below.

3.5.3.1 WSDOT and City of Vancouver Standards

The Washington State Department of Transportation defers to the local MPO or Regional Transportation Planning Organization (RTPO) for LOS thresholds on "Highways of Regional Significance." The RTC has adopted LOS E as the standard for urban state highways. For the purposes of the analysis of local Vancouver street intersections, including ramp terminals, the concurrency standards developed by the City of Vancouver are solely applied. **Exhibit 3-4** summarizes the intersection standards for WSDOT and Vancouver.

The City of Vancouver, in compliance with WSDOT requirements, has identified and recommended LOS standards for all intersections within the city. The description of these standards is provided in the 2003 Vancouver Concurrency Administration Manual. Acceptable signalized intersection operating levels (the average weighted delay for all vehicles entering the intersection) shall not exceed 55 seconds (LOS D), with exception of traffic signals located downtown (south of McLoughlin Boulevard on the west side of I-5). The acceptable intersection operating LOS for downtown is 80 seconds (LOS E). For stop-controlled and other unsignalized intersections, a per-vehicle delay less than 50 seconds (LOS E) is considered acceptable operations by the City of Vancouver.

3.5.3.2 ODOT and City of Portland Standards

The ODOT Analysis Procedures Manual (APM) requires that the performance standards from the Oregon Highway Plan (OHP) be used to analyze existing conditions and No-Build scenarios. The stated V/C standard for ramp terminals in the OHP is 0.85. In addition to the ramp terminals, ODOT has jurisdiction over Lombard Street and along Martin Luther King Jr. Boulevard between the I-5 Marine Drive ramp terminal and Columbia Boulevard. The OHP V/C standard for these intersections is 0.99.

The APM states that the level-of-service standards contained in the Highway Design Manual (HDM) be used for the evaluation of all build cases. The HDM does not explicitly list a V/C standard for ramp terminals. The V/C standard listed in the HDM for regional highways and for district/local roads is 0.85. Since the ramp terminals are located along facilities of these types, the V/C standard of 0.85 applies to ramp terminals for the build alternatives. For all other intersections in the study area under ODOT's jurisdiction, a V/C standard of 0.99, as stated in the OHP, will be applied to the build alternatives.

The results from the Synchro/SimTraffic intersection models for the ramp terminals, the intersections along Lombard Street, and the intersections along Martin Luther King Jr. Boulevard are measured against the above standards for both the morning and afternoon/evening peak hours. **Exhibit 3-5** summarizes the intersection standards for ODOT.

For the non-ramp terminal intersections in the Portland, level-of-service standards from the Portland Department of Transportation (PDOT) apply. Like ODOT, PDOT has two tiers of standards – one that is used for the analysis of the No-Build scenario and one for the build scenarios. The level-of-service standard in the PDOT's Transportation System Plan (TSP) states that signalized intersections must meet LOS D in the No-Build scenario. Unsignalized intersections must meet a standard of LOS E. These standards also apply to the build scenarios. However, in the case where intersections in the build scenario do not meet the level-of-service standard, they are still considered to be performing acceptably if they pass PDOT's "do no worse" policy. That is, intersections in the build scenario which fail to meet the LOS D/E standard, but perform better than under the No-Build scenario, meet PDOT's requirements. **Exhibit 3-5** summarizes the intersection standards for the City of Portland.

For purposes of the DEIS, if the project would degrade an intersection's performance to an unacceptable level-of-service, the project will work with the operating jurisdiction to develop a cost-effective solution to mitigate the intersection performance to the minimum of the peak hour standard. If vehicular queuing blockages occur with both the No-Build Alternative and the project, then the project would be mitigated to No-Build conditions.

If the No-Build Alternative does not meet warrants or safety criteria (e.g., traffic signal warrants, access spacing criteria) but the project does, the project would include mitigation measures to address the warrants or safety impacts.

3.6 Performance Criteria

Project performance criteria were developed based on CRC's Purpose and Need statement and Vision and Values statement (see **Sections 1.2 and 1.3**). Ten categories of performance criteria were established. Four of the criteria relate directly to traffic and safety measures:

- Mobility, reliability, accessibility, congestion reduction and efficiency;
- Modal choice;
- Safety; and
- Regional economy and freight mobility.

The following sections describe specific measures used to evaluate each of the traffic and safety related criterion in the I-5 corridor within the Bridge Influence Area.

3.6.1 Mobility, Reliability, Accessibility, Congestion Reduction and Efficiency

Measures used to evaluate mobility, reliability, accessibility, congestion reduction, and efficiency include:

- Reduction in travel times and delays.
- Reduction in the number of hours of highway congestion.
- Improvement in person throughput of the I-5 river crossing.
- Improvement in vehicle throughput of the I-5 river crossing.

3.6.2 Modal Choice

Measures used to evaluate modal choice include:

- Improvement in pedestrian/bicycle connectivity
- Increase in vehicle occupancy.

3.6.3 Safety

Measures used to evaluate safety include:

- Enhancement in vehicle/freight safety.
- Enhancement in pedestrian/bicycle facilities and safety.

3.6.4 Regional Economy; Freight Mobility

Measures used to evaluate regional economy and freight mobility include:

- Reduction in travel times and delays for vehicle-moved freight.
- Improvement in freight truck throughput of the I-5 river crossing.
- Improvement in vehicle throughput of the I-5 river crossing.

The performance results for each project alternative are summarized in **Section 4. Alternatives Performance Summary**.

Exhibit 3-1
CRC Traffic Study Area

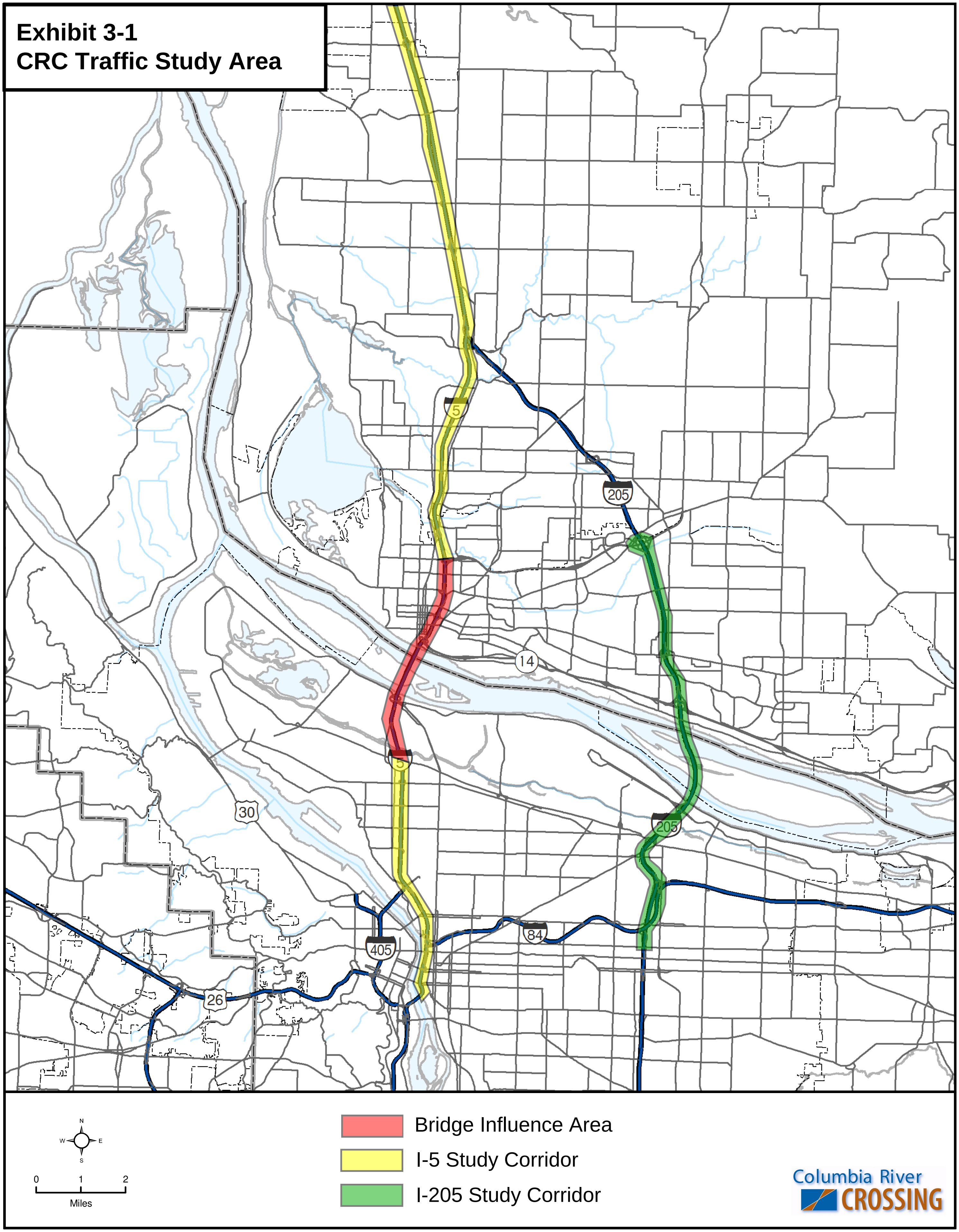
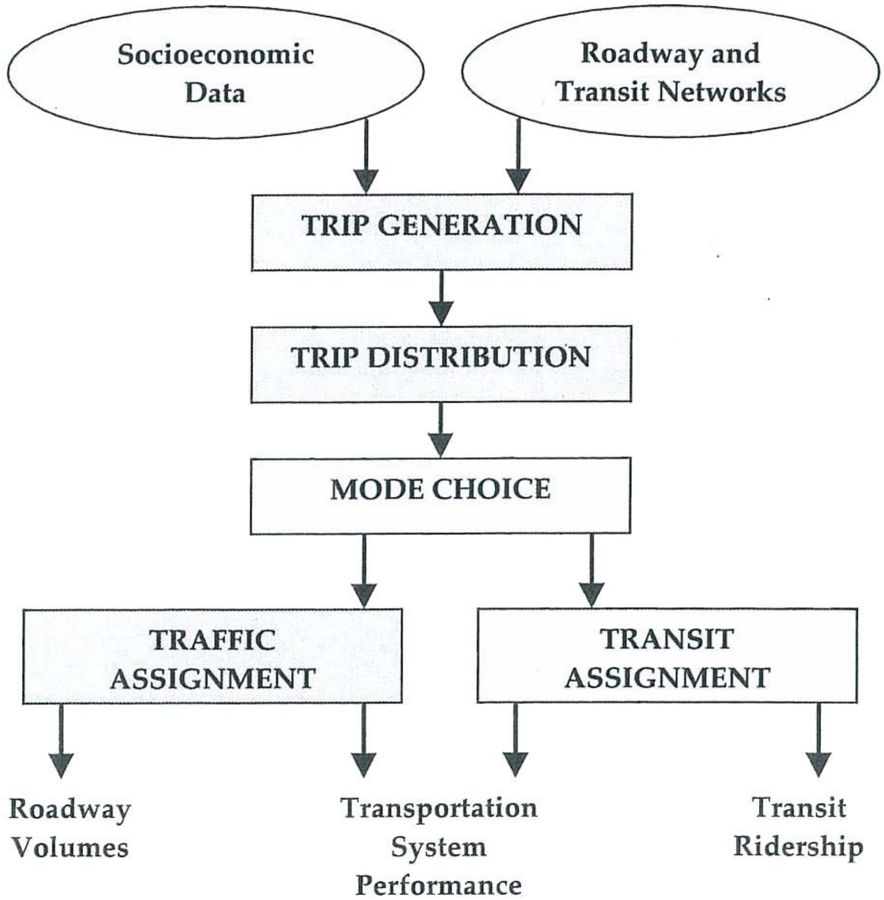


Exhibit 3-2

Multi-Modal Travel Model



The travel demand modeling process estimates trip-making behavior through a four-step process. Various socioeconomic scenarios and transportation alternatives can be forecasted by the model. Roadway traffic volumes, transit ridership, and system performance characteristics are produced by the model's application.

Exhibit 3-3

	Control Delay (seconds/vehicle)	
Level-of-Service	**Signalized Intersections**	**Unsignalized Intersections**
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Note: The LOS criteria are based on control delay, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Source: Transportation Research Board, Highway Capacity Manual, 2000, p. 16-2 for signalized intersections and p. 17-2 for unsignalized intersections.

Exhibit 3-4

WSDOT and City of Vancouver Intersection Standards				
Jurisdiction	**Method**	**Existing**	**No-Build**	**Build**
WSDOT[1]	n/a	n/a	n/a	n/a
City of Vancouver (signalized)[2]	LOS	E[3] / D[3]	E[3] / D[3]	E[3] / D[3]
City of Vancouver (unsignalized)[2]	LOS	E	E	E

Note 1: By legislation, WSDOT defers to regional and local agencies for standards

Note 2: Based on the 2003 Vancouver Concurrency Administration Manual

Note 3: Downtown Vancouver LOS Standard / Outside downtown Vancouver LOS Standard

Exhibit 3-5

ODOT and City of Portland Intersection Standards				
Jurisdiction	**Method**	**Existing**	**No-Build**	**Build**
ODOT (ramp terminals)[1,2]	V/C	0.85	0.85	0.85
ODOT (street intersections)[3,4]	V/C	0.99	0.99	0.99
City of Portland (signalized)[5]	LOS	D	D	D[6]
City of Portland (unsignalized)[5]	LOS	E	E	E[6]

Note 1: The standard stated in the Oregon Highway Plan (Action 1F1) applies to existing conditions and the No-Build alternative

Note 2: The standard stated in the Oregon Highway Design Manual (Table 10-1) applies to the Build alternatives

Note 3: Applies to all intersections along Lombard Street and to the intersection of MLK Jr. Boulevard and Columbia Boulevard

Note 4: The standard stated in the Oregon Highway Design Manual (Table 7, 2004 update) applies to all scenarios

Note 5: Based on the Portland Transportation System Plan

Note 6: PDOT also considers Build scenarios to meet standards if they perform no worse than the No-Build

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4. Alternatives Performance Summary

This section presents highway and local street system transportation performance data and compares the data among the various alternatives. Highway performance data address I-5 and I-205 and compare travel demand, effects of congestion, traffic service volumes, travel times, and served vs. unserved on-ramp volumes for each alternative. Local street performance data address travel demands across major roadways and intersection service levels for each alternative.

The four sections following this section provide detailed results and analysis of each of the following scenarios: existing conditions, No-Build Alternative (Alternative 1), replacement crossing (Alternatives 2 and 3), and supplemental crossing (Alternative 4 and 5). All projections are for the project design year of 2030.

4.1 I-5 and I-205 Performance

4.1.1 Daily Traffic Levels

Average daily traffic volumes represent the average 24-hour weekday volume on a roadway segment**. Exhibit 4-1** summarizes ADT volumes on the I-5 crossing, the I-205 crossing, and the total river crossing.

4.1.2 Travel Demand

Exhibits 4-2 through **4-5** summarize existing and forecast 2030 I-5 travel demand. The four-hour peak period travel demand is shown by direction by alternative for the entire 23-mile corridor from the Marquam Bridge in Portland, Oregon to the Pioneer Street interchange in Ridgefield, Washington.

Existing and forecast I-205 travel demand is summarized in **Exhibits 4-6** through **4-9**. The two-hour peak period travel demand is summarized by direction and alternative for the nine-mile corridor from the I-84 interchange in Portland, Oregon to the SR 500 interchange in Vancouver, Washington.

4.1.3 Effect of Congestion

Existing and forecast I-5 southbound and northbound daily hours of congestion are shown in **Exhibits 4-10** and **4-11**, respectively. The numbers of hours in which speeds are less than 30 mph have been summarized for each alternative between 5 a.m. and 9 p.m.

4.1.4 Travel Times

Existing and forecast southbound I-5 travel times during the two-hour morning peak are summarized for SR 500 to Columbia Boulevard and 179th Street to I-84 in **Exhibit 4-12**. The travel times are summarized for travel time segments by alternative. **Exhibit 4-13** summarizes northbound travel times for Columbia Boulevard to SR 500 and I-84 to 179th Street for the two-hour afternoon/evening peak. The travel times are summarized for both travel time segments by alternative.

Existing and forecast southbound I-205 travel times during the two-hour morning peak are summarized for three segments by alternative in **Exhibit 4-14**. The three travel time segments reported include SR 500 to bridge mid-point, bridge mid-point to I-84, and the combined segment from SR 500 to I-84. **Exhibit 4-15** summarizes northbound travel times for the two-hour afternoon/evening peak by alternative. The three travel time segments reported include I-84 to bridge mid-point, bridge mid-point to SR 500, and the combined segment from I-84 to SR 500.

4.1.5 Service Volumes

Existing and forecast I-5 service volumes across the I-5 bridges are summarized in **Exhibit 4-16**. The four-hour peak service volumes are summarized by direction by alternative. Similarly, four-hour peak I-5 truck service volumes across the Interstate Bridge are summarized by direction and by alternative in **Exhibit 4-17**.

4.1.6 Served vs. Unserved Ramp Volumes

Served ramp volumes refer to on-ramp vehicle demands that have been accommodated by the highway mainline during the four-hour peaks. Unserved ramp volumes are those vehicles that are not able to enter the highway mainline because of congestion or other reasons.

Exhibit 4-18 summarizes existing and forecast served versus unserved ramp volumes for the southbound morning peak within the Bridge Influence Area. The volumes are summarized by ramp and alternative. **Exhibit 4-19** summarizes northbound served versus unserved ramp volumes for the evening peak within the Bridge Influence Area by ramp and alternative.

4.1.7 Person Throughput

Exhibit 4-20 shows peak northbound and southbound person throughput across the I-5 bridges.

4.2 Local Street Performance

4.2.1 Travel Demand

Screenlines are a traffic analysis method used to examine local street operations. This technique measures entering and exiting traffic volumes across key north-south and east-west screenlines. Comparison of screenline volumes across different models yields information regarding the performance of local streets, especially when examined in conjunction with intersection level-of-service calculations.

For Vancouver, four screenlines were chosen to represent traffic moving north and south through the city, and three screenlines were selected to measure east and west travel. Vancouver screenline locations are shown in **Exhibit 4-21**.

For Portland, three screenlines were chosen to represent traffic moving north and south through the city, and three screenlines were selected to measure east and west travel. Portland screenline locations are shown in **Exhibit 4-22**.

Exhibits 4-23 and **4-24** display the screenline results for the morning and afternoon/evening peaks in Vancouver. The north-south screenline table summarizes the eastbound and westbound volume data and the east-west screenline table summarizes the southbound and northbound volume data. Volumes are rounded to the nearest 50 vehicles.

Exhibits 4-25 and **4-26** display the screenline results for the morning and afternoon/evening peaks in Portland. The north-south screenline table summarizes the eastbound and westbound volume data and the east-west screenline table summarizes the southbound and northbound volume data. Volumes are rounded to the nearest 50 vehicles.

4.2.2 Intersection Service Levels

Exhibits 4-27 and **4-28** display the results of the Synchro/SimTraffic analyses conducted in Vancouver for the morning and afternoon/evening peaks. For signalized intersections, results are presented for the overall intersection. For unsignalized intersections, data is given for the movement that experiences the most delay. In addition to the average delay, the tables present the corresponding level-of-service, the ICU or V/C of the intersection, the relevant standard for comparison, and a list of movements that exceed the available storage length, if applicable.

Exhibits 4-29 and **4-30** display the results of the Synchro/SimTraffic analyses conducted in Portland for the morning and afternoon/evening peaks. For signalized intersections, results are presented for the overall intersection. For unsignalized intersections, data are given for the movement that experiences the most delay. In addition to the average delay, the tables present the corresponding level-of-service, the ICU or V/C of the intersection, the relevant standard for comparison, and a list of movements that exceed the available storage length, if applicable.

4.3 Effect of Tolling

4.3.1 Service Volumes

Exhibit 4-31 summarizes the daily service volumes for I-5, I-205, and the total river crossing under different tolling scenarios. More information on tolling scenarios, tolling rate structures and highway performance for each tolling scenario can be found in Chapter 9.

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Exhibit 4-1

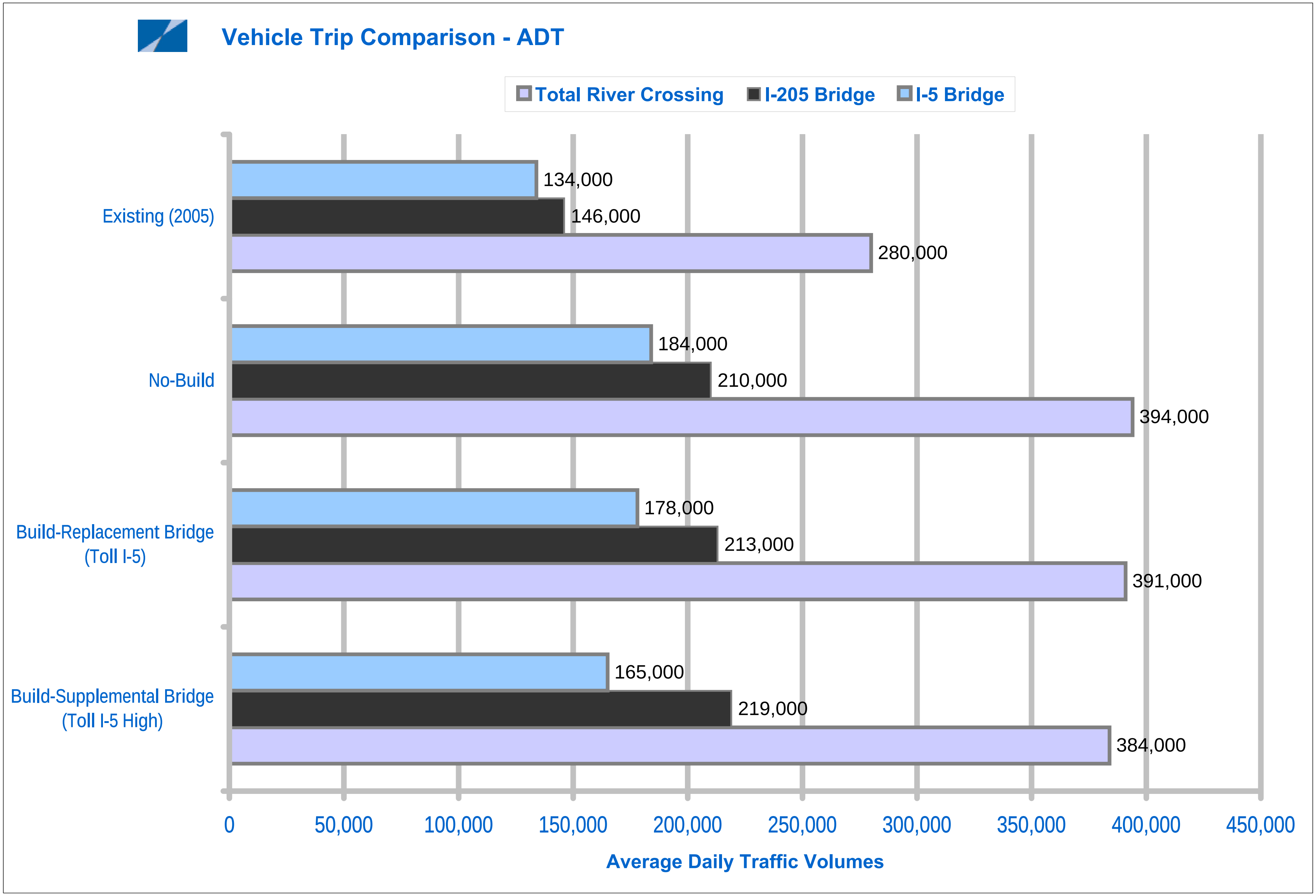
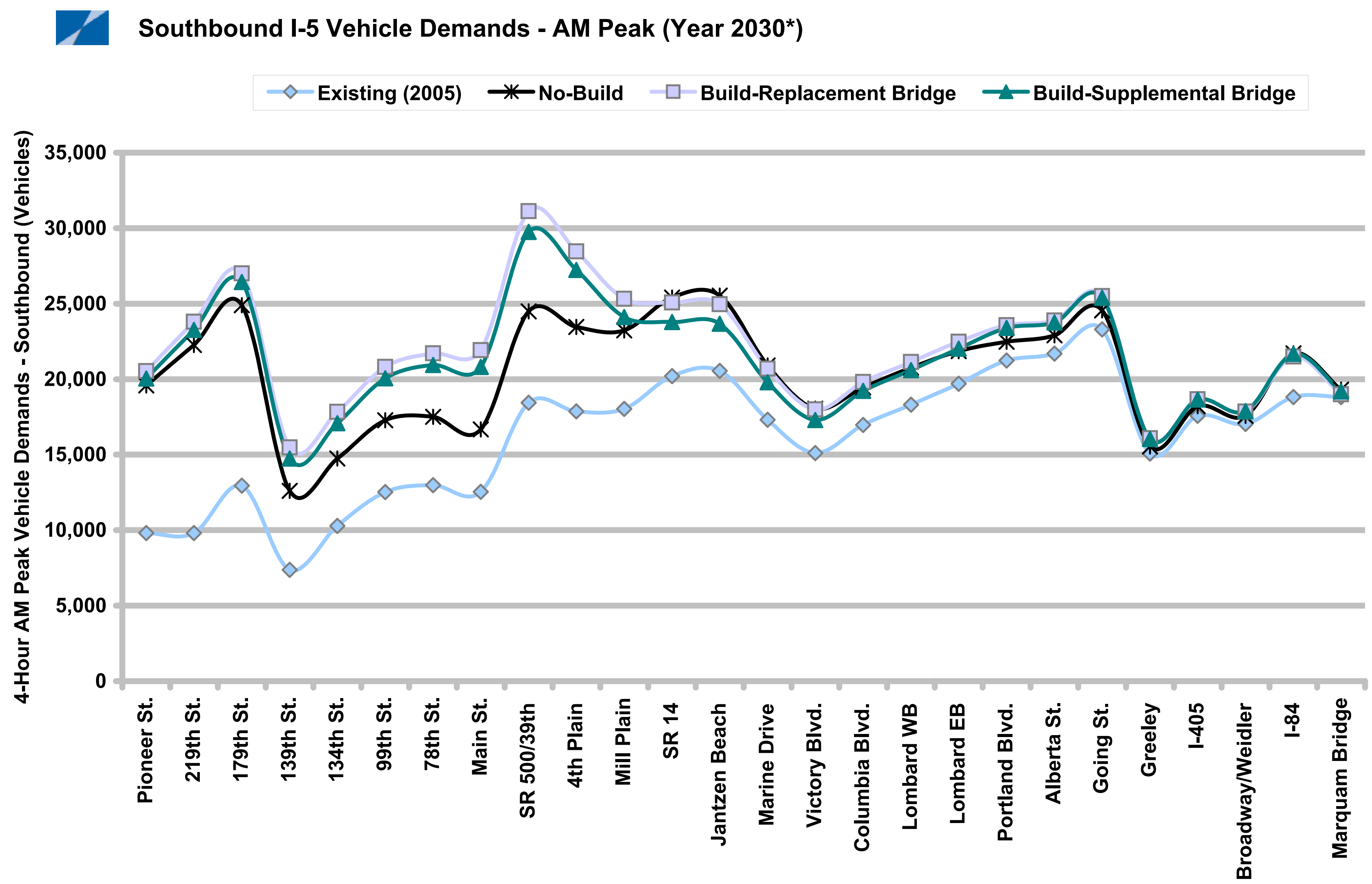
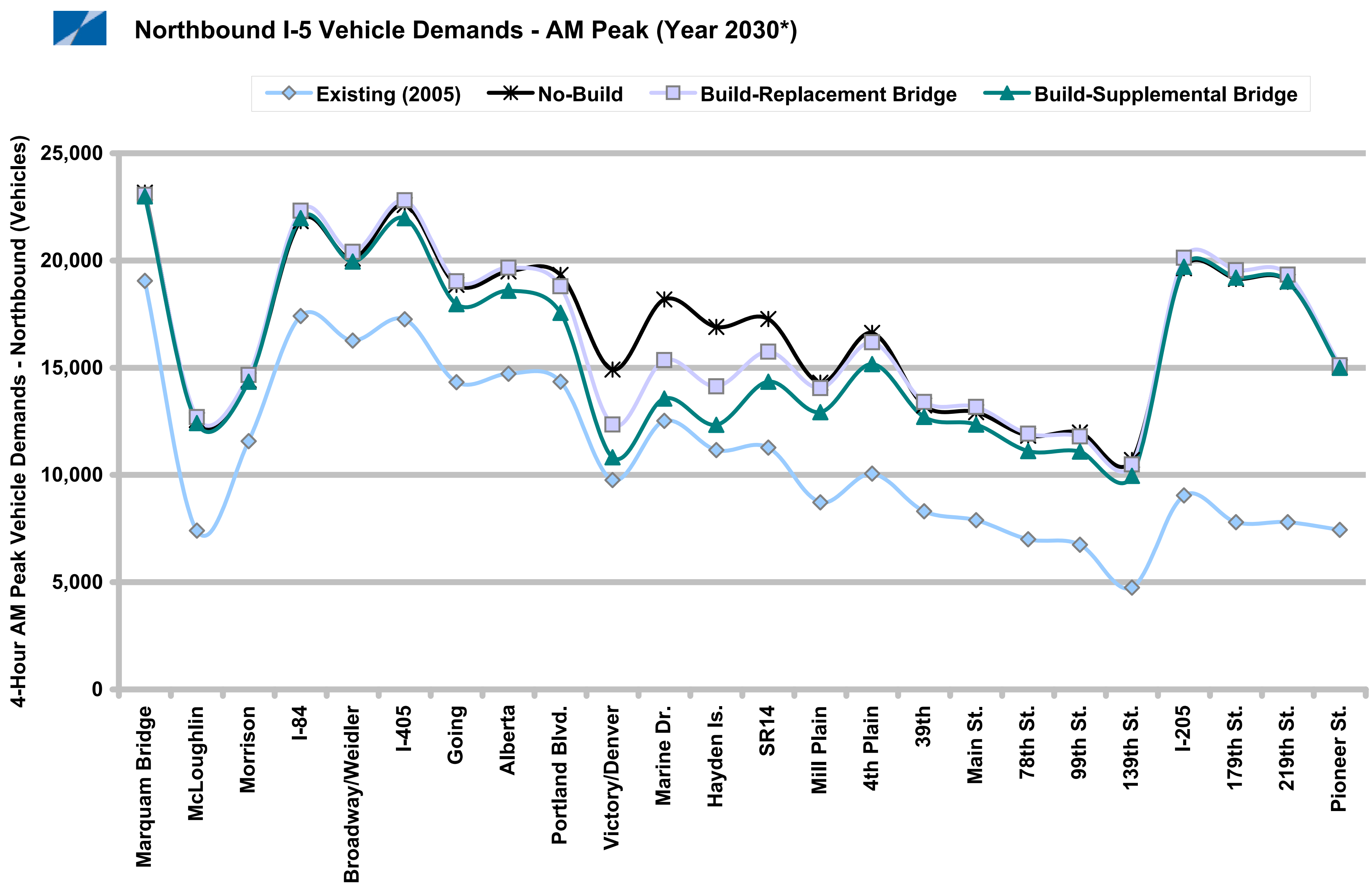

Vehicle Trip Comparison - ADT
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
134,000
146,000
280,000
No-Build
184,000
210,000
394,000
Build-Replacement Bridge (Toll I-5)
178,000
213,000
391,000
Build-Supplemental Bridge (Toll I-5 High)
165,000
219,000
384,000
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
Average Daily Traffic Volumes

Exhibit 4-2



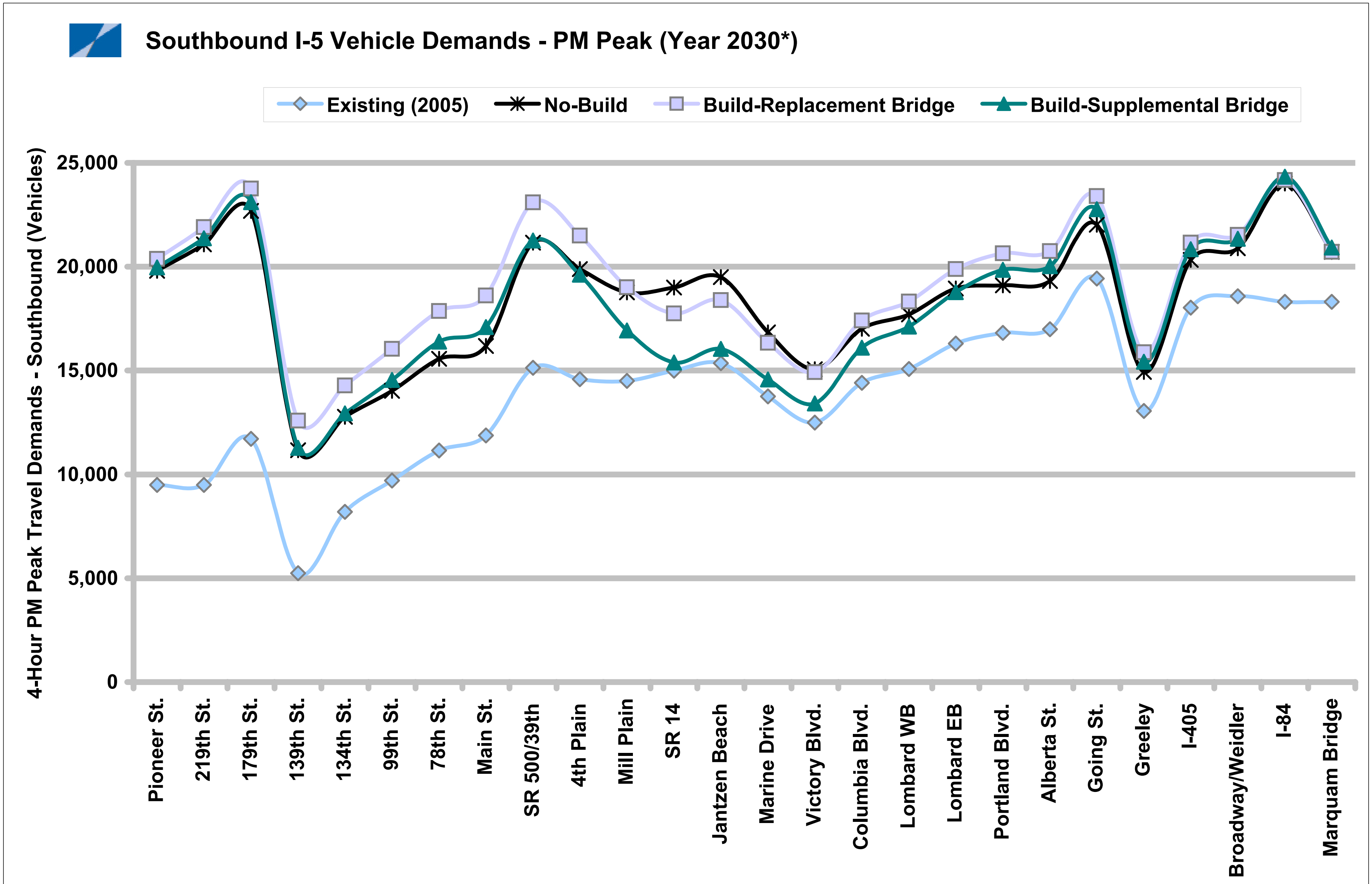
*Except for Existing Conditions (Year 2005)

Exhibit 4-3



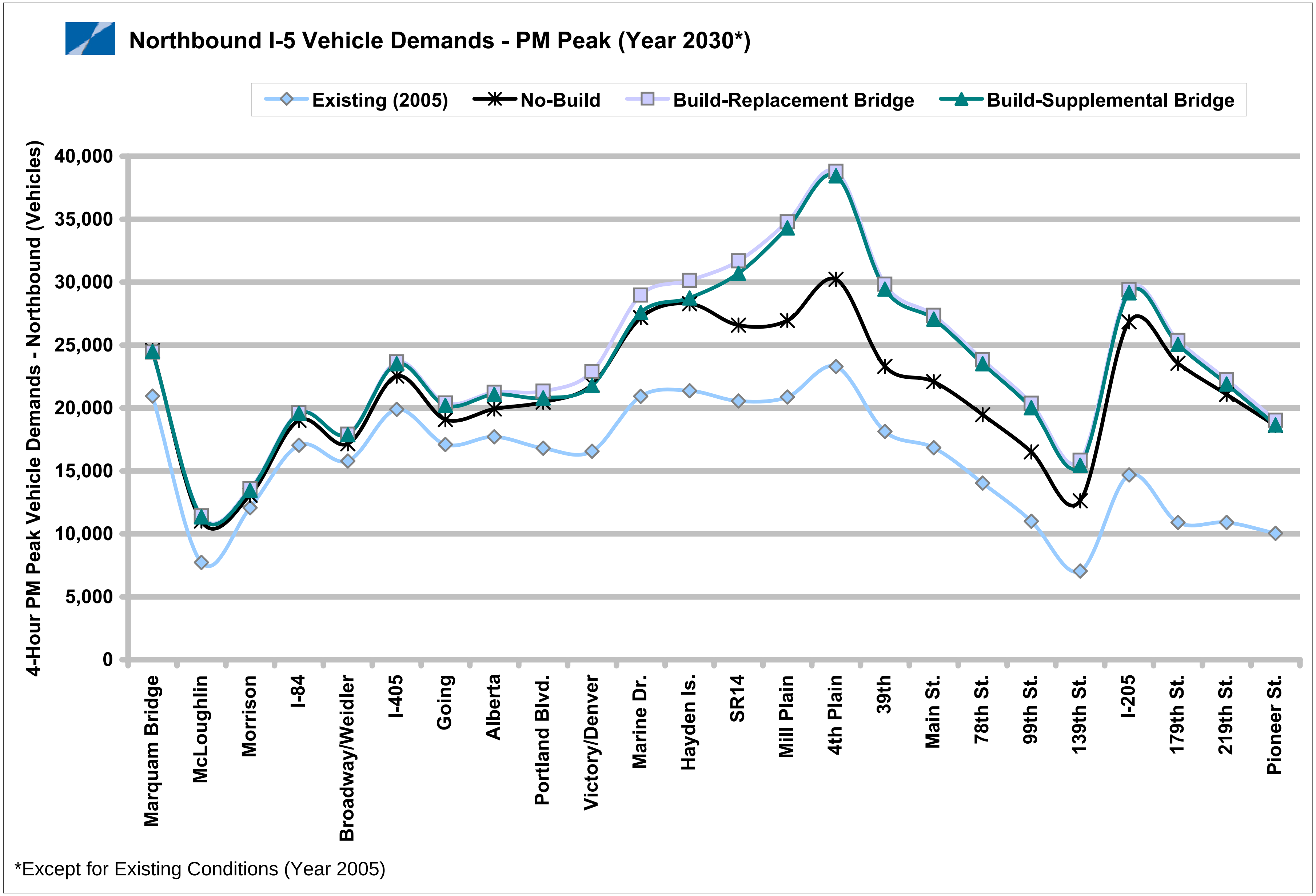
*Except for Existing Conditions (Year 2005)

Exhibit 4-4



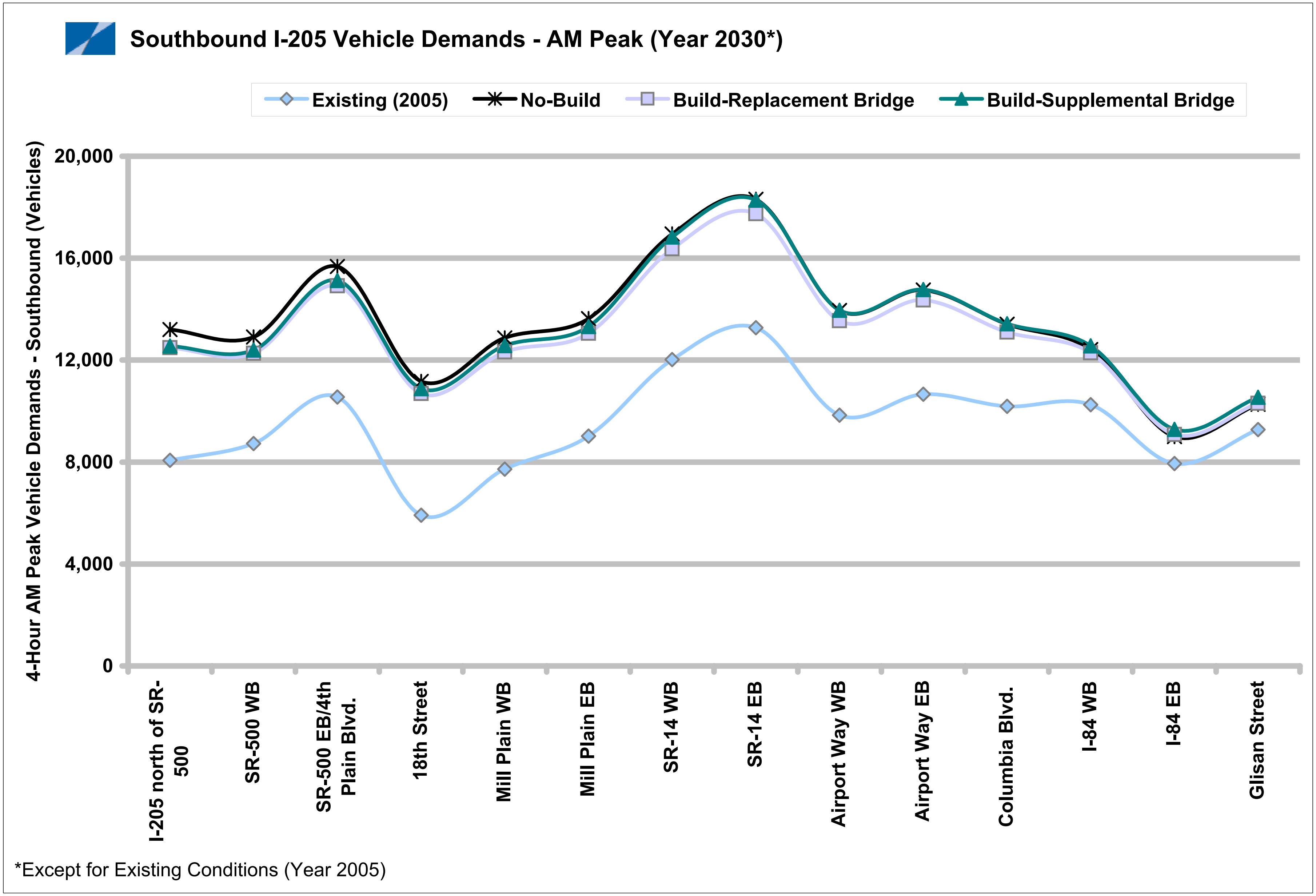
*Except for Conditions (Year 2005)

Exhibit 4-5



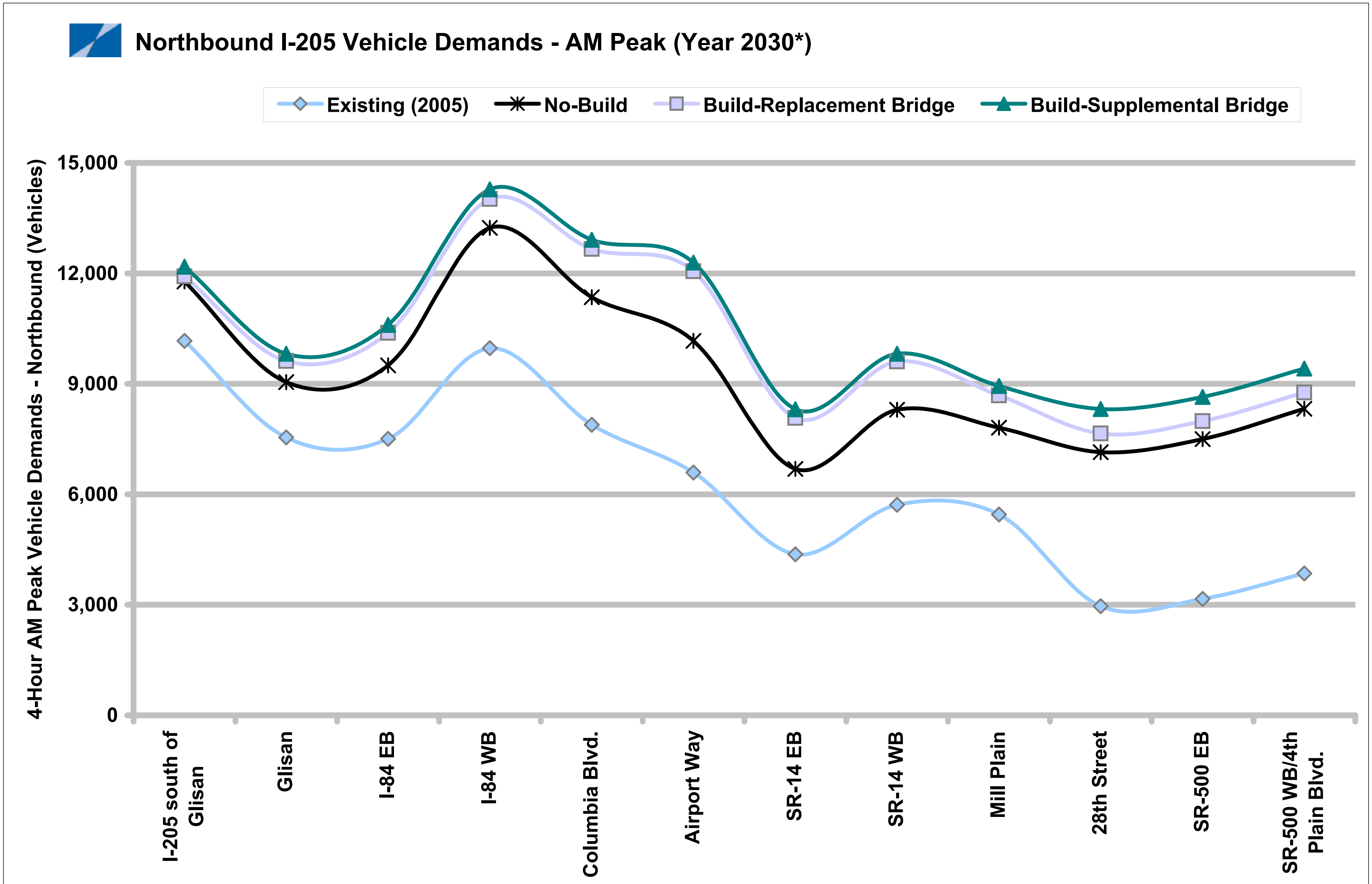
Northbound I-5 Vehicle Demands - PM Peak (Year 2030*)
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
4-Hour PM Peak Vehicle Demands - Northbound (Vehicles)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Marquam Bridge
McLoughlin
Morrison
I-84
Broadway/Weidler
I-405
Going
Alberta
Portland Blvd.
Victory/Denver
Marine Dr.
Hayden Is.
SR14
Mill Plain
4th Plain
39th
Main St.
78th St.
99th St.
139th St.
I-205
179th St.
219th St.
Pioneer St.
*Except for Existing Conditions (Year 2005)

Exhibit 4-6



Southbound I-205 Vehicle Demands - AM Peak (Year 2030*)
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
4-Hour AM Peak Vehicle Demands - Southbound (Vehicles)
20,000
16,000
12,000
8,000
4,000
0
I-205 north of SR-500
SR-500 WB
SR-500 EB/4th Plain Blvd.
18th Street
Mill Plain WB
Mill Plain EB
SR-14 WB
SR-14 EB
Airport Way WB
Airport Way EB
Columbia Blvd.
I-84 WB
I-84 EB
Glisan Street
*Except for Existing Conditions (Year 2005)

Exhibit 4-7



*Except for Existing Conditions (Year 2005)

Exhibit 4-8

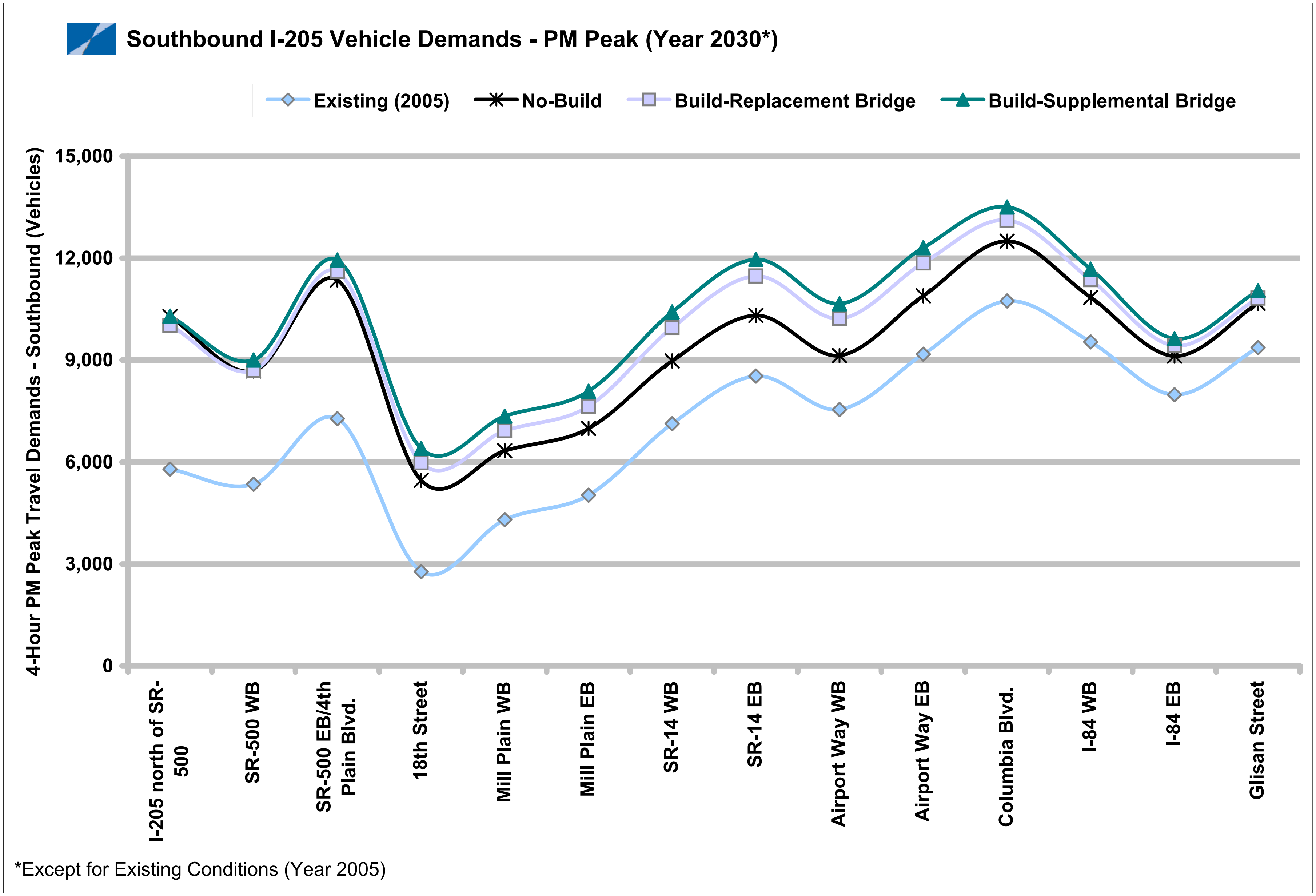
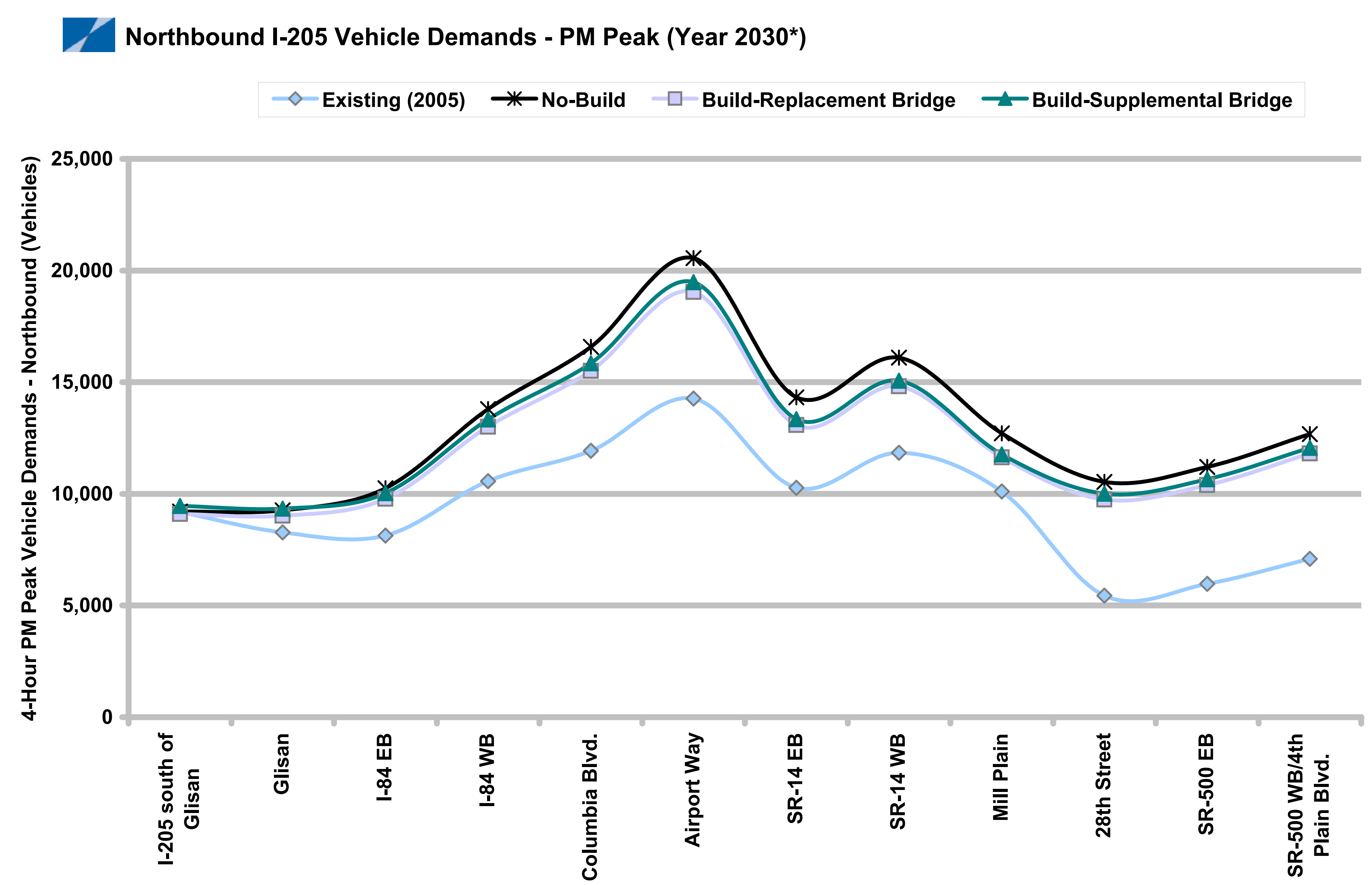
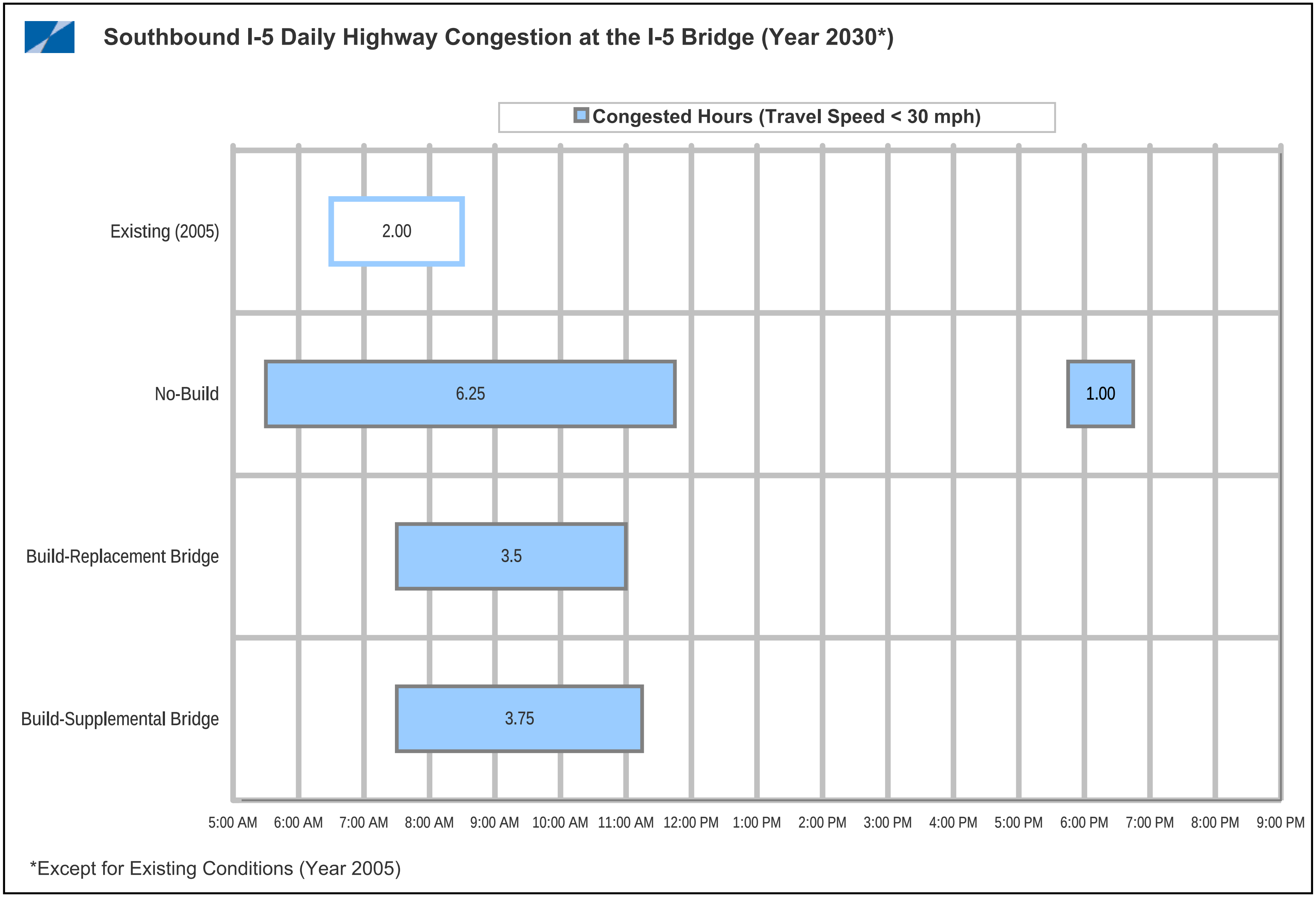

Southbound I-205 Vehicle Demands - PM Peak (Year 2030*)
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
4-Hour PM Peak Travel Demands - Southbound (Vehicles)
15,000
12,000
9,000
6,000
3,000
0
I-205 north of SR-500
SR-500 WB
SR-500 EB/4th Plain Blvd.
18th Street
Mill Plain WB
Mill Plain EB
SR-14 WB
SR-14 EB
Airport Way WB
Airport Way EB
Columbia Blvd.
I-84 WB
I-84 EB
Glisan Street
*Except for Existing Conditions (Year 2005)

Exhibit 4-9



*Except for Existing Conditions (Year 2005)

Exhibit 4-10



Southbound I-5 Daily Highway Congestion at the I-5 Bridge (Year 2030*)
Congested Hours (Travel Speed < 30 mph)
Existing (2005)
2.00
No-Build
6.25
1.00
Build-Replacement Bridge
3.5
Build-Supplemental Bridge
3.75
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
*Except for Existing Conditions (Year 2005)

Exhibit 4-11

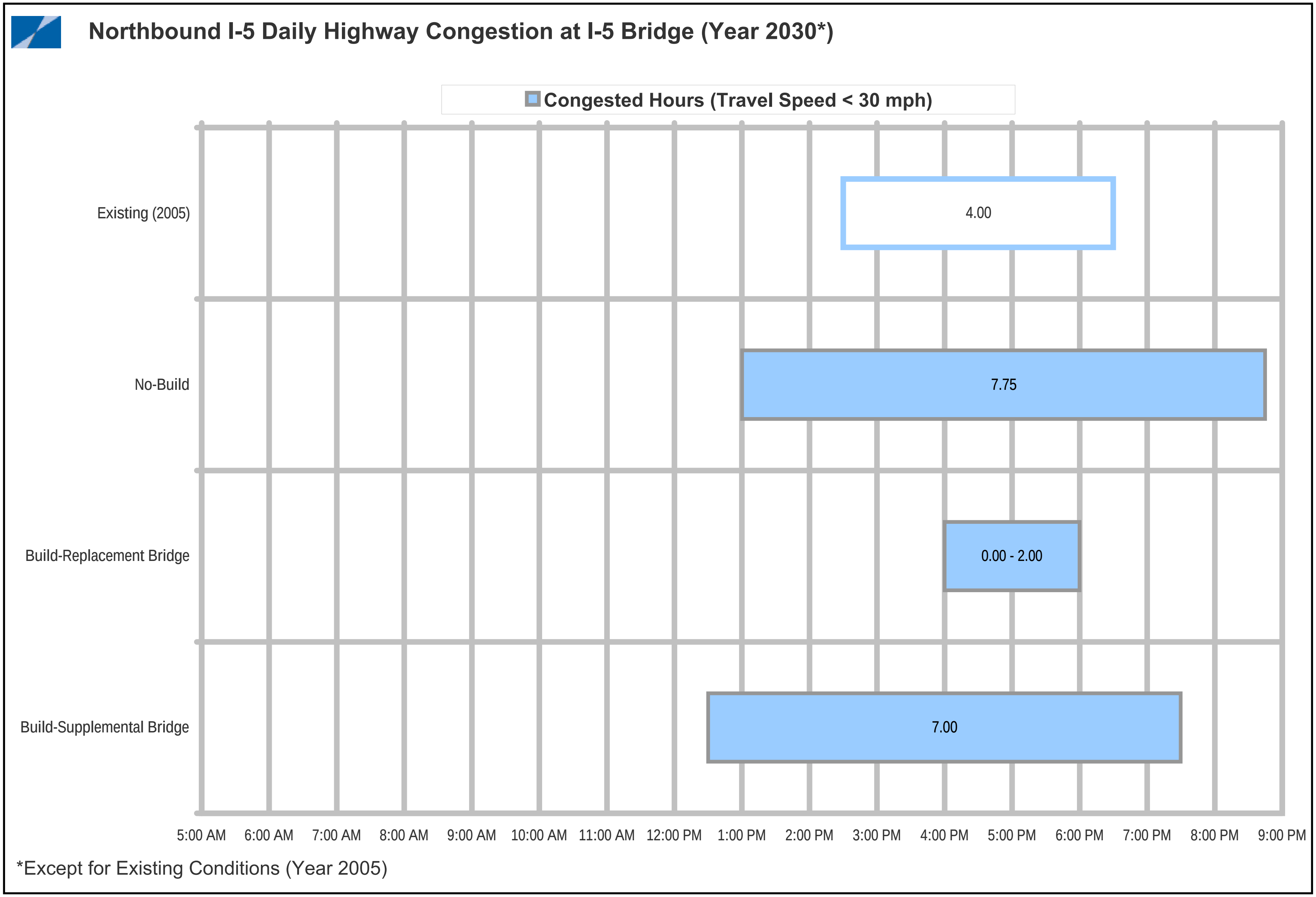
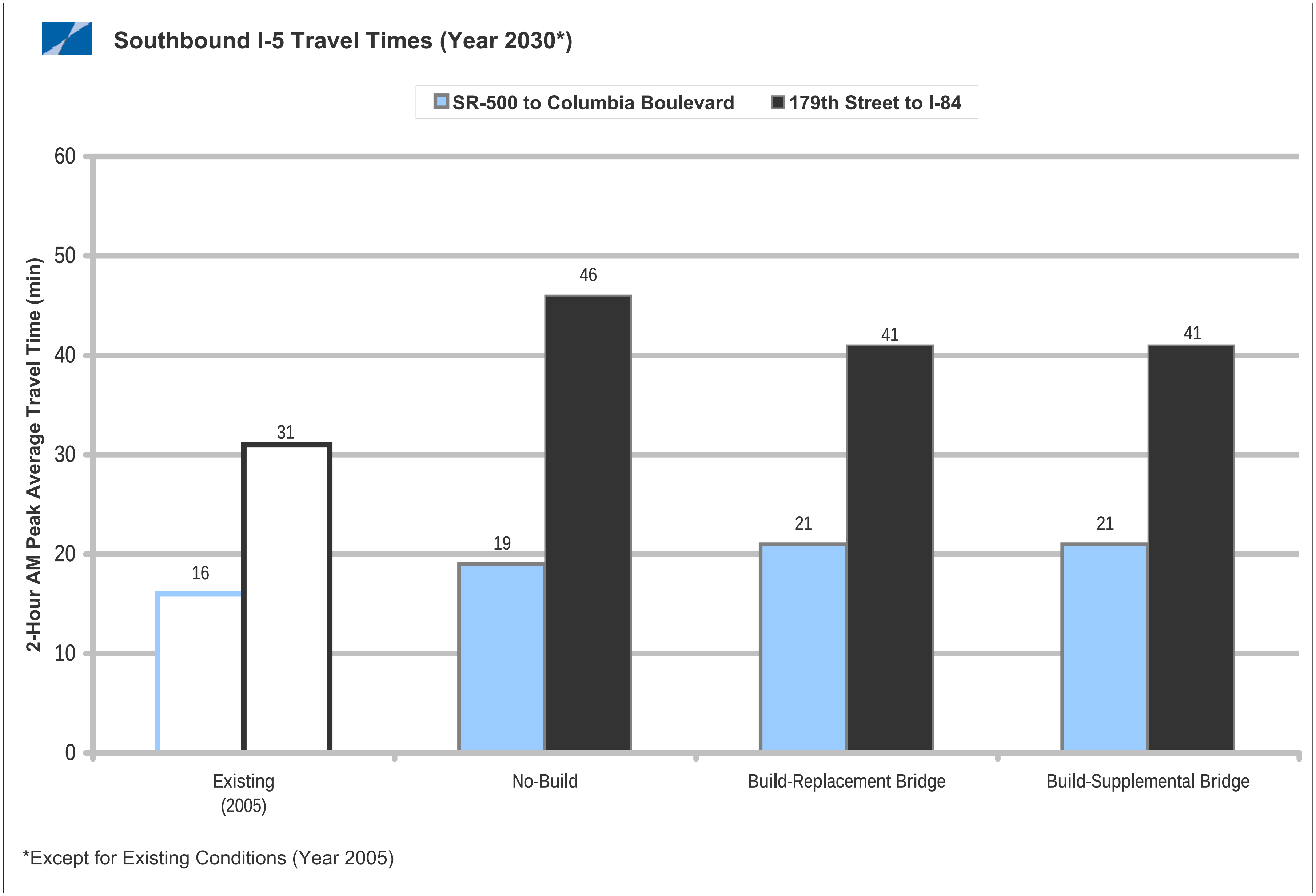

Northbound I-5 Daily Highway Congestion at I-5 Bridge (Year 2030*)
Congested Hours (Travel Speed < 30 mph)
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
4.00
7.75
0.00 - 2.00
7.00
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
*Except for Existing Conditions (Year 2005)

Exhibit 4-12



Southbound I-5 Travel Times (Year 2030*)
SR-500 to Columbia Boulevard
179th Street to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
16
31
19
46
21
41
21
41
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 4-13

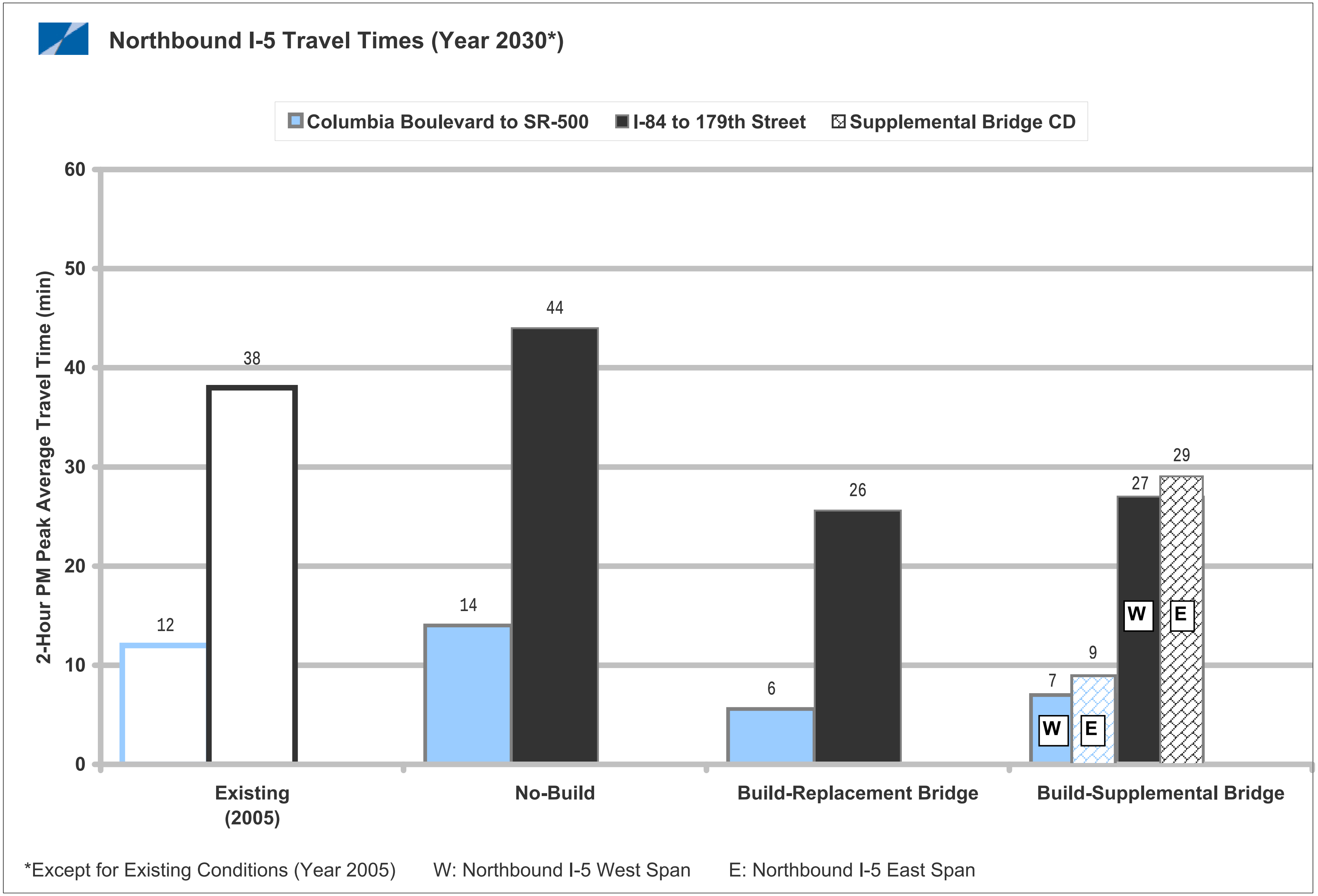
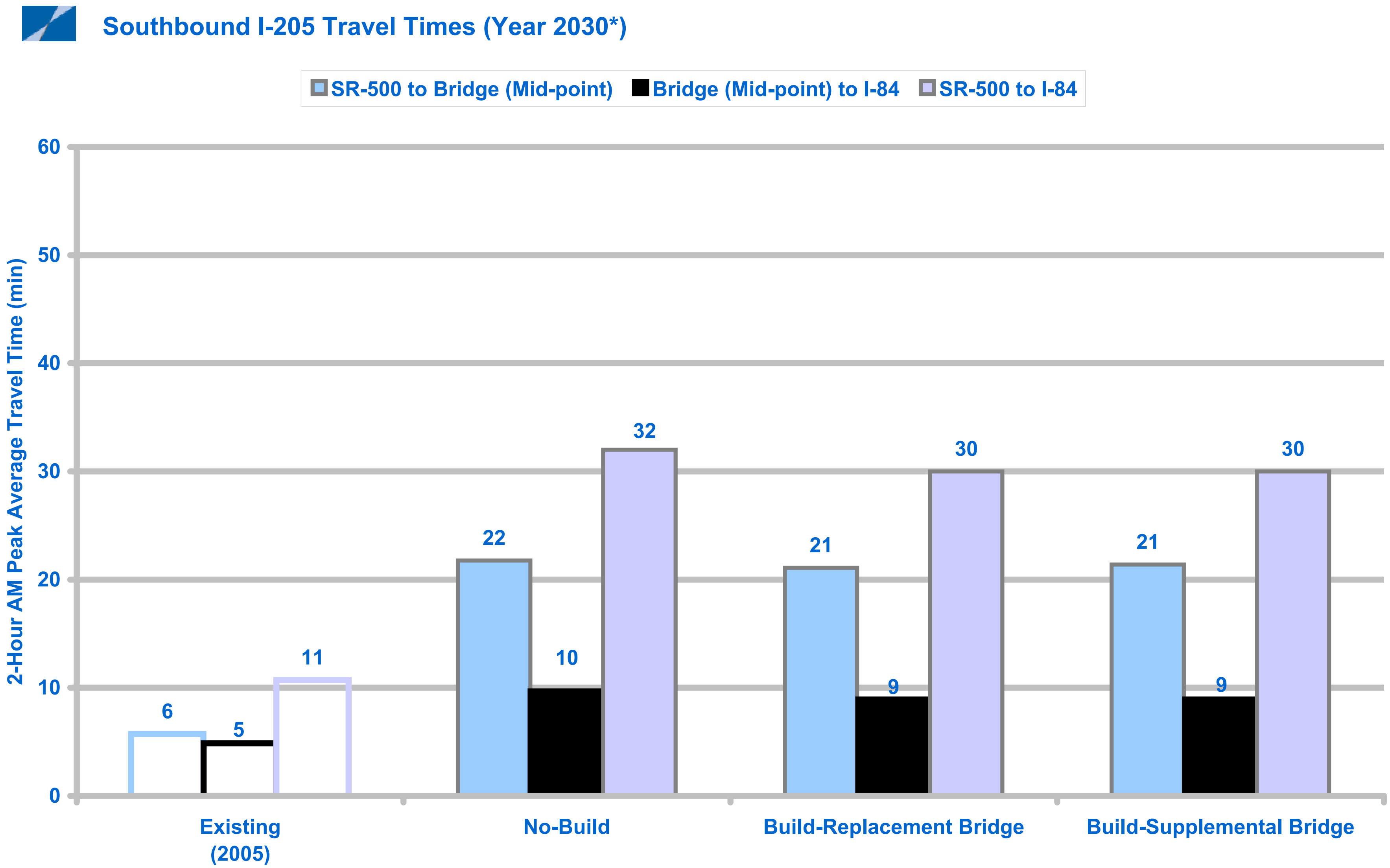
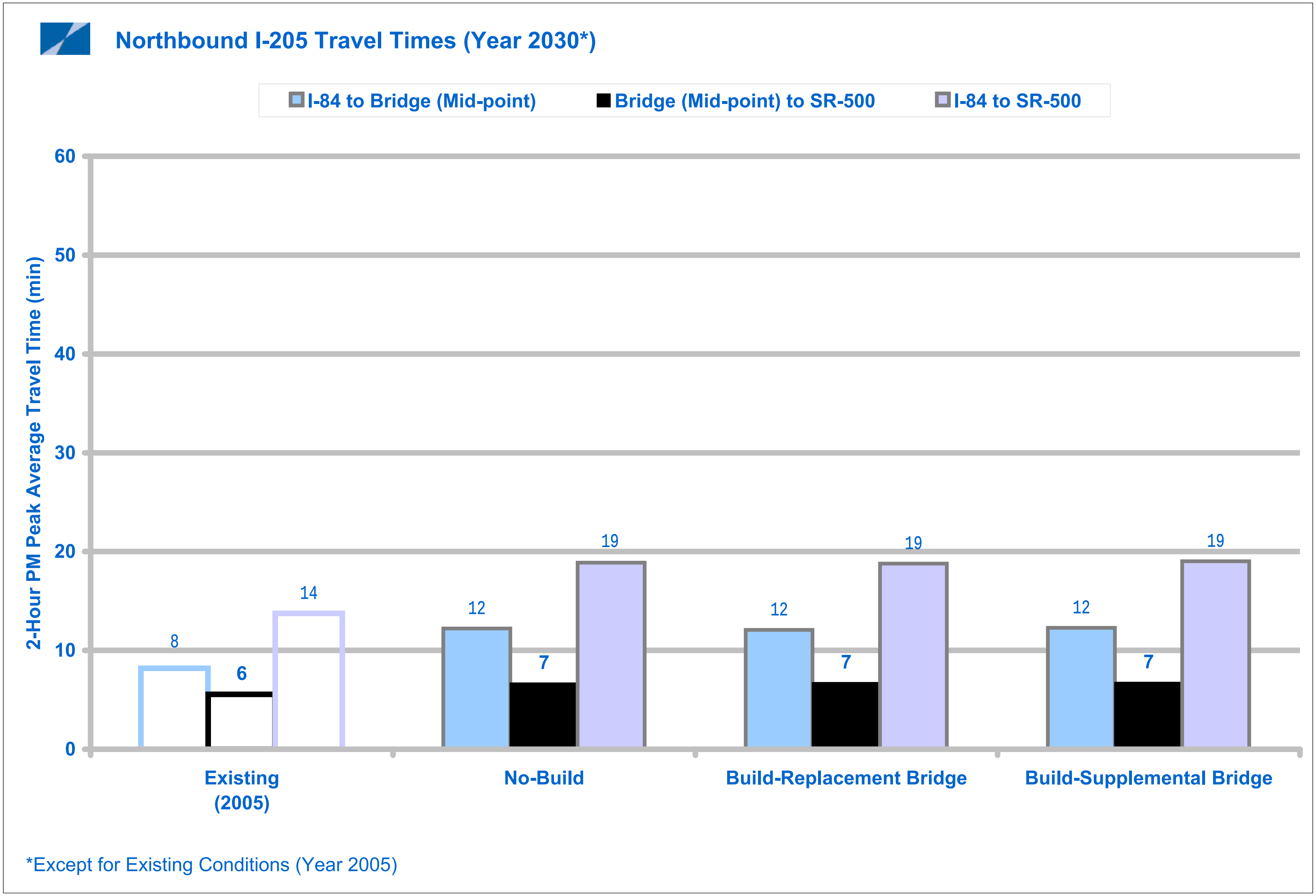

Northbound I-5 Travel Times (Year 2030*)
Columbia Boulevard to SR-500
I-84 to 179th Street
Supplemental Bridge CD
2-Hour PM Peak Average Travel Time (min)
0
10
20
30
40
50
60
12
38
14
44
6
26
7
9
27
29
W
E
W
E
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)
W: Northbound I-5 West Span
E: Northbound I-5 East Span

Exhibit 4-14



*Except for Existing Conditions (Year 2005)

Exhibit 4-15



Northbound I-205 Travel Times (Year 2030*)
I-84 to Bridge (Mid-point)
Bridge (Mid-point) to SR-500
I-84 to SR-500
2-Hour PM Peak Average Travel Time (min)
60
50
40
30
20
10
0
8
6
14
12
7
19
12
7
19
12
7
19
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 4-16

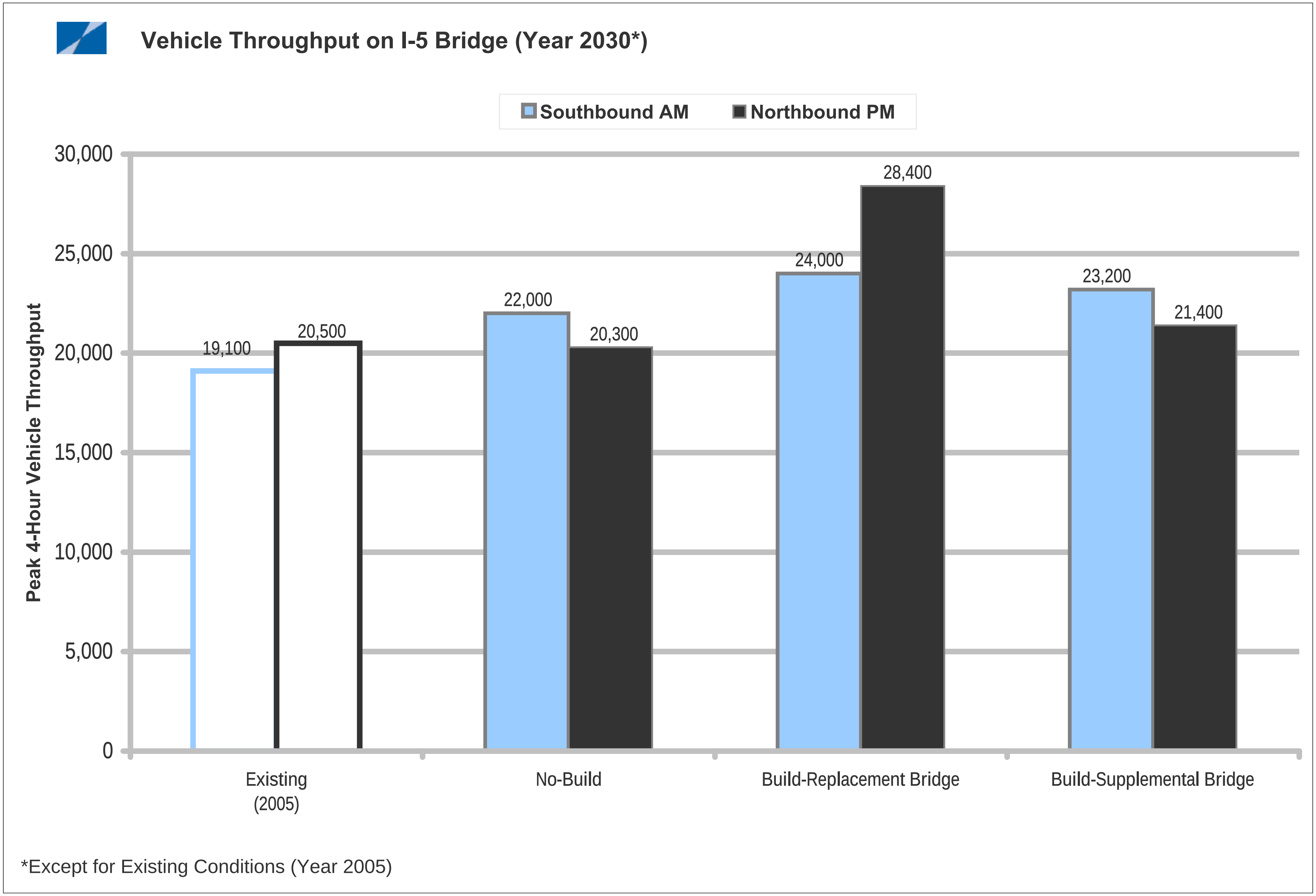
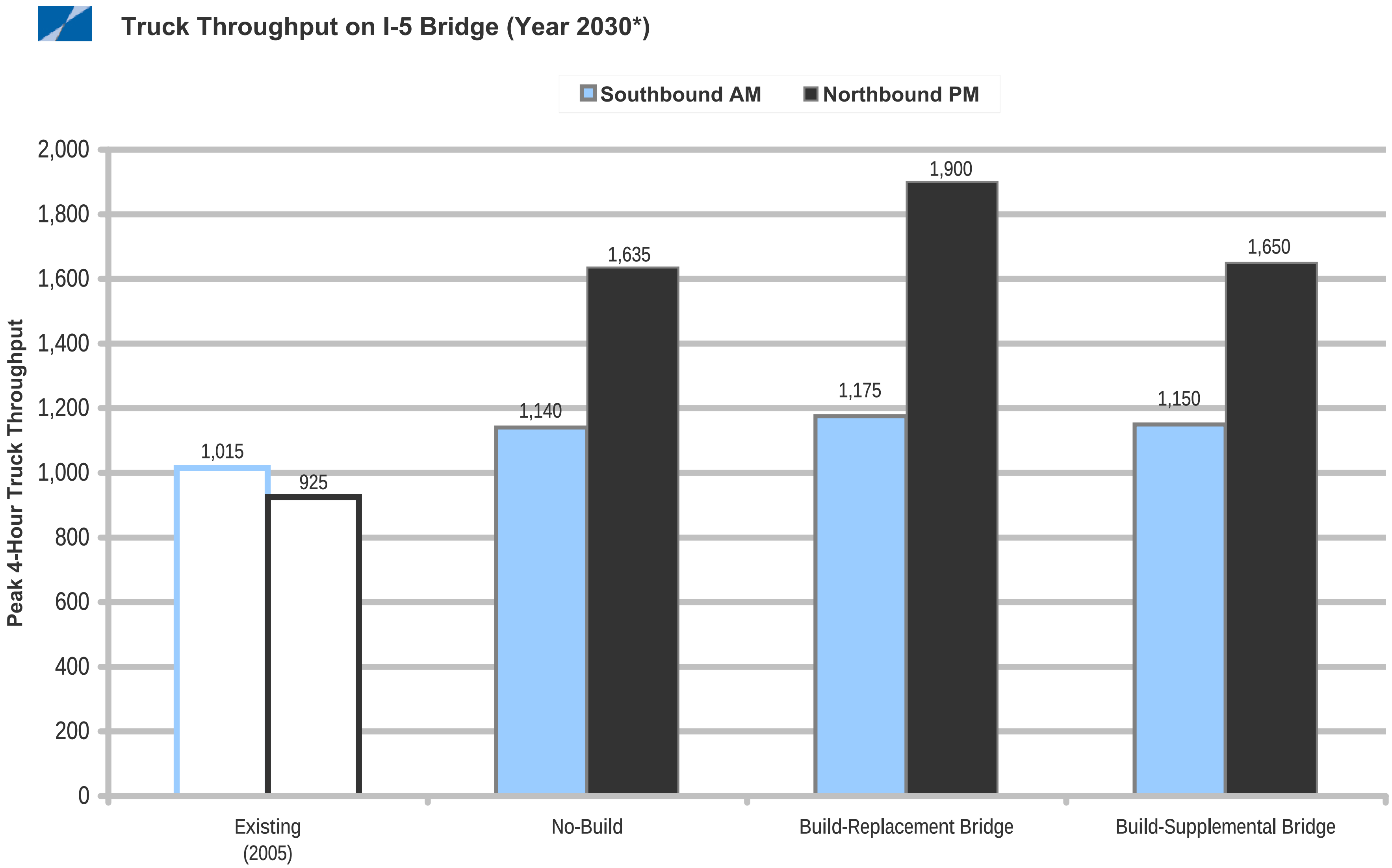

Vehicle Throughput on I-5 Bridge (Year 2030*)
Southbound AM
Northbound PM
Peak 4-Hour Vehicle Throughput
30,000
25,000
20,000
15,000
10,000
5,000
0
19,100
20,500
22,000
20,300
24,000
28,400
23,200
21,400
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 4-17



*Except for Existing Conditions (Year 2005)

Exhibit 4-18

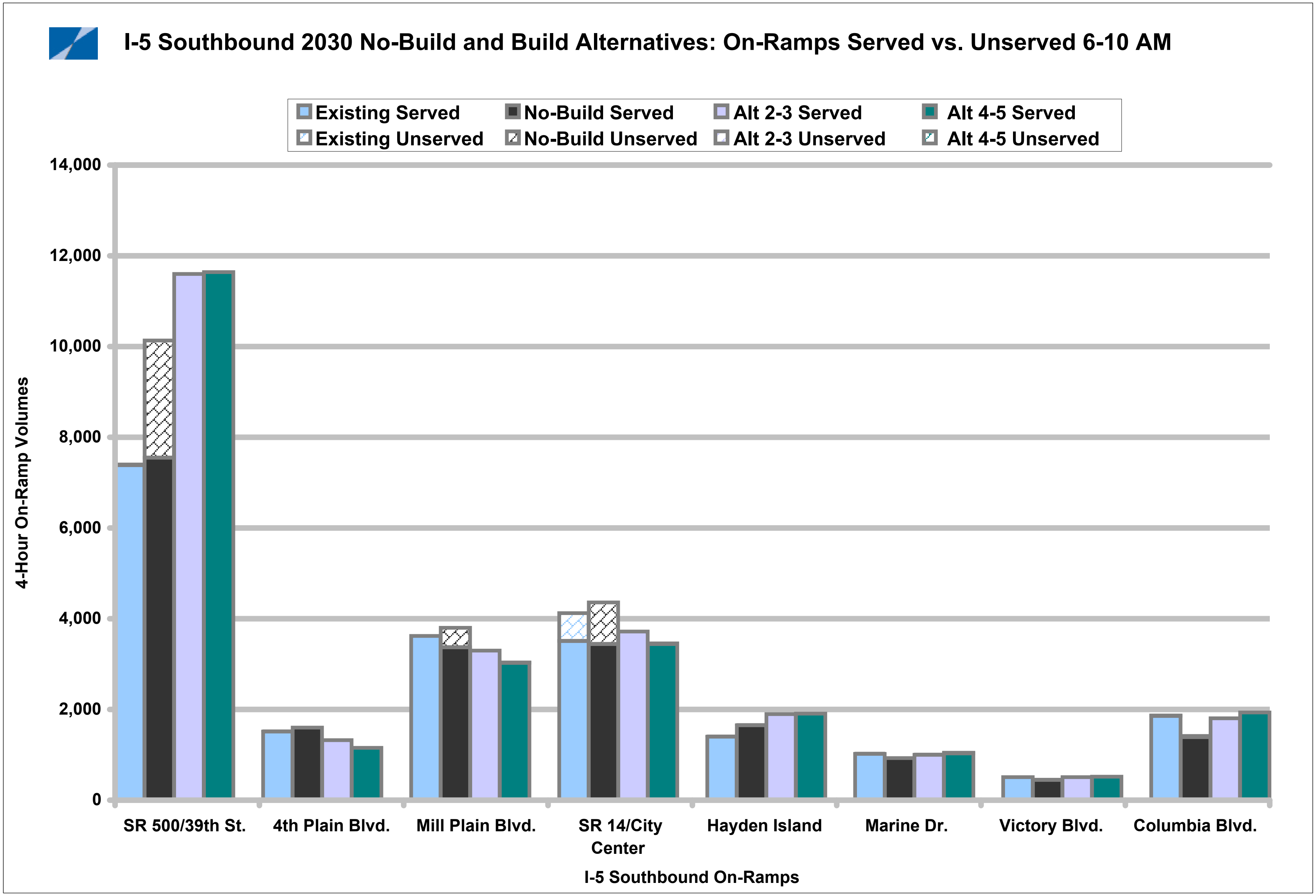
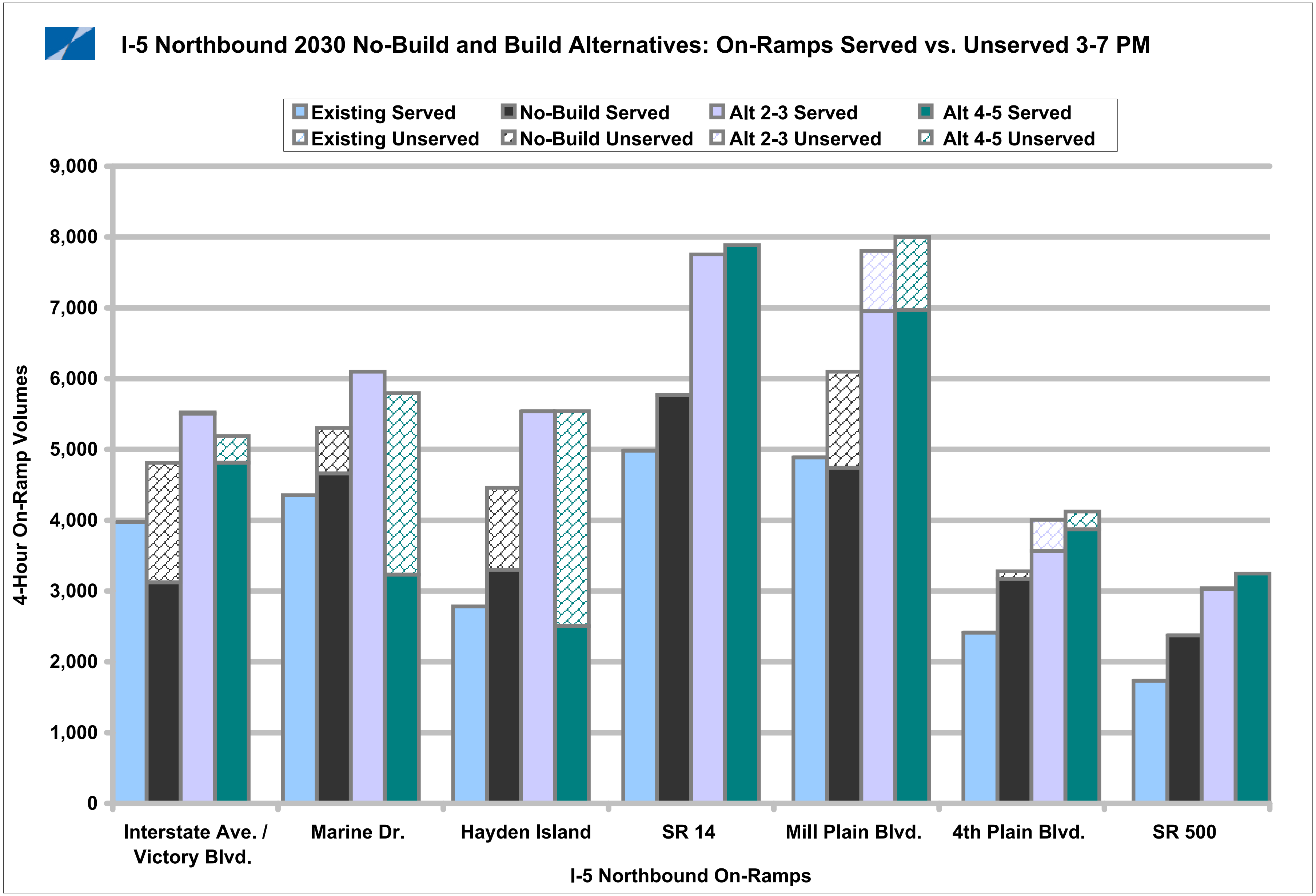
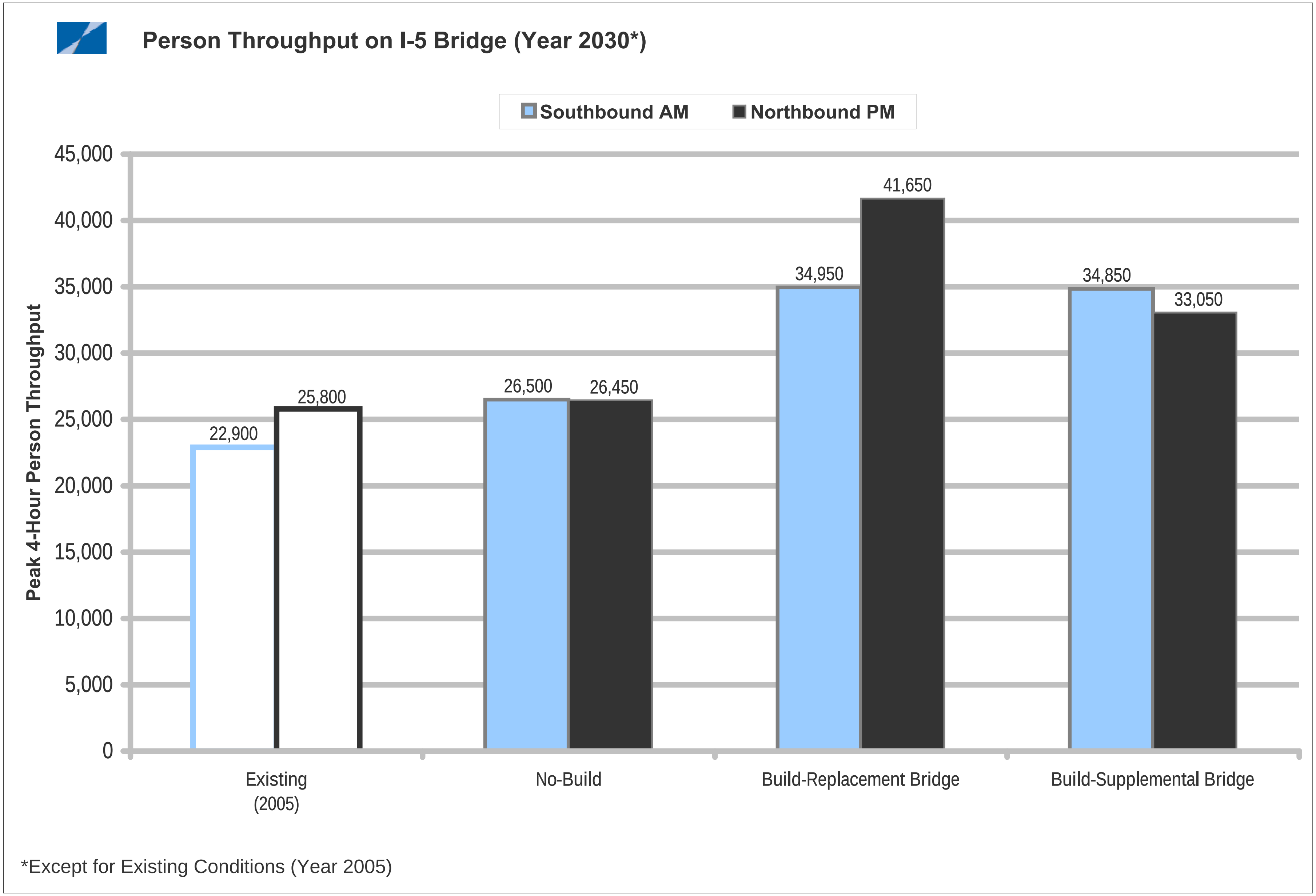

I-5 Southbound 2030 No-Build and Build Alternatives: On-Ramps Served vs. Unserved 6-10 AM
Existing Served
No-Build Served
Alt 2-3 Served
Alt 4-5 Served
Existing Unserved
No-Build Unserved
Alt 2-3 Unserved
Alt 4-5 Unserved
4-Hour On-Ramp Volumes
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
SR 500/39th St.
4th Plain Blvd.
Mill Plain Blvd.
SR 14/City Center
Hayden Island
Marine Dr.
Victory Blvd.
Columbia Blvd.
I-5 Southbound On-Ramps

Exhibit 4-19



I-5 Northbound 2030 No-Build and Build Alternatives: On-Ramps Served vs. Unserved 3-7 PM
Existing Served
No-Build Served
Alt 2-3 Served
Alt 4-5 Served
Existing Unserved
No-Build Unserved
Alt 2-3 Unserved
Alt 4-5 Unserved
4-Hour On-Ramp Volumes
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Interstate Ave. / Victory Blvd.
Marine Dr.
Hayden Island
SR 14
Mill Plain Blvd.
4th Plain Blvd.
SR 500
I-5 Northbound On-Ramps

Exhibit 4-20



Person Throughput on I-5 Bridge (Year 2030*)
Southbound AM
Northbound PM
Peak 4-Hour Person Throughput
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
22,900
25,800
26,500
26,450
34,950
41,650
34,850
33,050
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 4-21

Vancouver Screenline Locations

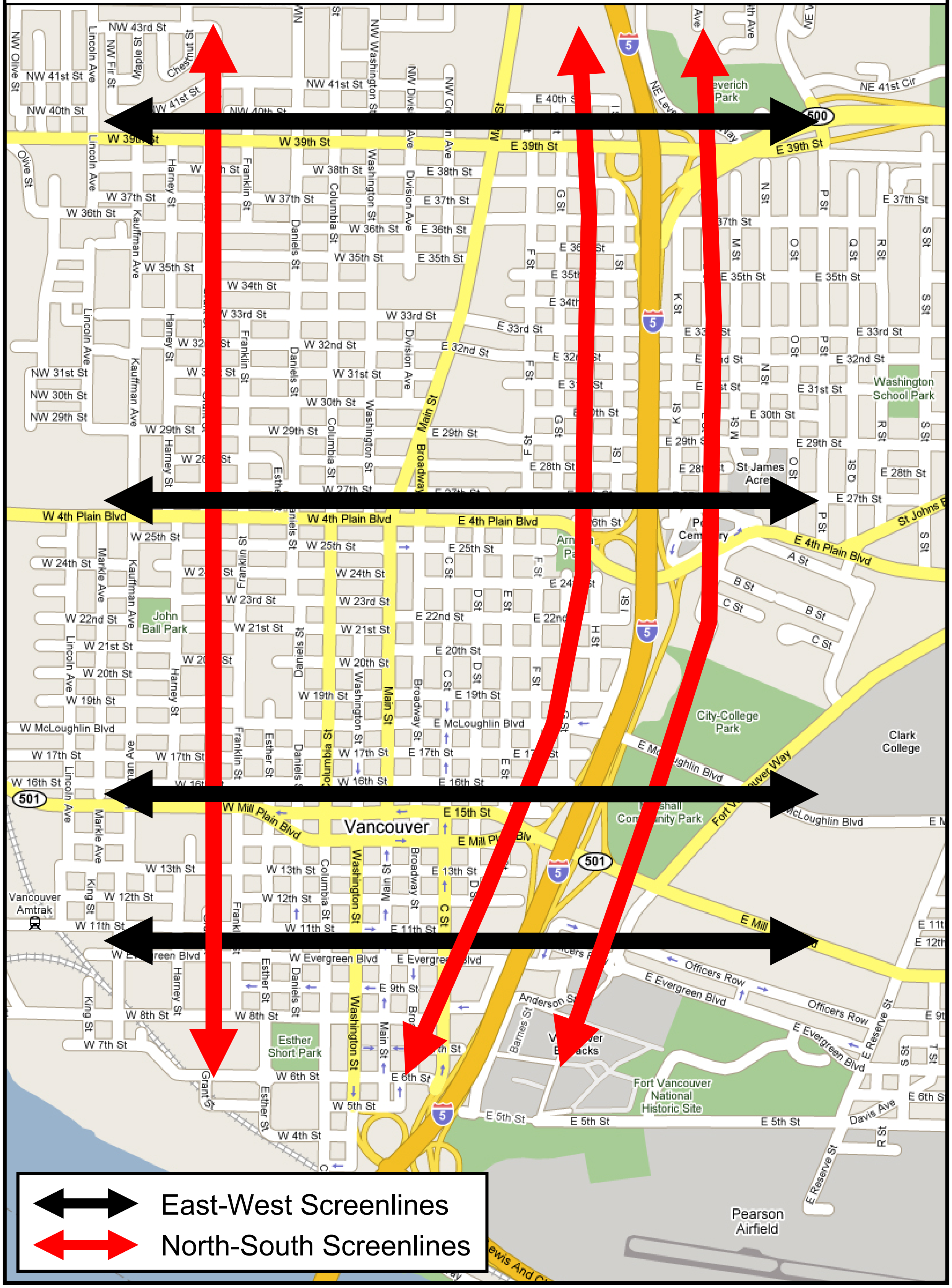


Exhibit 4-22

Portland Screenline Locations

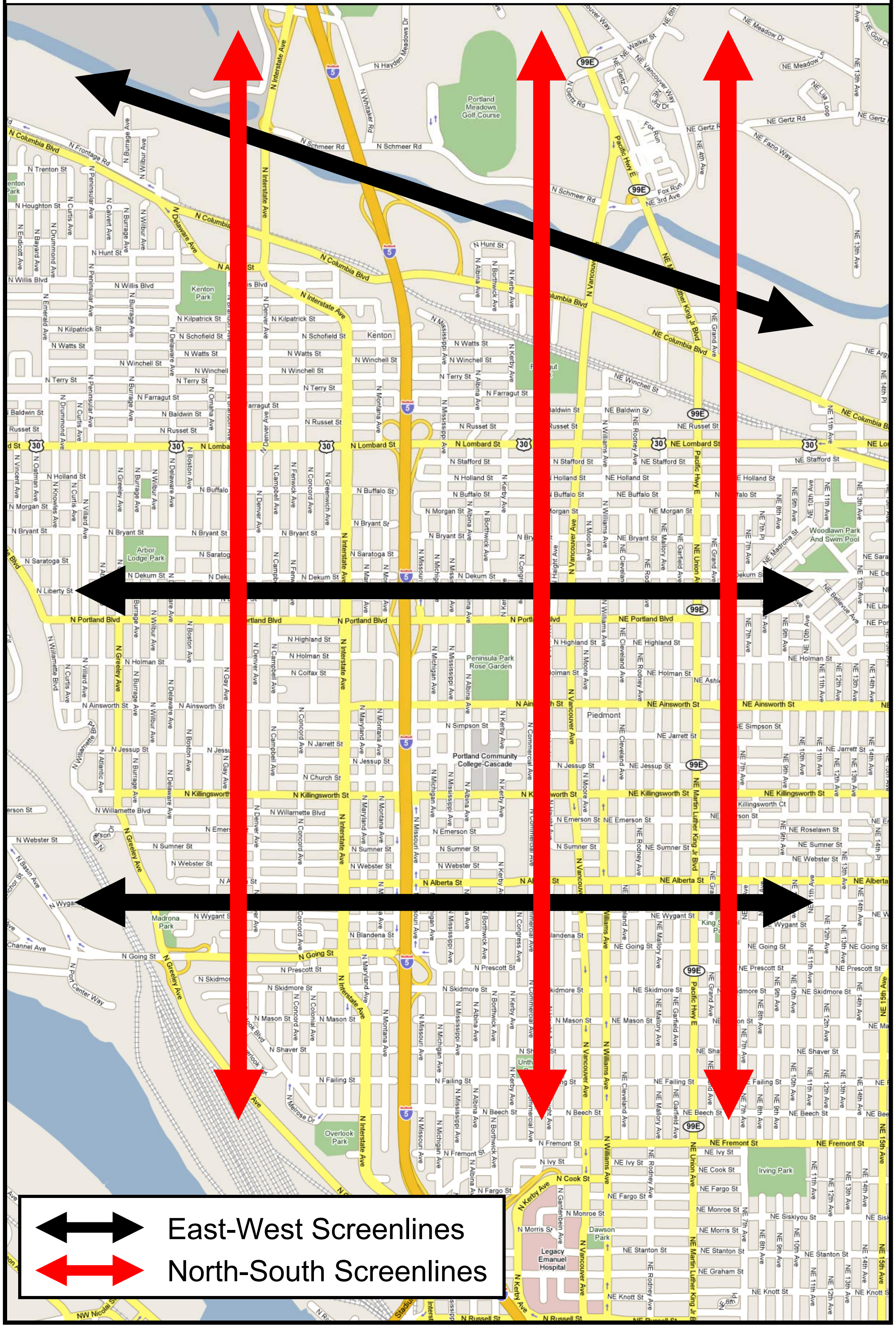


Exhibit 4-23

Vancouver North-South Screenlines - AM Peak Hour Volumes				
Screenline	**Existing**	**No-Build**	**Replacement Bridge**	**Supplemental Bridge**
West of Franklin St				
Westbound Total	1,350	2,950	3,350	3,350
Eastbound Total	1,400	2,200	2,350	2,350
West of I-5				
Westbound Total	3,100	5,000	5,700	5,700
Eastbound Total	2,750	3,800	4,150	4,150
East of I-5				
Westbound Total	2,550	3,950	3,600	3,600
Eastbound Total	2,300	3,400	3,200	3,200

Vancouver East-West Screenlines - AM Peak Hour Volumes				
Screenline	**Existing**	**No-Build**	**Replacement Bridge**	**Supplemental Bridge**
North of Evergreen Blvd				
Southbound Total	950	1,800	1,900	1,900
Northbound Total	800	1,350	1,250	1,250
North of 15th St				
Southbound Total	1,300	2,650	2,150	2,150
Northbound Total	450	650	750	750
North of 4th Plain Blvd				
Southbound Total	1,500	2,750	1,900	1,900
Northbound Total	350	450	550	550
North of 39th St				
Southbound Total	800	1,550	1,050	1,050
Northbound Total	250	350	750	750

Exhibit 4-24

Vancouver North-South Screenlines - PM Peak Hour Volumes				
Screenline	**Existing**	**No-Build**	**Replacement Bridge**	**Supplemental Bridge**
West of Franklin St				
Westbound Total	1,550	2,600	3,000	3,000
Eastbound Total	1,750	3,600	3,750	3,750
West of I-5				
Westbound Total	2,900	4,450	4,900	4,900
Eastbound Total	4,200	6,550	7,050	7,050
East of I-5				
Westbound Total	2,550	3,550	3,850	3,850
Eastbound Total	4,050	6,350	5,000	5,000

Vancouver East-West Screenlines - PM Peak Hour Volumes				
Screenline	**Existing**	**No-Build**	**Replacement Bridge**	**Supplemental Bridge**
North of Evergreen Blvd				
Southbound Total	950	1,350	1,400	1,400
Northbound Total	1,200	2,300	2,100	2,100
North of 15th St				
Southbound Total	850	1,250	1,100	1,100
Northbound Total	950	1,700	1,450	1,450
North of 4th Plain Blvd				
Southbound Total	600	800	800	800
Northbound Total	950	1,600	1,150	1,150
North of 39th St				
Southbound Total	500	650	1,000	1,000
Northbound Total	650	1,200	1,000	1,000

Exhibit 4-25

Portland North-South Screenlines - AM Peak Hour Volumes				
Screenline	**Existing**	**No-Build**	**Replacement Bridge**	**Supplemental Bridge**
West of Denver Ave				
Westbound Total	3,300	4,600	4,550	4,450
Eastbound Total	2,800	3,550	3,550	3,550
West of Vancouver Ave				
Westbound Total	3,100	3,800	3,700	3,900
Eastbound Total	2,450	3,100	3,450	3,600
East of MLK Jr Blvd				
Westbound Total	3,850	4,550	4,500	4,650
Eastbound Total	2,450	3,100	3,300	3,550

Portland East-West Screenlines - AM Peak Hour Volumes				
Screenline	**Existing**	**No-Build**	**Replacement Bridge**	**Supplemental Bridge**
Columbia Slough				
Southbound Total	1,500	1,800	1,700	1,700
Northbound Total	1,200	1,550	1,400	1,400
North of Portland Blvd				
Southbound Total	1,950	2,200	2,200	2,200
Northbound Total	1,000	1,400	1,450	1,400
South of Alberta St				
Southbound Total	3,250	3,800	3,750	3,850
Northbound Total	1,450	2,500	2,050	2,200

Exhibit 4-26

Portland North-South Screenlines - PM Peak Hour Volumes				
Screenline	**Existing**	**No-Build**	**Replacement Bridge**	**Supplemental Bridge**
West of Denver Ave				
Westbound Total	2,800	3,550	3,600	3,500
Eastbound Total	3,950	5,550	5,350	5,600
West of Vancouver Ave				
Westbound Total	2,950	3,550	3,600	3,500
Eastbound Total	3,050	3,800	3,600	3,800
East of MLK Jr Blvd				
Westbound Total	3,100	3,800	3,700	3,700
Eastbound Total	3,950	4,750	4,600	4,750

Portland East-West Screenlines - PM Peak Hour Volumes				
Screenline	**Existing**	**No-Build**	**Replacement Bridge**	**Supplemental Bridge**
Columbia Slough				
Southbound Total	1,500	1,850	1,750	1,650
Northbound Total	1,800	2,050	2,150	2,200
North of Portland Blvd				
Southbound Total	1,750	2,400	2,200	2,150
Northbound Total	2,550	2,900	3,050	2,900
South of Alberta St				
Southbound Total	2,400	3,350	2,850	2,700
Northbound Total	4,050	4,750	4,650	4,600

Exhibit 4-27

Vancouver Intersection Performance Results

AM Peak Hour — 2005 Existing Conditions

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way								
*	Columbia St. @ Columbia Way								
01	3rd/4th St. @ Columbia St	Westbound Left/Right	3.7	A	0.03	LOS E	Y	-	-
*	SR 14 and Main Street								
*	3rd/4th St. @ Esther St.								
02	4th St. @ Columbia St.	Eastbound Left/Thru/Right	4.4	A	0.03	LOS E	Y	-	-
03	4th St. @ Washington St.	Eastbound Right	1.1	A	0.01	LOS E	Y	-	-
04	5th St. @ Columbia St.	Southbound Left	12.6	B	0.15	LOS E	Y	90	100 (SBL)
05	5th St. @ Washington St.	**Overall Intersection**	39.6	D	0.42	LOS E	Y	180	200 (EBR to I-5)
								215	225 (SBL)
*	5th St. @ Main St.								
06	6th St. @ Columbia St.	**Overall Intersection**	7.8	A	0.42	LOS E	Y	-	-
07	6th St. @ Washington St.	**Overall Intersection**	20.3	C	0.39	LOS E	Y	-	-
08	6th St. @ Main St.	Westbound Left/Thru/Right	6.7	A	0.36	LOS E	Y	-	-
09	6th St. @ Broadway	Southbound Right	1.8	A	0.02	LOS E	Y	-	-
10	6th St. @ C St.	Northbound Left/Thru	5.7	A	-	LOS E	Y	-	-
11	8th St. @ Esther St.	Southbound Left/Thru/Right	6.0	A	0.08	LOS E	Y	-	-
12	8th St. @ Columbia St.	**Overall Intersection**	10.8	B	0.51	LOS E	Y	-	-
13	8th St. @ Washington St.	**Overall Intersection**	5.4	A	0.55	LOS E	Y	-	-
14	8th St. @ Main St.	**Overall Intersection**	11.3	B	0.55	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left	6.6	A	0.22	LOS E	Y	-	-
16	8th St. @ C St.	**Overall Intersection**	10.0	A	0.48	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	5.6	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Eastbound Left/Thru/Right	5.4	A	0.05	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Left	6.4	A	0.01	LOS E	Y	-	-
20	9th St. @ Main St.	Northbound Left	6.2	A	0.05	LOS E	Y	50	75 (NBL)
21	9th St. @ Broadway	Southbound Thru/Right	5.6	A	0.27	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Northbound Left/Thru/Right	4.7	A	0.12	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	**Overall Intersection**	13.4	B	0.49	LOS E	Y	-	-
24	Evergreen Blvd. @ Washington St.	**Overall Intersection**	9.1	A	0.53	LOS E	Y	-	-
25	Evergreen Blvd. @ Main St.	**Overall Intersection**	7.9	A	0.53	LOS E	Y	-	-
26	Evergreen Blvd. @ Broadway	**Overall Intersection**	18.7	B	0.83	LOS E	Y	75	75 (WBL)
								100	100 (SBL)
								210	225 (SBTR)
27	Evergreen Blvd. @ C St.	**Overall Intersection**	11.9	B	0.83	LOS E	Y	-	-
28	11th St. @ Esther St.	Southbound Left/Thru/Right	4.3	A	0.03	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	6.9	A	0.14	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	6.0	A	0.07	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Thru/Right	4.7	A	0.08	LOS E	Y	-	-
32	11th St. @ Broadway	Eastbound Thru/Right	6.1	A	0.06	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	4.2	A	0.08	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	**Overall Intersection**	12.8	B	0.66	LOS E	Y	-	-
35	Mill Plain Blvd. @ Washington St.	**Overall Intersection**	7.2	A	0.40	LOS E	Y	-	-
36	Mill Plain Blvd. @ Main St.	**Overall Intersection**	4.7	A	0.57	LOS E	Y	-	-
37	Mill Plain Blvd. @ Broadway	**Overall Intersection**	12.2	B	0.51	LOS E	Y	190	200 (SBLT)
38	Mill Plain Blvd. @ C St.	**Overall Intersection**	8.3	A	0.34	LOS E	Y	-	-
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	**Overall Intersection**	18.6	B	0.58	LOS E	Y	350	375 (EBR)
								275	350 (WBL)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps								
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	**Overall Intersection**	21.8	C	0.54	LOS E	Y	75	100 (WBR)
41	15th St. @ Columbia St.	**Overall Intersection**	10.1	B	0.53	LOS E	Y	-	-
42	15th St. @ Washington St.	**Overall Intersection**	4.9	A	0.44	LOS E	Y	-	-
43	15th St. @ Main St.	**Overall Intersection**	7.5	A	0.48	LOS E	Y	-	-
44	15th St. @ Broadway	**Overall Intersection**	18.2	B	0.47	LOS E	Y	-	-
45	15th St. @ C St.	**Overall Intersection**	8.8	A	0.48	LOS E	Y	-	-
46	McLoughlin Blvd. @ Columbia St.	**Overall Intersection**	7.3	A	0.52	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	**Overall Intersection**	11.0	B	0.55	LOS E	Y	-	-
48	McLoughlin Blvd. @ Broadway	**Overall Intersection**	10.1	B	0.46	LOS E	Y	-	-
*	McLoughlin Blvd. @ Clark College P&R								
49	McLoughlin Blvd. @ Fort Vancouver Way	**Overall Intersection**	9.1	A	0.36	LOS D	Y	-	-

AM Peak Hour — 2030 No-Build (Alternative 1)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Eastbound Left	5.9	A	0.01	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Eastbound Left	5.3	A	0.06	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Eastbound Left/Right	5.2	A	0.05	LOS E	Y	-	-
*	SR 14 and Main Street								
*	3rd/4th St. @ Esther St.	Westbound Left/Right	4.2	A	0.12	LOS E	Y	-	-
02	4th St. @ Columbia St.	Northbound Thru/Right	0.4	A	0.11	LOS E	Y	-	-
03	4th St. @ Washington St.	Eastbound Right	2.8	A	0.04	LOS E	Y	-	-
04	5th St. @ Columbia St.	Southbound Left	53.8	F	0.16	LOS E	N	90	100 (SBL)
								210	225 (SBT)
05	5th St. @ Washington St.	**Overall Intersection**	49.2	D	0.44	LOS E	Y	185	200 (EBR to I-5)
								210	225 (SBL)
								210	225 (SBT)
*	5th St. @ Main St.								
06	6th St. @ Columbia St.	**Overall Intersection**	26.5	C	0.47	LOS E	Y	185	225 (WBL)
07	6th St. @ Washington St.	**Overall Intersection**	61.6	E	0.49	LOS E	Y	220	225 (WBLT)
								490	500 (SBT)
08	6th St. @ Main St.	Westbound Left/Thru/Right	27.9	D	0.87	LOS E	Y	230	250 (WBLT)
09	6th St. @ Broadway	Southbound Right	32.1	D	0.44	LOS E	Y	-	-
10	6th St. @ C St.	Northbound Left/Thru	79.0	F	-	LOS E	N	850	850 (NBLT)
11	8th St. @ Esther St.	Southbound Left/Thru/Right	8.7	A	0.31	LOS E	Y	-	-
12	8th St. @ Columbia St.	**Overall Intersection**	15.4	B	0.98	LOS E	Y	195	200 (WBLTR)
13	8th St. @ Washington St.	**Overall Intersection**	25.4	C	0.59	LOS E	Y	100	125 (WBL)
								205	225 (SBLT)
14	8th St. @ Main St.	**Overall Intersection**	12.6	B	0.71	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left/Thru/Right	10.7	B	-	LOS E	Y	-	-
16	8th St. @ C St.	**Overall Intersection**	16.5	B	0.58	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	4.4	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Westbound Left/Thru/Right	7.8	A	0.19	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Left	67.4	F	0.06	LOS E	N	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	5.9	A	0.07	LOS E	Y	-	-
21	9th St. @ Broadway	Eastbound Left/Right	4.8	A	0.05	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Northbound Left/Thru/Right	7.8	A	0.18	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	**Overall Intersection**	15.3	B	0.73	LOS E	Y	205	225 (WBTR)
24	Evergreen Blvd. @ Washington St.	**Overall Intersection**	22.9	C	0.61	LOS E	Y	75	100 (WBL)
								210	225 (SBTR)
25	Evergreen Blvd. @ Main St.	**Overall Intersection**	17.0	B	0.77	LOS E	Y	220	225 (WBLTR)
26	Evergreen Blvd. @ Broadway	**Overall Intersection**	15.8	B	0.78	LOS E	Y	75	125 (WBL)
								210	225 (WBTR)
27	Evergreen Blvd. @ C St.	**Overall Intersection**	15.7	B	0.68	LOS E	Y	-	-
28	11th St. @ Esther St.	Southbound Left/Thru/Right	4.7	A	0.06	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	12.1	B	0.42	LOS E	Y	-	-
30	11th St. @ Washington St.	Westbound Left/Thru	26.2	C	0.38	LOS E	Y	-	-
31	11th St. @ Main St.	Westbound Left/Thru/Right	14.1	B	0.23	LOS E	Y	-	-
32	11th St. @ Broadway	Westbound Left/Thru/Right	8.6	A	0.20	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	6.4	A	0.26	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	**Overall Intersection**	18.9	B	0.82	LOS E	Y	75	150 (SBL)
								210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	**Overall Intersection**	7.8	A	0.49	LOS E	Y	-	-
36	Mill Plain Blvd. @ Main St.	**Overall Intersection**	13.1	B	1.10	LOS E	Y	70	150 (SBL)
								210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	**Overall Intersection**	10.3	B	0.90	LOS E	Y	70	75 (SBL)
								200	200 (SBT)
38	Mill Plain Blvd. @ C St.	**Overall Intersection**	6.5	A	0.43	LOS E	Y	-	-
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	**Overall Intersection**	15.3	B	0.78	LOS E	Y	275	350 (WBL)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps								
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	**Overall Intersection**	36.3	D	0.88	LOS E	Y	75	125 (WBR)
								590	600 (NBLT)
								325	500 (NBR)
41	15th St. @ Columbia St.	**Overall Intersection**	24.9	C	0.82	LOS E	Y	-	-
42	15th St. @ Washington St.	**Overall Intersection**	11.6	B	0.58	LOS E	Y	-	-
43	15th St. @ Main St.	**Overall Intersection**	23.4	C	1.10	LOS E	Y	195	200 (WBLT)
44	15th St. @ Broadway	**Overall Intersection**	20.5	C	0.90	LOS E	Y	205	225 (WBLT)
45	15th St. @ C St.	**Overall Intersection**	13.5	B	0.59	LOS E	Y	-	-
46	McLoughlin Blvd. @ Columbia St.	**Overall Intersection**	14.6	B	0.82	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	**Overall Intersection**	21.9	C	0.91	LOS E	Y	-	-
48	McLoughlin Blvd. @ Broadway	**Overall Intersection**	22.5	C	0.69	LOS E	Y	75	125 (WBL)
								105	125 (WBR)
*	McLoughlin Blvd. @ Clark College P&R								
49	McLoughlin Blvd. @ Fort Vancouver Way	**Overall Intersection**	12.3	B	0.50	LOS D	Y	-	-

AM Peak Hour — 2030 Replacement Bridge (Alternative 2 - BRT Vancouver Alignment)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Southbound Left/Right	14.8	B	0.48	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Southbound Thru/Right	8.5	A	0.56	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	**Overall Intersection**	29.6	C	0.78	LOS E	Y	100	150 (WBL)
								205	225 (WBT)
								150	250 (WBR)
								100	150 (SBL)
*	SR 14 and Main Street	**Overall Intersection**	11.4	B	0.59	LOS E	Y	100	150 (SBL)
*	3rd/4th St. @ Esther St.	Westbound Left/Right	9.1	A	0.44	LOS E	Y	-	-
02	4th St. @ Columbia St.								
03	4th St. @ Washington St.								
04	5th St. @ Columbia St.	Westbound Left/Right	> 100	F	0.61	LOS E	N	200	200 (WBLR)
05	5th St. @ Washington St.	Southbound Right	42.2	D	0.06	LOS E	Y	-	-
*	5th St. @ Main St.	**Overall Intersection**	7.3	A	0.66	LOS E	Y	175	175 (SBLTR)
06	6th St. @ Columbia St.	**Overall Intersection**	15.2	B	0.91	LOS E	Y	75	125 (NBL)
								205	225 (NBTR)
07	6th St. @ Washington St.	**Overall Intersection**	17.3	B	0.78	LOS E	Y	210	225 (EBLTR)
								195	200 (NBTR)
08	6th St. @ Main St.	Eastbound Left/Thru/Right	29.5	D	1.20	LOS E	Y	205	225 (EBLTR)
09	6th St. @ Broadway								
10	6th St. @ C St.								
11	8th St. @ Esther St.	Northbound Left/Thru/Right	7.5	A	0.40	LOS E	Y	-	-
12	8th St. @ Columbia St.	**Overall Intersection**	14.2	B	0.96	LOS E	Y	-	-
13	8th St. @ Washington St.	**Overall Intersection**	9.1	A	0.71	LOS E	Y	-	-
14	8th St. @ Main St.	**Overall Intersection**	12.1	B	0.58	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left/Thru/Right	8.6	A	1.16	LOS E	Y	-	-
16	8th St. @ C St.	**Overall Intersection**	13.8	B	0.53	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	6.3	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Westbound Left/Thru/Right	17.3	C	0.12	LOS E	Y	-	-
19	9th St. @ Washington St.	**Overall Intersection**	5.2	A	0.40	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	6.8	A	0.20	LOS E	Y	-	-
21	9th St. @ Broadway	Eastbound Left/Right	3.6	A	0.06	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Northbound Left/Thru/Right	12.5	B	0.43	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	**Overall Intersection**	18.6	B	0.92	LOS E	Y	225	225 (WBTR)
								100	150 (NBL)
								220	225 (NBTR)
								205	225 (SBTR)
24	Evergreen Blvd. @ Washington St.	**Overall Intersection**	9.2	A	0.57	LOS E	Y	-	-
25	Evergreen Blvd. @ Main St.	**Overall Intersection**	13.6	B	0.80	LOS E	Y	210	225 (SBLTR)
26	Evergreen Blvd. @ Broadway	**Overall Intersection**	12.9	B	0.81	LOS E	Y	210	225 (SBLTR)
27	Evergreen Blvd. @ C St.	**Overall Intersection**	13.3	B	0.84	LOS E	Y	-	-
28	11th St. @ Esther St.	Northbound Left/Thru/Right	5.0	A	0.17	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	13.3	B	0.34	LOS E	Y	-	-
30	11th St. @ Washington St.	**Overall Intersection**	8.2	A	0.38	LOS E	Y	-	-
31	11th St. @ Main St.	Westbound Left/Thru/Right	8.9	A	0.38	LOS E	Y	-	-
32	11th St. @ Broadway	Eastbound Left/Thru/Right	12.3	B	0.33	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru/Right	5.6	A	0.20	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	**Overall Intersection**	> 100	F	1.20	LOS E	N	810	825 (EBLTR)
								150	225 (NBR)
								75	150 (SBL)
								210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	**Overall Intersection**	> 100	F	0.47	LOS E	N	220	225 (EBLTR)
								205	225 (SBT)
36	Mill Plain Blvd. @ Main St.	**Overall Intersection**	70.7	E	1.14	LOS E	Y	205	225 (EBLTR)
								70	150 (SBL)
								210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	**Overall Intersection**	73.9	E	1.05	LOS E	Y	210	225 (EBTR)
								70	150 (SBL)
								200	200 (SBT)
38	Mill Plain Blvd. @ C St.	**Overall Intersection**	75.1	E	0.63	LOS E	Y	200	200 (EBLTR)
								195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Southbound Right	> 100	F	0.00	LOS E	N	255	1175 (SBR)
								350	375 (EBR)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	**Overall Intersection**	> 100	F	0.65	LOS E	N	775	950 (EBL)
								265	1425 (NBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Northbound Right	> 100	F	0.00	LOS E	N	430	675 (NBR)
41	15th St. @ Columbia St.	**Overall Intersection**	63.5	E	1.20	LOS E	Y	225	225 (WBLTR)
								700	700 (SBTR)
42	15th St. @ Washington St.	**Overall Intersection**	23.7	C	0.71	LOS E	Y	205	300 (WBL)
								205	225 (WBT)
43	15th St. @ Main St.	**Overall Intersection**	65.2	E	1.14	LOS E	Y	190	200 (WBLTR)
								760	775 (SBTR)
44	15th St. @ Broadway	**Overall Intersection**	86.2	F	1.05	LOS E	N	200	200 (WBLTR)
								775	875 (SBT)
45	15th St. @ C St.	**Overall Intersection**	> 100	F	0.75	LOS E	N	995	1000 (WBLTR)
46	McLoughlin Blvd. @ Columbia St.	**Overall Intersection**	> 100	F	0.80	LOS E	N	1365	1375 (SBLTR)
47	McLoughlin Blvd. @ Main St.	**Overall Intersection**	> 100	F	1.06	LOS E	N	215	225 (WBLTR)
								1355	1375 (SBLTR)
48	McLoughlin Blvd. @ Broadway	**Overall Intersection**	55.2	E	0.73	LOS E	Y	215	225 (EBLTR)
								75	125 (WBL)
*	McLoughlin Blvd. @ Clark College P&R								
49	McLoughlin Blvd. @ Fort Vancouver Way	**Overall Intersection**	13.0	B	0.48	LOS D	Y	-	-

AM Peak Hour — 2030 Replacement Bridge (Alternative 3 - LRT Vancouver Alignment)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Southbound Left/Right	6.5	A	0.48	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Southbound Thru/Right	7.0	A	0.56	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	**Overall Intersection**	14.7	B	0.78	LOS E	Y	100	150 (SBL)
								100	150 (WBL)
								205	225 (WBT)
								150	200 (WBR)
*	SR 14 and Main Street	**Overall Intersection**	17.4	B	0.59	LOS E	Y	100	150 (SBL)
*	3rd/4th St. @ Esther St.	Westbound Left/Right	7.4	A	0.44	LOS E	Y	-	-
02	4th St. @ Columbia St.								
03	4th St. @ Washington St.								
04	5th St. @ Columbia St.	Northbound Thru	10.5	B	0.61	LOS E	Y	90	100 (SBL)
05	5th St. @ Washington St.	Southbound Right	16.6	B	0.06	LOS E	Y	-	-
*	5th St. @ Main St.	**Overall Intersection**	8.1	A	0.66	LOS E	Y	-	-
06	6th St. @ Columbia St.	**Overall Intersection**	13.4	B	0.91	LOS E	Y	75	125 (NBL)
								205	225 (NBTR)
07	6th St. @ Washington St.	**Overall Intersection**	12.5	B	0.78	LOS E	Y	-	-
08	6th St. @ Main St.	Eastbound Left/Thru/Right	23.3	C	1.20	LOS E	Y	205	225 (EBLTR)
09	6th St. @ Broadway								
10	6th St. @ C St.								
11	8th St. @ Esther St.	Northbound Left/Thru/Right	6.9	A	0.40	LOS E	Y	-	-
12	8th St. @ Columbia St.	**Overall Intersection**	13.8	B	0.96	LOS E	Y	-	-
13	8th St. @ Washington St.	**Overall Intersection**	8.8	A	0.63	LOS E	Y	-	-
14	8th St. @ Main St.	**Overall Intersection**	13.9	B	0.58	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left/Thru/Right	9.9	A	1.16	LOS E	Y	-	-
16	8th St. @ C St.	**Overall Intersection**	11.6	B	0.53	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	6.2	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Southbound Left/Thru/Right	2.5	A	0.03	LOS E	Y	-	-
19	9th St. @ Washington St.	**Overall Intersection**	3.9	A	0.35	LOS E	Y	-	-
20	9th St. @ Main St.	Northbound Left/Thru/Right	1.9	A	0.03	LOS E	Y	-	-
21	9th St. @ Broadway	Southbound Thru/Right	1.2	A	0.20	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Westbound Left/Thru/Right	2.9	A	0.06	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	**Overall Intersection**	20.7	C	0.92	LOS E	Y	225	225 (WBTR)
								100	150 (NBL)
								205	275 (SBL)
24	Evergreen Blvd. @ Washington St.	**Overall Intersection**	14.6	B	0.57	LOS E	Y	210	225 (WBT)
25	Evergreen Blvd. @ Main St.	**Overall Intersection**	13.3	B	0.80	LOS E	Y	220	225 (WBLTR)
26	Evergreen Blvd. @ Broadway	**Overall Intersection**	13.3	B	0.81	LOS E	Y	75	125 (WBL)
								210	225 (WBTR)
27	Evergreen Blvd. @ C St.	**Overall Intersection**	12.6	B	0.84	LOS E	Y	-	-
28	11th St. @ Esther St.	Westbound Left/Thru/Right	4.8	A	0.01	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	11.8	B	0.34	LOS E	Y	-	-
30	11th St. @ Washington St.	**Overall Intersection**	11.1	B	0.37	LOS E	Y	-	-
31	11th St. @ Main St.	Westbound Left/Thru/Right	8.2	A	0.38	LOS E	Y	-	-
32	11th St. @ Broadway	Southbound Left/Thru/Right	2.3	A	0.04	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru/Right	5.3	A	0.20	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	**Overall Intersection**	> 100	F	1.25	LOS E	N	810	825 (EBLTR)
								75	150 (SBL)
								210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	**Overall Intersection**	86.6	F	0.47	LOS E	N	220	225 (EBLTR)
								205	225 (SBLT)
								210	225 (NBTR)
36	Mill Plain Blvd. @ Main St.	**Overall Intersection**	48.7	D	1.22	LOS E	Y	205	225 (EBLTR)
								70	150 (SBL)
								210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	**Overall Intersection**	23.7	C	1.03	LOS E	Y	210	225 (EBTR)
38	Mill Plain Blvd. @ C St.	**Overall Intersection**	80.5	F	0.63	LOS E	N	200	200 (EBLTR)
								195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Southbound Right	> 100	F	0.00	LOS E	N	825	825 (EBT)
								350	375 (EBR)
								125	125 (WBT)
								255	1150 (SBR)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	**Overall Intersection**	> 100	F	0.65	LOS E	N	155	225 (WBL)
								265	1350 (NBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Northbound Left/Thru	> 100	F	0.00	LOS E	N	-	-
								430	1350 (NBR)
41	15th St. @ Columbia St.	**Overall Intersection**	64.6	E	1.25	LOS E	Y	225	225 (WBLTR)
								700	700 (SBTR)
42	15th St. @ Washington St.	**Overall Intersection**	56.2	E	0.64	LOS E	Y	205	300 (WBL)
								205	225 (WBT)
43	15th St. @ Main St.	**Overall Intersection**	> 100	F	1.22	LOS E	N	190	200 (WBLTR)
								225	225 (SBTR)
44	15th St. @ Broadway	**Overall Intersection**	> 100	F	1.03	LOS E	N	200	200 (WBLTR)
45	15th St. @ C St.	**Overall Intersection**	> 100	F	0.75	LOS E	N	870	875 (WBLTR)
46	McLoughlin Blvd. @ Columbia St.	**Overall Intersection**	> 100	F	0.84	LOS E	N	510	525 (WBLTR)
								1365	1375 (SBLTR)
47	McLoughlin Blvd. @ Main St.	**Overall Intersection**	> 100	F	1.07	LOS E	N	225	225 (WBLTR)
								1350	1350 (SBLTR)
48	McLoughlin Blvd. @ Broadway	**Overall Intersection**	> 100	F	0.38	LOS E	N	1320	1325 (WBT)
*	McLoughlin Blvd. @ Clark College P&R								
49	McLoughlin Blvd. @ Fort Vancouver Way	**Overall Intersection**	69.8	E	0.48	LOS D	N	-	-

AM Peak Hour — 2030 Replacement Bridge (Alternative 3 - LRT I-5 Full Length)

CBD Results same as LRT Vancouver Alignment

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
34	Mill Plain Blvd. @ Columbia St.	**Overall Intersection**	> 100	F	1.20	LOS E	N	810	825 (EBLTR)
								150	200 (NBR)
								75	150 (SBL)
								210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	**Overall Intersection**	> 100	F	0.88	LOS E	N	220	225 (EBLTR)
								205	225 (SBT)
								210	225 (NBTR)
36	Mill Plain Blvd. @ Main St.	**Overall Intersection**	81.3	F	1.08	LOS E	N	205	225 (EBLTR)
								70	150 (SBL)
								210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	**Overall Intersection**	67.3	E	1.07	LOS E	Y	210	225 (EBTR)
								70	150 (SBL)
								205	225 (SBT)
38	Mill Plain Blvd. @ C St.	**Overall Intersection**	91.6	F	0.63	LOS E	N	200	200 (EBLTR)
								195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Southbound Right	> 100	F	0.00	LOS E	N	255	1175 (SBR)
								350	375 (EBR)
								125	125 (WBT)
								255	1175 (SBR)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	**Overall Intersection**	> 100	F	0.65	LOS E	N	775	800 (EBL)
								740	750 (WBT)
								265	1375 (NBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Northbound Left/Thru	> 100	F	0.00	LOS E	N	-	-
41	15th St. @ Columbia St.	**Overall Intersection**	52.9	D	1.20	LOS E	Y	240	250 (WBLTR)
								700	700 (SBTR)
42	15th St. @ Washington St.	**Overall Intersection**	31.6	C	0.88	LOS E	Y	205	275 (WBL)
								205	225 (WBT)
43	15th St. @ Main St.	**Overall Intersection**	52.8	D	1.08	LOS E	Y	190	200 (WBLTR)
								755	775 (SBTR)
44	15th St. @ Broadway	**Overall Intersection**	86.5	F	1.07	LOS E	N	200	200 (WBLTR)
								775	775 (SBT)
45	15th St. @ C St.	**Overall Intersection**	> 100	F	0.74	LOS E	N	870	875 (WBLTR)
								490	500 (SBTR)
46	McLoughlin Blvd. @ Columbia St.	**Overall Intersection**	> 100	F	0.72	LOS E	N	510	525 (WBLTR)
								1365	1375 (SBLTR)
47	McLoughlin Blvd. @ Main St.	**Overall Intersection**	83.3	F	0.72	LOS E	N	100	125 (WBL)
								225	225 (WBTR)
								50	100 (SBR)
48	McLoughlin Blvd. @ Broadway	**Overall Intersection**	78.0	E	0.52	LOS E	Y	75	100 (EBL)
								100	125 (WBL)
								1095	1100 (WBTR)
*	McLoughlin Blvd. @ Clark College P&R	**Overall Intersection**	12.2	B	0.23	LOS D	Y	-	-
49	McLoughlin Blvd. @ Fort Vancouver Way	**Overall Intersection**	13.7	B	0.48	LOS D	Y	-	-

Continued on next page

Exhibit 4-27 - continued

Vancouver Intersection Performance Results

AM Peak Hour — 2005 Existing Conditions

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Westbound Left/Thru/Right	8.4	A	0.12	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	6.6	A	0.06	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	18.8	B	0.61	LOS D	Y	-	-
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	35.7	D	0.66	LOS D	Y	125	150 (WBL)
								200	200 (WBTR)
								75	100 (SBL)
								470	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	18.4	B	0.65	LOS D	Y	-	-
55	4th Plain Blvd. @ F St.	***Overall Intersection***	12.5	B	0.50	LOS D	Y	150	200 (EBL)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	8.8	A	0.46	LOS D	Y	-	-
*	I-5 NB On-/Off-Ramps @ Clark College P&R								
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	12.3	B	0.51	LOS D	Y	75	150 (WBR)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	6.5	A	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	13.2	B	0.41	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.07	LOS E	N	-	-
								215	225 (SBTR)
61	28th St. @ Broadway	Northbound Thru/Right	1.0	A	-	LOS E	Y	-	-
62	29th St. @ Main St./Broadway	Eastbound Left/Thru/Right	23.8	C	-	LOS E	Y	-	-
63	33rd St. @ Main St.	***Overall Intersection***	18.3	B	0.54	LOS D	Y	50	75 (WBL)
								75	100 (SBL)
64	39th St. @ Main St.	***Overall Intersection***	28.5	C	0.69	LOS D	Y	75	125 (EBL)
								75	125 (WBL)
								215	225 (WBTR)
								125	175 (SBL)
65	39th St. @ F St.	Southbound Left/Thru/Right	22.6	C	0.12	LOS E	Y	-	-
								50	75 (WBL)
66	39th St. @ H St.	***Overall Intersection***	8.2	A	0.54	LOS D	Y	135	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	Northbound Left	68.0	F	1.55	LOS E	N	1660	600 (NBL)
								125	200 (NBR)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	11.9	B	0.59	LOS D	Y	-	-
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	4.5	A	0.44	LOS D	Y	-	-
*	P&R North @ Main St.								
70	45th St. @ Main St.	***Overall Intersection***	7.4	A	0.44	LOS D	Y	-	-
*	Kiggins P&R @ Main St.								
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	9.7	A	0.50	LOS D	Y	-	-
*	Kiggins Bowl P&R/Hazel Dell @ Main St.								
72	Ross St. @ Main St.	***Overall Intersection***	4.6	A	0.29	LOS D	Y	-	-
73	Ross St. @ North Rd.	Northbound Left/Thru	6.0	A	0.24	LOS E	Y	-	-

2030 No-Build (Alternative 1)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	17.7	C	0.07	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	8.9	A	0.09	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	33.3	C	0.83	LOS D	Y	150	175 (WBL)
								75	100 (SBL)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	43.9	D	0.87	LOS D	Y	170	225 (WBL)
								195	200 (WBT)
								75	125 (SBL)
								470	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	0.80	LOS D	N	195	200 (EBLT)
								125	150 (WBL)
								495	500 (WBT)
								440	450 (SBLTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	21.3	C	0.58	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	23.4	C	0.69	LOS D	Y	200	275 (EBL)
*	I-5 NB On-/Off-Ramps @ Clark College P&R								
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	19.5	B	0.61	LOS D	Y	75	125 (WBR)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	7.0	A	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	19.8	B	0.51	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.18	LOS E	N	-	-
								215	275 (EBL)
61	28th St. @ Broadway	Westbound Left	23.6	C	0.32	LOS E	Y	-	-
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	1000	1000 (SBTR)
63	33rd St. @ Main St.	***Overall Intersection***	51.0	D	0.83	LOS D	Y	50	75 (EBL)
								50	100 (WBL)
								75	125 (NBL)
								75	125 (SBL)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.06	LOS D	N	75	125 (EBL)
								1310	1325 (EBTR)
								75	150 (WBL)
								215	225 (WBTR)
								75	125 (NBL)
								125	200 (SBL)
								360	375 (SBT)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.18	LOS E	N	305	325 (NBLR)
								50	75 (WBL)
								430	450 (WBTR)
								325	400 (SBLR)
66	39th St. @ H St.	***Overall Intersection***	39.7	D	0.74	LOS D	Y	430	450 (EBTR)
								135	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.67	LOS D	N	135	150 (EBT)
								55	125 (EBR)
								715	725 (WBT)
								1660	1700 (NBL)
								125	275 (NBR)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.88	LOS D	N	1170	1175 (WBTR)
								790	800 (NBLT)
								75	100 (NBR)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	> 100	F	0.66	LOS D	N	150	225 (SBL)
								1170	1175 (SBT)
*	P&R North @ Main St.								
70	45th St. @ Main St.	***Overall Intersection***	41.1	D	0.74	LOS D	Y	260	275 (SBT)
*	Kiggins P&R @ Main St.								
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	> 100	F	0.80	LOS D	N	2105	2125 (SB - F/I-5)
								1570	1575 (SB - F/Main)
*	Kiggins Bowl P&R/Hazel Dell @ Main St.								
72	Ross St. @ Main St.	***Overall Intersection***	> 100	F	0.53	LOS D	N	60	100 (WBL)
								225	275 (SBL)
								1290	1600 (SBT)
73	Ross St. @ North Rd.	Northbound Left/Thru	> 100	F	0.57	LOS E	N	-	-

2030 Replacement Bridge (Alternative 2 - BRT Vancouver Alignment)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Westbound Left/Thru/Right	29.2	D	0.10	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	> 100	F	0.09	LOS E	N	425	425 (SBTR)
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	41.1	D	0.72	LOS D	Y	150	200 (WBL)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	94.4	F	0.88	LOS D	N	645	775 (WBL)
								195	200 (WBTR)
								75	100 (NBR)
								75	125 (SBL)
								475	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	0.57	LOS D	Y**	490	500 (WBTR)
								190	200 (SBLTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	27.1	C	0.68	LOS D	Y	150	150 (EBT)
								550	550 (WBTR)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	49.4	D	0.73	LOS D	Y	200	250 (EBL)
								1045	1050 (WBT)
								1045	1050 (WBR)
*	I-5 NB On-/Off-Ramps @ Clark College P&R								
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	14.4	B	0.47	LOS D	Y	75	150 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Southbound Right	44.2	E	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	14.0	B	0.49	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	74.1	F	0.09	LOS E	Y*	-	-
								230	250 (SBTR)
61	28th St. @ Broadway								
62	29th St. @ Main St./Broadway	***Overall Intersection***	33.3	C	0.59	LOS D	Y	725	725 (SBTR)
63	33rd St. @ Main St.	***Overall Intersection***	76.9	E	0.75	LOS D	N	50	75 (EBL)
								50	75 (WBL)
								75	100 (SBL)
								770	775 (SBTR)
64	39th St. @ Main St.	***Overall Intersection***	68.4	E	0.91	LOS D	Y*	275	425 (EBL)
								1305	1325 (EBTR)
								75	125 (WBL)
								215	225 (WBTR)
								75	125 (NBL)
65	39th St. @ F St.	Southbound Left/Thru/Right	> 100	F	0.02	LOS E	Y**	-	-
								435	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	57.6	E	0.84	LOS E	Y	435	450 (EBTR)
								140	150 (WBTR)
								310	325 (SBLTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	42.1	D	0.80	LOS D	Y	55	100 (EBR)
								275	350 (WBL)
								730	750 (WBT)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1335	1350 (WBT)
								790	800 (NBL)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	9.3	A	0.50	LOS D	Y	100	125 (NBL)
								100	150 (SBL)
*	P&R North @ Main St.	***Overall Intersection***	11.0	B	0.59	LOS D	Y	-	-
70	45th St. @ Main St.	***Overall Intersection***	10.1	B	0.61	LOS D	Y	105	125 (SBTR)
*	Kiggins P&R @ Main St.	Southbound Thru	6.3	A	0.44	LOS E	Y	-	-
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	26.8	C	0.72	LOS D	Y	1570	950 (SBLTR)
*	Kiggins Bowl P&R/Hazel Dell @ Main St.								
72	Ross St. @ Main St.	***Overall Intersection***	12.2	B	0.65	LOS D	Y	60	100 (WBL)
73	Ross St. @ North Rd.	Northbound Left/Thru	8.6	A	0.54	LOS E	Y	-	-

2030 Replacement Bridge (Alternative 3 - LRT Vancouver Alignment)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Southbound Left/Thru/Right	32.0	D	0.01	LOS E	Y	435	450 (SBLTR)
51	24th St. @ Main St.	Southbound Thru/Right	49.7	E	0.61	LOS E	Y	425	425 (SBTR)
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	> 100	F	0.72	LOS D	N	150	200 (WBL)
								235	250 (SBTR)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	> 100	F	0.88	LOS D	N	195	275 (WBTR)
								425	425 (NBT)
								75	100 (SBL)
								475	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	0.57	LOS D	Y**	450	450 (WBTR)
								190	200 (SBLTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	93.2	F	0.68	LOS D	N	150	200 (EBL)
								550	550 (WBTR)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.73	LOS D	N	200	250 (EBL)
								1045	1050 (WBT)
								2155	2850 (SBL)
								2155	2850 (SBR)
*	I-5 NB On-/Off-Ramps @ Clark College P&R								
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.47	LOS D	N	620	625 (WBT)
								185	200 (NBL)
								75	150 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Westbound Thru/Right	> 100	F	0.29	LOS E	N	730	750 (WBTR)
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	19.6	B	0.49	LOS D	Y	-	-
60	28th St. @ Main St.	Northbound Thru/Right	> 100	F	0.21	LOS E	Y**	475	475 (NBTR)
								230	250 (SBTR)
61	28th St. @ Broadway								
62	29th St. @ Main St./Broadway	***Overall Intersection***	> 100	F	0.00	LOS D	Y**	230	250 (NBTR)
								715	725 (SBTR)
63	33rd St. @ Main St.	***Overall Intersection***	> 100	F	0.75	LOS D	N	50	100 (EBL)
								780	800 (EBTR)
								50	100 (WBL)
								610	625 (WBTR)
								210	225 (NBTR)
								75	100 (SBL)
								770	775 (SBTR)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	0.85	LOS D	Y**	275	350 (EBL)
								1305	1325 (EBTR)
								75	125 (WBL)
								215	225 (WBTR)
								75	125 (NBL)
								625	625 (NBTR)
								350	350 (SBT)
65	39th St. @ F St.	Westbound Thru/Right	> 100	F	0.59	LOS E	Y**	435	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	56.1	E	0.84	LOS E	Y**	435	450 (EBTR)
								140	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	67.1	E	0.80	LOS D	Y*	55	100 (EBR)
								730	750 (WBT)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1175	1175 (WBT)
								790	800 (NBL)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	26.1	C	0.50	LOS D	Y	100	150 (SBL)
*	P&R North @ Main St.	***Overall Intersection***	23.2	C	0.59	LOS D	Y	-	-
70	45th St. @ Main St.	***Overall Intersection***	13.7	B	0.61	LOS D	Y	105	125 (SBTR)
*	Kiggins P&R @ Main St.	Southbound Thru	10.6	B	0.44	LOS E	Y	430	350 (SBT)
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	41.0	D	0.72	LOS D	Y	205	225 (SBLTR)
*	Kiggins Bowl P&R/Hazel Dell @ Main St.								
72	Ross St. @ Main St.	***Overall Intersection***	19.0	B	0.00	LOS D	Y	60	100 (WBL)
73	Ross St. @ North Rd.	Northbound Left/Thru	11.1	B	0.54	LOS E	Y	-	-

2030 Replacement Bridge (Alternative 3 - LRT I-5 Full Length)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Westbound Left/Thru/Right	> 100	F	0.09	LOS E	N	-	-
								435	450 (SBLTR)
51	24th St. @ Main St.	Eastbound Left/Right	21.3	C	0.05	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	75.0	E	0.71	LOS D	N	150	200 (WBL)
								75	75 (SBL)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	60.8	E	0.80	LOS D	N	195	200 (WBTR)
								75	75 (NBR)
								75	125 (SBL)
								475	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	91.3	F	0.97	LOS D	Y*	125	150 (WBL)
								495	500 (WBTR)
								440	450 (SBLTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	14.7	B	0.67	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	96.2	F	0.85	LOS D	N	200	275 (EBL)
								545	550 (EBT)
								960	975 (WBT)
								960	975 (WBR)
								1550	1600 (SBL)
								400	550 (SBR)
*	I-5 NB On-/Off-Ramps @ Clark College P&R	***Overall Intersection***	14.4	B	0.40	LOS D	Y	50	75 (NBR)
								75	75 (SBR)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	18.2	B	0.63	LOS D	Y	150	175 (EBR)
								150	200 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	4.9	A	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	14.1	B	0.49	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.10	LOS E	Y**	325	325 (EBLTR)
								215	225 (SBTR)
61	28th St. @ Broadway	Westbound Left	23.7	C	0.45	LOS E	Y	-	-
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS D	Y**	150	150 (WBLTR)
								1000	950 (SBTR)
63	33rd St. @ Main St.	***Overall Intersection***	37.6	D	0.66	LOS D	Y	50	50 (EBL)
								50	75 (WBL)
								75	75 (SBL)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.00	LOS D	Y**	75	125 (EBL)
								1305	1325 (EBTR)
								75	125 (WBL)
								215	225 (WBTR)
								75	125 (NBL)
								125	175 (SBL)
								360	375 (SBTR)
65	39th St. @ F St.	Southbound Left/Thru/Right	> 100	F	0.02	LOS E	Y**	-	-
								435	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	54.5	D	0.84	LOS E	Y	435	450 (EBTR)
								140	150 (WBTR)
								310	325 (SBLTR)
67	39th St. @ I-5 SB On-/Off-Ramps	Northbound Left	68.1	E	0.30	LOS D	Y*	-	-
								55	100 (EBR)
								730	750 (WBT)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1175	1175 (WBT)
								790	800 (NBL)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	16.9	B	0.49	LOS D	Y	-	-
*	P&R North @ Main St.								
70	45th St. @ Main St.	***Overall Intersection***	18.3	B	0.72	LOS D	Y	125	175 (SBL)
*	Kiggins P&R @ Main St.								
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	> 100	F	0.87	LOS D	Y**	150	200 (EBR)
								1785	1500 (SB F/Main)
*	Kiggins Bowl P&R/Hazel Dell @ Main St.	***Overall Intersection***	6.0	A	0.40	LOS D	Y	-	-
72	Ross St. @ Main St.	***Overall Intersection***	12.1	B	0.62	LOS D	Y	60	75 (WBL)
73	Ross St. @ North Rd.	Northbound Left/Thru	13.4	B	0.57	LOS E	Y	-	-

Delay / LOS affected by freeway congestio
Intersection queuing spills back into upstream intersectio
Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.
* Intersection not modeled in existing conditions scenario
Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 4-28

Vancouver Intersection Performance Results

PM Peak Hour — 2005 Existing Conditions

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way								
*	Columbia St. @ Columbia Way								
01	3rd/4th St. @ Columbia St	Westbound Left/Right	4.7	A	0.05	LOS E	Y	-	-
*	SR 14 and Main Street								
*	3rd/4th St. @ Esther St.								
02	4th St. @ Columbia St.	Westbound Left/Thru/Right	4.8	A	0.05	LOS E	Y	-	-
03	4th St. @ Washington St.	Eastbound Right	1.6	A	0.01	LOS E	Y	-	-
04	5th St. @ Columbia St.	Southbound Left	3.6	A	0.22	LOS E	Y	-	-
05	5th St. @ Washington St.	Overall Intersection	8.1	A	0.34	LOS E	Y	-	-
*	5th St. @ Main St.								
06	6th St. @ Columbia St.	Overall Intersection	10.7	B	0.42	LOS E	Y	-	-
07	6th St. @ Washington St.	Overall Intersection	11.6	B	0.36	LOS E	Y	-	-
08	6th St. @ Main St.	Westbound Left/Thru/Right	6.1	A	0.32	LOS E	Y	-	-
09	6th St. @ Broadway	Southbound Right	4.6	A	0.22	LOS E	Y	-	-
10	6th St. @ C St.	Northbound Left/Thru	2.1	A	-	LOS E	Y	-	-
11	8th St. @ Esther St.	Northbound Left/Thru/Right	8.0	A	0.31	LOS E	Y	-	-
12	8th St. @ Columbia St.	Overall Intersection	15.1	B	0.74	LOS E	Y	-	-
13	8th St. @ Washington St.	Overall Intersection	9.5	A	0.58	LOS E	Y	75	125 (WBL)
14	8th St. @ Main St.	Overall Intersection	17.0	B	0.58	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Thru/Right	10.2	B	0.13	LOS E	Y	-	-
16	8th St. @ C St.	Overall Intersection	14.3	B	0.34	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	4.5	A	0.07	LOS E	Y	-	-
18	9th St. @ Columbia St.	Westbound Left/Thru/Right	6.3	A	0.18	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Thru	8.5	A	0.08	LOS E	Y	-	-
20	9th St. @ Main St.	Northbound Thru	6.7	A	0.34	LOS E	Y	50	50 (NBL)
21	9th St. @ Broadway	Southbound Thru/Right	6.2	A	0.24	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Southbound Left/Thru/Right	6.6	A	0.14	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	Overall Intersection	10.9	B	0.53	LOS E	Y	-	-
24	Evergreen Blvd. @ Washington St.	Overall Intersection	10.5	B	0.56	LOS E	Y	-	-
25	Evergreen Blvd. @ Main St.	Overall Intersection	9.7	A	0.56	LOS E	Y	-	-
26	Evergreen Blvd. @ Broadway	Overall Intersection	12.7	B	0.56	LOS E	Y	210	225 (SBTR)
27	Evergreen Blvd. @ C St.	Overall Intersection	13.0	B	0.56	LOS E	Y	-	-
28	11th St. @ Esther St.	Northbound Left/Thru/Right	6.3	A	0.11	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	8.9	A	0.34	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	7.0	A	0.21	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Thru/Right	7.5	A	0.41	LOS E	Y	-	-
32	11th St. @ Broadway	Eastbound Thru/Right	6.2	A	0.19	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	7.8	A	0.18	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	Overall Intersection	14.7	B	0.75	LOS E	Y	-	-
35	Mill Plain Blvd. @ Washington St.	Overall Intersection	8.2	A	0.45	LOS E	Y	-	-
36	Mill Plain Blvd. @ Main St.	Overall Intersection	12.4	B	0.62	LOS E	Y	100	150 (NBR)
37	Mill Plain Blvd. @ Broadway	Overall Intersection	16.6	B	0.70	LOS E	Y	-	-
38	Mill Plain Blvd. @ C St.	Overall Intersection	14.1	B	0.60	LOS E	Y	-	-
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Overall Intersection	37.5	D	0.72	LOS E	Y	275	350 (WBL)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps								
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Overall Intersection	26.8	C	0.86	LOS E	Y	610	725 (EBL)
								610	625 (EBT)
								75	125 (WBR)
41	15th St. @ Columbia St.	Overall Intersection	9.0	A	0.54	LOS E	Y	-	-
42	15th St. @ Washington St.	Overall Intersection	5.6	A	0.37	LOS E	Y	-	-
43	15th St. @ Main St.	Overall Intersection	9.0	A	0.59	LOS E	Y	-	-
44	15th St. @ Broadway	Overall Intersection	24.8	C	0.43	LOS E	Y	210	250 (WBL)
45	15th St. @ C St.	Overall Intersection	6.7	A	0.41	LOS E	Y	-	-
46	McLoughlin Blvd. @ Columbia St.	Overall Intersection	6.4	A	0.42	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	Overall Intersection	11.6	B	0.67	LOS E	Y	-	-
48	McLoughlin Blvd. @ Broadway	Overall Intersection	7.8	A	0.39	LOS E	Y	-	-
*	McLoughlin Blvd. @ Clark College P & R								
*	McLoughlin Blvd. @ Fort Vancouver Way	Overall Intersection	12.6	B	0.43	LOS D	Y	-	-

2030 No-Build (Alternative 1)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Eastbound Left	6.3	A	0.08	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Eastbound Left	7.0	A	0.10	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Eastbound Left/Right	7.4	A	0.17	LOS E	Y	-	-
*	SR 14 and Main Street								
*	3rd/4th St. @ Esther St.	Southbound Left/Thru	2.9	A	0.01	LOS E	Y	-	-
02	4th St. @ Columbia St.	Northbound Thru/Right	0.9	A	0.25	LOS E	Y	-	-
03	4th St. @ Washington St.	Eastbound Right	2.6	A	0.02	LOS E	Y	-	-
04	5th St. @ Columbia St.	Southbound Left	15.7	C	0.43	LOS E	Y	90	150 (SBL)
05	5th St. @ Washington St.	Overall Intersection	18.3	B	0.54	LOS E	Y	180	225 (EBR to SR-14)
								210	225 (SBT)
*	5th St. @ Main St.								
06	6th St. @ Columbia St.	Overall Intersection	25.1	C	0.75	LOS E	Y	75	100 (SBL)
07	6th St. @ Washington St.	Overall Intersection	30.5	C	0.59	LOS E	Y	220	225 (WBLT)
08	6th St. @ Main St.	Westbound Left/Thru/Right	11.4	B	0.48	LOS E	Y	-	-
09	6th St. @ Broadway	Southbound Right	5.6	A	0.27	LOS E	Y	-	-
10	6th St. @ C St.	Northbound Left/Thru	4.6	A	0.74	LOS E	Y	-	-
11	8th St. @ Esther St.	Northbound Left/Thru/Right	> 100	F	0.64	LOS E	N	-	-
12	8th St. @ Columbia St.	Overall Intersection	51.4	D	1.22	LOS E	Y	500	500 (EBLTR)
								215	225 (SBLTR)
13	8th St. @ Washington St.	Overall Intersection	19.0	B	0.60	LOS E	Y	100	125 (WBL)
14	8th St. @ Main St.	Overall Intersection	18.9	B	0.66	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left/Thru/Right	12.1	B	0.54	LOS E	Y	-	-
16	8th St. @ C St.	Overall Intersection	20.6	C	0.48	LOS E	Y	-	-
17	9th St. @ Esther St.	Eastbound Left/Thru/Right	97.0	F	0.03	LOS E	N	-	-
18	9th St. @ Columbia St.	Eastbound Left/Thru/Right	82.7	F	0.24	LOS E	N	-	-
19	9th St. @ Washington St.	Westbound Thru	15.4	C	0.11	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	8.9	A	0.06	LOS E	Y	-	-
21	9th St. @ Broadway	Northbound Left/Thru	9.3	A	0.25	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Southbound Left/Thru/Right	9.5	A	0.18	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	Overall Intersection	21.1	C	0.73	LOS E	Y	100	125 (EBL)
24	Evergreen Blvd. @ Washington St.	Overall Intersection	13.5	B	0.65	LOS E	Y	75	100 (WBL)
25	Evergreen Blvd. @ Main St.	Overall Intersection	17.8	B	0.67	LOS E	Y	215	225 (NBLTR)
26	Evergreen Blvd. @ Broadway	Overall Intersection	20.3	C	0.64	LOS E	Y	220	225 (NBLTR)
27	Evergreen Blvd. @ C St.	Overall Intersection	34.7	C	0.75	LOS E	Y	75	125 (EBL)
28	11th St. @ Esther St.	Northbound Left/Thru/Right	6.0	A	0.15	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	28.9	D	0.54	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	40.8	E	0.24	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Left/Thru/Right	81.7	F	0.20	LOS E	N	-	-
32	11th St. @ Broadway	Westbound Left/Thru/Right	> 100	F	0.43	LOS E	N	215	225 (WBLTR)
								210	225 (NBLTR)
33	11th St. @ C St.	Westbound Right	> 100	F	0.32	LOS E	N	205	225 (WBTR)
								215	225 (NBT)
34	Mill Plain Blvd. @ Columbia St.	Overall Intersection	> 100	F	0.78	LOS E	N	810	825 (EBLTR)
								150	250 (NBR)
								75	125 (SBL)
								210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	Overall Intersection	68.7	E	0.59	LOS E	Y	215	225 (EBTR)
								210	225 (SBT)
36	Mill Plain Blvd. @ Main St.	Overall Intersection	> 100	F	1.22	LOS E	N	210	225 (EBT)
								765	775 (NBTR)
								70	100 (SBL)
37	Mill Plain Blvd. @ Broadway	Overall Intersection	85.8	F	0.85	LOS E	N	210	225 (EBT)
								770	775 (NBTR)
								70	125 (SBL)
38	Mill Plain Blvd. @ C St.	Overall Intersection	81.0	F	0.84	LOS E	N	205	225 (EBT)
								765	775 (NBTR)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Overall Intersection	94.0	F	0.92	LOS E	N	795	800 (EBT)
								350	525 (EBR)
								275	400 (WBL)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps								
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Overall Intersection	35.3	D	0.97	LOS E	Y	450	450 (WBT)
								75	150 (WBR)
								325	375 (NBR)
41	15th St. @ Columbia St.	Overall Intersection	12.4	B	0.78	LOS E	Y	210	225 (NBT)
42	15th St. @ Washington St.	Overall Intersection	20.6	C	0.43	LOS E	Y	210	250 (WBL)
43	15th St. @ Main St.	Overall Intersection	14.9	B	1.22	LOS E	Y	195	200 (WBT)
44	15th St. @ Broadway	Overall Intersection	18.8	B	0.85	LOS E	Y	205	225 (WBT)
								70	150 (NBL)
								25	75 (SBR)
45	15th St. @ C St.	Overall Intersection	31.7	C	0.55	LOS E	Y	195	200 (NBLT)
46	McLoughlin Blvd. @ Columbia St.	Overall Intersection	59.1	E	0.73	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	Overall Intersection	93.8	F	0.86	LOS E	N	500	500 (EBLTR)
								755	775 (NBLTR)
48	McLoughlin Blvd. @ Broadway	Overall Intersection	> 100	F	0.55	LOS E	N	75	125 (EBL)
								220	225 (EBTR)
								105	175 (WBR)
*	McLoughlin Blvd. @ Clark College P & R								
*	McLoughlin Blvd. @ Fort Vancouver Way	Overall Intersection	14.3	B	0.50	LOS D	Y	-	-

2030 Replacement Bridge (Alternative 2 - BRT Vancouver Alignment)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Southbound Left/Right	14.0	B	0.60	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Southbound Left/Right	10.1	B	0.70	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Overall Intersection	39.7	D	0.60	LOS E	Y	100	125 (WBL)
								100	150 (SBL)
								430	450 (SBTR)
								150	175 (WBR)
*	SR 14 and Main Street	Overall Intersection	39.3	D	0.85	LOS E	Y	100	150 (SBL)
*	3rd/4th St. @ Esther St.	Southbound Left/Thru	1.6	A	0.03	LOS E	Y	-	-
02	4th St. @ Columbia St.								
03	4th St. @ Washington St.								
04	5th St. @ Columbia St.	Westbound Left/Right	> 100	F	0.69	LOS E	N	200	275 (WBLR)
								205	225 (SBT)
05	5th St. @ Washington St.	Southbound Right	73.5	F	0.07	LOS E	N	194	225 (SBR)
*	5th St. @ Main St.	Overall Intersection	13.9	B	0.63	LOS E	Y	175	175 (SBLT)
06	6th St. @ Columbia St.	Overall Intersection	64.5	E	0.82	LOS E	Y	210	250 (WBL)
								205	225 (NBTR)
								75	100 (SBL)
07	6th St. @ Washington St.	Overall Intersection	24.5	C	0.49	LOS E	Y	-	-
08	6th St. @ Main St.	Southbound Left/Thru/Right	21.2	C	0.67	LOS E	Y	207	225 (EBLTR)
09	6th St. @ Broadway								
10	6th St. @ C St.								
11	8th St. @ Esther St.	Eastbound Left/Thru/Right	11.8	B	0.01	LOS E	Y	-	-
12	8th St. @ Columbia St.	Overall Intersection	51.1	D	1.00	LOS E	Y	75	125 (EBL)
								220	225 (WBLTR)
								150	175 (NBL)
								495	500 (NBTR)
								500	500 (EBTR)
								75	125 (SBL)
								210	225 (SBTR)
13	8th St. @ Washington St.	Overall Intersection	17.0	B	0.80	LOS E	Y	220	300 (EBLTR)
14	8th St. @ Main St.	Overall Intersection	25.1	C	0.89	LOS E	Y	210	225 (EBLTR)
								205	225 (SBLTR)
15	8th St. @ Broadway	Southbound Left/Thru/Right	25.4	D	1.27	LOS E	Y	-	-
16	8th St. @ C St.	Overall Intersection	18.2	B	0.87	LOS E	Y	215	225 (EBLR)
17	9th St. @ Esther St.	Northbound Left/Thru/Right	3.4	A	0.01	LOS E	Y	-	-
18	9th St. @ Columbia St.	Northbound Left/Thru/Right	11.7	B	0.01	LOS E	Y	210	225 (NBLTR)
								220	225 (SBLTR)
19	9th St. @ Washington St.	Overall Intersection	11.4	B	0.38	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	30.9	D	0.58	LOS E	Y	-	-
21	9th St. @ Broadway	Northbound Left/Thru	4.6	A	0.02	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Eastbound Left/Thru/Right	47.0	E	0.01	LOS E	Y	535	550 (EBLTR)
23	Evergreen Blvd. @ Columbia St.	Overall Intersection	56.5	E	0.85	LOS E	Y	100	150 (EBL)
								510	525 (EBTR)
								220	225 (NBTR)
								100	125 (SBL)
								205	225 (SBTR)
24	Evergreen Blvd. @ Washington St.	Overall Intersection	12.1	B	0.78	LOS E	Y	225	225 (EBLTR)
25	Evergreen Blvd. @ Main St.	Overall Intersection	32.2	C	0.78	LOS E	Y	210	275 (EBLTR)
								220	225 (WBLTR)
								215	225 (NBLTR)
								210	225 (SBLTR)
26	Evergreen Blvd. @ Broadway	Overall Intersection	17.0	B	0.73	LOS E	Y	75	125 (WBL)
								220	225 (NBLTR)
27	Evergreen Blvd. @ C St.	Overall Intersection	57.6	E	1.12	LOS E	Y	210	225 (SBLTR)
								75	100 (EBL)
								900	900 (WBLR)
28	11th St. @ Esther St.	Northbound Left/Thru/Right	8.5	A	0.12	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	26.3	D	1.03	LOS E	Y	-	-
30	11th St. @ Washington St.	Overall Intersection	11.3	B	0.40	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Left/Thru/Right	28.4	D	1.06	LOS E	Y	-	-
32	11th St. @ Broadway	Eastbound Left/Thru/Right	10.5	B	0.49	LOS E	Y	-	-
33	11th St. @ C St.	Southbound Left/Thru/Right	48.3	E	0.00	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	Overall Intersection	> 100	F	1.18	LOS E	Y**	810	825 (EBLTR)
								150	200 (NBR)
								75	100 (SBL)
								210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	Overall Intersection	23.1	C	0.61	LOS E	Y	235	250 (EBLTR)
								95	100 (NBTR)
36	Mill Plain Blvd. @ Main St.	Overall Intersection	91.5	F	1.23	LOS E	Y*	205	225 (EBLTR)
								370	375 (NBTR)
								70	150 (SBL)
								210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	Overall Intersection	44.6	D	0.93	LOS E	Y	210	225 (EBLTR)
								375	375 (NBLT)
								70	150 (SBL)
								200	200 (SBT)
38	Mill Plain Blvd. @ C St.	Overall Intersection	> 100	F	1.18	LOS E	N	200	200 (EBLTR)
								370	375 (NBTR)
								195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Southbound Right	> 100	F	0.00	LOS E	N	-	-
								825	825 (EBT)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Overall Intersection	> 100	F	1.00	LOS E	N	125	950 (EBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Westbound Right	30.8	D	0.54	LOS E	Y	200	275 (WBR)
41	15th St. @ Columbia St.	Overall Intersection	11.0	B	1.18	LOS E	Y	240	250 (WBLTR)
42	15th St. @ Washington St.	Overall Intersection	14.9	B	0.74	LOS E	Y	205	300 (WBL)
								205	225 (WBT)
43	15th St. @ Main St.	Overall Intersection	14.4	B	1.23	LOS E	Y	190	200 (WBLTR)
								70	125 (NBL)
44	15th St. @ Broadway	Overall Intersection	21.8	C	0.93	LOS E	Y	200	200 (WBLTR)
								70	100 (NBL)
45	15th St. @ C St.	Overall Intersection	> 100	F	0.80	LOS E	N	875	875 (WBLTR)
								490	500 (SBTR)
46	McLoughlin Blvd. @ Columbia St.	Overall Intersection	14.5	B	0.69	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	Overall Intersection	20.1	C	0.83	LOS E	Y	-	-
48	McLoughlin Blvd. @ Broadway	Overall Intersection	12.7	B	0.48	LOS E	Y	105	150 (WBR)
*	McLoughlin Blvd. @ Clark College P & R								
*	McLoughlin Blvd. @ Fort Vancouver Way	Overall Intersection	18.6	B	0.51	LOS D	Y	150	175 (SBL)

2030 Replacement Bridge (Alternative 3 - LRT Vancouver Alignment)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Westbound Left/Thru/Right	14.2	B	0.07	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Southbound Left/Right	14.2	B	0.70	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Overall Intersection	43.5	D	0.60	LOS E	Y	100	125 (WBL)
								146	150 (SBL)
								430	450 (SBTR)
								159	175 (WBR)
*	SR 14 and Main Street	Overall Intersection	62.2	E	0.85	LOS E	Y	100	150 (SBL)
								300	300 (EBTR)
								565	575 (SBT)
*	3rd/4th St. @ Esther St.	Southbound Left/Thru	21.5	C	0.03	LOS E	Y	-	-
02	4th St. @ Columbia St.								
03	4th St. @ Washington St.								
04	5th St. @ Columbia St.	Northbound Thru	30.0	D	0.27	LOS E	Y	205	225 (SBT)
05	5th St. @ Washington St.	Southbound Right	1.6	A	0.07	LOS E	Y	-	-
*	5th St. @ Main St.	Overall Intersection	29.8	C	0.63	LOS E	Y	210	225 (WBLTR)
								175	175 (SBLT)
06	6th St. @ Columbia St.	Overall Intersection	53.9	D	0.82	LOS E	Y	210	275 (WBL)
								205	225 (NBTR)
07	6th St. @ Washington St.	Overall Intersection	22.7	C	0.49	LOS E	Y	-	-
08	6th St. @ Main St.	Eastbound Left/Thru/Right	20.5	C	0.67	LOS E	Y	207	225 (EBLTR)
09	6th St. @ Broadway								
10	6th St. @ C St.								
11	8th St. @ Esther St.	Eastbound Left/Thru/Right	65.8	F	0.01	LOS E	Y*	535	550 (EBLTR)
12	8th St. @ Columbia St.	Overall Intersection	74.7	E	1.00	LOS E	Y	75	150 (EBL)
								220	225 (WBLTR)
								171	175 (NBL)
								495	500 (NBTR)
								500	500 (EBTR)
								120	125 (SBL)
								210	225 (SBTR)
13	8th St. @ Washington St.	Overall Intersection	32.0	C	0.80	LOS E	Y	220	300 (EBLTR)
								210	225 (WBTR)
								203	225 (SBTR)
14	8th St. @ Main St.	Overall Intersection	32.3	C	0.89	LOS E	Y	210	225 (EBLTR)
								220	225 (WBLTR)
								205	225 (SBLTR)
15	8th St. @ Broadway	Southbound Left/Thru/Right	26.8	D	1.27	LOS E	Y	-	-
16	8th St. @ C St.	Overall Intersection	19.5	B	0.87	LOS E	Y	217	225 (EBLR)
17	9th St. @ Esther St.	Northbound Left/Thru/Right	19.1	C	0.01	LOS E	Y	-	-
18	9th St. @ Columbia St.	Northbound Left/Thru/Right	17.9	C	0.01	LOS E	Y	210	225 (NBLTR)
19	9th St. @ Washington St.	Overall Intersection	10.6	B	0.38	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	20.0	C	0.58	LOS E	Y	-	-
21	9th St. @ Broadway	Eastbound Left/Right	7.9	A	0.20	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Eastbound Left/Thru/Right	> 100	F	0.01	LOS E	N	535	550 (EBLTR)
								215	225 (NBLTR)
23	Evergreen Blvd. @ Columbia St.	Overall Intersection	65.9	E	0.85	LOS E	Y	100	150 (EBL)
								510	525 (EBTR)
								133	150 (WBL)
								220	225 (NBTR)
24	Evergreen Blvd. @ Washington St.	Overall Intersection	17.3	B	0.78	LOS E	Y	225	225 (EBLTR)
25	Evergreen Blvd. @ Main St.	Overall Intersection	30.7	C	0.78	LOS E	Y	210	275 (EBLTR)
								215	225 (NBLTR)
								210	225 (SBLTR)
26	Evergreen Blvd. @ Broadway	Overall Intersection	15.3	B	0.73	LOS E	Y	75	125 (WBL)
								219	225 (NBLTR)
27	Evergreen Blvd. @ C St.	Overall Intersection	30.9	C	1.12	LOS E	Y	210	225 (SBLTR)
28	11th St. @ Esther St.	Northbound Left/Thru/Right	10.1	B	0.12	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	26.9	D	0.62	LOS E	Y	-	-
30	11th St. @ Washington St.	Overall Intersection	14.8	B	0.43	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Left/Thru/Right	38.0	E	1.23	LOS E	Y	-	-
32	11th St. @ Broadway	Southbound Left/Thru/Right	24.2	C	0.12	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru/Right	53.1	F	0.63	LOS E	Y*	220	225 (EBLTR)
34	Mill Plain Blvd. @ Columbia St.	Overall Intersection	> 100	F	1.18	LOS E	Y**	810	825 (EBLTR)
								150	225 (NBR)
								75	150 (SBL)
								210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	Overall Intersection	68.4	E	0.61	LOS E	Y	235	250 (EBLTR)
								210	225 (NBTR)
36	Mill Plain Blvd. @ Main St.	Overall Intersection	73.5	E	1.23	LOS E	Y	205	225 (EBLTR)
								765	775 (NBTR)
								70	150 (SBL)
								210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	Overall Intersection	45.0	D	0.93	LOS E	Y	210	225 (EBLTR)
								770	775 (NBTR)
								70	125 (SBL)
38	Mill Plain Blvd. @ C St.	Overall Intersection	> 100	F	1.18	LOS E	N	200	200 (EBLTR)
								765	775 (NBTR)
								195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Southbound Right	> 100	F	-	LOS E	N	950	950 (SBR)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Overall Intersection	> 100	F	1.00	LOS E	N	775	850 (EBL)
								950	950 (EBT)
								1115	1125 (NBL)
								940	950 (SBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Northbound Right	> 100	F	-	LOS E	N	420	500 (NBR)
41	15th St. @ Columbia St.	Overall Intersection	53.6	D	1.18	LOS E	Y	225	225 (WBLTR)
								75	100 (NBL)
								210	225 (NBT)
42	15th St. @ Washington St.	Overall Intersection	32.5	C	0.60	LOS E	Y	205	225 (WBL)
								205	225 (WBT)
43	15th St. @ Main St.	Overall Intersection	37.3	D	1.23	LOS E	Y	190	200 (WBLTR)
								70	125 (NBL)
								225	225 (SBTR)
44	15th St. @ Broadway	Overall Intersection	30.0	C	0.93	LOS E	Y	200	200 (WBLTR)
								70	150 (NBL)
								200	225 (NBT)
45	15th St. @ C St.	Overall Intersection	> 100	F	0.80	LOS E	N	875	875 (WBLTR)
								490	500 (SBTR)
46	McLoughlin Blvd. @ Columbia St.	Overall Intersection	16.1	B	0.69	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	Overall Intersection	20.9	C	0.83	LOS E	Y	-	-
48	McLoughlin Blvd. @ Broadway	Overall Intersection	5.7	A	0.36	LOS E	Y	-	-
*	McLoughlin Blvd. @ Clark College P & R								
*	McLoughlin Blvd. @ Fort Vancouver Way	Overall Intersection	28.8	C	0.51	LOS D	Y	150	175 (SBL)

2030 Replacement Bridge (Alternative 3 - LRT I-5 Full Length)

CBD Results same as LRT Vancouver Alignment

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
34	Mill Plain Blvd. @ Columbia St.	Overall Intersection	> 100	F	1.18	LOS E	Y**	810	825 (EBLTR)
								191	200 (NBR)
								84	100 (SBL)
35	Mill Plain Blvd. @ Washington St.	Overall Intersection	45.7	D	0.61	LOS E	Y	235	250 (EBLTR)
36	Mill Plain Blvd. @ Main St.	Overall Intersection	63.5	E	1.23	LOS E	Y	205	225 (EBLTR)
								765	775 (NBTR)
								134	150 (SBL)
								210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	Overall Intersection	26.1	C	0.92	LOS E	Y	210	225 (EBLTR)
								89	100 (SBL)
38	Mill Plain Blvd. @ C St.	Overall Intersection	95.3	F	1.12	LOS E	N	200	200 (EBLTR)
								195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Eastbound Thru	14.9	B	1.01	LOS E	Y	-	-
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Overall Intersection	52.5	D	1.00	LOS E	Y	-	-
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Westbound Thru	40.9	E	0.23	LOS E	Y	-	-
41	15th St. @ Columbia St.	Overall Intersection	16.8	B	1.18	LOS E	Y	240	250 (WBLTR)
								88	100 (NBL)
42	15th St. @ Washington St.	Overall Intersection	20.2	C	0.58	LOS E	Y	205	300 (WBL)
								205	225 (WBT)
43	15th St. @ Main St.	Overall Intersection	20.7	C	1.23	LOS E	Y	190	200 (WBLTR)
								77	100 (NBL)
44	15th St. @ Broadway	Overall Intersection	21.8	C	0.92	LOS E	Y	200	200 (WBLTR)
								107	125 (NBL)
								30	50 (SBR)
45	15th St. @ C St.	Overall Intersection	81.2	F	0.81	LOS E	N	875	875 (WBLTR)
								490	500 (SBTR)
46	McLoughlin Blvd. @ Columbia St.	Overall Intersection	17.1	B	0.62	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	Overall Intersection	28.0	C	0.74	LOS E	Y	100	100 (EBLTR)
								50	50 (SBLTR)
48	McLoughlin Blvd. @ Broadway	Overall Intersection	31.2	C	0.53	LOS E	Y	84	100 (EBL)
								88	100 (WBL)
*	McLoughlin Blvd. @ Clark College P & R	Overall Intersection	7.6	A	0.36	LOS D	Y	-	-
*	McLoughlin Blvd. @ Fort Vancouver Way	Overall Intersection	20.9	C	0.55	LOS D	Y	150	175 (SBL)

Continued on next page

Exhibit 4-28 - continued

Vancouver Intersection Performance Results

PM Peak Hour

2005 Existing Conditions

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	5.4	A	-	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	7.7	A	0.07	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	15.8	B	0.50	LOS D	Y	-	-
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	28.3	C	0.66	LOS D	Y	125	150 (WBL)
								200	200 (WBTR)
								75	100 (NBL)
								75	125 (NBR)
								75	125 (SBL)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	24.0	C	0.94	LOS D	Y	125	150 (WBL)
								495	500 (WBTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	7.1	A	0.57	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	11.3	B	0.54	LOS D	Y	-	-
*	I-5 NB On-/Off-Ramps @ Clark College P&R								
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	16.0	B	0.63	LOS D	Y	75	150 (WBR)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	7.0	A	-	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	16.6	B	0.54	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	6.8	A	0.03	LOS E	Y	-	-
61	28th St. @ Broadway	Northbound Thru/Right	1.9	A	-	LOS E	Y	-	-
62	29th St. @ Main St./Broadway	Eastbound Left/Thru/Right	12.5	B	-	LOS E	Y	-	-
63	33rd St. @ Main St.	***Overall Intersection***	18.3	B	0.45	LOS D	Y	50	75 (EBL)
								50	75 (WBL)
64	39th St. @ Main St.	***Overall Intersection***	38.3	D	0.71	LOS D	Y	75	125 (EBL)
								490	500 (EBTR)
								75	100 (WBL)
								215	225 (WBTR)
								75	125 (NBL)
								125	175 (SBL)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.16	LOS E	N	-	-
								50	75 (WBL)
								430	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	8.3	A	0.57	LOS D	Y	135	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	Northbound Left	30.0	D	-	LOS E	Y	-	-
								55	100 (EBR)
								125	175 (NBR)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	23.1	C	0.76	LOS D	Y	75	125 (NBR)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	4.9	A	0.33	LOS D	Y	-	-
*	P&R North @ Main St.								
70	45th St. @ Main St.	***Overall Intersection***	9.1	A	0.44	LOS D	Y	-	-
*	Kiggins P&R @ Main St.								
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	8.5	A	0.45	LOS D	Y	-	-
*	Kiggins Bowl P&R/Hazel Dell @ Main St.								
72	Ross St. @ Main St.	***Overall Intersection***	8.5	A	0.46	LOS D	Y	60	75 (WBL)
								60	75 (WBR)
73	Ross St. @ North Rd.	Northbound Left/Thru	6.3	A	-	LOS E	Y	-	-

2030 No-Build (Alternative 1)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	6.9	A	0.02	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	> 100	F	0.13	LOS E	N	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	> 100	F	0.74	LOS D	N	760	775 (EBTR)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	76.4	E	0.84	LOS D	N	250	325 (EBL)
								495	500 (EBTR)
								170	225 (WBL)
								195	200 (WBT)
								75	100 (NBL)
								425	425 (NBT)
								75	150 (NBR)
								75	125 (SBL)
								470	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	1.05	LOS D	N	195	200 (EBTR)
								125	175 (WBL)
								495	550 (WBT)
								1800	1800 (NBLTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	11.0	B	0.57	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	36.6	D	0.92	LOS D	Y	200	275 (EBL)
								555	575 (EBT)
								850	850 (WBT)
*	I-5 NB On-/Off-Ramps @ Clark College P&R								
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.88	LOS D	N	275	350 (EBL)
								850	850 (EBT)
								840	850 (WBT)
								75	150 (WBR)
								3225	3200 (NBLT)
								600	900 (NBR)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	50.2	F	0.01	LOS E	N	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	69.5	E	0.66	LOS D	N	170	225 (EBL)
								805	825 (EBT)
								150	175 (NBL)
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.05	LOS E	N	-	-
								215	225 (SBTR)
61	28th St. @ Broadway	Northbound Thru/Right	52.8	F	0.37	LOS E	N	-	-
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	150	150 (WBLTR)
								430	450 (EBLTR)
								215	225 (NBTR)
								100	100 (SBTR)
								210	300 (NWR)
63	33rd St. @ Main St.	***Overall Intersection***	> 100	F	0.66	LOS D	N	50	100 (EBL)
								770	775 (EBTR)
								50	100 (WBL)
								600	600 (WBTR)
								1000	1000 (NBT)
								75	100 (SBL)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.10	LOS D	N	75	150 (EBL)
								1270	1275 (EBTR)
								75	125 (WBL)
								215	225 (WBTR)
								75	125 (NBL)
								1570	1575 (NBTR)
								125	175 (SBL)
								360	375 (SBT)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.61	LOS E	N	305	325 (NBLR)
								215	225 (EBTR)
								50	75 (WBL)
								430	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	> 100	F	0.85	LOS D	N	430	450 (EBTR)
								135	150 (WBTR)
								310	325 (SBLTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	48.0	D	0.86	LOS D	Y	135	150 (EBT)
								55	125 (EBR)
								710	725 (WBT)
								1660	1175 (NBR)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.95	LOS D	N	300	350 (EBL)
								710	725 (EBT)
								1170	1175 (WBTR)
								790	800 (NBLT)
								75	125 (NBR)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	80.4	F	0.59	LOS D	N	1170	1175 (SBT)
*	P&R North @ Main St.								
70	45th St. @ Main St.	***Overall Intersection***	17.6	B	0.55	LOS D	Y	-	-
*	Kiggins P&R @ Main St.								
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	29.7	C	0.67	LOS D	Y	1135	375 (SB - F/I-5)
								1550	425 (SB - F/Main)
*	Kiggins Bowl P&R/Hazel Dell @ Main St.								
72	Ross St. @ Main St.	***Overall Intersection***	16.0	B	0.70	LOS D	Y	60	75 (WBL)
								60	75 (WBR)
73	Ross St. @ North Rd.	Southbound Thru/Right	70.1	F	0.38	LOS E	N	-	-

2030 Replacement Bridge (Alternative 2 - BRT Vancouver Alignment)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Northbound Left/Thru/Right	2.2	A	0.39	LOS E	Y	-	-
51	24th St. @ Main St.	Northbound Left/Thru	5.6	A	0.02	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	32.9	C	0.75	LOS D	Y	150	175 (WBL)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	39.1	D	0.82	LOS D	Y	250	300 (EBL)
								495	500 (EBTR)
								195	225 (WBL)
								195	200 (WBTR)
								75	125 (NBL)
								425	425 (NBT)
								75	150 (NBR)
								75	125 (SBL)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	19.3	B	0.76	LOS D	Y	125	200 (NBL)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	13.2	B	0.61	LOS D	Y	75	100 (EBL)
								150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	70.1	E	0.92	LOS D	N	200	275 (EBL)
								554	575 (EBT)
								990	1000 (WBT)
								990	1300 (WBR)
*	I-5 NB On-/Off-Ramps @ Clark College P&R								
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	58.2	E	0.74	LOS D	Y*	620	625 (WBT)
								150	175 (NBR)
								250	350 (EBR)
								75	125 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Westbound Thru/Right	79.0	F	0.28	LOS E	N	730	750 (WBTR)
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	86.3	F	0.62	LOS D	N	170	250 (EBL)
								150	175 (WBL)
60	28th St. @ Main St.	Northbound Thru/Right	3.0	A	0.21	LOS E	Y	-	-
61	28th St. @ Broadway								
62	29th St. @ Main St./Broadway	***Overall Intersection***	33.4	C	0.54	LOS D	Y	160	175 (WBLTR)
								230	275 (NBTR)
63	33rd St. @ Main St.	***Overall Intersection***	> 100	F	0.79	LOS D	Y**	50	100 (EBL)
								50	100 (WBL)
								210	225 (NBTR)
								75	100 (SBL)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.03	LOS D	Y**	275	425 (EBL)
								1310	1425 (EBTR)
								75	100 (WBL)
								215	225 (WBTR)
								225	325 (SBL)
								360	375 (SBT)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.20	LOS E	Y**	290	300 (NBLTR)
								215	225 (EBTR)
								430	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	57.7	E	0.91	LOS D	Y*	435	450 (EBTR)
								140	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	67.7	E	0.80	LOS D	N	55	100 (EBR)
								730	750 (WBT)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1120	1125 (WBT)
								790	825 (NBL)
								75	150 (NBR)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	34.1	C	0.55	LOS D	Y	495	500 (SBTR)
								100	125 (NBL)
*	P&R North @ Main St.	***Overall Intersection***	40.7	D	0.50	LOS D	Y	571	575 (SBT)
70	45th St. @ Main St.	***Overall Intersection***	15.4	B	0.61	LOS D	Y	105	125 (SBTR)
*	Kiggins P&R @ Main St.	Westbound Left/Right	> 100	F	0.20	LOS E	N	-	-
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	69.9	E	0.68	LOS D	N	-	-
*	Kiggins Bowl P&R/Hazel Dell @ Main St.								
72	Ross St. @ Main St.	***Overall Intersection***	> 100	F	0.82	LOS D	N	60	100 (EBL)
								60	100 (WBR)
73	Ross St. @ North Rd.	Southbound Thru/Right	> 100	F	0.35	LOS E	N	935	950 (SBTR)
								1175	1175 (NBLT)

2030 Replacement Bridge (Alternative 3 - LRT Vancouver Alignment)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Westbound Left/Thru/Right	4.4	A	0.09	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	32.9	D	0.15	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	76.2	E	0.75	LOS D	Y*	150	175 (EBL)
								760	775 (EBTR)
								150	200 (WBL)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	72.4	E	0.82	LOS D	Y*	250	300 (EBL)
								495	500 (EBTR)
								195	200 (WBL)
								195	200 (WBTR)
								75	125 (NBL)
								425	425 (NBT)
								75	125 (NBR)
								75	125 (SBL)
								475	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	25.0	C	0.70	LOS D	Y	195	200 (EBLTR)
								125	175 (NBL)
								765	575 (NBTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	7.9	A	0.61	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	47.7	D	0.92	LOS D	Y	200	275 (EBL)
								1045	1050 (WBT)
								1045	1050 (WBR)
*	I-5 NB On-/Off-Ramps @ Clark College P&R								
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	38.4	D	0.74	LOS D	Y	620	625 (WBT)
								250	350 (EBR)
								75	125 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	> 100	F	0.01	LOS E	N	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	61.9	E	0.62	LOS D	Y*	170	250 (EBL)
								1420	1425 (EBT)
								150	200 (NBL)
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.03	LOS E	Y**	-	-
								475	475 (NBTR)
								230	250 (SBTR)
61	28th St. @ Broadway								
62	29th St. @ Main St./Broadway	***Overall Intersection***	> 100	F	0.51	LOS D	Y**	160	175 (WBLTR)
								230	250 (NBTR)
								725	725 (SBTR)
63	33rd St. @ Main St.	***Overall Intersection***	> 100	F	0.69	LOS D	Y**	50	100 (EBL)
								780	800 (EBTR)
								50	100 (WBL)
								935	950 (NBTR)
								75	125 (SBL)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.03	LOS D	Y**	275	400 (EBL)
								1305	1325 (EBTR)
								75	125 (WBL)
								215	225 (WBTR)
								275	325 (NBL)
								1395	1400 (NBTR)
								225	250 (SBL)
								350	350 (SBT)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.20	LOS E	Y**	290	300 (NBLTR)
								215	225 (EBTR)
								435	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	61.9	E	0.95	LOS D	Y*	435	450 (EBTR)
								140	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	49.6	D	0.80	LOS D	Y	55	100 (EBR)
								730	750 (WBT)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1175	1175 (WBT)
								790	800 (NBL)
								75	150 (NBR)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	56.6	E	0.55	LOS D	Y*	100	150 (NBL)
								100	150 (SBL)
								495	500 (SBTR)
*	P&R North @ Main St.	***Overall Intersection***	47.7	D	0.50	LOS D	Y	570	575 (WBT)
70	45th St. @ Main St.	***Overall Intersection***	20.3	C	0.61	LOS D	Y	105	125 (SBTR)
*	Kiggins P&R @ Main St.	Westbound Left/Right	> 100	F	0.21	LOS E	N	130	150 (WBLR)
								430	450 (SBT)
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	29.5	C	0.68	LOS D	Y	430	400 (NBL)
								2105	225 (SB - F/I-5)
								1550	325 (SB - F/Main)
*	Kiggins Bowl P&R/Hazel Dell @ Main St.								
72	Ross St. @ Main St.	***Overall Intersection***	17.7	B	0.82	LOS D	N	60	75 (WBL)
								60	75 (WBR)
								200	200 (NBR)
73	Ross St. @ North Rd.	Southbound Thru/Right	> 100	F	0.98	LOS E	Y	935	950 (SBTR)
								1175	1175 (NBLT)

2030 Replacement Bridge (Alternative 3 - LRT I-5 Full Length)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Northbound Left/Thru/Right	2.2	A	0.01	LOS E	Y	-	-
51	24th St. @ Main St.	Northbound Left/Thru	5.1	A	0.02	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	92.7	F	0.70	LOS D	Y*	760	775 (EBTR)
								760	775 (EBTR)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	56.2	E	0.78	LOS D	Y*	250	300 (EBL)
								495	500 (EBTR)
								212	225 (WBL)
								195	200 (WBTR)
								102	125 (NBL)
								425	425 (NBT)
								130	150 (NBR)
								125	125 (SBL)
								491	500 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	29.6	C	1.00	LOS D	Y	195	200 (EBLTR)
								176	200 (NBL)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	9.2	A	0.61	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	53.8	D	0.93	LOS D	Y	200	275 (EBL)
								554	575 (EBT)
								990	1000 (WBT)
								1232	1250 (WBR)
*	I-5 NB On-/Off-Ramps @ Clark College P&R	***Overall Intersection***	49.9	D	0.47	LOS D	Y	355	375 (WBT)
								355	375 (WBR)
								430	450 (SBL)
								125	125 (SBR)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	37.5	D	0.79	LOS D	Y	670	675 (WBT)
								165	175 (NBR)
								223	225 (EBR)
								261	275 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	6.9	A	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	23.0	C	0.62	LOS D	Y	170	250 (EBL)
60	28th St. @ Main St.	Southbound Thru/Right	4.5	A	0.29	LOS E	Y	-	-
61	28th St. @ Broadway	Northbound Thru/Right	1.7	A	0.11	LOS D	Y	-	-
62	29th St. @ Main St./Broadway	***Overall Intersection***	4.4	A	0.00	LOS D	Y	-	-
63	33rd St. @ Main St.	***Overall Intersection***	38.3	D	0.56	LOS D	Y	50	100 (EBL)
								81	100 (WBL)
								96	100 (SBL)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.16	LOS D	Y**	75	125 (EBL)
								1310	1325 (EBTR)
								111	125 (WBL)
								215	225 (WBTR)
								114	125 (NBL)
								151	175 (SBL)
								360	375 (SBT)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.47	LOS E	Y**	60	75 (WBL)
								430	450 (WBTR)
								305	325 (NBLTR)
66	39th St. @ H St.	***Overall Intersection***	25.1	C	0.81	LOS D	Y	140	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	54.0	D	0.00	LOS D	Y	55	100 (EBR)
								765	775 (WBT)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.77	LOS D	Y**	1175	1175 (WBT)
								863	875 (NBL)
								141	150 (NBR)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	62.5	E	0.41	LOS D	Y*	1200	1200 (SBTR)
*	P&R North @ Main St.								
70	45th St. @ Main St.	***Overall Intersection***	29.2	C	0.72	LOS D	Y	200	225 (EBL)
								125	125 (SBTR)
*	Kiggins P&R @ Main St.								
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	42.9	D	0.81	LOS D	Y	315	375 (NBL)
*	Kiggins Bowl P&R/Hazel Dell @ Main St.	***Overall Intersection***	6.2	A	0.57	LOS D	Y	80	100 (EBL)
72	Ross St. @ Main St.	***Overall Intersection***	16.7	B	0.79	LOS D	Y	60	100 (WBL)
								73	75 (WBR)
73	Ross St. @ North Rd.	Southbound Thru/Right	> 100	F	0.35	LOS E	N	935	950 (SBTR)
								1175	1175 (NBLT)

Delay / LOS affected by freeway congestio

Intersection queuing spills back into upstream intersectic

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.

* Intersection not modeled in existing conditions scenario

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 4-29

Portland Intersection Performance Results

AM Peak Hour — 2005 Existing Conditions

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	24.2	C	0.83	LOS D	Y	125	200 (WBL)
02	Going and Interstate	***Overall Intersection***	31.7	C	0.75	LOS D	Y	125	250 (WBL)
								125	150 (NBL)
03	Alberta and Interstate	***Overall Intersection***	18.0	B	0.72	LOS D	Y	100	125 (SBL)
04	Alberta and SB I-5 Off-Ramp	Westbound Left	18.4	C	0.73	0.85	Y	175	175 (WBLT)
05	Alberta and NB I-5 Off-Ramp	Westbound Thru/Right	13.0	B	0.51	0.85	Y	-	-
06	Alberta and MLK Jr.	***Overall Intersection***	20.3	C	0.78	LOS D	Y	75	125 (WBR)
								100	125 (NBL)
07	Portland and Interstate	***Overall Intersection***	18.2	B	0.54	LOS D	Y	-	-
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	18.3	B	0.52	0.85	Y	190	225 (WBL)
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	11.8	B	0.39	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	17.5	B	0.66	LOS D	Y	-	-
11	Lombard and Interstate	***Overall Intersection***	27.8	C	0.66	0.99	Y	150	175 (WBL)
12	Lombard and I-5 SB On-Ramps	Eastbound Thru/Right	4.8	A	0.31	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	8.5	A	0.48	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	61.4	E	0.79	0.99	Y	100	125 (EBL)
								100	175 (WBL)
								100	175 (NBL)
								150	300 (SBL)
15	Interstate and Argyle	***Overall Intersection***	22.2	C	0.61	LOS D	Y	75	125 (EBR)
								50	75 (NBL)
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	17.6	B	0.62	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	32.7	C	0.72	0.99	Y	100	200 (NBL)
								225	250 (SBL)
18	Victory and Expo Road	Southbound Left/Thru	5.2	A	0.04	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Westbound Left/Thru	1.1	A	0.17	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	4.0	A	0.10	0.85	Y	-	-
21	Union Ct and I-5 NB Off-Ramp	Eastbound Left	7.1	A	0.24	0.85	Y	-	-
22	Union Ct/Marine Way and Vancouver Way	Northwest Thru/Right	7.1	A	0.36	LOS E	Y	-	-
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	32.8	C	0.66	0.85	Y	200	275 (NBL)
								125	200 (SBR)
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	11.0	B	0.35	0.85	Y	-	-
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	8.2	A	0.35	LOS D	Y	-	-
26	Hayden Island North Ramp Terminal - Center								
27	Hayden Island North Ramp Terminal - West								
28	Hayden Island North Ramp Terminal - East								
29	Hayden Island Drive and N Jantzen Drive								
30	Hayden Island Drive and Center Ave								
31	Hayden Island Drive and Jantzen Beach Center								
32	Tomahawk Island Drive and Jantzen Ave								
33	Jantzen Beach Center and Jantzen Dr								
34	Center Ave and Jantzen Ave								
35	Center Ave and New Central Road								
36	Hayden Island South Ramp Terminal - Center								
37	Hayden Island South Ramp Terminal - East								
38	Hayden Island South Ramp Terminal - West								
39	Vancouver Way and MLK on- and off-ramps								
40	Marine Drive and Anchor Way								
41	Union Court and Vancouver Way								

2030 No-Build (Alternative 1)

#	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	***Overall Intersection***	87.6	F	0.93	LOS D	N	125	250 (WBL)
02	***Overall Intersection***	52.9	D	0.88	LOS D	Y	125	275 (WBL)
							125	150 (NBL)
							355	450 (EBL)
03	***Overall Intersection***	27.5	C	0.73	LOS D	Y	100	150 (SBL)
04	***Overall Intersection***	46.3	D	0.78	0.85	Y	75	125 (WBL)
							175	175 (WBT)
05	***Overall Intersection***	53.9	D	0.43	0.85	Y	75	100 (EBL)
06	***Overall Intersection***	39.8	D	0.89	LOS D	Y	75	125 (WBR)
							100	150 (NBL)
							100	125 (SBL)
07	***Overall Intersection***	20.6	C	0.62	LOS D	Y	100	125 (WBL)
08	***Overall Intersection***	18.8	B	0.53	0.85	Y	125	150 (SWR)
09	***Overall Intersection***	12.6	B	0.44	0.85	Y	-	-
10	***Overall Intersection***	14.7	B	0.70	LOS D	Y	100	150 (NBL)
11	***Overall Intersection***	> 100	F	0.90	0.99	Y	150	325 (WBL)
							225	275 (NBL)
							150	275 (EBL)
							1155	1175 (EBTR)
							555	1100 (WBTR)
12	Westbound Thru	12.9	B	0.42	0.85	Y	-	-
13	Northbound Right	16.8	C	0.57	0.85	Y	-	-
14	***Overall Intersection***	> 100	F	0.88	0.99	Y	100	175 (EBL)
							100	175 (WBL)
							100	200 (NBL)
							150	300 (SBL)
15	***Overall Intersection***	26.7	C	0.69	LOS D	Y	75	125 (EBR)
							50	125 (NBL)
							150	150 (NBT)
16	***Overall Intersection***	14.9	B	0.63	0.85	Y	150	200 (WBR)
17	***Overall Intersection***	37.2	D	0.89	0.99	Y	100	200 (NBL)
							225	250 (SBL)
18	Westbound Left/Thru/Right	3.1	A	0.12	LOS E	Y	-	-
19	Westbound Left/Thru	1.3	A	0.21	0.85	Y	-	-
20	***Overall Intersection***	5.0	A	0.13	0.85	Y	-	-
21	Eastbound Left	8.4	A	0.28	0.85	Y	-	-
22	Northeast Left/Thru	8.4	A	0.55	LOS E	Y	-	-
23	***Overall Intersection***	> 100	F	0.83	0.85	Y	200	2075 (NBL)
							275	350 (EBL)
24	***Overall Intersection***	11.2	B	0.35	0.85	Y	-	-
25	***Overall Intersection***	9.5	A	0.32	LOS D	Y	-	-
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								

2030 Replacement Bridge (Alternatives 2 and 3)

#	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	***Overall Intersection***	65.0	E	0.92	LOS D	Y*	125	250 (WBL)
							125	150 (SBL)
02	***Overall Intersection***	64.9	E	0.88	LOS D	N	355	500 (EBL)
							125	300 (WBL)
							125	225 (NBL)
03	***Overall Intersection***	31.0	C	0.79	LOS D	Y	100	150 (SBL)
04	***Overall Intersection***	20.6	C	0.77	0.85	Y	75	125 (WBL)
							175	175 (WBT)
05	***Overall Intersection***	31.7	C	0.47	0.85	Y	75	100 (EBL)
06	***Overall Intersection***	31.0	C	0.87	LOS D	Y	75	125 (WBR)
							100	150 (NBL)
							100	150 (SBL)
07	***Overall Intersection***	22.6	C	0.65	LOS D	Y	100	150 (WBL)
08	***Overall Intersection***	19.3	B	0.53	0.85	Y	190	225 (WBL)
							125	150 (SBR)
09	***Overall Intersection***	13.5	B	0.47	0.85	Y	-	-
10	***Overall Intersection***	14.3	B	0.71	LOS D	Y	100	150 (NBL)
11	***Overall Intersection***	> 100	F	0.88	0.99	Y	150	200 (EBL)
							150	300 (WBL)
							555	850 (WBTR)
							225	275 (NBL)
12	Westbound Thru	5.8	A	0.42	0.85	Y	-	-
13	Northbound Right	8.1	A	0.63	0.85	Y	-	-
14	***Overall Intersection***	> 100	F	0.89	0.99	Y	100	175 (EBL)
							100	175 (WBL)
							100	200 (NBL)
							150	300 (SBL)
15	***Overall Intersection***	22.4	C	0.67	LOS D	Y	75	125 (EBR)
							50	125 (NBL)
							150	150 (NBT)
16	***Overall Intersection***	15.4	B	0.67	0.85	Y	150	200 (WBR)
17	***Overall Intersection***	36.1	D	0.82	0.99	Y	100	200 (NBL)
							225	350 (SBL)
18	Westbound Left/Thru/Right	3.1	A	0.08	LOS E	Y	-	-
19	Westbound Left/Thru	1.4	A	0.19	0.85	Y	-	-
20	***Overall Intersection***	5.2	A	0.11	0.85	Y	-	-
21								
22								
23	***Overall Intersection***	15.2	B	0.52	0.85	Y	-	-
24								
25								
26	***Overall Intersection***	10.2	B	0.25	0.85	Y	-	-
27	***Overall Intersection***	2.5	A	0.22	0.85	Y	-	-
28	Northbound Right	1.7	A	0.30	0.85	Y	-	-
29	***Overall Intersection***	8.4	A	0.26	LOS D	Y	-	-
30	***Overall Intersection***	8.4	A	0.34	LOS D	Y	-	-
31	***Overall Intersection***	11.9	B	0.28	LOS D	Y	-	-
32	***Overall Intersection***	11.7	B	0.32	LOS D	Y	-	-
33	***Overall Intersection***	6.3	A	0.30	LOS D	Y	-	-
34	***Overall Intersection***	15.6	B	0.32	LOS D	Y	-	-
35	Southbound Left/Thru	6.5	A	0.21	LOS E	Y	-	-
36	***Overall Intersection***	14.0	B	0.24	0.85	Y	-	-
37	***Overall Intersection***	5.1	A	0.15	0.85	Y	-	-
38	***Overall Intersection***	6.0	A	0.14	0.85	Y	-	-
39	***Overall Intersection***	7.9	A	0.44	0.85	Y	150	200 (SBR)
40	***Overall Intersection***	2.3	A	0.44	LOS D	Y	-	-
41	Westbound Left	23.6	C	0.27	LOS E	Y	450	525 (WBL)
							75	125 (NBR)

2030 Supplemental Bridge (Alternatives 4 and 5)

#	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	***Overall Intersection***	63.2	E	0.91	LOS D	Y*	125	250 (WBL)
							125	150 (SBL)
02	***Overall Intersection***	62.1	E	0.86	LOS D	N	355	500 (EBL)
							125	300 (WBL)
							125	200 (NBL)
03	***Overall Intersection***	31.0	C	0.74	LOS D	Y	100	175 (SBL)
04	***Overall Intersection***	27.6	C	0.80	0.85	Y	75	125 (WBL)
							175	175 (WBT)
05	***Overall Intersection***	51.1	D	0.55	0.85	Y	75	125 (EBL)
06	***Overall Intersection***	64.2	E	0.89	LOS D	N	75	150 (WBR)
							100	150 (NBL)
							100	150 (SBL)
07	***Overall Intersection***	21.3	C	0.63	LOS D	Y	100	125 (WBL)
08	***Overall Intersection***	19.0	B	0.55	0.85	Y	190	225 (WBL)
							125	150 (SBR)
09	***Overall Intersection***	13.2	B	0.44	0.85	Y	-	-
10	***Overall Intersection***	13.2	B	0.69	LOS D	Y	100	150 (NBL)
11	***Overall Intersection***	> 100	F	0.80	0.99	Y	150	200 (EBL)
							150	300 (WBL)
							555	825 (WBTR)
							225	275 (NBL)
12	Westbound Thru	78.8	F	0.42	0.85	Y	450	775 (WBT)
13	Northbound Right	> 100	F	0.63	0.85	Y	-	-
14	***Overall Intersection***	> 100	F	0.92	0.99	Y	100	175 (EBL)
							100	200 (WBL)
							100	200 (NBL)
							150	300 (SBL)
15	***Overall Intersection***	24.4	C	0.67	LOS D	Y	75	150 (EBR)
							50	100 (NBL)
16	***Overall Intersection***	17.6	B	0.72	0.85	Y	150	200 (WBR)
17	***Overall Intersection***	47.6	D	0.85	0.99	Y	100	225 (NBL)
							225	325 (SBL)
18	Westbound Left/Thru/Right	2.8	A	0.09	LOS E	Y	-	-
19	Westbound Left/Thru	1.5	A	0.18	0.85	Y	-	-
20	***Overall Intersection***	5.6	A	0.12	0.85	Y	-	-
21								
22								
23	***Overall Intersection***	14.4	B	0.51	0.85	Y	-	-
24								
25								
26	***Overall Intersection***	10.3	B	0.25	0.85	Y	-	-
27	***Overall Intersection***	2.4	A	0.22	0.85	Y	-	-
28	Northbound Right	1.7	A	0.30	0.85	Y	-	-
29	***Overall Intersection***	8.8	A	0.26	LOS D	Y	-	-
30	***Overall Intersection***	8.3	A	0.34	LOS D	Y	-	-
31	***Overall Intersection***	11.9	B	0.28	LOS D	Y	-	-
32	***Overall Intersection***	11.7	B	0.32	LOS D	Y	-	-
33	***Overall Intersection***	6.3	A	0.30	LOS D	Y	-	-
34	***Overall Intersection***	14.9	B	0.32	LOS D	Y	-	-
35	Southbound Left/Thru	6.5	A	0.21	LOS E	Y	-	-
36	***Overall Intersection***	14.0	B	0.24	0.85	Y	-	-
37	***Overall Intersection***	4.6	A	0.15	0.85	Y	-	-
38	***Overall Intersection***	5.7	A	0.14	0.85	Y	-	-
39	***Overall Intersection***	8.9	A	0.43	0.85	Y	150	200 (SBR)
40	***Overall Intersection***	2.2	A	0.43	LOS D	Y	-	-
41	Westbound Left	24.1	C	0.67	LOS E	Y	75	125 (NBR)

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1).
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 4-30

Portland Intersection Performance Results

PM Peak Hour

2005 Existing Conditions

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	Overall Intersection	30.5	C	0.89	LOS D	Y	125	150 (EBL)
								125	175 (NBL)
								125	150 (SBL)
02	Going and Interstate	Overall Intersection	33.8	C	0.72	LOS D	Y	125	150 (NBL)
03	Alberta and Interstate	Overall Intersection	25.1	C	0.76	LOS D	Y	125	175 (NBL)
04	Alberta and SB I-5 Off-Ramp	Westbound Left	12.0	B	0.75	0.85	Y	-	-
05	Alberta and NB I-5 Off-Ramp	Eastbound Left	11.7	B	0.71	0.85	Y	-	-
06	Alberta and MLK Jr.	Overall Intersection	38.0	D	0.88	LOS D	Y	75	150 (WBR)
								100	150 (NBL)
								100	150 (SBL)
07	Portland and Interstate	Overall Intersection	32.0	C	0.71	LOS D	Y	100	150 (WBL)
								175	225 (NBL)
08	Portland and I-5 SB On-/Off Ramps	Overall Intersection	15.0	B	0.48	0.85	Y	-	-
09	Portland and I-5 NB On-/Off Ramps	Overall Intersection	12.7	B	0.42	0.85	Y	-	-
10	Portland and MLK Jr.	Overall Intersection	16.5	B	0.75	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	Overall Intersection	32.4	C	0.76	0.99	Y	100	175 (NBR)
12	Lombard and I-5 SB On-Ramps	Eastbound Thru/Right	3.7	A	0.36	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	10.7	B	0.42	0.85	Y	-	-
14	Lombard and MLK Jr.	Overall Intersection	74.0	E	0.85	0.99	Y	100	150 (EBL)
								100	175 (WBL)
								100	225 (NBL)
								150	300 (SBL)
15	Interstate and Argyle	Overall Intersection	17.6	B	0.61	LOS D	Y	75	125 (EBR)
								50	75 (NBL)
16	Columbia Blvd and I-5 Ramps	Overall Intersection	12.6	B	0.58	0.85	Y	150	175 (WBR)
17	Columbia Blvd and MLK Jr.	Overall Intersection	39.3	D	0.71	0.99	Y	150	175 (WBL)
								100	225 (NBL)
								225	300 (SBL)
18	Victory and Expo Road	Southbound Left/Thru	7.1	A	0.37	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Eastbound Thru	5.5	A	0.27	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	Overall Intersection	56.9	E	0.32	0.85	Y	290	325 (EBL)
								200	250 (WBTR)
21	Union Ct and I-5 NB Off-Ramp	Eastbound Left/Thru	33.1	D	0.30	0.85	Y	200	250 (EBL)
22	Union Ct/Marine Way and Vancouver Way	Northeast Left/Thru	48.9	E	0.66	LOS E	Y	370	500 (NBTR)
								75	100 (SBLTR)
								370	400 (NBR)
								55	75 (SWL)
								55	75 (SWTR)
23	Marine Dr and I-5 On-/Off-Ramps	Overall Intersection	55.7	E	0.69	0.85	Y	275	325 (EBL)
								373	1150 (WBR)
24	Center Ave and I-5 SB On-/Off Ramps	Overall Intersection	20.2	C	0.61	0.85	Y	115	225 (WBLT)
25	Hayden Island Dr and Hayden Island Dr South	Overall Intersection	12.9	B	0.44	LOS D	Y	-	-
26	Hayden Island North Ramp Terminal - Center								
27	Hayden Island North Ramp Terminal - West								
28	Hayden Island North Ramp Terminal - East								
29	Hayden Island Drive and N Jantzen Drive								
30	Hayden Island Drive and Center Ave								
31	Hayden Island Drive and Jantzen Beach Center								
32	Tomahawk Island Drive and Jantzen Ave								
33	Jantzen Beach Center and Jantzen Dr								
34	Center Ave and Jantzen Ave								
35	Center Ave and New Central Road								
36	Hayden Island South Ramp Terminal - Center								
37	Hayden Island South Ramp Terminal - East								
38	Hayden Island South Ramp Terminal - West								
39	Vancouver Way and MLK on- and off-ramps								
40	Marine Drive and Anchor Way								
41	Union Court and Vancouver Way								

2030 No-Build (Alternative 1)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	Overall Intersection	93.6	F	0.99	LOS D	N	125	175 (EBL)
								125	150 (NBL)
								125	200 (SBL)
								125	175 (WBL)
02	Going and Interstate	Overall Intersection	65.2	E	0.84	LOS D	N	125	225 (NBL)
								125	250 (WBL)
03	Alberta and Interstate	Overall Intersection	38.8	D	0.94	LOS D	Y	125	225 (NBL)
								100	150 (SBL)
								965	1150 (NBTR)
04	Alberta and SB I-5 Off-Ramp	Overall Intersection	19.5	B	0.52	0.85	Y	75	125 (WBL)
								175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	Overall Intersection	17.3	B	0.74	0.85	Y	75	125 (EBL)
								175	175 (EBT)
06	Alberta and MLK Jr.	Overall Intersection	71.9	E	0.91	LOS D	N	100	200 (NBL)
								100	200 (SBL)
07	Portland and Interstate	Overall Intersection	36.3	D	0.75	LOS D	Y	100	200 (WBL)
								175	225 (NBL)
08	Portland and I-5 SB On-/Off Ramps	Overall Intersection	17.2	B	0.52	0.85	Y	125	175 (SWR)
09	Portland and I-5 NB On-/Off Ramps	Overall Intersection	9.3	A	0.40	0.85	Y	-	-
10	Portland and MLK Jr.	Overall Intersection	16.8	B	0.84	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	Overall Intersection	> 100	F	0.95	0.99	Y	100	200 (NBR)
								250	275 (SBL)
								150	250 (EBL)
								150	300 (WBL)
								225	300 (NBL)
								1150	1150 (EBTR)
12	Lombard and I-5 SB On-Ramps	Westbound Thru	7.6	A	0.56	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	14.9	B	0.55	0.85	Y	-	-
14	Lombard and MLK Jr.	Overall Intersection	> 100	F	0.99	0.99	Y	100	200 (EBL)
								100	200 (WBL)
								100	225 (NBL)
								150	250 (SBL)
								1320	1325 (SBTR)
								1730	1750 (EBTR)
15	Interstate and Argyle	Overall Intersection	> 100	F	0.63	LOS D	N	1300	1300 (EBLT)
								50	125 (NBL)
								125	125 (NBT)
								75	150 (EBR)
16	Columbia Blvd and I-5 Ramps	Overall Intersection	11.7	B	0.57	0.85	Y	-	-
17	Columbia Blvd and MLK Jr.	Overall Intersection	83.5	F	0.74	0.99	Y	350	450 (WBL)
								100	225 (NBL)
								225	400 (SBL)
								150	450 (EBR)
18	Victory and Expo Road	Southbound Left/Thru	76.6	F	0.45	LOS E	N	-	-
19	Victory Blvd and I-5 SB On-Ramp	Eastbound Thru	27.7	D	0.28	0.85	Y	75	75 (EBT)
20	Victory Blvd and NB On-/Off-Ramps	Overall Intersection	> 100	F	0.31	0.85	Y	290	775 (EBL)
								850	850 (WBT)
								200	225 (WBR)
21	Union Ct and I-5 NB Off-Ramp	Northbound Thru	> 100	F	0.20	0.85	Y	200	300 (EBL)
								1195	1550 (EBR)
22	Union Ct/Marine Way and Vancouver Way	Northeast Left/Thru	95.4	F	0.82	LOS E	N	75	200 (SBLTR)
								370	2500 (NBTL)
								370	2500 (NBTR)
								55	100 (SWL)
								55	150 (SWTR)
23	Marine Dr and I-5 On-/Off-Ramps	Overall Intersection	> 100	F	0.82	0.85	Y	275	400 (EBL)
								2130	2150 (EBT)
								373	2925 (WBR)
								200	1525 (NBLT)
24	Center Ave and I-5 SB On-/Off Ramps	Overall Intersection	24.8	C	0.80	0.85	Y	115	225 (WBLT)
								75	125 (WBR)
25	Hayden Island Dr and Hayden Island Dr South	Overall Intersection	69.8	E	0.67	LOS D	N	70	100 (WBLR)
								150	200 (SBL)
								820	825 (SBT)
26	Hayden Island North Ramp Terminal - Center								
27	Hayden Island North Ramp Terminal - West								
28	Hayden Island North Ramp Terminal - East								
29	Hayden Island Drive and N Jantzen Drive								
30	Hayden Island Drive and Center Ave								
31	Hayden Island Drive and Jantzen Beach Center								
32	Tomahawk Island Drive and Jantzen Ave								
33	Jantzen Beach Center and Jantzen Dr								
34	Center Ave and Jantzen Ave								
35	Center Ave and New Central Road								
36	Hayden Island South Ramp Terminal - Center								
37	Hayden Island South Ramp Terminal - East								
38	Hayden Island South Ramp Terminal - West								
39	Vancouver Way and MLK on- and off-ramps								
40	Marine Drive and Anchor Way								
41	Union Court and Vancouver Way								

2030 Replacement Bridge (Alternatives 2 and 3)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	Overall Intersection	77.5	E	0.98	LOS D	Y*	125	200 (EBL)
								125	200 (WBL)
								125	175 (NBL)
								125	225 (SBL)
02	Going and Interstate	Overall Intersection	66.0	E	0.83	LOS D	Y	125	175 (WBL)
								125	175 (NBL)
								300	450 (SBL)
								965	975 (SBTR)
03	Alberta and Interstate	Overall Intersection	37.3	D	0.90	LOS D	Y	125	200 (NBL)
								100	125 (SBL)
04	Alberta and SB I-5 Off-Ramp	Overall Intersection	16.3	B	0.56	0.85	Y	75	125 (WBL)
								175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	Overall Intersection	21.4	C	0.76	0.85	Y	75	125 (EBL)
								175	175 (EBT)
06	Alberta and MLK Jr.	Overall Intersection	21.1	C	0.88	LOS D	Y	100	200 (NBL)
								100	175 (SBL)
07	Portland and Interstate	Overall Intersection	77.1	E	0.77	LOS D	N	100	150 (EBL)
								100	225 (WBL)
								175	325 (NBL)
08	Portland and I-5 SB On-/Off Ramps	Overall Intersection	15.9	B	0.53	0.85	Y	125	150 (SWR)
09	Portland and I-5 NB On-/Off Ramps	Overall Intersection	15.0	B	0.54	0.85	Y	-	-
10	Portland and MLK Jr.	Overall Intersection	17.0	B	0.82	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	Overall Intersection	> 100	F	0.98	0.99	Y	150	250 (EBL)
								1150	1150 (EBTR)
								150	275 (WBL)
								225	300 (NBL)
								100	200 (NBR)
								250	350 (SBL)
12	Lombard and I-5 SB On-Ramps	Eastbound Thru/Right	4.7	A	0.54	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Overall Intersection	4.7	A	0.53	0.85	Y	-	-
14	Lombard and MLK Jr.	Overall Intersection	> 100	F	0.95	0.99	Y	100	200 (EBL)
								1730	1750 (EBTR)
								100	200 (WBL)
								100	200 (NBL)
								150	300 (SBL)
15	Interstate and Argyle	Overall Intersection	78.6	E	0.66	LOS D	Y*	75	150 (EBR)
								50	100 (NBL)
								125	125 (NBT)
16	Columbia Blvd and I-5 Ramps	Overall Intersection	15.1	B	0.62	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	Overall Intersection	47.5	D	0.85	0.99	Y	350	425 (WBL)
								100	225 (NBL)
								225	400 (SBL)
18	Victory and Expo Road	Southbound Left/Thru	8.0	A	0.44	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Eastbound Thru	0.2	A	0.31	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	Overall Intersection	9.1	A	0.40	0.85	Y	-	-
21	Union Ct and I-5 NB Off-Ramp								
22	Union Ct/Marine Way and Vancouver Way								
23	Marine Dr and I-5 On-/Off-Ramps	Overall Intersection	18.1	B	0.63	0.85	Y	-	-
24	Center Ave and I-5 SB On-/Off Ramps								
25	Hayden Island Dr and Hayden Island Dr South								
26	Hayden Island North Ramp Terminal - Center	Overall Intersection	15.6	B	0.39	0.85	Y	-	-
27	Hayden Island North Ramp Terminal - West	Overall Intersection	3.2	A	0.42	0.85	Y	-	-
28	Hayden Island North Ramp Terminal - East	Northbound Right	1.8	A	0.32	0.85	Y	-	-
29	Hayden Island Drive and N Jantzen Drive	Overall Intersection	15.1	B	0.40	LOS D	Y	-	-
30	Hayden Island Drive and Center Ave	Overall Intersection	11.6	B	0.45	LOS D	Y	-	-
31	Hayden Island Drive and Jantzen Beach Center	Overall Intersection	11.6	B	0.40	LOS D	Y	-	-
32	Tomahawk Island Drive and Jantzen Ave	Overall Intersection	19.1	B	0.56	LOS D	Y	-	-
33	Jantzen Beach Center and Jantzen Dr	Overall Intersection	10.3	B	0.50	LOS D	Y	-	-
34	Center Ave and Jantzen Ave	Overall Intersection	15.9	B	0.47	LOS D	Y	-	-
35	Center Ave and New Central Road	Southbound Left/Thru	10.7	B	0.67	LOS E	Y	-	-
36	Hayden Island South Ramp Terminal - Center	Overall Intersection	22.4	C	0.36	0.85	Y	-	-
37	Hayden Island South Ramp Terminal - East	Overall Intersection	9.4	A	0.32	0.85	Y	-	-
38	Hayden Island South Ramp Terminal - West	Overall Intersection	3.9	A	0.23	0.85	Y	-	-
39	Vancouver Way and MLK on- and off-ramps	Overall Intersection	8.3	A	0.35	0.85	Y	-	-
40	Marine Drive and Anchor Way	Overall Intersection	1.3	A	0.39	LOS D	Y	-	-
41	Union Court and Vancouver Way	Northbound Left	> 100	F	0.59	LOS E	N	-	-

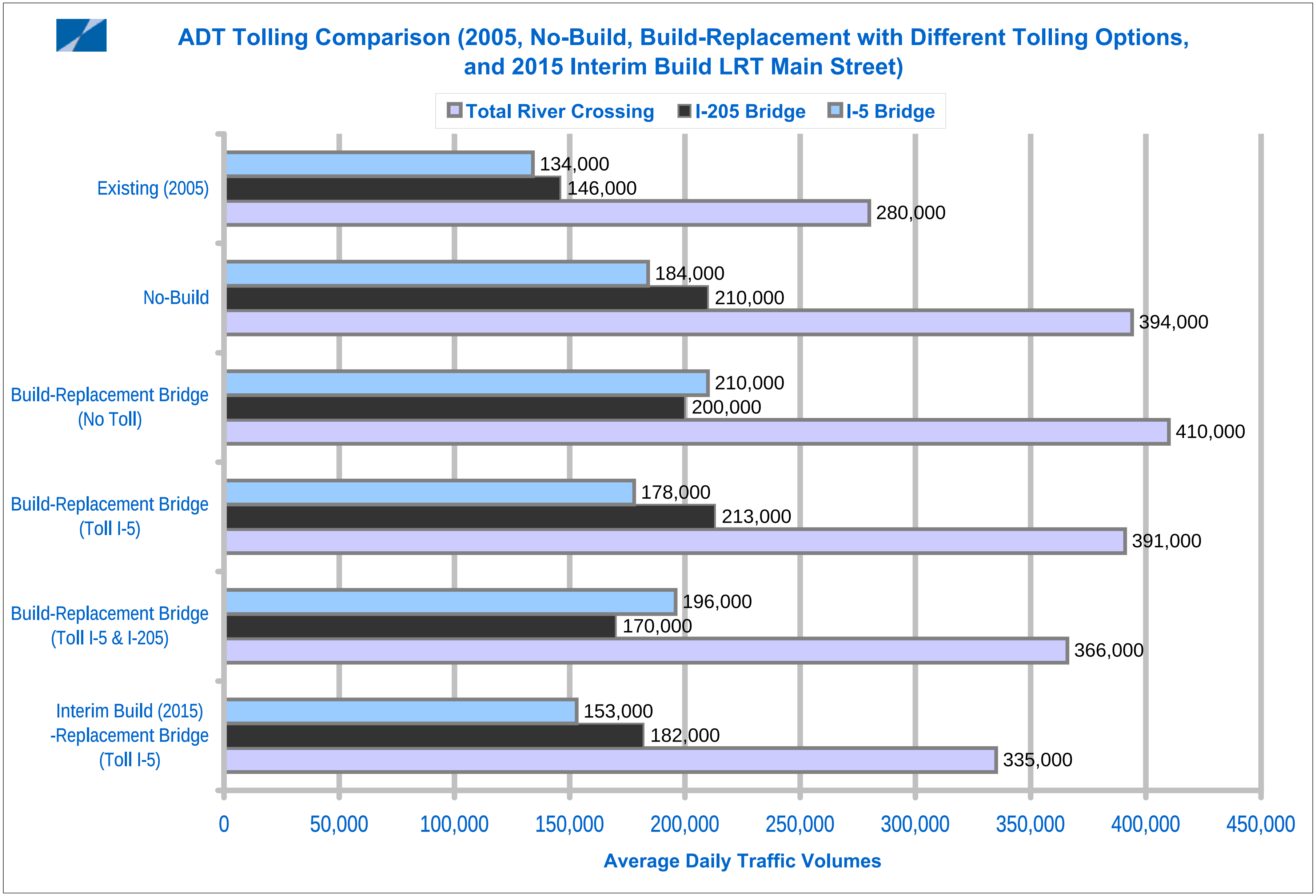
2030 Supplemental Bridge (Alternatives 4 and 5)

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	Overall Intersection	> 100	F	0.98	LOS D	Y*	125	150 (EBL)
								125	200 (WBL)
								125	175 (NBL)
								125	200 (SBL)
02	Going and Interstate	Overall Intersection	58.0	E	0.84	LOS D	Y*	355	425 (EBL)
								125	225 (WBL)
								125	175 (NBL)
								300	475 (SBL)
03	Alberta and Interstate	Overall Intersection	35.3	D	0.92	LOS D	Y	125	175 (NBL)
								100	125 (SBL)
04	Alberta and SB I-5 Off-Ramp	Overall Intersection	16.0	B	0.53	0.85	Y	75	125 (WBL)
								175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	Overall Intersection	15.8	B	0.70	0.85	Y	75	125 (EBL)
								175	175 (EBT)
06	Alberta and MLK Jr.	Overall Intersection	53.6	D	0.86	LOS D	Y	100	175 (NBL)
								100	150 (SBL)
07	Portland and Interstate	Overall Intersection	57.1	E	0.76	LOS D	N	100	125 (EBL)
								100	200 (WBL)
								175	300 (NBL)
08	Portland and I-5 SB On-/Off Ramps	Overall Intersection	15.1	B	0.52	0.85	Y	-	-
09	Portland and I-5 NB On-/Off Ramps	Overall Intersection	16.1	B	0.51	0.85	Y	-	-
10	Portland and MLK Jr.	Overall Intersection	19.4	B	0.83	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	Overall Intersection	> 100	F	1.07	0.99	N	150	250 (EBL)
								1150	1150 (EBTR)
								150	200 (WBL)
								225	300 (NBL)
								100	200 (NBR)
								250	350 (SBL)
12	Lombard and I-5 SB On-Ramps	Eastbound Thru/Right	5.0	A	0.55	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Overall Intersection	4.8	A	0.55	0.85	Y	-	-
14	Lombard and MLK Jr.	Overall Intersection	> 100	F	0.97	0.99	Y	100	175 (EBL)
								1730	1750 (EBTR)
								100	200 (WBL)
								100	200 (NBL)
								150	300 (SBL)
15	Interstate and Argyle	Overall Intersection	> 100	F	0.71	LOS D	Y**	1300	1300 (EBLT)
								75	150 (EBR)
								50	100 (NBL)
								125	125 (NBT)
16	Columbia Blvd and I-5 Ramps	Overall Intersection	15.1	B	0.62	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	Overall Intersection	39.9	D	0.84	0.99	Y	100	225 (NBL)
								225	350 (SBL)
18	Victory and Expo Road	Southbound Left/Thru	8.4	A	0.47	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Westbound Left/Thru	2.6	A	0.29	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	Overall Intersection	10.4	B	0.35	0.85	Y	-	-
21	Union Ct and I-5 NB Off-Ramp								
22	Union Ct/Marine Way and Vancouver Way								
23	Marine Dr and I-5 On-/Off-Ramps	Overall Intersection	10.3	B	0.60	0.85	Y	-	-
24	Center Ave and I-5 SB On-/Off Ramps								
25	Hayden Island Dr and Hayden Island Dr South								
26	Hayden Island North Ramp Terminal - Center	Overall Intersection	46.9	D	0.40	0.85	Y	1725	2250 (NBL)
27	Hayden Island North Ramp Terminal - West	Overall Intersection	21.6	C	0.41	0.85	Y	-	-
28	Hayden Island North Ramp Terminal - East	Westbound Thru	20.8	C	0.30	0.85	Y	-	-
29	Hayden Island Drive and N Jantzen Drive	Overall Intersection	13.2	B	0.40	LOS D	Y	-	-
30	Hayden Island Drive and Center Ave	Overall Intersection	> 100	F	0.44	LOS D	N	550	550 (EBT)
								250	300 (EBR)
31	Hayden Island Drive and Jantzen Beach Center	Overall Intersection	> 100	F	0.40	LOS D	N	650	875 (NBR)
32	Tomahawk Island Drive and Jantzen Ave	Overall Intersection	31.7	C	0.56	LOS D	Y	-	-
33	Jantzen Beach Center and Jantzen Dr	Overall Intersection	> 100	F	0.51	LOS D	N	-	-
34	Center Ave and Jantzen Ave	Overall Intersection	> 100	F	0.47	LOS D	N	150	175 (EBL)
								630	650 (EBT)
								710	725 (SBL)
35	Center Ave and New Central Road	Southbound Left/Thru	> 100	F	0.67	LOS E	N	575	575 (SBLT)
36	Hayden Island South Ramp Terminal - Center	Overall Intersection	> 100	F	0.39	0.85	Y	200	250 (EBL)
37	Hayden Island South Ramp Terminal - East	Overall Intersection	76.9	E	0.32	0.85	Y	250	350 (WBR)
38	Hayden Island South Ramp Terminal - West	Overall Intersection	> 100	F	0.23	0.85	Y	385	400 (EBT)
39	Vancouver Way and MLK on- and off-ramps	Overall Intersection	> 100	F	0.32	0.85	Y	1200	1200 (SBLT)
								150	325 (SBR)
40	Marine Drive and Anchor Way	Overall Intersection	29.4	C	0.37	LOS D	Y	-	-
41	Union Court and Vancouver Way	Westbound Left	> 100	F	0.44	LOS E	N	75	125 (EBR)
								450	625 (WBL)
								574	575 (WBT)

Delay / LOS affected by freeway congestion
Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1).
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 4-31


ADT Tolling Comparison (2005, No-Build, Build-Replacement with Different Tolling Options, and 2015 Interim Build LRT Main Street)
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
134,000
146,000
280,000
No-Build
184,000
210,000
394,000
Build-Replacement Bridge (No Toll)
210,000
200,000
410,000
Build-Replacement Bridge (Toll I-5)
178,000
213,000
391,000
Build-Replacement Bridge (Toll I-5 & I-205)
196,000
170,000
366,000
Interim Build (2015) -Replacement Bridge (Toll I-5)
153,000
182,000
335,000
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
Average Daily Traffic Volumes

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5. Affected Environment/Existing Conditions

5.1 Description of Existing Facilities

5.1.1 I-5 and I-205 Roadway System Inventory

Interstate 5 was evaluated for traffic performance and safety considerations from the city of Ridgefield in Clark County to the Marquam Bridge in downtown Portland. This 23-mile segment generally consists of three mainline through-lanes in each direction and includes 23 interchanges. Speed limits are 70 mph north of 179th Street, 60 mph between 179th Street and Mill Plain Boulevard, 50 mph from Mill Plain Boulevard to Marine Drive, 55 mph from Marine Drive to I-405, and 50 mph from I-405 to the Marquam Bridge.

The proposed project would rebuild I-5 within the 4.8-mile Bridge Influence Area. This area extends from the SR 500/39th Street interchange in Vancouver to near the Interstate Avenue/Victory Boulevard interchange in Portland. The following seven interchanges would be affected:

- SR 500/39th Street: A partially directional (SR 500) and diamond (39th Street) interchange configuration;
- Fourth Plain Boulevard: A diamond with one folded quadrant interchange configuration;
- Mill Plain Boulevard: A diamond interchange configuration;
- SR 14/City Center: A directional cloverleaf with flyover ramps;
- Hayden Island: Hook ramp interchange configuration;
- Marine Drive: Modified partial cloverleaf configuration; and
- Interstate Avenue/Victory Boulevard: A diamond interchange configuration.

In addition to I-5, traffic performance along a nine-mile segment of I-205 was evaluated. The segment extends from SR 500 in Vancouver to I-84 in Portland and consists of three mainline through-lanes in each direction, except across the Glenn Jackson Bridge, which has four lanes in each direction. There are seven interchanges along this segment of I-205 and the posted speed limit is 60 mph.

5.1.2 Local Streets

Seventy-three intersections in Vancouver and 25 intersections in Portland were studied to complement the analyses on I-5 and I-205. The study intersections were chosen based on discussions with WSDOT, ODOT, City of Vancouver, and City of Portland. The goal was to identify locations that might be potentially negatively or positively affected by the proposed project. An indexed list of Vancouver intersections studied is shown in **Exhibit 5-1**, followed by a corresponding map of the intersections in **Exhibit 5-2**. The indexed list of Portland intersections is shown in **Exhibit 5-3**, followed by a corresponding map of the intersections in **Exhibit 5-4**.

5.2 I-5 and I-205 Performance

This section summarizes existing performance for the I-5 and I-205 study areas. These data were collected in 2005.

5.2.1 Daily Traffic Levels

Average daily traffic volumes represent the average 24-hour weekday volume on a roadway segment. The I-5 bridges currently carry 135,000 vehicles each day. The I-205 Glenn Jackson Bridge, located six and one half miles to the east, carries 146,000 vehicles each day. **Exhibit 5-5** summarizes existing ADT volumes on the I-5 crossing, the I-205 crossing, and the total river crossing.

5.2.2 Traffic Demand – Vehicles

5.2.2.1 Peak Travel Patterns along I-5 in Bridge Influence Area

In 2005, the average length of a vehicle-trip using the I-5 crossing, from the beginning of the trip to the end of the trip, was about 20 miles during the morning and afternoon/evening peaks. However, the majority of vehicle trips across the Interstate Bridge use I-5 for only a short portion of their trip.

Vehicle license plate surveys were undertaken in 2005 to determine where peak direction vehicle trips across the Interstate Bridge enter and exit I-5. As shown in **Exhibit 5-6**, during the weekday morning peak, 25 percent of southbound traffic across the I-5 bridges traveled on I-5 from north of SR 500 to I-5 south of Columbia Boulevard. In other words, 75 percent of southbound morning traffic across the bridge entered or exited I-5 via a ramp in the Bridge Influence Area.

During the afternoon/evening peak, 32 percent of northbound traffic across the Interstate Bridge traveled on I-5 from south of Columbia Boulevard to I-5 north of SR 500, meaning that 68 percent of northbound afternoon/evening peak traffic across the bridge entered or exited I-5 via a ramp within the Bridge Influence Area (see **Exhibit 5-7**).

The 4.8-mile Bridge Influence Area provides connections to seven major roadways in both Vancouver and Portland. Peak period travel demand in I-5's study corridor, further discussed below, are the heaviest within the Bridge Influence Area due to the limited available crossings of the Columbia River and I-5's interface with key east-west highways and arterial roadways immediately north and south of the Columbia River. The high traffic demand, in combination with short spacing between on- and off-ramps, results in congested traffic conditions and safety issues.

5.2.2.2 Vehicle Demand on I-5

The terms “traffic demand” and “traffic throughput,” both used throughout this document, have different meanings. Traffic demand refers to the total number of motorists attempting to access the transportation system, including those caught in congestion. Traffic throughput is the total number of motorists actually able to travel through the transportation system. When traffic demand exceeds traffic throughput, traffic congestion occurs and some motorists are forced to take an alternate route or experience delay.

Current traffic volumes within the study area are typically at their highest on weekdays during the four-hour morning peak between 6 a.m. and 10 a.m. and during the four-hour afternoon/evening peak from 3 p.m. to 7 p.m. During the morning peak, southbound traffic demand is greatest, whereas northbound traffic demand is greatest during the afternoon/evening peak.

Exhibit 5-8 summarizes southbound I-5 morning peak traffic demand. Southbound traffic demand during the morning peak reaches 20,200 vehicles at the Interstate Bridge. This demand exceeds the capacity of I-5, resulting in substantial traffic congestion. Southbound traffic demand along the 23-mile study corridor ranges from a low of about 10,000 vehicles near Pioneer Street in Ridgefield to a high of over 23,000 vehicles north of the I-405 split in Portland.

Northbound traffic demand during the morning peak reaches 11,200 vehicles at the Interstate Bridge. Northbound traffic demand along the 23-mile corridor, shown in **Exhibit 5-9**, ranges from a low of about 5,000 vehicles near 139th Street in Vancouver to a high of just under 20,000 vehicles at the Marquam Bridge in Portland.

Southbound I-5 traffic demand is generally lower during the afternoon/evening peak than during the morning peak. Interstate Bridge traffic demand reaches 15,000 vehicles. **Exhibit 5-10** summarizes southbound peak traffic demand along the I-5 corridor, which ranges from a low of just under 10,000 vehicles near Pioneer Street in Ridgefield to a high of just under 20,000 vehicles north of the I-405 split in Portland.

Northbound I-5 traffic demand is substantially higher during the afternoon/evening peak than during the morning peak. Traffic demand at the Interstate Bridge reaches 21,400 vehicles, exceeding I-5’s capacity and resulting in substantial congestion, as discussed later in this chapter. Northbound traffic demand along the I-5 study corridor, as shown in **Exhibit 5-11**, ranges from a low of about 7,000 vehicles near 139th Street in Vancouver to a high of almost 24,000 vehicles near Fourth Plain Boulevard in Vancouver.

5.2.2.3 Vehicle Demand on I-205

Exhibit 5-12 shows southbound I-205 morning peak traffic demand. Demand is close to 8,000 vehicles north of SR 500, peaks near 13,000 vehicles at the I-205 Glenn Jackson Bridge, and decreases to 9,000 vehicles near I-84. **Exhibit 5-13** summarizes northbound I-205 morning peak traffic demand, which peaks at about 10,000 vehicles near I-84.

Exhibit 5-14 summarizes southbound I-205 afternoon/evening peak traffic demand, which is close to 6,000 vehicles at SR 500, decreases to 3,000 vehicles north of Mill Plain Boulevard, and then increases approaching the Glenn Jackson Bridge. Traffic demand continues to grow in Portland until Columbia Boulevard, then decreases approaching the I-84 interchange. Similar to I-5, northbound I-205 traffic demand is higher during the afternoon/evening peak than during the morning peak. As shown in **Exhibit 5-15**, northbound I-205 traffic demand peaks near 14,000 vehicles on the Glenn Jackson Bridge.

5.2.3 Traffic Demand – Truck Freight

The I-5 crossing is critical to national and international freight flow. I-5 serves direct international land connections to Mexico and Canada, and carries over ten million tons of freight to and from California. National, West Coast, and regional freight flows depend on the daily function of I-5 within the Bridge Influence Area.

The rapid increase in freight volumes, particularly those carried by trucks, is well recognized by the Oregon and Washington transportation plans. Oregon and Washington combined have a $350 billion economy and export goods valued at $45 billion per year. The six most freight-intensive industry sectors that are sensitive to transportation along Portland-Vancouver highways and rail corridors are wood and paper products, transportation equipment, steel, farm and food products, high technology, and distribution and wholesale trade. These industries account for approximately 70 percent of the commodity tonnage crossing the Columbia River via I-5 and I-205 on large trucks.

Truck trips are associated with certain industries. Manufacturing industries tend to produce and attract long-haul truck trips that originate over 250 miles from their destination. Manufacturers also attract and generate short-haul trips to and from ports and other local manufacturers. Wholesale industries, which distribute goods throughout the region, attract long-haul and short-haul truck trips, and generate the majority of local truck trips (fewer than 50 miles long). Retail industries are the primary attraction for local distribution truck trips generated by the wholesale industries.

The main sources of regional truck traffic are the Port of Portland, the Columbia Corridor industrial area, the Port of Vancouver, and the Columbia Industrial Park in Washington. **Exhibit 5-16** provides a corridor view of the relationship between truck trips and land uses that generate truck trips. The midday hourly truck volumes are compared to overall hourly volumes to illustrate that trucks prefer to travel during this time. The highest truck demand occurs in the vicinity of Columbia Boulevard and Marine Drive interchanges. In Washington, regional truck movements are highest by the SR 14 and Mill Plain Boulevard interchanges.

Interstate 5 is the primary truck route for local, regional, national, and international movement of goods through the Portland-Vancouver region. As shown in **Exhibit 5-17**, trucks carry 67 percent of all freight in the region today, twice as much freight in the Portland-Vancouver region than the other five modes (rail, ocean, barge, pipeline, and air) combined.

5.2.3.1 Oversized Loads

Trucks carry oversize loads on a daily basis through the Bridge Influence Area. Oversize loads are trucks carrying goods that cause them to be over-length, over-height, over-width, and/or over-weight. On highways and arterials, the primary limiting factor for oversize load route choice is vertical clearance.

Within the Bridge Influence Area there are unique and strategically important oversize load transport routes. For example, the Port of Vancouver currently generates over-length and over-height loads of wind turbines and wind turbine parts going to eastern Washington and Oregon wind energy farms. These shipments leave the Port of Vancouver on Mill Plain Boulevard, enter I-5 southbound, and exit to SR 14 eastbound. The Columbia Industrial Park generates oversize loads destined for the Port of Vancouver and to points north and south on I-5. These loads travel westbound on SR 14 towards I-5, access I-5 (northbound or southbound), and exit onto Mill Plain Boulevard. In Oregon, the high-volume oversize load activity occurs on I-5 and exits I-5 southbound at Marine Drive to access Martin Luther King Jr. Boulevard, or exits I-5 northbound at Columbia Boulevard to access the Columbia Corridor industrial area and the Port of Portland.

5.2.3.2 Freight Rail

Two Class I freight railroad mainlines pass through the Bridge Influence Area. As shown in **Exhibit 5-17**, freight rail carries 11 percent of the regional freight tonnage. The Union Pacific's (UP) Portland-to-Hinkle line passes under I-5 south of Columbia Boulevard. The UP railroad line also crosses over Columbia Boulevard on the west side of I-5. On the north side of the river, the Burlington Northern Santa Fe Railway's (BNSF) Columbia River route crosses over I-5 between the Columbia River and SR 14. The BNSF line serves the Port of Vancouver, the Port of Portland and points east and north. The BNSF owns and operates a double-tracked swing-span bridge over the Columbia River located approximately one mile downstream of the Interstate Bridge. Union Pacific has trackage rights on the BNSF Columbia River Bridge and on the BNSF mainline north to the Seattle area.

5.2.4 Effects of Congestion

5.2.4.1 Duration of Congestion on Southbound I-5

Travel speed and traffic congestion profiles were created to show travel speeds at different locations along the I-5 corridor at different times of day. The regional travel demand model provided four-hour morning (6–10 a.m.) and afternoon/evening (3–7 p.m.) travel forecasts. The forecast information was post-processed and input into the VISSIM traffic operations model to estimate travel speeds by location throughout the two peak periods. These data were summarized by 15-minute time increments to create an accurate picture of the beginning and end of congestion at each specific location.

Using the eight hours of VISSIM results, interpolation and extrapolation between and outside of these time periods was performed to develop 16-hour profiles. These profiles, encompassing the period from 5 a.m. to 9 p.m., assist in assessing early morning, midday, and afternoon/evening effects. The interpolation/extrapolation technique used non-peak period speed and travel time data collected for the CRC project, archived loop detector data, observations from highway cameras, and corridor speed plots available from the Oregon and Washington departments of transportation.

Exhibit 5-18 shows the existing conditions along southbound I-5 (y-axis) by time of day (x-axis). Different colors represent varying speeds, summarized by location. Red represents 0-10 mph, dark orange represents 11-20 mph, light orange represents 21-30 mph, yellow represents 31-40 mph, light green represents 41-50 mph, and dark green represents greater than 50 mph. Congestion is defined in this study as occurring when travel speeds are less than 30 mph.

As shown in **Exhibit 5-18**, under existing conditions I-5 undergoes a fairly regular operational cycle in both directions of travel during typical weekday conditions. In the morning peak congestion and queuing occur at four southbound locations: 1) I-5 crossing, 2) Delta Park lane drop, 3) north of the I-405 split, and 4) the Rose Quarter/I-84 off-ramp section. The queues are caused by capacity restrictions and disruptions in traffic flow due to inadequate merging, diverging, and weaving distances for vehicles. These bottlenecks interact with each other and control the flow throughput of upstream locations.

The Interstate Bridge is generally congested for 2 hours during the morning as a result of the bridge's limited capacity and the downstream Delta Park bottleneck. Three hours of congestion generally occur at Delta Park lane drop during the morning peak. About 2.5 hours of congestion occur north of the I-405 split due to high traffic demand within the three lane section north of the I-5/I-405 split.

During the afternoon/evening peak, southbound congestion and vehicular queuing occur at two bottleneck locations: 1) north of the I-405 split, and 2) the Rose Quarter/I-84 off-ramp section.

In addition, midday queuing and related congestion occurs at the Delta Park lane drop and Rose Quarter/I-84 off-ramp section. This queuing occurs independently of peak commute period congestion and lasts multiple hours throughout the day.

5.2.4.2 Duration of Congestion on Northbound I-5

Northbound I-5 experiences multiple hours of congestion along I-5 between Portland, Oregon and Ridgefield, Washington. **Exhibit 5-19** summarizes the duration of congestion for existing conditions between 5 a.m. and 9 p.m. During the afternoon/evening peak, northbound congestion and vehicular queuing occurs at two distinct locations: 1) Broadway Avenue on-ramp and I-405 off-ramp, and 2) the Interstate Bridge.

The Interstate Bridge bottleneck, which lasts for 4 hours, is more restrictive and extends longer than the Broadway/I-405 bottleneck, which lasts almost 2 hours. During the morning travel period, queuing occurs between the I-84 on-ramp and the I-405 off-ramp and extends for almost 2 hours.

5.2.5 Travel Times

5.2.5.1 Travel Times along I-5

Existing peak period travel times during the two-hour morning peak are summarized for southbound I-5 in **Exhibit 5-20**. The southbound travel time between SR 500 and Columbia Boulevard (5.2 miles) is 16 minutes and between 179th Street and I-84 (16.6 miles) is 31 minutes.

Travel times during the two-hour afternoon/evening peak are summarized for northbound I-5 in **Exhibit 5-21**. The northbound travel time Columbia Boulevard and SR 500 is 12 minutes and between I-84 and 179th Street is 38 minutes.

5.2.5.2 Travel Times along I-205

Existing peak period travel times during the two-hour morning peak are summarized for southbound I-205 in **Exhibit 5-22**. The southbound travel time between SR 500 and I-84 (10.6 miles) is 11 minutes. The Washington portion of this trip is six minutes between SR 500 and the midpoint on the Glenn Jackson Bridge; the Oregon portion is five minutes.

Northbound I-205 travel times during the two-hour afternoon/evening peak are summarized in **Exhibit 5-23**. The northbound travel time between I-84 and SR 500 is 14 minutes. The Oregon portion of this trip is eight minutes between I-84 and the midpoint of the Glenn Jackson Bridge; the Washington portion is six minutes.

5.2.6 Service Volumes – Vehicles

5.2.6.1 Vehicle Throughput (Served Volume) on Southbound I-5

In addition to the travel speed and traffic congestion profiles, served traffic volume and travel speed profiles were developed to show the different levels of throughput between alternatives, as shown in **Exhibits 5-24** and **5-25**. The previously identified constraints along I-5 limit the amount of vehicular demand that can be served along the corridor in the peak travel directions during the morning and afternoon/evening peaks. These diagrams were created to compare, on an hour-by-hour basis, traffic levels served along various locations of the highway corridor. Color codes, consistent with those used for the travel speed and traffic congestion profiles, illustrate average hourly travel speeds.

Exhibit 5-24 shows the existing levels of southbound vehicular throughput versus travel speeds along the 23-mile I-5 study corridor during the four-hour morning peak. As shown, the highest service volumes occur within the Bridge Influence Area during the early hours of the morning peak. Once congestion occurs at the previously identified four southbound bottlenecks, vehicle throughput and speeds deteriorate before recovering within the last hour of the morning peak.

5.2.6.2 Vehicle Throughput (Served Volume) on Northbound I-5

Exhibit 5-25 shows the existing levels of northbound vehicular throughput during the four-hour afternoon/evening peak. The highest service volumes occur within the Bridge Influence Area, with the highest vehicle throughput occurring on the fringes of the afternoon/evening peak. The northbound vehicle throughput reaches 20,500 vehicles at the Interstate Bridge.

5.2.7 Service Volumes – Trucks

The data and analysis of truck volumes include all medium and heavy trucks. The terms "medium" and "heavy" refer to the Federal Highway Administration's (FHWA) 13 truck type classification system. Medium trucks have three or four axles and a "tractor-trailer" configuration and are classified as Class 6 or 7. Heavy trucks have five or more axles in a tractor-trailer configuration, which may include more than one trailer. Heavy trucks are classified as Class 8, 9, 10, 11, 12, or 13.

Although I-5 carries less total daily traffic than I-205 across the Columbia River, the I-5 bridge carries about 3,200 (42 percent) more medium and heavy trucks per day than the I-205 bridge. This differential may be explained by a number of factors. During uncongested periods, regional truck through-trips typically remain on I-5 because it provides a shorter and faster route than I-205 (the travel distance on I-5 from the south I-205 junction to the north I-205 junction is 19.3 miles, while the travel distance between the two junctions on I-205 is 25.5 miles). Distance is a cost factor for a truck trip and includes the cost of truck operations, fuel, and travel time for the driver. During congested conditions some trucks avoid I-5 and divert to I-205.

Exhibit 5-26 presents the daily northbound and southbound volume of medium and heavy trucks on I-5 at several locations. The last pair of columns on the right of the exhibit shows I-205 on the Glenn Jackson Bridge for comparison.

Exhibit 5-26 shows that the highest truck volumes in the I-5 study area occur north of I-405 and between Lombard Street and Columbia Boulevard. Northbound volumes in these segments are higher than the southbound volumes. The daily truck volume between Lombard Street and Columbia Boulevard is 12 percent of all daily traffic at this location, and over the Interstate Bridge trucks constitute eight percent of all traffic.

Exhibit 5-27 shows the daily southbound hourly traffic volumes for general purpose and truck traffic over the Interstate Bridge. Traffic volumes across the Interstate Bridge are relatively similar between 6 a.m. and 6 p.m., except for the morning peak hours. Truck volumes are highest at midday during regular business hours, to take advantage of less congested highway conditions. On the Interstate Bridge, trucks make up between nine and ten percent of all traffic between 9 a.m. and 2 p.m. During the late evening and early morning hours, trucks constitute a much larger percentage of total highway traffic, reaching almost one quarter of all traffic at 2 a.m. The morning and afternoon/evening peaks have smaller truck shares of overall traffic.

Northbound hourly traffic volumes for general purpose and truck volumes are shown in **Exhibit 5-28**. Unlike the southbound direction, there are clearly higher volumes during the afternoon/evening peak period in the peak northbound commuting direction. Traffic volumes steadily increase from the early morning hours until 6 p.m. The late morning and midday hours between 8 a.m. and 1 p.m. experience truck percentages that exceed the daily average. Trucks constitute a large portion of traffic during the early morning hours, with more than one third of vehicles during the 4 a.m. hour. The volume of trucks relative to the total traffic volume is smaller during the afternoon/evening peak when congestion occurs and traffic speeds are slow, especially between 5 p.m. and 7 p.m.

Exhibit 5-29 presents medium and heavy truck volumes from 7 a.m. to 7 p.m. Approximately 42 percent of the daily truck volume travels between 9 a.m. and 3 p.m. when conditions are generally uncongested and travel times are more reliable for truck movement. Approximately 18 percent of the truck volume occurs during the afternoon/evening peak, from 3 p.m. to 7 p.m., when over 1,000 trucks travel northbound and 1,100 trucks travel southbound across the bridge. Almost 30 percent of daily truck travel across the I-5 bridges occurs during the late evening and early morning hours between 7 p.m. and 7 a.m.

5.2.8 Served vs. Unserved Ramp Volumes

5.2.8.1 Served vs. Unserved Ramp Volumes on Southbound I-5

Existing morning peak served versus unserved on-ramp volumes are summarized for southbound I-5 in **Exhibit 5-30**. The morning peak ramp demands are served at all southbound on-ramps within the I-5 Bridge Influence Area except for at the southbound SR 14/City Center on-ramp, which is estimated to have 600 unserved vehicles over the four-hour period.

5.2.8.2 Served vs. Unserved Ramp Volumes on Northbound I-5

Existing afternoon/evening peak served versus unserved on-ramp volumes are summarized for northbound I-5 in **Exhibit 5-31**. All of the northbound I-5 on-ramps within the Bridge Influence Area are able to serve the four-hour travel demand throughout the afternoon/evening peak.

5.2.9 Person Throughput

About 21,400 persons in vehicles and 1,500 persons in buses cross the I-5 bridge southbound during the morning peak. During the afternoon/evening peak, about 24,600 persons in vehicles and 1,200 persons in buses travel over the bridge northbound. **Exhibit 5-32** shows peak north and southbound person throughput across the I-5 bridges.

5.2.10 Safety

This section provides an overview of vehicular collision analysis conducted for the CRC Bridge Influence Area. Vehicular collision analyses were conducted to determine historic crash rates, crash types and severities, and to ascertain how existing non-standard highway geometrics, I-5 lift bridge operations, traffic volumes, and traffic congestion correlate with the highway corridor's crash history.

5.2.10.1 Number of Vehicular Collisions and Collision Rates

A review of motor vehicle collisions reported within and slightly outside the Bridge Influence Area was conducted. Collision data were obtained from both the Washington and Oregon departments of transportation for the five-year period from January 1, 2002, to December 31, 2006.

During the five-year period, 2,051 collisions were reported on the I-5 mainline and ramps within the Bridge Influence Area. There are no estimates available for the number of collisions that did not meet the criteria for crash reporting or were not reported for other reasons. There was an average rate of 1.12 reported collisions per day.

The standard transportation engineering method of reporting collision rates is in collisions per million vehicle-miles traveled (MVMT). The average collision rate for "urban city interstate highways" in Oregon during the five-year study period was 0.55 collisions per MVMT. The Washington State Department of Transportation does not calculate the average collision rate for urbanized interstate highways within the state.

The collision rate experienced on I-5 in the Oregon segment of the Bridge Influence Area, was 1.08 collisions per MVMT. The collision rate experienced in the Washington segment of the Bridge Influence Area was 1.02 collisions per MVMT. This is nearly twice the average rate (0.55 MVMT) experienced on similar urban interstate facilities in Oregon.

5.2.10.2 Vehicular Collisions by Type and Severity

The number, type, and severity of collisions reported during the five-year period were compiled and plotted by direction (northbound and southbound) in 0.1-mile increments on maps of I-5. Four collision types were reported: rear-end, side-swipe, fixed object, and other. Three severity types were reported: property damage only (PDO), injury, and fatality.

Exhibit 5-33 shows the total number and type of collisions reported within the Bridge Influence Area in Washington for each tenth of a mile segment and for the ramp sections. **Exhibit 5-34** shows the number and type of collisions reported within the Bridge Influence Area in Oregon for each tenth of a mile segment and ramp sections. A high percentage of the reported collisions occurred near the approaches to the Interstate Bridge on either side of Columbia River. Other notable collision locations in Washington included southbound I-5 at SR 14, between SR 500 and the Fourth Plain Boulevard interchange, and near the Mill Plain Boulevard interchange. In Oregon high collision locations were on Hayden Island, at Victory Boulevard, Columbia Boulevard and Lombard Street interchanges.

In Washington, the total of southbound collisions was nearly three times those northbound. Fifty-seven percent of these collisions were rear-ends and 15 percent were side-swipes. Southbound collisions were much higher than northbound collisions, reflecting recurrent southbound traffic congestion at and near the bridgehead to the Interstate Bridge.

In Oregon, northbound collisions were approximately double those southbound. Seventy-seven percent of these collisions were rear-ends and 13 percent were side-swipes. Northbound crashes were much higher than southbound crashes in Oregon, also reflective of high northbound congestion levels at and near the I-5 bridge bridgehead.

Exhibit 5-35 shows the number and severity of collisions reported within the Bridge Influence Area in Washington. **Exhibit 5-36** shows the number and severity of collisions reported within the Bridge Influence Area in Oregon. The majority of crashes were identified as PDO, and accounted for approximately 61 percent of the total. Injury crashes accounted for almost all the remainder of the crashes, or nearly 39 percent. Injury crashes were more prevalent in the peak direction of travel: southbound in Washington, northbound in Oregon.

Three fatalities occurred during the five-year crash study period between 2002 and 2006, representing 0.1 percent of all collisions. All three fatalities involved either a pedestrian or a bicyclist being struck by a vehicle or truck. Two of the three crashes occurred on southbound I-5 near the Interstate Bridge, one near the Hayden Island southbound on-ramp and one near the southbound SR 14 on-ramp. The third fatality occurred along northbound I-5 near the Victory Boulevard off-ramp.

5.2.10.3 Relationship of Vehicular Collisions to Highway Geometrics

While the highway and bridge design generally met design standards applicable at the time of their construction, vehicles have changed and standards have evolved over the years, reflecting continued research in areas such as vehicle operating characteristics, driver expectations, traffic flow theory, and physical highway elements.

The FHWA has designated 12 geometric controlling criteria that have a primary importance for safety. These criteria are: design speed, grade, lane width, stopping sight distance, shoulder width, cross-slope, bridge width, superelevation, horizontal alignment, horizontal clearance, vertical alignment, and vertical clearance.

The Washington and Oregon departments of transportation have developed geometric design standards related to each of the 12 controlling criteria. Their current design standards were compared to I-5 existing geometrics within the Bridge Influence Area. Particular emphasis was placed on the following elements, each related to one or more of the above criteria:

- Ramp-to-highway acceleration lane length;
- Highway-to-ramp deceleration lane length;
- Ramp-to-ramp separation length;
- Turning roadway – ramp merge;
- Turning roadway – ramp split;
- Highway vertical alignment;
- Highway horizontal alignment;
- Highway weaving area lane length; and
- Highway shoulder width.

Non-standard geometric features exist throughout the I-5 Bridge Influence Area, including short ramp merges/acceleration lanes, short ramp diverges/deceleration lanes, short weaving areas, vertical curves (crest and sag curves) limiting sight distance, and narrow shoulders. The greatest concentration of existing non-standard geometric features is located on the Interstate Bridge and along its approaches. Within this area, there are multiple existing non-standard features. **Exhibit 5-37** lists existing non-standard features on I-5 in the Bridge Influence Area and the degree to which the elements meet current design standards. An assessment was conducted along the entire five-mile Bridge Influence Area segment, which found the presence of 40 non-standard features.

Many ramps within the Bridge Influence Area do not provide standard acceleration or deceleration lane lengths and some weaving areas are also non-standard. Non-standard shoulder widths are prevalent throughout the Bridge Influence Area.

Based upon a comparison of the non-standard geometric features and reported collisions, there is a strong correlation between the presence of non-standard design features and the frequency and type of collisions.

For example, non-standard acceleration and deceleration lanes at several on- and off-ramps contribute to a high number of rear-end and side-swipe collisions along northbound I-5, particularly on Hayden Island, the downtown Vancouver/City Center off-ramp, and at SR 14. Along southbound I-5, non-standard acceleration and deceleration lanes contribute to a high number of rear-end and side-swipe collisions at Fourth Plain Boulevard, SR 14, on Hayden Island, and at the Victory Boulevard Interchange.

Existing non-standard weaving areas contribute to a high number of rear-end and side-swipe collisions along I-5, primarily southbound between SR 500 and Fourth Plain Boulevard, between Mill Plain Boulevard and SR 14, between Hayden Island and Marine Drive, and between Marine Drive and Victory Boulevard.

The distance between the SR 14 and City/Center off-ramps on the north end of the Interstate Bridge and other ramps in the Bridge Influence Area are below standard. The bridge's vertical alignment contains non-standard crest and sag curves which results in limited sight distance. The shoulders on the Interstate Bridge and other areas in the Bridge Influence Area are significantly below standards. All of these geometric elements contribute to the number of reported collisions near or at the Interstate Bridge.

5.2.10.4 Vehicular Collisions during Bridge Lifts and Traffic Stops

The I-5 crossing is equipped with two lift spans. Lifting the spans or stopping traffic for bridge maintenance (even when the span is not lifted) is allowed on weekdays between 9 a.m. and 2:30 p.m. and overnight between 6 p.m. and 6:30 a.m., and any time on weekends.

An analysis determined that the probability of collisions increases during bridge lifts and traffic stops. Logs obtained from ODOT's Maintenance Unit, which maintains and operates the I-5 crossing, include information on bridge lift/traffic stop dates, times and duration.

Using a five-year collision database (for years 2000-2004), a comparison was made between collisions that were reported to have occurred within a 1-hour window of logged bridge lifts/traffic stops on weekdays between 9 a.m. and 2:30 p.m. The analysis only considered collisions that involved vehicles approaching the bridge (i.e., northbound Oregon traffic or southbound Washington traffic) as bridge lifts/traffic stops directly impact approaching traffic.

Based on the results of the analysis, northbound collisions are three times more likely when a bridge lift or traffic stop occurs than when it does not. Southbound collisions are four times more likely. Collisions occurring during bridge lifts or traffic stops generally result in a higher rate of rear-end collisions and greater injury frequency than those collisions that occur during peaks, when lifts and traffic stops are not allowed.

5.2.10.5 Vehicular Collisions by Time of Day

The number and type of collisions reported in the I-5 Bridge Influence Area during the five-year period were sorted by hour and direction. **Exhibit 5-38** shows the number of collisions, by hour, reported along southbound I-5. **Exhibit 5-39** shows the number of collisions, by hour, reported along northbound I-5. Graphical curves depicting existing traffic counts on the Interstate Bridge were added to **Exhibit 5-38** and **Exhibit 5-39** to determine if a correlation exists between collision frequency and traffic volumes.

As shown in **Exhibit 5-38**, during periods when traffic is uncongested along southbound I-5, the number of reported collisions is generally proportional to prevailing traffic volumes. However, during periods of high traffic volumes and congestion, collisions increase faster than overall traffic volumes. Exhibit **5-39** shows similar results for northbound I-5. During congested periods the frequency of collisions is substantially higher than during uncongested periods. The frequency of collisions during the congested peak periods is about twice the proportion during uncongested traffic periods.

5.2.10.6 Identification of Safety Improvement Locations – Washington

The Washington State Department of Transportation uses two major programs to identify and correct potentially unsafe locations. These are the high accident location (HAL) and the high accident corridor (HAC) programs.

A HAL location is a spot location less than a mile long which has experienced a higher than average rate of severe accidents during the previous two years. Several factors are considered when determining if a location meets the HAL classification criteria. The severity of an accident, the severity per million vehicles, the roadway access category, and the accumulated severity rate per million vehicle miles are all taken into account when determining whether a location is a HAL.

A HAC is a section of state highway one or more miles long, which has a higher than average number of severe accidents over a continuous period of time. For the five-year analysis period, the following statewide benchmark averages are calculated for each of the six roadway access categories:

- Total severity points per mile.
- Total accidents per mile.

- Severity points per accident per mile.

Information provided by WSDOT revealed that within the study area of this project, the following five locations met the HAL criteria:

- The westbound SR 14 off-ramp to southbound I-5 on-ramp.
- The southbound I-5 off-ramp to eastbound SR 14 on-ramp.
- The southbound I-5 off-ramp to Mill Plain Boulevard.
- The southbound I-5 off-ramp to Fourth Plain Boulevard.
- 39th Street between the southbound and northbound ramp terminals.

All of these locations are ramp-related which supports the conclusion drawn from the crash analysis that there are safety issues with the ramps. There were no HAC locations identified within the study area of this project.

5.2.10.7 Identification of Safety Improvement Locations – Oregon

The Oregon Department of Transportation's Safety Priority Index System (SPIS) is the primary method for identifying high crash locations on state highways within Oregon. The SPIS score is based on three years of crash data and considers crash frequency, crash rate, and crash severity. ODOT bases its SPIS on 0.10 mile segments to account for variances in how crash locations are reported. To become a SPIS site, a location must meet one of the following criteria:

- Three or more crashes have occurred at the same location over the previous three years
- One or more fatal crashes have occurred at the same location over the previous three years

Each year, a list of the top 10 percent SPIS sites is generated and the top five percent of sites are investigated by the five Region Traffic manager's offices. These sites are evaluated and investigated for safety problems. If a correctable problem is identified, a benefit/cost analysis is performed and appropriate projects are initiated, often with funding from the Highway Safety Improvement Program.

A search of the ODOT 2004 to 2006 SPIS database revealed five locations (two overlap) within the Oregon section of the project area that ranked among the highest 10 percent in the state. These locations are summarized in **Exhibit 5-40**. Two of these locations are in the top five percent in the state and the other three are in the top 10 percent. ODOT does not include the interchange ramps and intersections in the calculations of SPIS rates for the highway.

5.2.10.8 Vehicular Collisions Involving Trucks

On average, truck collisions occur at a slightly higher rate than general purpose traffic throughout the I-5 corridor. A summary of truck-related collisions is presented in **Exhibit 5-41**. There are differences in nomenclature for trucks in Oregon and Washington.

Vehicles described as “semi tow, truck, or bobtail” in the ODOT database were counted as truck collisions. Vehicles described as “Truck Tractor, Truck Tractor & Semi-Trailer, Truck (Flatbed, Van, etc), Truck – Double Trailer Combinations, or Truck & Trailer” in the WSDOT database were counted as truck collisions.

Collisions involving trucks account for about 12 percent of all collisions reported on I-5 from Lombard Street to Main Street/Hwy 99, and are approximately equal to or higher than the proportion of truck volume to all traffic.

During the five-year study period in Oregon, 95 collisions involving trucks were reported. Forty-six percent occurred southbound and 54 percent occurred northbound. During the five-year study period in Washington, 160 collisions involved trucks. Seventy-two percent occurred southbound and 28 percent occurred northbound.

The rate of side-swipe collisions involving trucks is higher than any other type (39 percent). This could be attributed to the trucks attempting to change lanes in congested traffic as well as short acceleration/deceleration lanes and weaving sections in the Bridge Influence Area.

Locations with high numbers of truck-related collisions are the Columbia Boulevard ramps, Victory Boulevard ramps, Hayden Island, and the northbound exit to Marine Drive. The SR 14 westbound to I-5 southbound on-ramp, with its short turning radius, steep super-elevation, and uphill grade, likely contributes to the higher number of truck-related collisions at the bridge approach. Between 2002 and 2006, there were 13 reported collisions between I-5 mile post 0.39 and 0.30, immediately south of the SR 14 on-ramp.

5.3 Local Streets

This section summarizes existing local street performance for the peak hours of travel. Local street congestion is most intense near the I-5 ramps and is influenced by the travel direction and length of time that I-5 is congested each day.

5.3.1 Travel Demand

5.3.1.1 Vancouver Screenlines

Exhibit 5-42 displays existing conditions screenline data for the morning peak in Vancouver. Traffic in the Vancouver central city is highest near I-5. Commuters travel to the highway from neighborhoods north and east of the downtown area. Vehicular traffic heads to the Vancouver city core from I-5 as well as the western and northern parts of Vancouver and Clark County. The west side of I-5 experiences larger volumes than the east side of the highway.

The largest northbound and southbound traffic volumes cross Fourth Plain Boulevard and Mill Plain Boulevard/15th Street, two of the major east-west thoroughfares in Vancouver. During the morning peak, volumes are highest southbound as motorists travel to the Vancouver Central Business District (CBD). Some commuters exit I-5 near Main Street and travel southbound along Vancouver arterials to avoid congestion on I-5. This diverted traffic, combined with local traffic destined for the Vancouver CBD, can overload certain north/south arterials. In general, given the trip attraction rate of the Vancouver CBD, traffic volumes are higher closer to downtown.

Exhibit 5-43 displays existing conditions screenline data for the afternoon/evening peak in Vancouver. Traffic volumes are highest for eastbound movements near I-5 as vehicles leave downtown during the afternoon/evening. The majority of vehicles exiting I-5 at Mill Plain Boulevard and Fourth Plain Boulevard contribute to the higher eastbound volumes split.

I-5 is not generally congested during the northbound afternoon/evening peak. Free flow conditions attract motorists from the Vancouver CBD who access I-5 from Mill Plain Boulevard and Fourth Plain Boulevard instead of using the north/south Vancouver arterials as in the morning peak. This contributes to a more even distribution of north and southbound volumes along Vancouver arterials during the afternoon/evening peak. Traffic volumes are highest in the heart of downtown and decrease further north as vehicles turn off arterials to access neighborhoods via local streets.

5.3.1.2 Portland Screenlines

Exhibit 5-44 displays existing conditions screenline data for the morning peak in Portland. Volumes are highest throughout the study area for westbound movements, especially east of I-5. In particular, traffic volumes across Martin Luther King Jr. Boulevard show a strong trend towards westbound movements, as commuters travel from eastern parts of the city towards the downtown area. Southbound travel is heavier than northbound and the north/south split widens closer to downtown Portland.

Exhibit 5-45 displays existing condition screenline data for the afternoon/evening peak in Portland. Travel across the screenlines is more balanced than the morning peak. The widest disparity between eastbound and westbound movements exists across the Denver Avenue and Martin Luther King Jr. Boulevard screenlines. Northbound traffic is heavier than southbound. Similar to the morning peak, the disparity between northbound and southbound traffic is highest near Alberta Street, and the gap narrows farther north. As motorists leave the arterial network to access neighborhood streets, northbound volumes drop, leading to an almost even split of arterial traffic near the Columbia Slough.

5.3.2 Intersection Service Levels

5.3.2.1 Vancouver – Morning and Afternoon/Evening Peak Hours

5.3.2.1.1 SR 14/City Center Interchange Area

The SR 14/City Center interchange area consists of 33 study intersections, bound by the following area as shown in **Exhibit 5-46**:

- The Columbia River to the south;
- 11th Street to the north;
- Esther Street to the west; and
- I-5 to the east.

During the morning and afternoon/evening peak hours, all 33 intersections perform at acceptable service levels and meet the City of Vancouver's standard of LOS E for downtown intersections. **Exhibits 5-47** and **5-48** list the intersection operations of all 33 intersections during the morning and afternoon/evening peak hours.

During the morning peak hour, several intersections experience traffic that backs up into upstream intersections. At the entrance to the I-5 southbound and SR 14 westbound on-ramps at Fifth Street and Washington Street, queues extend north on Washington Street. Main Street and Evergreen Boulevard experience queuing during both the morning and afternoon/evening peaks which result in vehicular queues extending into upstream intersections. The list of intersections with queues that exceed storage or backup into upstream intersections can be seen in **Exhibit 5-47** and **Exhibit 5-48**.

5.3.2.1.2 Mill Plain Boulevard Interchange Area

The Mill Plain Boulevard interchange area consists of the following 16 study intersections as shown in **Exhibit 5-49**:

- Mill Plain Boulevard at Columbia Street (Vancouver);
- Mill Plain Boulevard at Washington Street (Vancouver);
- Mill Plain Boulevard at Main Street (Vancouver);
- Mill Plain Boulevard at Broadway (Vancouver);
- Mill Plain Boulevard at C Street (Vancouver);
- Mill Plain Boulevard at I-5 southbound on- and off-ramps (WSDOT);
- Mill Plain Boulevard at I-5 northbound on- and off-ramps (WSDOT);
- 15th Street at Columbia Street (Vancouver);
- 15th Street at Washington Street (Vancouver);
- 15th Street at Main Street (Vancouver);
- 15th Street at Broadway (Vancouver);
- 15th Street at C Street (Vancouver);
- McLoughlin Boulevard at Columbia Street (Vancouver);
- McLoughlin Boulevard at Main Street (Vancouver);
- McLoughlin Boulevard at Broadway (Vancouver); and
- McLoughlin Boulevard at Fort Vancouver Way (Vancouver).

During the morning and afternoon/evening peak hours, all 16 intersections meet the City of Vancouver's level-of-service standard and perform acceptably. **Exhibit 5-47** and **Exhibit 5-48** list the intersection operations of all 16 intersections during the morning and afternoon/evening peak hours.

During the morning peak hour, the intersection of Mill Plain Boulevard at Main Street often experiences vehicular queues that extend beyond its southbound left-turn lane, resulting in blockage of some upstream intersections. In addition, I-5 highway congestion backs into the southbound ramp terminal at Mill Plain Boulevard. As a result, this intersection experiences vehicular queues that extend beyond its eastbound right-turn and westbound left-turn pockets.

During the afternoon/evening peak hour, the Mill Plain diamond interchange experiences eastbound vehicular queuing at the northbound ramp terminal, which extends west through the southbound ramp terminal. The queuing results from the significant traffic volume which originates from the downtown area and travels north to access I-5 at Mill Plain Boulevard. The intersection of 15th Street and Broadway experiences vehicular queues that extend beyond its westbound left lane, resulting in blockage of some westbound through movements.

5.3.2.1.3 Fourth Plain Boulevard Interchange Area

The Fourth Plain Boulevard interchange area consists of the following 14 study intersections as shown in **Exhibit 5-50**:

- 24th Street at Columbia Street (Vancouver);
- 24th Street at Main Street (Vancouver);
- Fourth Plain Boulevard at Columbia Street (Vancouver);
- Fourth Plain Boulevard at Main Street (Vancouver);
- Fourth Plain Boulevard at Broadway (Vancouver);
- Fourth Plain Boulevard at F Street (Vancouver);
- Fourth Plain Boulevard at I-5 southbound on- and off-ramps (WSDOT);
- Fourth Plain Boulevard at I-5 northbound on- and off-ramps (WSDOT);
- Fourth Plain Boulevard at Post Cemetery (Vancouver);
- Fourth Plain Boulevard at St. Johns Boulevard (Vancouver);
- 28th Street at Main Street (Vancouver);
- 28th Street at Broadway (Vancouver);
- 29th Street at Main Street/Broadway (Vancouver); and
- 33rd Street at Main Street (Vancouver).

During the morning and afternoon/evening peak hours, all but one of the 14 intersections perform at acceptable service levels and meet Vancouver’s standard of LOS D for signalized or LOS E for unsignalized intersections. The intersection of 28th Street at Main Street does not meet the level-of-service standard during the morning peak hour and performs at LOS F on the stop-controlled approach of 28th Street. During the afternoon/evening peak hour, the intersection of 28th Street at Main Street performs acceptably. **Exhibits 5-47** and **5-48** list the operations of all 14 intersections during the morning and afternoon/evening peak hours.

Fourth Plain Boulevard at Main Street experiences westbound vehicular queuing that extends through the intersection with F Street in the morning peak hour. Southbound traffic in the morning peak also experiences queues that extend into upstream intersections.

During the afternoon/evening peak hour, queuing in the vicinity of the Fourth Plain Boulevard interchange area is often substantial for both northbound and westbound traffic, resulting in some intersection blockage. The intersection of 33rd Street at Main Street often experiences vehicular queues that extend beyond its eastbound and westbound left-turn lanes, resulting in blockage of some through movements.

5.3.2.1.4 SR 500/Main Street/39th Street Interchange Area

The SR 500/Main Street/39th Street interchange area consists of the following ten study intersections as shown in **Exhibit 5-51**:

- 39th Street at Main Street (Vancouver);
- 39th Street at F Street (Vancouver);
- 39th Street at H Street (Vancouver);
- 39th Street at I-5 southbound on- and off-ramps (WSDOT);
- 39th Street at I-5 northbound on- and off-ramps (WSDOT);
- WSDOT/40th Street at Main Street (Vancouver);
- 45th Street at Main Street (Vancouver);
- Hazel Dell at Main Street (Vancouver);
- Ross Street at Main Street (Clark County); and
- Ross Street at North Road (Clark County).

During the morning and afternoon/evening peak hours, nine of the ten study area intersections perform at acceptable service levels. The intersection of 39th Street at the I-5 southbound ramp terminal does not meet Vancouver’s unsignalized LOS E standard during the morning peak hour. During the afternoon/evening peak hour, the intersection of 39th Street at F Street does not meet the unsignalized LOS E standard. **Exhibit 5-47** and **Exhibit 5-48** list the operations of all ten intersections during the morning and afternoon/evening peak hours.

During the morning peak hour, vehicles near the 39th Street interchange experience queues that extend beyond the left-turn lanes on all approaches at Main Street. The westbound vehicular queues extend into the intersection of 39th Street at F Street. The intersection of 39th Street at the I-5 ramp terminal often experiences vehicular queues on the northbound approach, resulting in queues of approximately 600 feet.

During the afternoon/evening peak hour, vehicles near the 39th Street at Main Street often experience queues that extend beyond the left-turn lanes on all approaches. The westbound vehicular queues extend into the intersection of 39th Street at H Street. The intersection of 39th Street at the I-5 northbound and southbound ramp terminals often experiences vehicular queues on the northbound approaches.

5.3.2.2 Portland – Morning and Afternoon/Evening Peak Hours

5.3.2.2.1 Hayden Island Interchange Area

The Hayden Island interchange area consists of the following two study intersections as shown in **Exhibit 5-52**:

- Center Avenue and I-5 southbound on- and off-ramps (ODOT); and
- Hayden Island Drive and Hayden Island Drive South (Portland, closest signalized intersection to northbound on- and off-ramps).

During the morning and afternoon/evening peak hours, Center Avenue and the I-5 southbound ramp terminal perform at an acceptable service level and meet ODOT’s 0.85 V/C ratio standard for ramp terminals. During morning and afternoon/evening peak hours, Hayden Island Drive and Hayden Island Drive South perform at an acceptable service level and meet Portland’s intersection standard of LOS D. **Exhibits 5-53** and **5-54** list the operations of both intersections during the morning and afternoon/evening peak hours.

During the afternoon/evening peak hour, the westbound left turn at the Hayden Island southbound ramp terminal often experiences vehicular queues that extend beyond its left-turn pocket, resulting in queuing that sometimes extends into the deceleration area of the highway off-ramp.

5.3.2.2.2 Marine Drive Interchange Area

The Marine Drive interchange area consists of the following three study intersections as shown in **Exhibit 5-55**:

- Union Court and I-5 northbound off-ramp (ODOT);
- Marine Drive and I-5 on- and off-ramps (ODOT); and
- Union Court/Marine Way and Vancouver Way (Portland).

During the morning peak hour, all three of the intersections perform at acceptable service levels and meet ODOT’s 0.85 V/C ratio standard or Portland’s unsignalized intersection standard of LOS E. Afternoon/evening highway congestion from I-5 northbound causes increased delay during the afternoon/evening peak hour along Marine Drive on both the east side and west side of the interchange. However, all intersections perform at acceptable service levels. **Exhibit 5-53** lists the intersection operations of the three intersections during the morning peak hour.

During the afternoon/evening peak hour, the I-5 northbound ramp meter affects the Marine Drive ramp terminal and the Union Court at Vancouver Way intersection. The on-ramp queue extends past the ramp and then east across the highway overpass. As a result, several left- and right-turn lanes at these three locations experience queues that are longer than the available storage lengths and extend through upstream intersections.

However, all intersections operate at an acceptable service level. **Exhibit 5-54** lists the intersection operations of the three intersections during the afternoon/evening peak hour.

5.3.2.2.3 Victory Boulevard Interchange Area

The Victory Boulevard interchange area consists of the following four study intersections as shown in **Exhibit 5-56**:

- Interstate Avenue at Argyle Street (Portland);
- Victory Boulevard at Expo Road (Portland) ;
- Victory Boulevard at southbound on-ramp (ODOT); and
- Victory Boulevard at northbound on-ramp (ODOT).

During the morning and afternoon/evening peak hours, all four of the intersections operate at acceptable service levels and meet ODOT's 0.85 V/C ratio standard or Portland's intersection standard of LOS D or E. **Exhibits 5-53** and **5-54** lists the intersection operations of the four intersections during the morning and afternoon/evening peak hours.

During the afternoon/evening peak hour, the Victory Boulevard northbound ramp terminals experience vehicular queues caused by northbound highway congestion on I-5, resulting in blockage of some eastbound left-turning vehicles at the intersection. However, the intersection operates at an acceptable level-of-service. The list of intersections with queues that exceed storage or backup into upstream intersections can be seen in **Exhibits 5-53** and **5-54**.

5.3.2.2.4 Interstate Avenue Analysis Area

The Interstate Avenue analysis area consists of the following four study intersections as shown in **Exhibit 5-57**:

- Going Street at Interstate Avenue (Portland);
- Alberta Street at Interstate Avenue (Portland);
- Rosa Parks Way at Interstate Avenue (Portland); and
- Lombard Street at Interstate Avenue (ODOT).

During the morning and afternoon/evening peak hours, all four of the intersections operate at acceptable service levels and meet either Portland's standard of LOS D or ODOT's 0.99 V/C ratio standard. **Exhibits 5-53** and **5-54** list the intersection operations of the four intersections during the morning and afternoon/evening peak hours.

The lists of intersections with queues that exceed storage or backup into upstream intersections are also shown in **Exhibits 5-53** and **5-54**. Going Street often experiences vehicular queues that extend beyond its westbound and northbound left-turn pockets. Alberta Street often experiences vehicular queues that extend beyond its southbound and northbound left-turn pockets. Rosa Parks Way (Rosa Parks Way) experiences vehicular queues that extend beyond its westbound and northbound left-turn pockets. Lombard

Street also experiences vehicular queues that extend beyond its westbound and northbound left-turn pockets.

5.3.2.2.5 Martin Luther King Jr. Boulevard Analysis Area

The Martin Luther King Jr. Boulevard analysis area consists of the following five study intersections as shown in **Exhibit 5-57**:

- Fremont Street at Martin Luther King Jr. Boulevard (Portland);
- Alberta Street at Martin Luther King Jr. Boulevard (Portland);
- Rosa Parks Way (Portland Boulevard) at Martin Luther King Jr. Boulevard (Portland);
- Lombard Street at Martin Luther King Jr. Boulevard (ODOT); and
- Columbia Boulevard at Martin Luther King Jr. Boulevard (ODOT).

During the morning and afternoon/evening peak hours, all intersections perform at acceptable service levels and meet either Portland's standard of LOS D or ODOT's 0.99 V/C ratio standard. **Exhibits 5-53** and **5-54** list the intersection operations during the morning and afternoon/evening peak hours.

Exhibits 5-53 and **5-54** list intersections with queues that exceed storage or backup into upstream intersections. Fremont Street often experiences vehicular queues that extend beyond its left-turn pockets on all approaches. Alberta Street experiences queues that extend beyond its left-turn pockets on all approaches except for the eastbound approach. Rosa Parks Way experiences vehicular queues that extend beyond its northbound left-turn pocket. Lombard Street sees vehicular queues that extend beyond its left-turn pockets on all approaches. Columbia Boulevard experiences vehicular queues that extend beyond its left-turn pockets on all approaches except for the eastbound approach.

5.3.2.2.6 I-5 Ramp Terminals Analysis Area

The I-5 Ramp Terminals analysis area consists of the following seven study intersections as shown in **Exhibit 5-57**:

- Alberta Street at the I-5 southbound ramp terminal (ODOT);
- Alberta Street at the I-5 northbound ramp terminal (ODOT);
- Rosa Parks Way at the I-5 southbound ramp terminal (ODOT);
- Rosa Parks Way at the I-5 northbound ramp terminal (ODOT);
- Lombard Street at the I-5 southbound ramp terminal (ODOT);
- Lombard Street at the I-5 northbound ramp terminal (ODOT); and
- Columbia Boulevard at I-5 ramp terminal (ODOT).

During morning and afternoon/evening peak hours, all intersections perform at acceptable service levels and meet ODOT's 0.85 V/C ratio standard. **Exhibits 5-53** and **5-54** list the operations during the morning and afternoon/evening peak hours.

Exhibits 5-53 and **5-54** list intersections with queues that exceed storage or backup into upstream intersections. At the Alberta Street southbound ramp terminal, westbound traffic queues extend through the northbound ramp terminal during the morning peak. At the Rosa Parks Way southbound ramp terminal during the morning peak hour, westbound left-turning vehicular queues exceed the available storage. For both peaks, westbound right-turning vehicular queues exceed the available storage at the Columbia Boulevard and I-5 ramp terminal.

5.4 Pedestrian and Bicycle Circulation

5.4.1 Existing Circulation System

Pedestrians and bicyclists often experience challenging conditions when crossing the Columbia River on the I-5 bridges. The width of the shared-use pedestrian and bicycle facility on the I-5 Interstate Bridge is substandard (generally no wider than 4 feet) and separated from traffic by substandard low barriers (in Washington and Oregon, engineering standards state that shared-use paths should be a minimum of 14 feet wide). The mixing of pedestrians and bicycles in this narrow facility can cause safety problems. Pedestrians and bicyclists are exposed to high noise levels, exhaust, and debris. The grades on the bridge create high downhill speeds for bicyclists and difficult uphill climbs for some pedestrians and bicyclists.

There exist, direct pedestrian and bicycle connections to the Marine Drive area on the east and west sides of I-5. In Vancouver, direct connections provide access to the downtown Vancouver area; however, pedestrian and bicycle connections between Vancouver, Hayden Island, and Marine Drive are circuitous and require users to navigate local street intersections. For example, no connection exists for pedestrians or bicyclists wanting to stay on the west side of the bridge between Hayden Island and Marine Drive.

On the south side of the Columbia River, connections to the large Portland bikeway network exist via Marine Drive to the west and east, Martin Luther King Jr. Boulevard to the southeast and Expo Road to the south. Directional way-finding signing can be confusing or non-existent in some places. Furthermore, the paths connecting the crossing to the larger bikeway network are narrow and place bicyclists close to high speed traffic, which includes a high percentage of heavy vehicles.

Exhibit 5-58 illustrates existing and planned multi-use trails and bicycle lanes in the vicinity of the Interstate Bridge.

5.4.2 Travel Demand

Pedestrian and bicycle volumes across the Columbia River were measured by conducting counts at four locations: (1) shared-use pathway entrance to the I-205 Glenn Jackson Bridge near NE Airport Way in Portland, (2) the east pathway to the I-5 bridgehead on the Oregon side of the Columbia River, (3) the west pathway to the I-5 bridgehead on the Oregon side of the Columbia River, and (4) the shared-use pathway on the east side of the I-5 Oregon Slough Bridge.

Exhibit 5-59 displays the river crossing results by direction of travel, time of day and by mode. A combined total of 566 trips were logged during the 14-hour period at the three river crossing locations. There were a total of 198 trips over the I-205 Glenn Jackson Bridge, or approximately 35 percent of the total river crossings. The remaining 368 trips used the two pathways on the I-5 Interstate Bridge. Of these trips, 237 or 64 percent, traveled across the Interstate Bridge on the wider, west side pathway. There were 131 trips that made use of the east side pathway. It should be noted that the data was collected during the Portland-Vancouver area's Bike Commute Challenge, an annual month-long local contest that promotes bicycle usage. Average daily traffic conditions are likely to be less than the volumes observed during the count day.

Pedestrian and bicycle trip activity is similar to vehicular traffic in that travel over the bridge is heavier in the southbound direction during the morning and in the northbound direction during the afternoon/evening. The morning peak hour for pedestrian and bicycle travel occurs between 7 and a.m.. The afternoon/evening peak occurs between 5 and 7 p.m.. There does not appear to be a midday peak.

Bicyclists constitute a majority of travelers between the two non-motorized modes, accounting for 87 percent of the total trips. A total of 188 bicycle trips were made on the I-205 Glenn Jackson Bridge, or 38 percent of the total bicycle river crossings. Ten pedestrian trips, or 14 percent of the overall total pedestrian crossings, were conducted on the I-205 crossing. For the I-5 Interstate Bridge, 65 percent of bicycle trips and 61 percent of pedestrian trips were conducted on the west side pathway. There were 20 percent more trips northbound than in the southbound direction.

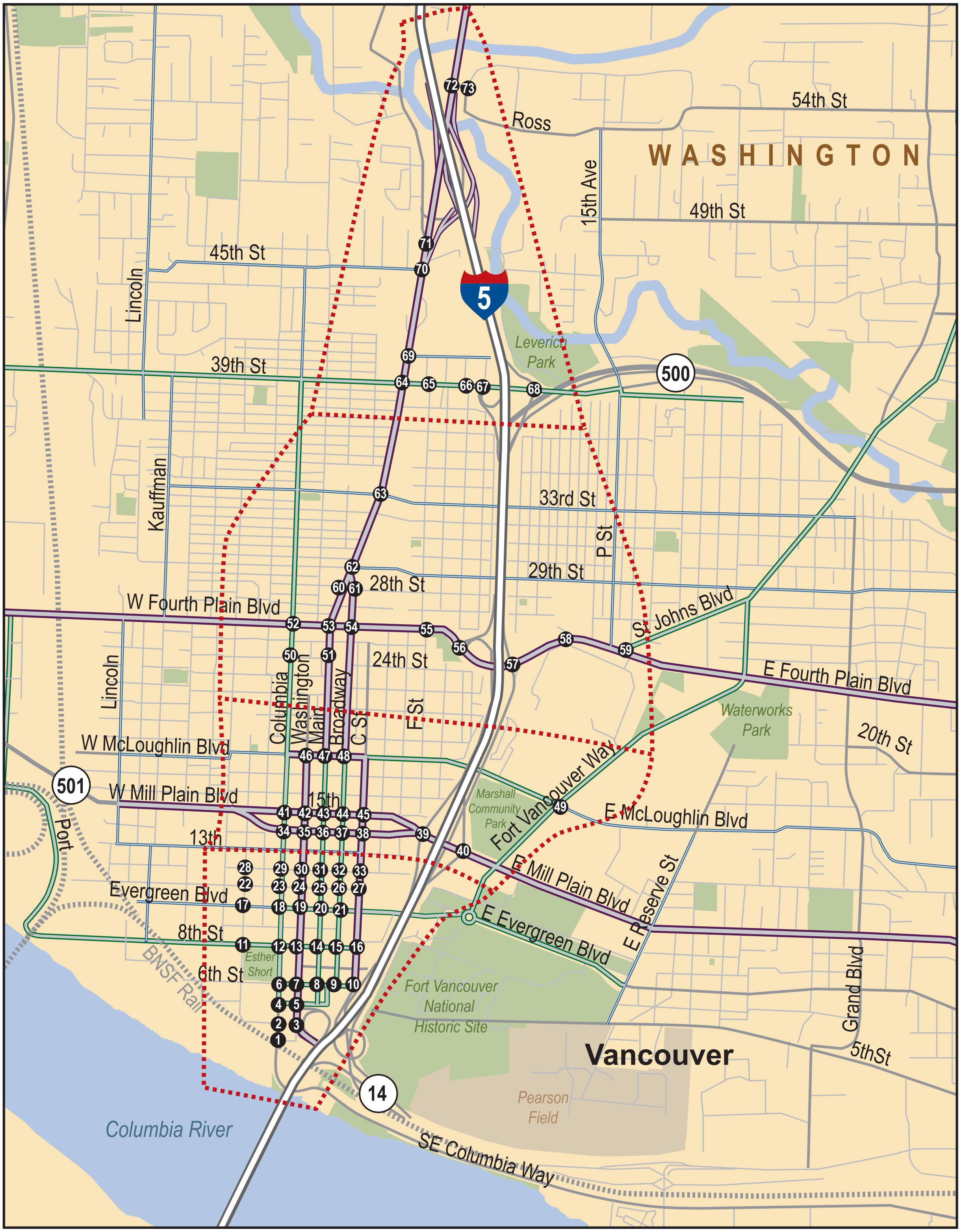
5.4.3 Existing Issues

Exhibit 5-60 highlights and lists several existing pedestrian and bicycle issues related to pedestrian and bicycle circulation in the vicinity of the Interstate Bridge. Many of the concerns are related to substandard facilities: narrow pathways, low traffic barriers, low clearances and steep grades. Pedestrians and bicyclists must travel close to vehicular traffic, where they are exposed to noise, exhaust and debris. Directional signage can be confusing or non-existent in some places.

Exhibit 5-1

Vancouver Analysis Intersections			
#	**Intersection**	**#**	**Intersection**
01	3rd/4th St. and Columbia St	38	Mill Plain Blvd. and C St.
02	4th St. and Columbia St.	39	Mill Plain Blvd. and I-5 SB On-/Off-Ramps
03	4th St. and Washington St.	40	Mill Plain Blvd. and I-5 NB On-/Off-Ramps
04	5th St. and Columbia St.	41	15th St. and Columbia St.
05	5th St. and Washington St.	42	15th St. and Washington St.
06	6th St. and Columbia St.	43	15th St. and Main St.
07	6th St. and Washington St.	44	15th St. and Broadway
08	6th St. and Main St.	45	15th St. and C St.
09	6th St. and Broadway	46	McLoughlin Blvd. and Columbia St.
10	6th St. and C St.	47	McLoughlin Blvd. and Main St.
11	8th St. and Esther St.	48	McLoughlin Blvd. and Broadway
12	8th St. and Columbia St.	49	McLoughlin Blvd. and Fort Vancouver Way
13	8th St. and Washington St.	50	24th St. and Columbia St.
14	8th St. and Main St.	51	24th St. and Main St.
15	8th St. and Broadway	52	4th Plain Blvd. and Columbia St.
16	8th St. and C St.	53	4th Plain Blvd. and Main St.
17	9th St. and Esther St.	54	4th Plain Blvd. and Broadway
18	9th St. and Columbia St.	55	4th Plain Blvd. and F St.
19	9th St. and Washington St.	56	4th Plain Blvd. and I-5 SB On-/Off-Ramps
20	9th St. and Main St.	57	4th Plain Blvd. and I-5 NB On-/Off-Ramps
21	9th St. and Broadway	58	4th Plain Blvd. and Post Cemetery
22	Evergreen Blvd. and Esther St.	59	4th Plain Blvd. and St. Johns Blvd.
23	Evergreen Blvd. and Columbia St.	60	28th St. and Main St.
24	Evergreen Blvd. and Washington St.	61	28th St. and Broadway
25	Evergreen Blvd. and Main St.	62	29th St. and Main St./Broadway
26	Evergreen Blvd. and Broadway	63	33rd St. and Main St.
27	Evergreen Blvd. and C St.	64	39th St. and Main St.
28	11th St. and Esther St.	65	39th St. and F St.
29	11th St. and Columbia St.	66	39th St. and H St.
30	11th St. and Washington St.	67	39th St. and I-5 SB On-/Off-Ramps
31	11th St. and Main St.	68	39th St. and I-5 NB On-/Off-Ramps
32	11th St. and Broadway	69	WSDOT/40th St. and Main St.
33	11th St. and C St.	70	45th St. and Main St.
34	Mill Plain Blvd. and Columbia St.	71	Hazel Dell and Main St. (West)
35	Mill Plain Blvd. and Washington St.	72	Ross St. and Main St.
36	Mill Plain Blvd. and Main St.	73	Ross St. and North Rd.
37	Mill Plain Blvd. and Broadway		

Exhibit 5-2



Parametrix 273-3012-004

N

0 MILES 0.5

Principal Arterial
Minor Arterial
Collector
1 Intersection Analyzed
Sub-areas

Exhibit
Interchange Sub-areas in Washington

Columbia River CROSSING

Exhibit 5-3

Portland Analysis Intersections	
#	**Intersection**
01	Fremont and MLK Jr.
02	Going and Interstate
03	Alberta and Interstate
04	Alberta and SB I-5 Off-Ramp
05	Alberta and NB I-5 Off-Ramp
06	Alberta and MLK Jr.
07	Portland and Interstate
08	Portland and I-5 SB On-/Off Ramps
09	Portland and I-5 NB On-/Off Ramps
10	Portland and MLK Jr.
11	Lombard and Interstate
12	Lombard and I-5 SB On-Ramps
13	Lombard and I-5 NB Off-Ramps
14	Lombard and MLK Jr.
15	Interstate and Argyle
16	Columbia Blvd and I-5 Ramps
17	Columbia Blvd and MLK Jr.
18	Victory and Expo Road
19	Victory Blvd and I-5 SB On-Ramp
20	Victory Blvd and NB On-/Off-Ramps
21	Union Ct and I-5 NB Off-Ramp
22	Union Ct/Marine Way and Vancouver Way
23	Marine Dr and I-5 On-/Off-Ramps
24	Center Ave and I-5 SB On-/Off Ramps
25	Hayden Island Dr and Hayden Island Dr South

Exhibit 5-4

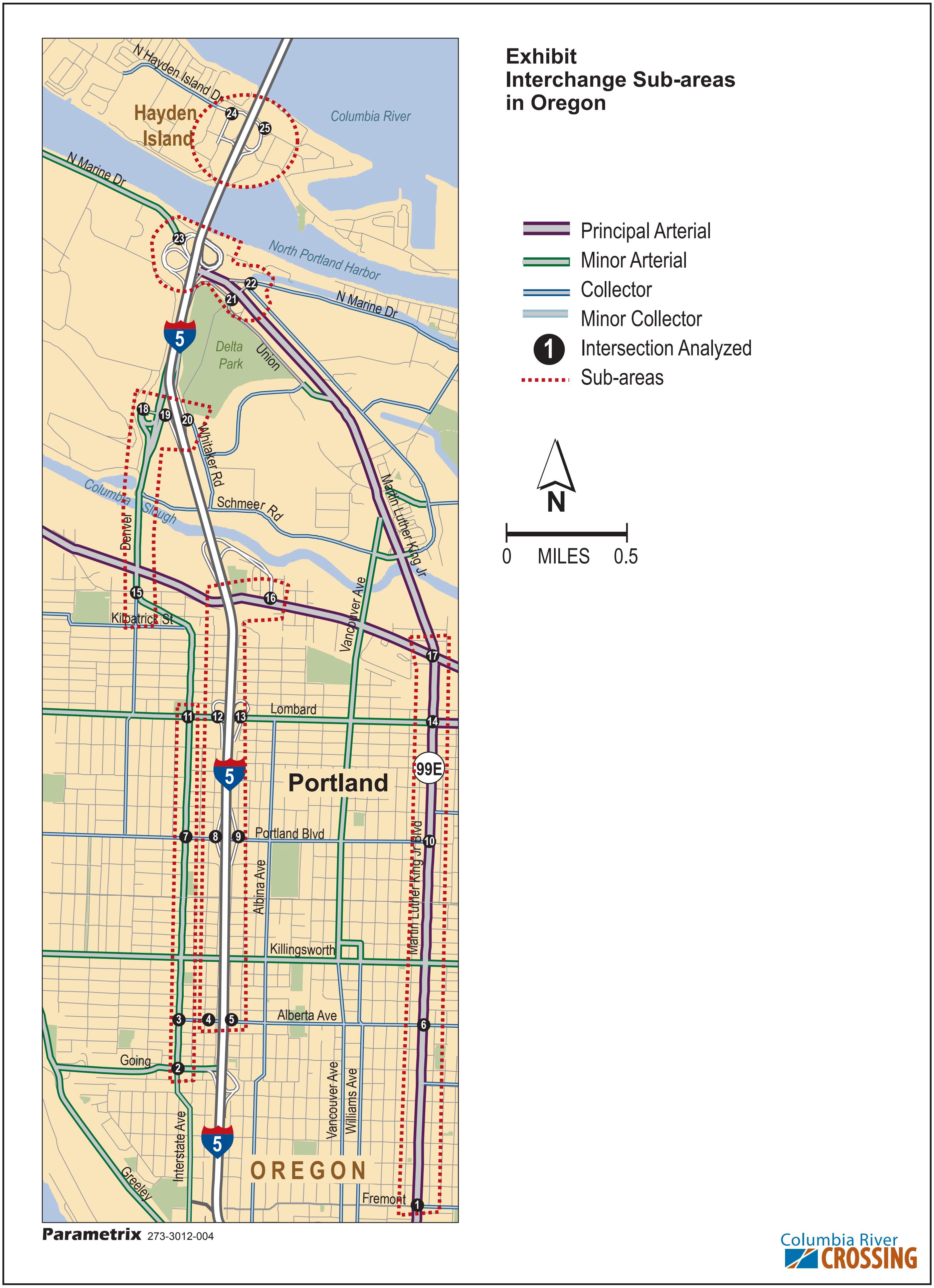


Exhibit
Interchange Sub-areas
in Oregon
Principal Arterial
Minor Arterial
Collector
Minor Collector
Intersection Analyzed
Sub-areas
N
0 MILES 0.5
N Hayden Island Dr
Hayden Island
Columbia River
N Marine Dr
North Portland Harbor
N Marine Dr
Delta Park
Union
Whitaker Rd
Schmeer Rd
Columbia Slough
Denver
Martin Luther King Jr
Vancouver Ave
Kilpatrick St
Lombard
Portland
99E
Portland Blvd
Albina Ave
Martin Luther King Jr Blvd
Killingsworth
Alberta Ave
Going
Interstate Ave
Vancouver Ave
Williams Ave
Greeley
OREGON
Fremont
5
Parametrix 273-3012-004
Columbia River CROSSING

Exhibit 5-5

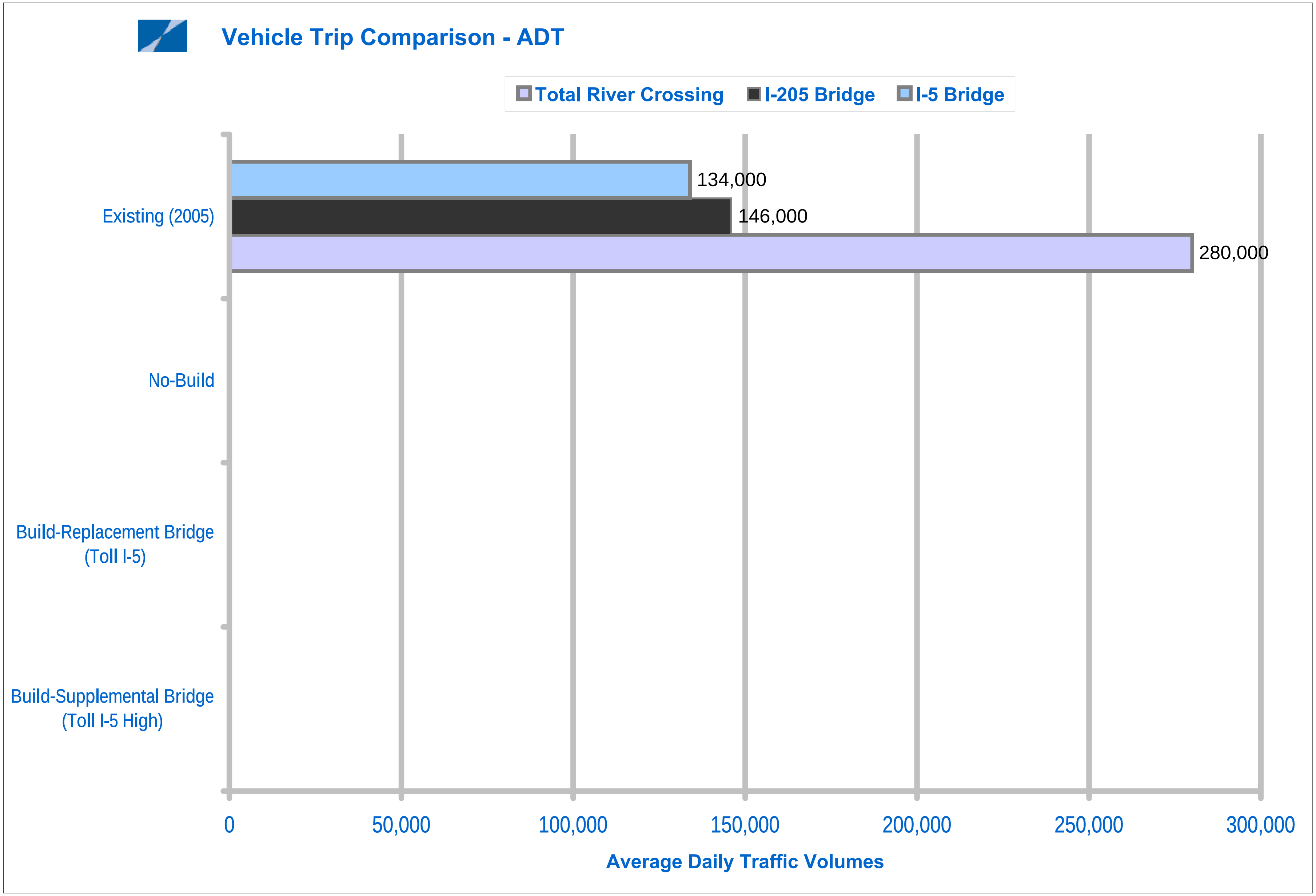

Vehicle Trip Comparison - ADT
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
No-Build
Build-Replacement Bridge (Toll I-5)
Build-Supplemental Bridge (Toll I-5 High)
134,000
146,000
280,000
0
50,000
100,000
150,000
200,000
250,000
300,000
Average Daily Traffic Volumes

Exhibit 5-6

Southbound Vehicle Trips within BIA (2005)

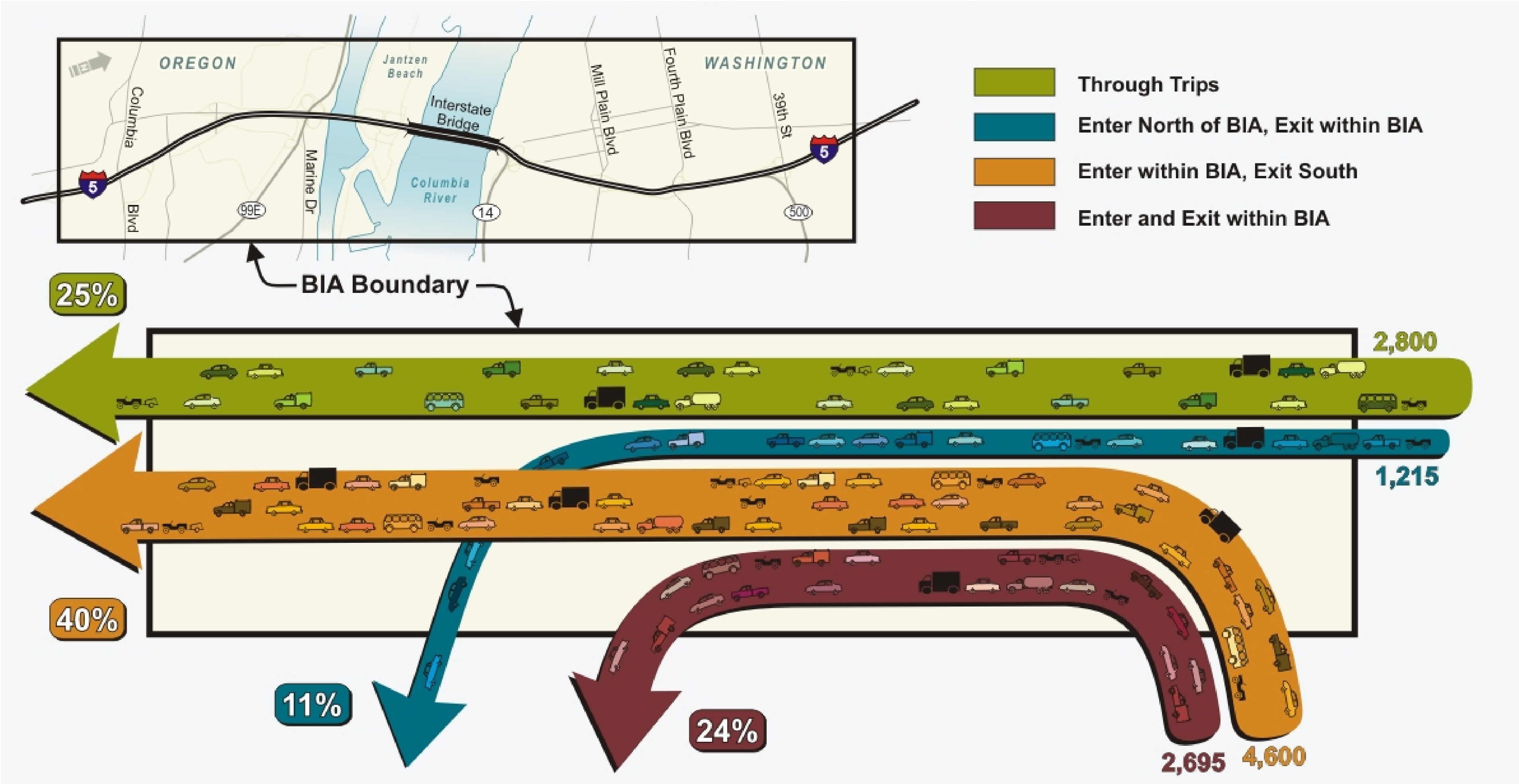


Exhibit 5-7

Northbound Vehicle Trips within BIA (2005)

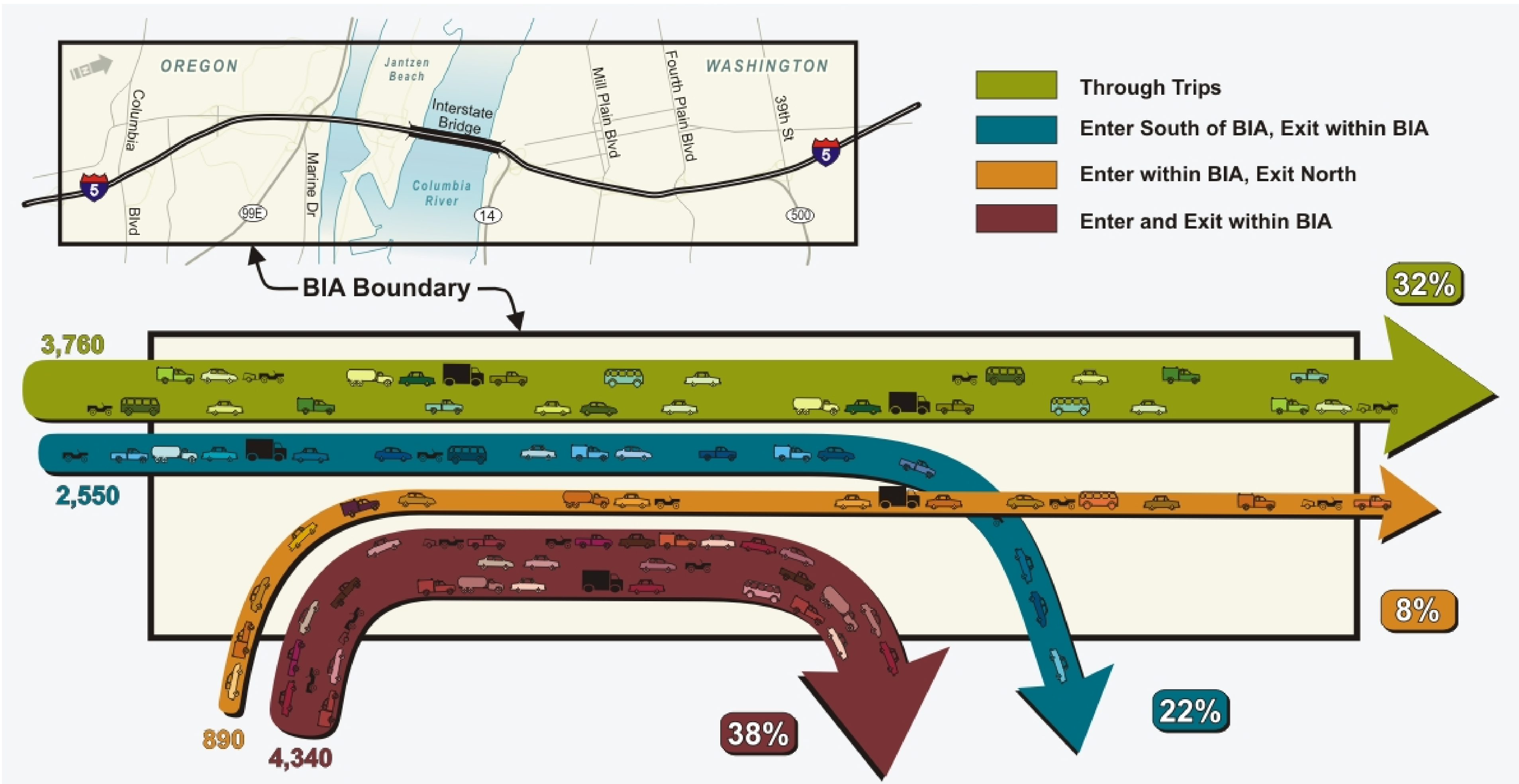
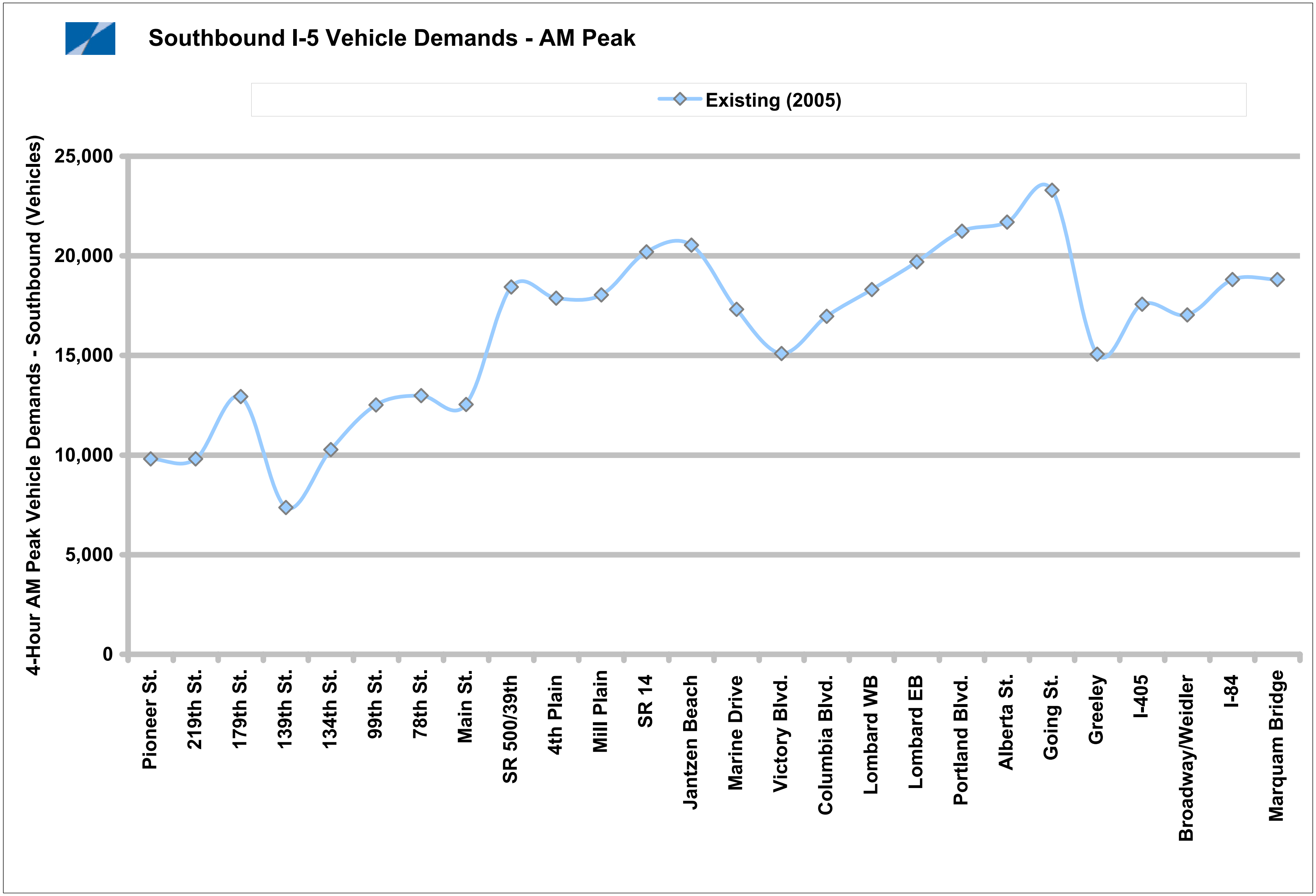
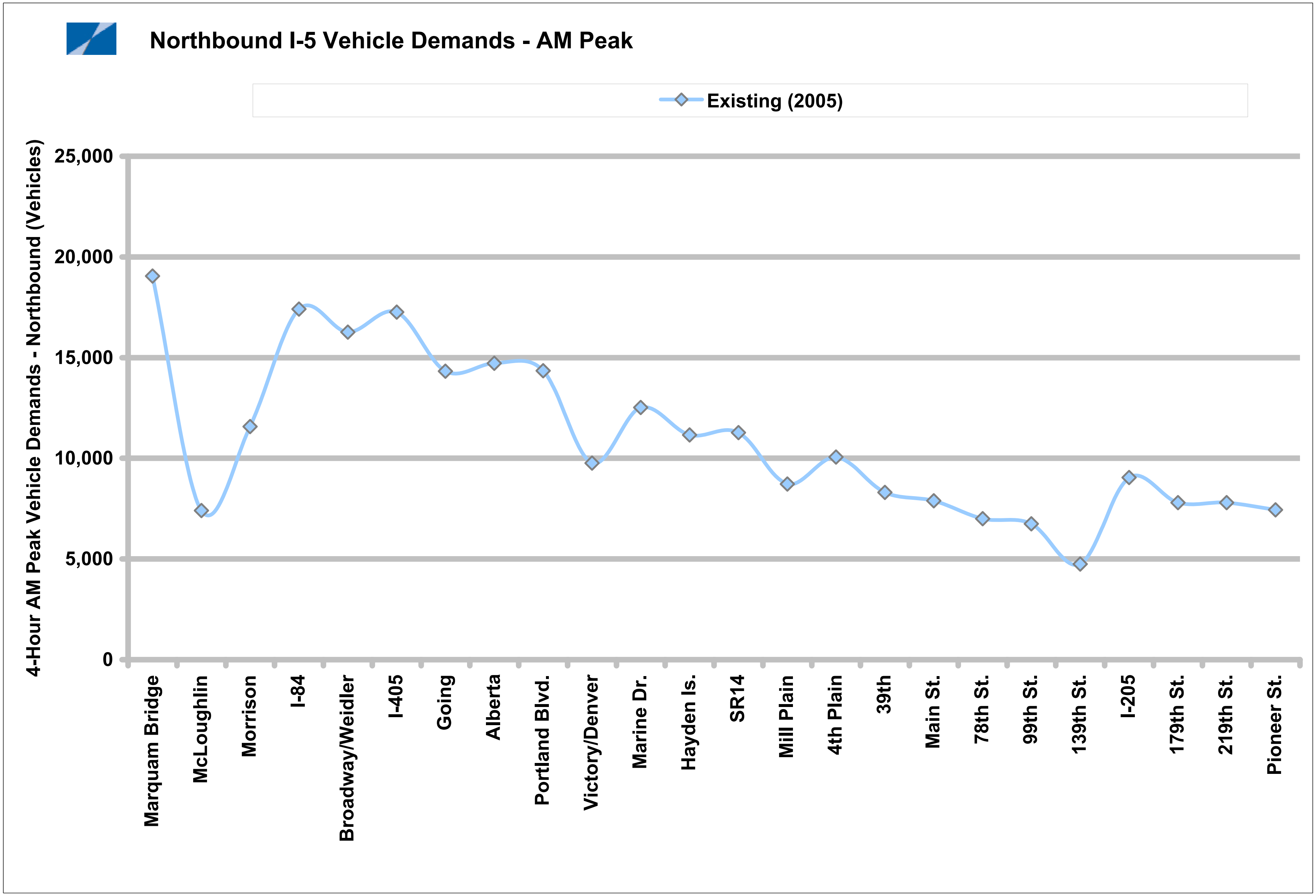


Exhibit 5-8



Southbound I-5 Vehicle Demands - AM Peak
Existing (2005)
4-Hour AM Peak Vehicle Demands - Southbound (Vehicles)
25,000
20,000
15,000
10,000
5,000
0
Pioneer St.
219th St.
179th St.
139th St.
134th St.
99th St.
78th St.
Main St.
SR 500/39th
4th Plain
Mill Plain
SR 14
Jantzen Beach
Marine Drive
Victory Blvd.
Columbia Blvd.
Lombard WB
Lombard EB
Portland Blvd.
Alberta St.
Going St.
Greeley
I-405
Broadway/Weidler
I-84
Marquam Bridge

Exhibit 5-9



Northbound I-5 Vehicle Demands - AM Peak
Existing (2005)
4-Hour AM Peak Vehicle Demands - Northbound (Vehicles)
25,000
20,000
15,000
10,000
5,000
0
Marquam Bridge
McLoughlin
Morrison
I-84
Broadway/Weidler
I-405
Going
Alberta
Portland Blvd.
Victory/Denver
Marine Dr.
Hayden Is.
SR14
Mill Plain
4th Plain
39th
Main St.
78th St.
99th St.
139th St.
I-205
179th St.
219th St.
Pioneer St.

Exhibit 5-10

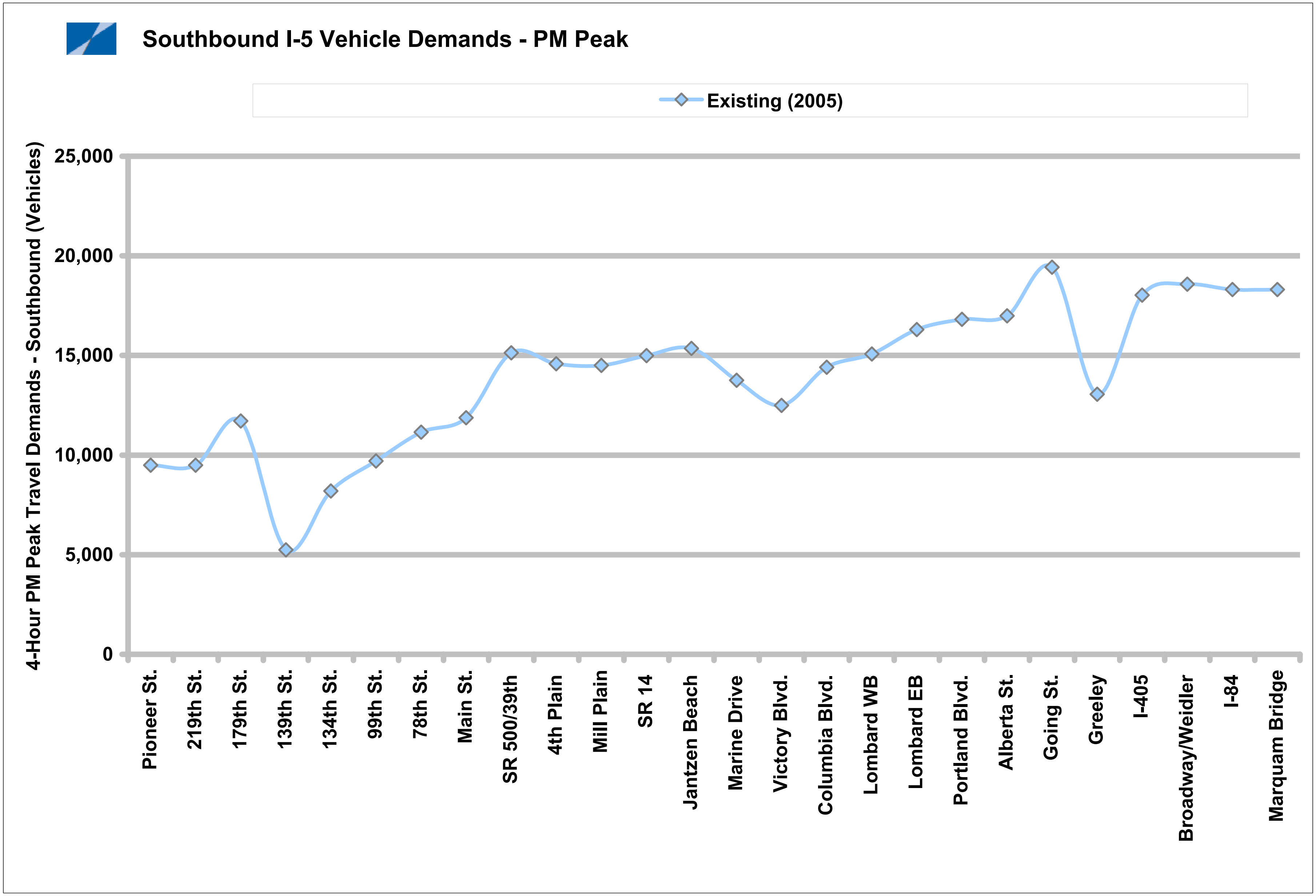
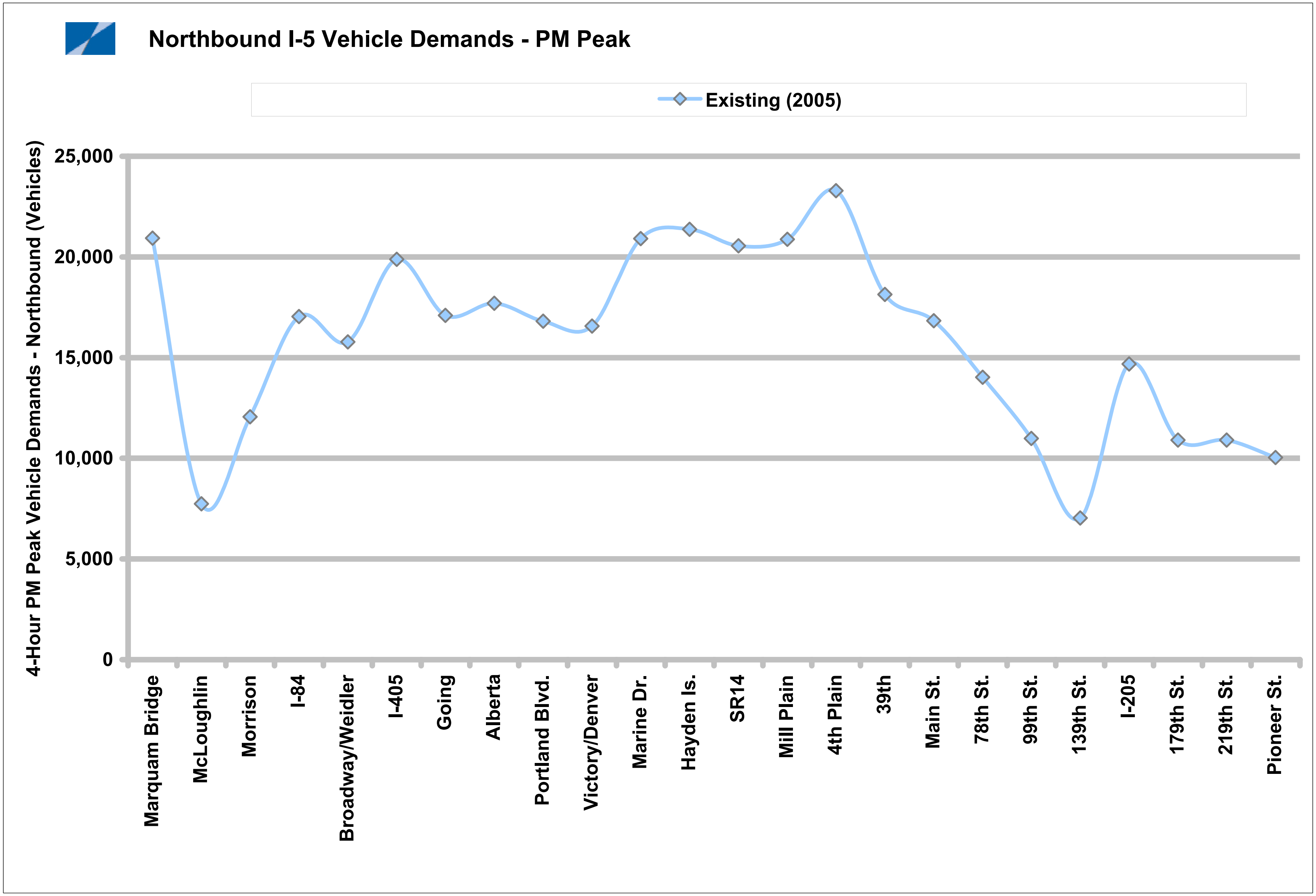

Southbound I-5 Vehicle Demands - PM Peak
Existing (2005)
4-Hour PM Peak Travel Demands - Southbound (Vehicles)
25,000
20,000
15,000
10,000
5,000
0
Pioneer St.
219th St.
179th St.
139th St.
134th St.
99th St.
78th St.
Main St.
SR 500/39th
4th Plain
Mill Plain
SR 14
Jantzen Beach
Marine Drive
Victory Blvd.
Columbia Blvd.
Lombard WB
Lombard EB
Portland Blvd.
Alberta St.
Going St.
Greeley
I-405
Broadway/Weidler
I-84
Marquam Bridge

Exhibit 5-11



Northbound I-5 Vehicle Demands - PM Peak
Existing (2005)
4-Hour PM Peak Vehicle Demands - Northbound (Vehicles)
25,000
20,000
15,000
10,000
5,000
0
Marquam Bridge
McLoughlin
Morrison
I-84
Broadway/Weidler
I-405
Going
Alberta
Portland Blvd.
Victory/Denver
Marine Dr.
Hayden Is.
SR14
Mill Plain
4th Plain
39th
Main St.
78th St.
99th St.
139th St.
I-205
179th St.
219th St.
Pioneer St.

Exhibit 5-12

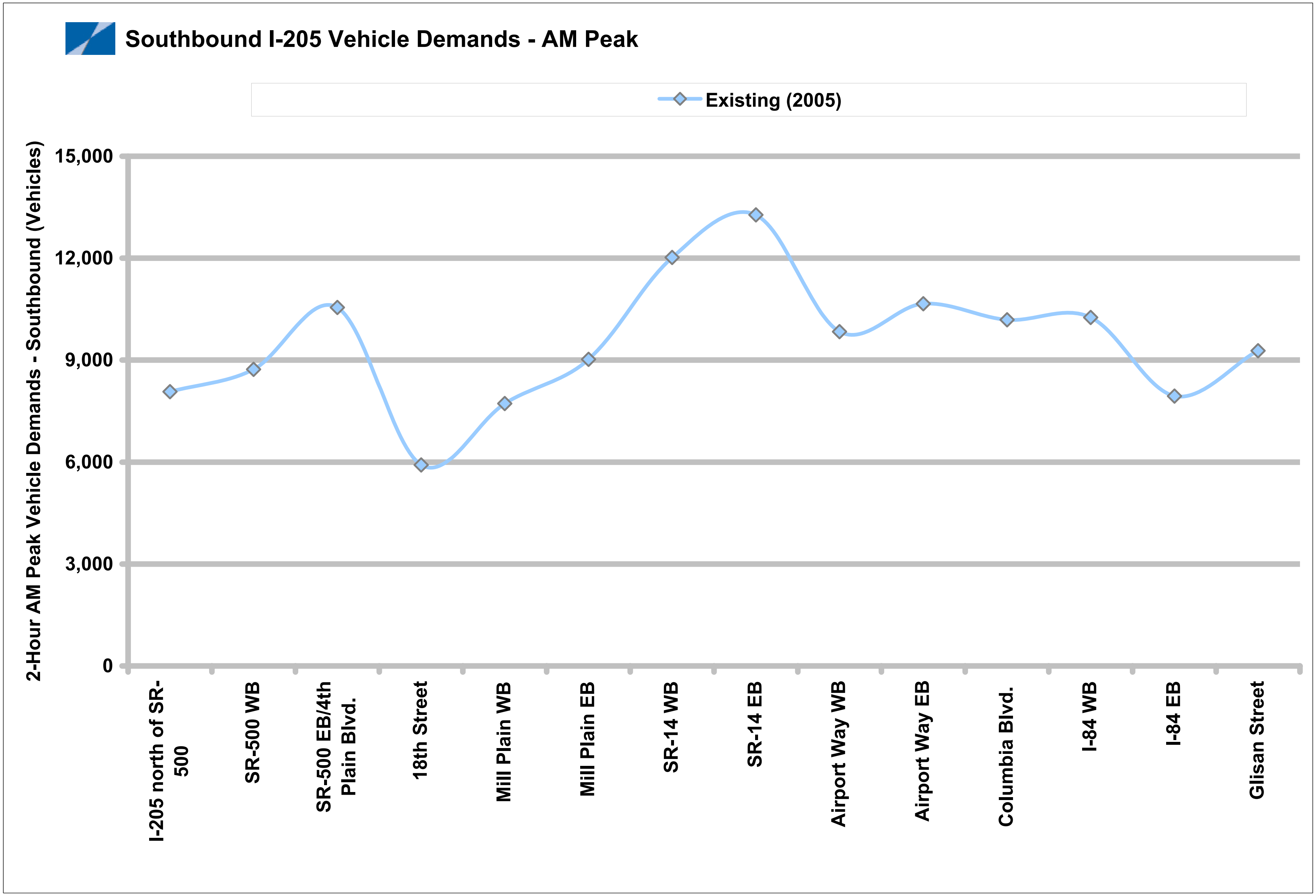
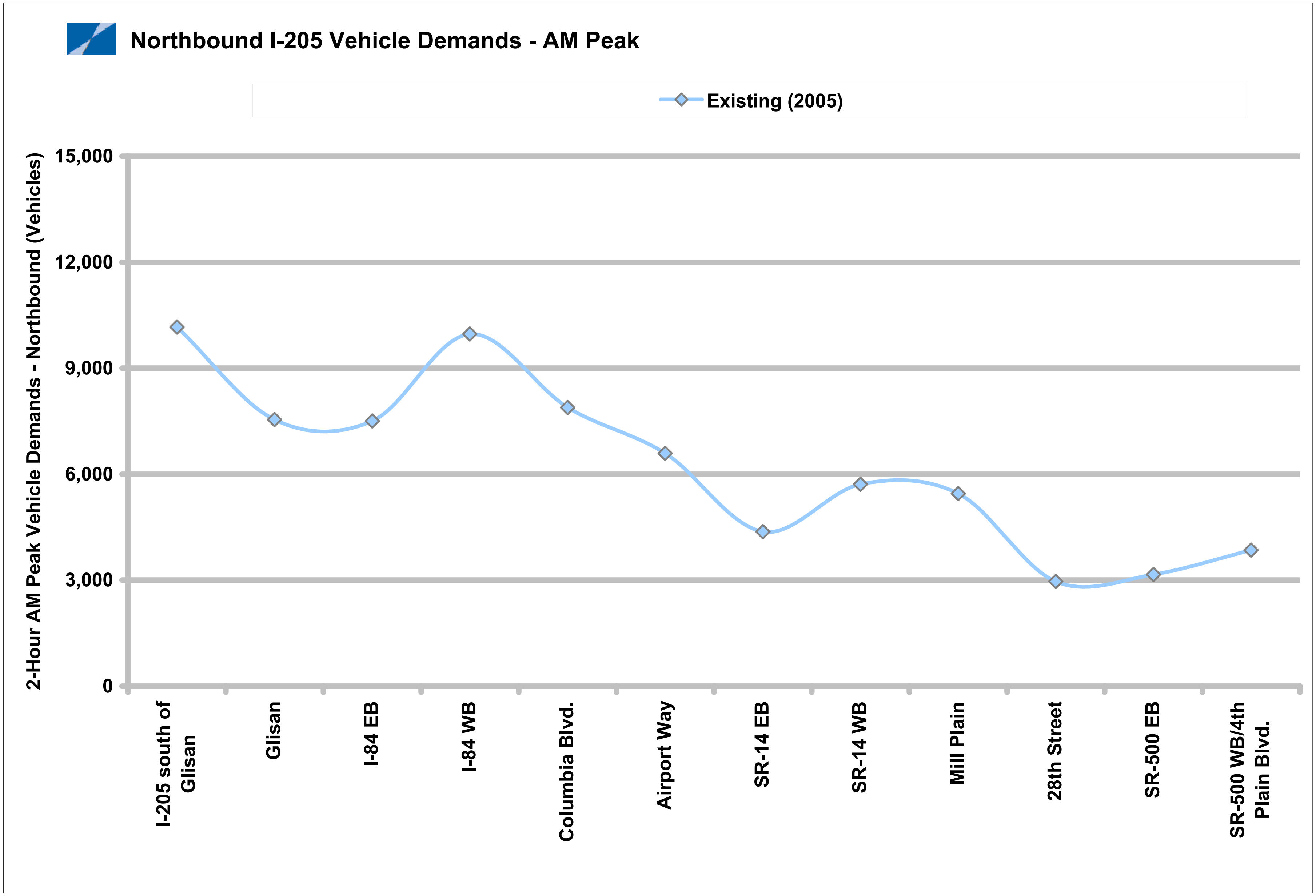
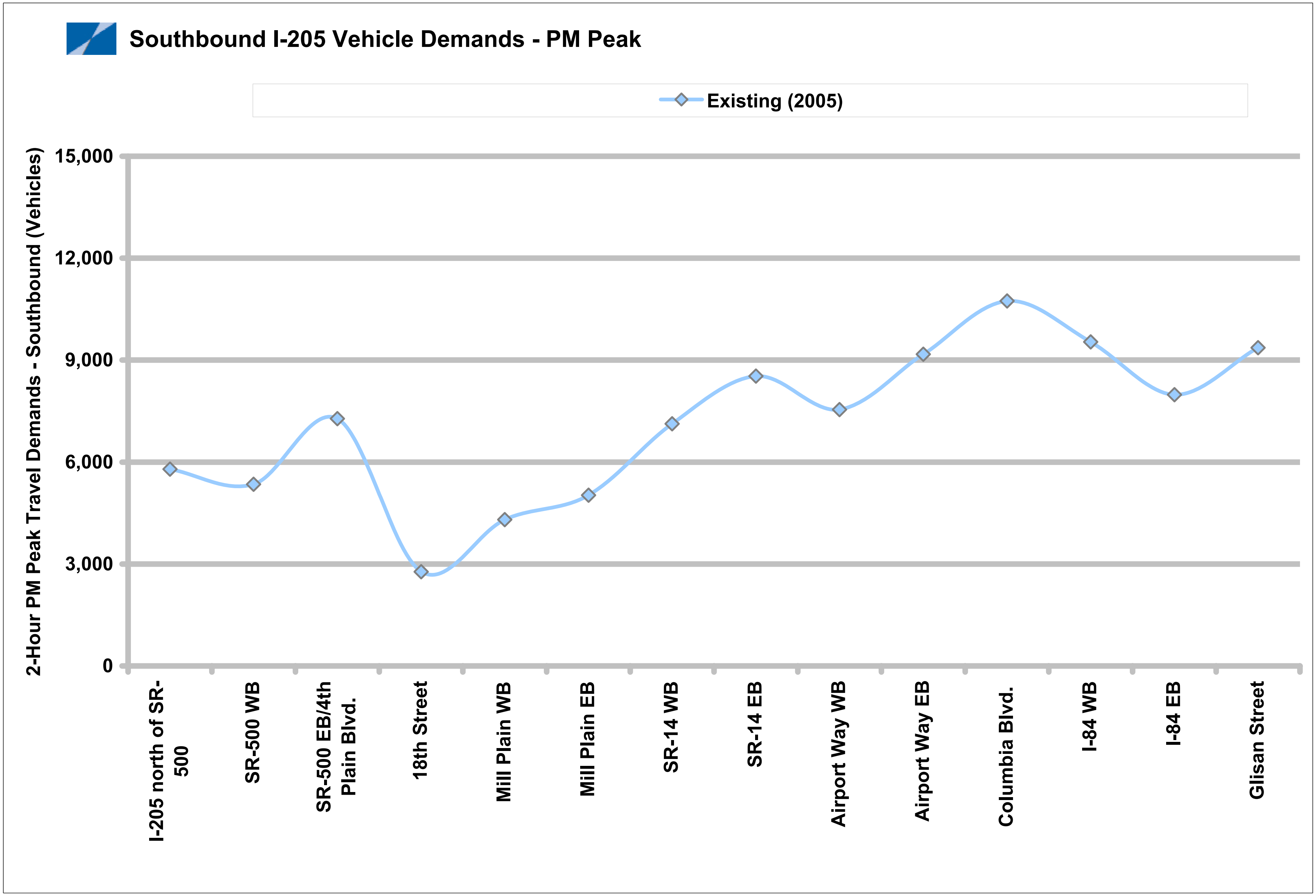

Southbound I-205 Vehicle Demands - AM Peak
Existing (2005)
2-Hour AM Peak Vehicle Demands - Southbound (Vehicles)
15,000
12,000
9,000
6,000
3,000
0
I-205 north of SR-500
SR-500 WB
SR-500 EB/4th Plain Blvd.
18th Street
Mill Plain WB
Mill Plain EB
SR-14 WB
SR-14 EB
Airport Way WB
Airport Way EB
Columbia Blvd.
I-84 WB
I-84 EB
Glisan Street

Exhibit 5-13



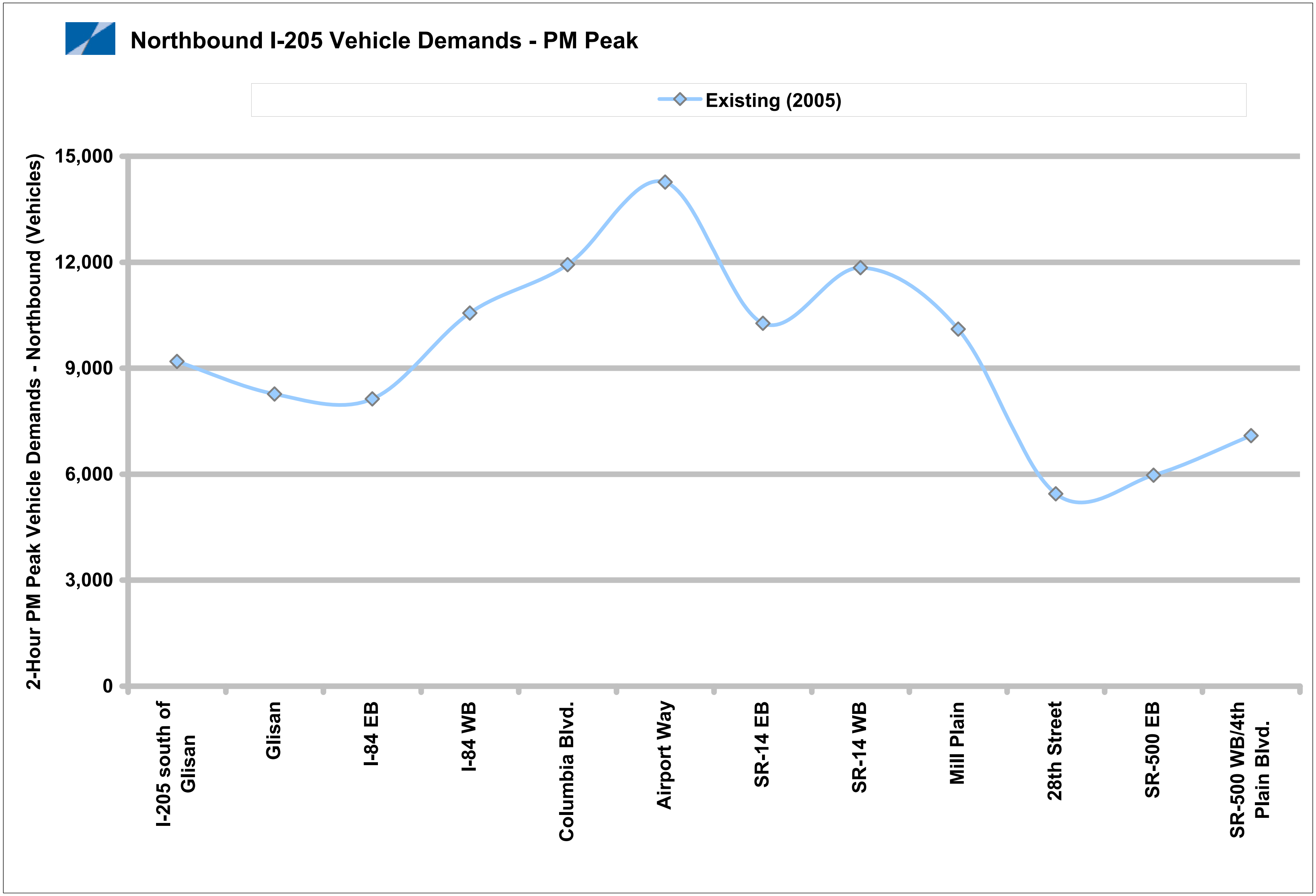
Northbound I-205 Vehicle Demands - AM Peak
Existing (2005)
2-Hour AM Peak Vehicle Demands - Northbound (Vehicles)
15,000
12,000
9,000
6,000
3,000
0
I-205 south of Glisan
Glisan
I-84 EB
I-84 WB
Columbia Blvd.
Airport Way
SR-14 EB
SR-14 WB
Mill Plain
28th Street
SR-500 EB
SR-500 WB/4th Plain Blvd.

Exhibit 5-14



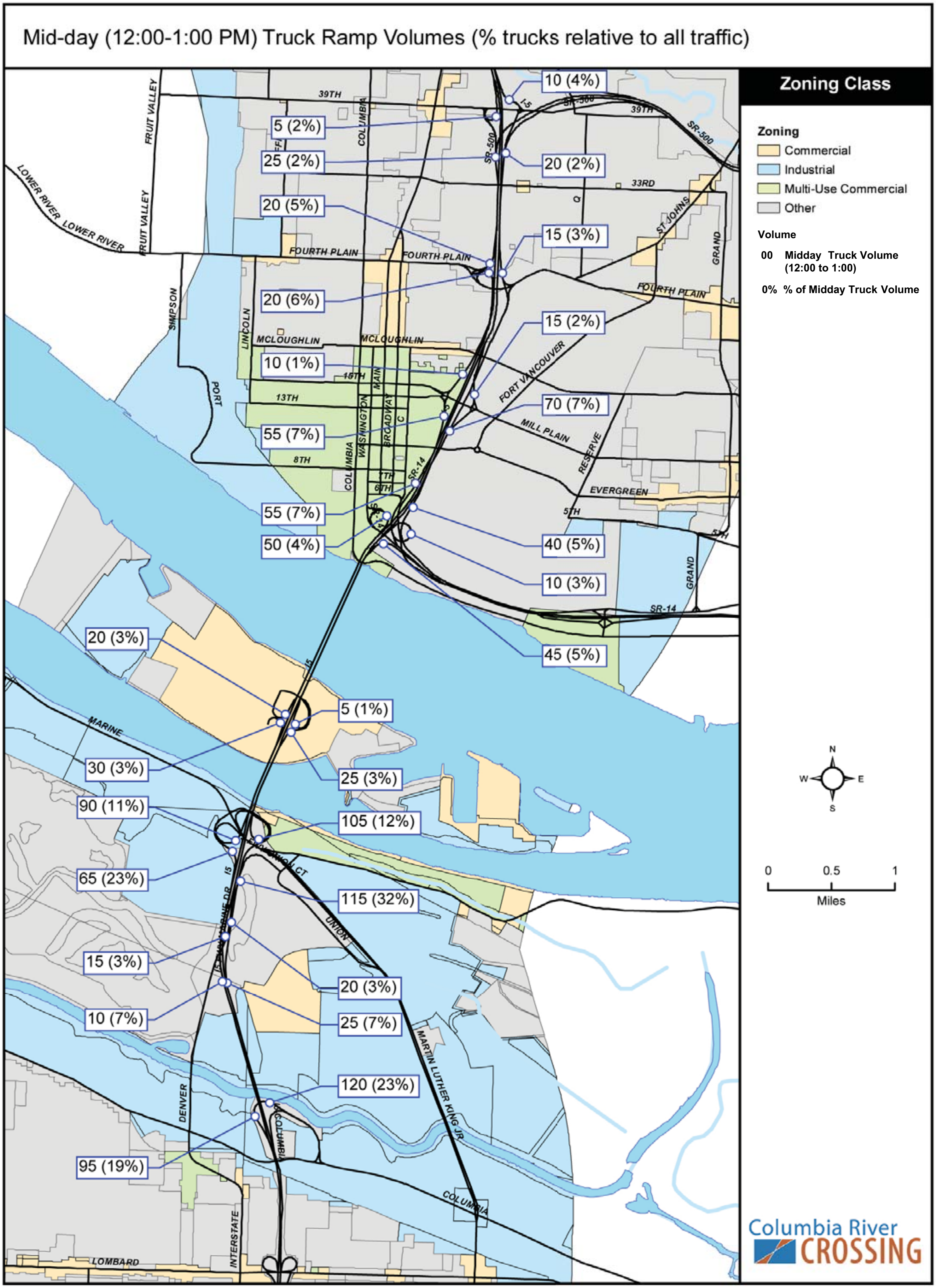
Southbound I-205 Vehicle Demands - PM Peak
Existing (2005)
2-Hour PM Peak Travel Demands - Southbound (Vehicles)
15,000
12,000
9,000
6,000
3,000
0
I-205 north of SR-500
SR-500 WB
SR-500 EB/4th Plain Blvd.
18th Street
Mill Plain WB
Mill Plain EB
SR-14 WB
SR-14 EB
Airport Way WB
Airport Way EB
Columbia Blvd.
I-84 WB
I-84 EB
Glisan Street

Exhibit 5-15



Northbound I-205 Vehicle Demands - PM Peak
Existing (2005)
2-Hour PM Peak Vehicle Demands - Northbound (Vehicles)
15,000
12,000
9,000
6,000
3,000
0
I-205 south of Glisan
Glisan
I-84 EB
I-84 WB
Columbia Blvd.
Airport Way
SR-14 EB
SR-14 WB
Mill Plain
28th Street
SR-500 EB
SR-500 WB/4th Plain Blvd.

Exhibit 5-16



Analysis by M. Rohden; Analysis Date: 6-Dec-2006; Plot Date: 6-Dec-2006: File Name: PBR_Fig11_2_LMU.mxd

Exhibit 5-17

Portland-Vancouver Region Freight Tonnage by Mode		
	Year 2000 Volume	
Mode	**Tons (millions)**	**Market Share**
Truck	197.2	67%
Rail	32.9	11%
Ocean	28.4	10%
Barge	15.1	5%
Pipeline	22.2	7%
Air	0.4	< 1 percent
TOTAL	**296.2**	**100%**

Source: Portland/Vancouver International and Domestic Trade Capacity Analysis 2006

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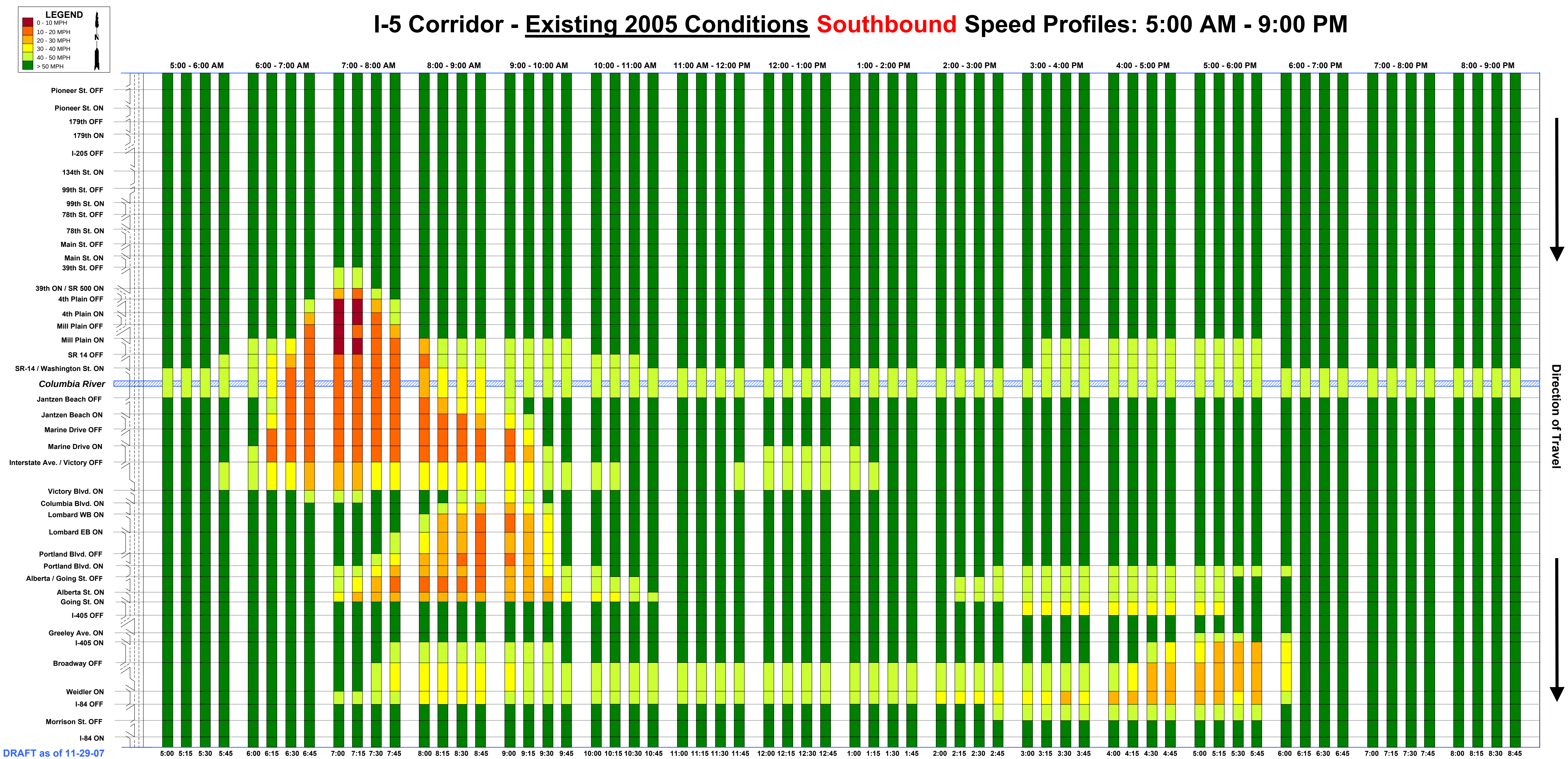
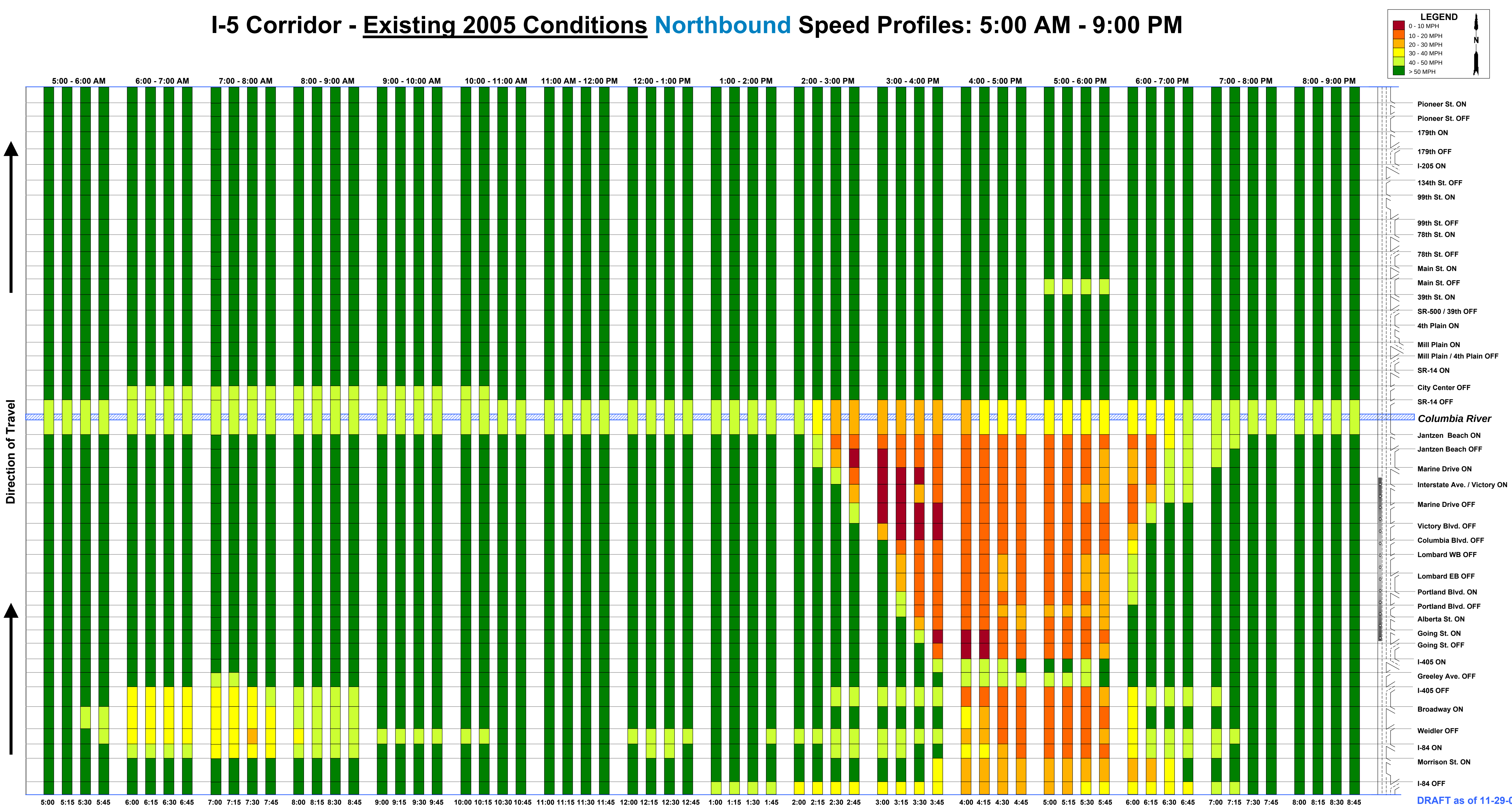
Exhibit 5-18



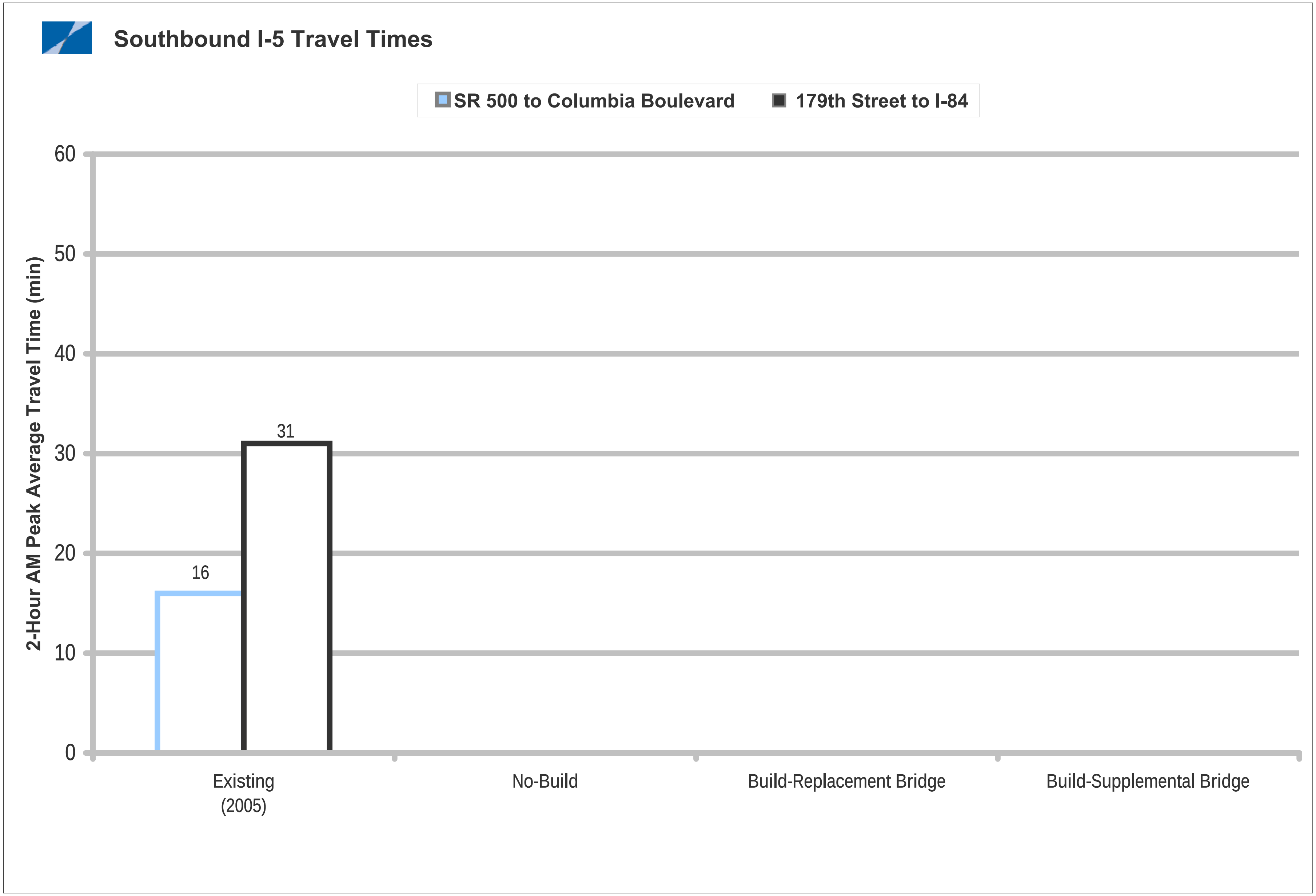
I-5 Corridor - Existing 2005 Conditions Southbound Speed Profiles: 5:00 AM - 9:00 PM
LEGEND
0 - 10 MPH
10 - 20 MPH
20 - 30 MPH
30 - 40 MPH
40 - 50 MPH
> 50 MPH
5:00 - 6:00 AM
6:00 - 7:00 AM
7:00 - 8:00 AM
8:00 - 9:00 AM
9:00 - 10:00 AM
10:00 - 11:00 AM
11:00 AM - 12:00 PM
12:00 - 1:00 PM
1:00 - 2:00 PM
2:00 - 3:00 PM
3:00 - 4:00 PM
4:00 - 5:00 PM
5:00 - 6:00 PM
6:00 - 7:00 PM
7:00 - 8:00 PM
8:00 - 9:00 PM
Pioneer St. OFF
Pioneer St. ON
179th OFF
179th ON
I-205 OFF
134th St. ON
99th St. OFF
99th St. ON
78th St. OFF
78th St. ON
Main St. OFF
Main St. ON
39th St. OFF
39th ON / SR 500 ON
4th Plain OFF
4th Plain ON
Mill Plain OFF
Mill Plain ON
SR 14 OFF
SR-14 / Washington St. ON
Columbia River
Jantzen Beach OFF
Jantzen Beach ON
Marine Drive OFF
Marine Drive ON
Interstate Ave. / Victory OFF
Victory Blvd. ON
Columbia Blvd. ON
Lombard WB ON
Lombard EB ON
Portland Blvd. OFF
Portland Blvd. ON
Alberta / Going St. OFF
Alberta St. ON
Going St. ON
I-405 OFF
Greeley Ave. ON
I-405 ON
Broadway OFF
Weidler ON
I-84 OFF
Morrison St. OFF
I-84 ON
DRAFT as of 11-29-07
5:00 5:15 5:30 5:45
6:00 6:15 6:30 6:45
7:00 7:15 7:30 7:45
8:00 8:15 8:30 8:45
9:00 9:15 9:30 9:45
10:00 10:15 10:30 10:45
11:00 11:15 11:30 11:45
12:00 12:15 12:30 12:45
1:00 1:15 1:30 1:45
2:00 2:15 2:30 2:45
3:00 3:15 3:30 3:45
4:00 4:15 4:30 4:45
5:00 5:15 5:30 5:45
6:00 6:15 6:30 6:45
7:00 7:15 7:30 7:45
8:00 8:15 8:30 8:45
Direction of Travel

Exhibit 5-19



I-5 Corridor - Existing 2005 Conditions Northbound Speed Profiles: 5:00 AM - 9:00 PM
LEGEND
0 - 10 MPH
10 - 20 MPH
20 - 30 MPH
30 - 40 MPH
40 - 50 MPH
> 50 MPH
N
Direction of Travel
5:00 - 6:00 AM
6:00 - 7:00 AM
7:00 - 8:00 AM
8:00 - 9:00 AM
9:00 - 10:00 AM
10:00 - 11:00 AM
11:00 AM - 12:00 PM
12:00 - 1:00 PM
1:00 - 2:00 PM
2:00 - 3:00 PM
3:00 - 4:00 PM
4:00 - 5:00 PM
5:00 - 6:00 PM
6:00 - 7:00 PM
7:00 - 8:00 PM
8:00 - 9:00 PM
Pioneer St. ON
Pioneer St. OFF
179th ON
179th OFF
I-205 ON
134th St. OFF
99th St. ON
99th St. OFF
78th St. ON
78th St. OFF
Main St. ON
Main St. OFF
39th St. ON
SR-500 / 39th OFF
4th Plain ON
Mill Plain ON
Mill Plain / 4th Plain OFF
SR-14 ON
City Center OFF
SR-14 OFF
Columbia River
Jantzen Beach ON
Jantzen Beach OFF
Marine Drive ON
Interstate Ave. / Victory ON
Marine Drive OFF
Victory Blvd. OFF
Columbia Blvd. OFF
Lombard WB OFF
Lombard EB OFF
Portland Blvd. ON
Portland Blvd. OFF
Alberta St. ON
Going St. ON
Going St. OFF
I-405 ON
Greeley Ave. OFF
I-405 OFF
Broadway ON
Weidler OFF
I-84 ON
Morrison St. ON
I-84 OFF
5:00 5:15 5:30 5:45 6:00 6:15 6:30 6:45 7:00 7:15 7:30 7:45 8:00 8:15 8:30 8:45 9:00 9:15 9:30 9:45 10:00 10:15 10:30 10:45 11:00 11:15 11:30 11:45 12:00 12:15 12:30 12:45 1:00 1:15 1:30 1:45 2:00 2:15 2:30 2:45 3:00 3:15 3:30 3:45 4:00 4:15 4:30 4:45 5:00 5:15 5:30 5:45 6:00 6:15 6:30 6:45 7:00 7:15 7:30 7:45 8:00 8:15 8:30 8:45
DRAFT as of 11-29-07

Exhibit 5-20



Southbound I-5 Travel Times
SR 500 to Columbia Boulevard
179th Street to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
31
16
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge

Exhibit 5-21

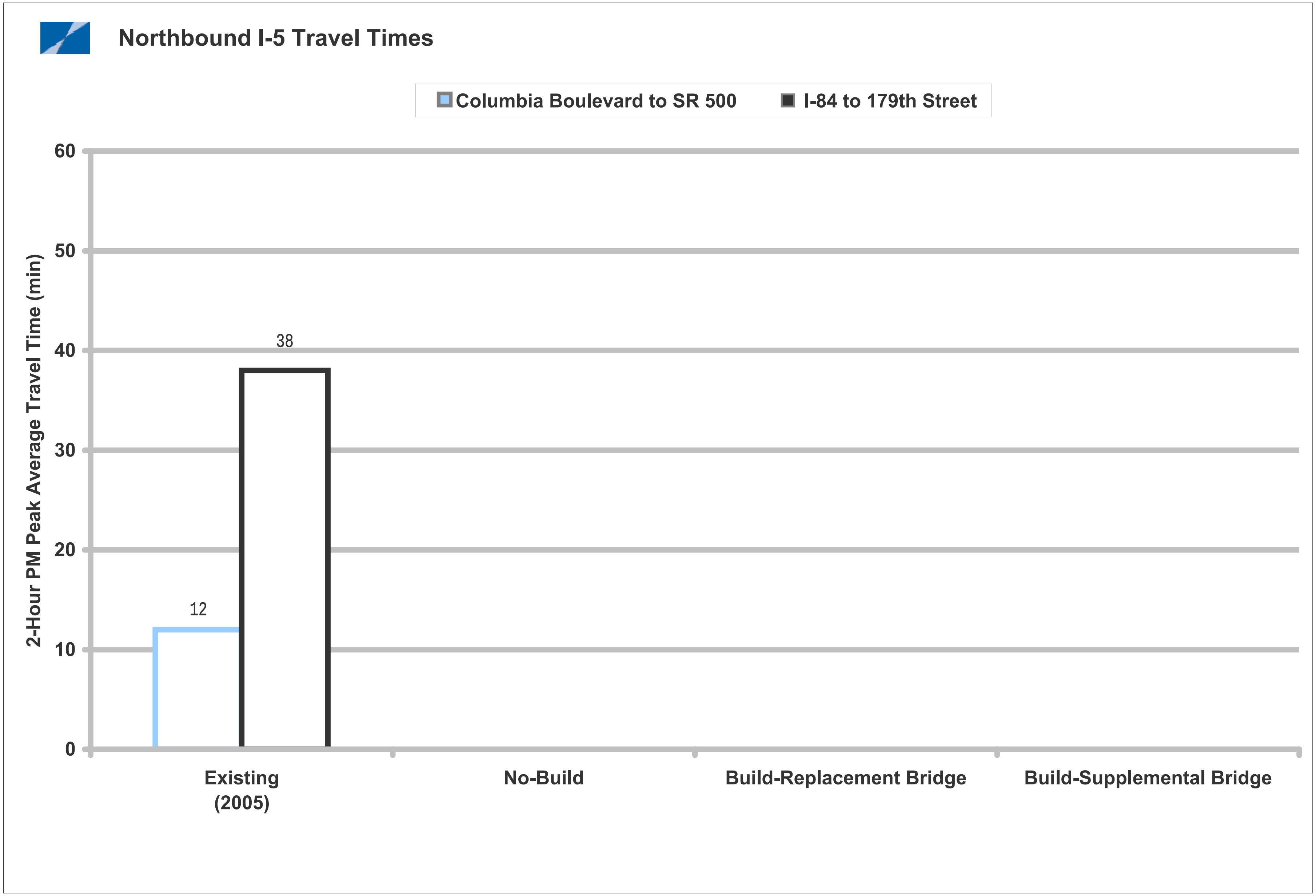
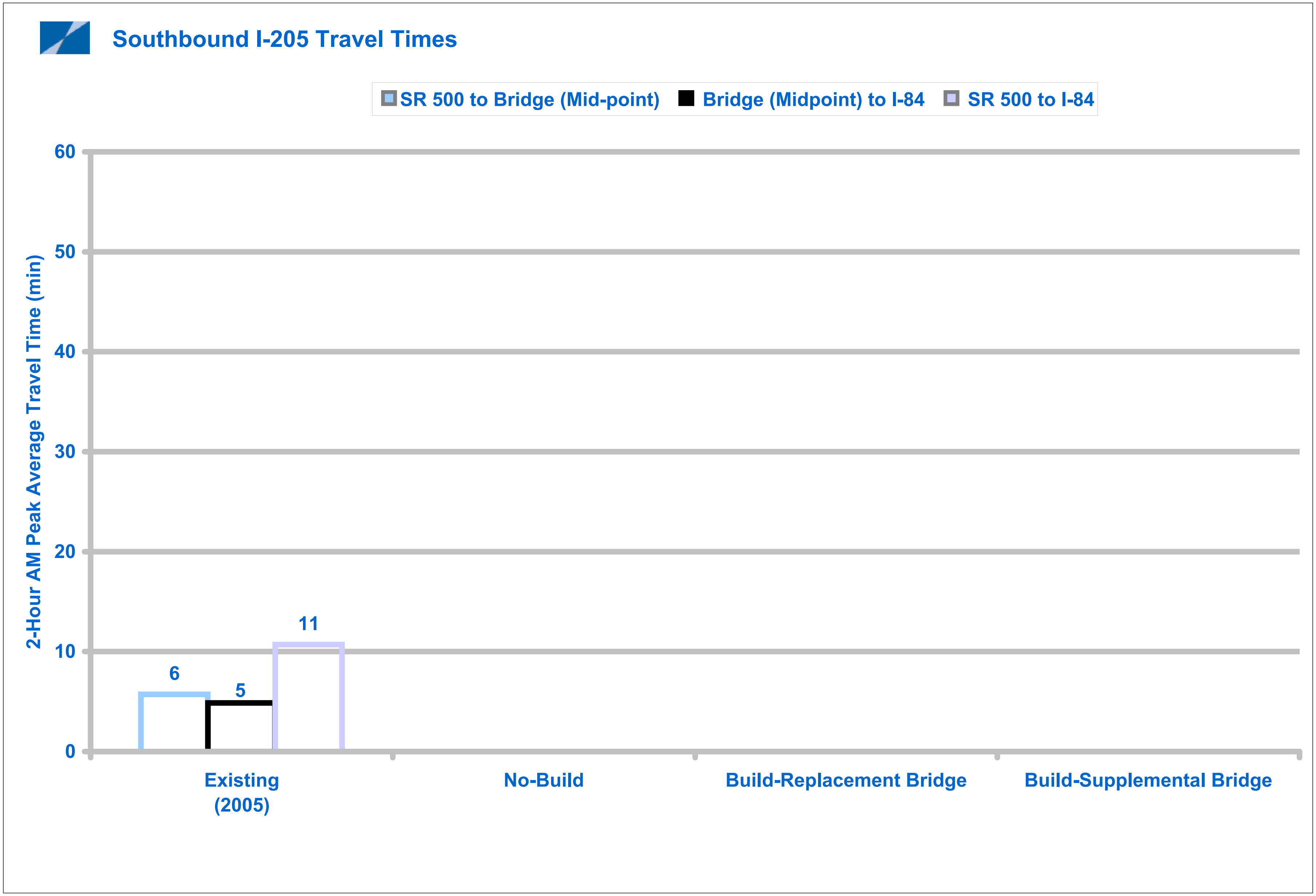
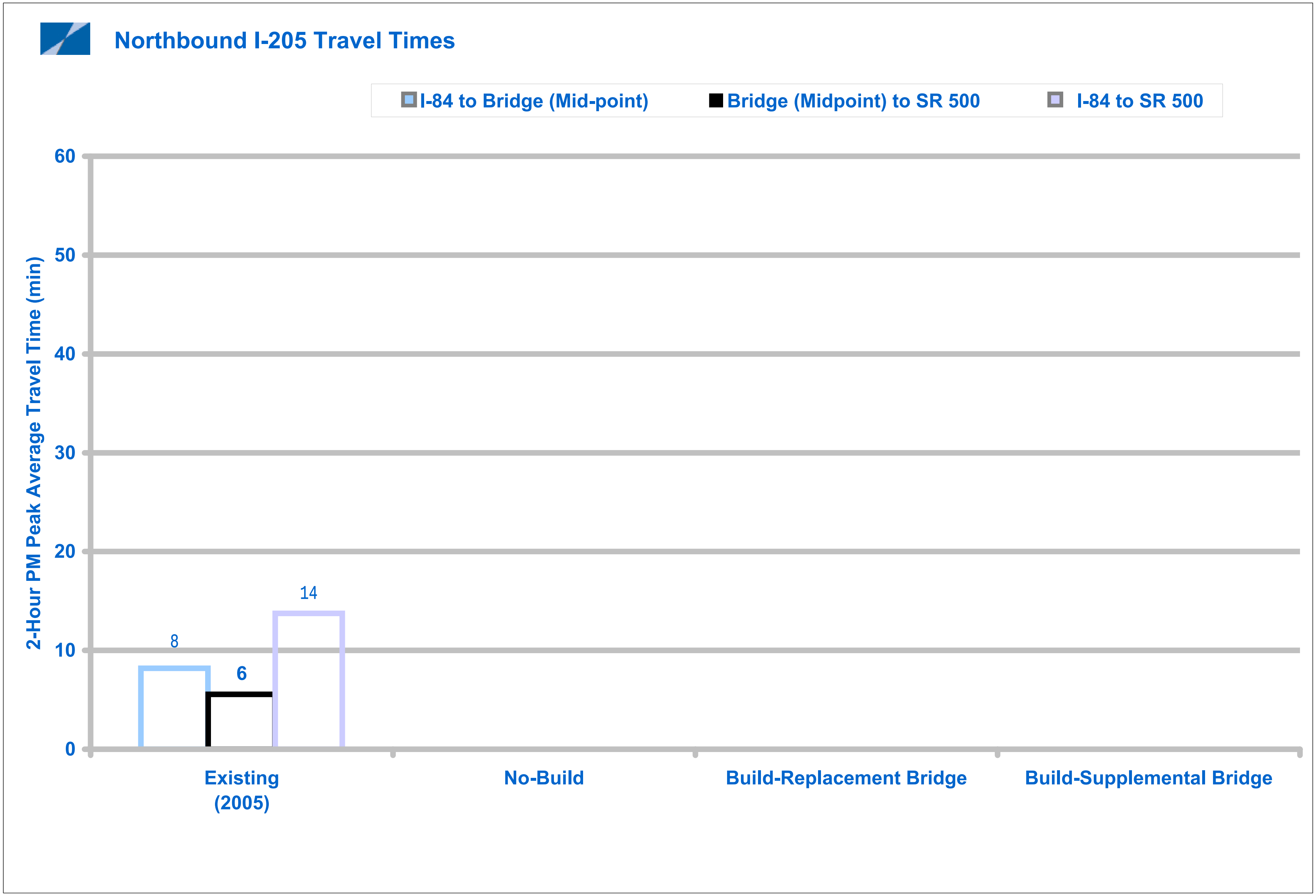

Northbound I-5 Travel Times
Columbia Boulevard to SR 500
I-84 to 179th Street
2-Hour PM Peak Average Travel Time (min)
60
50
40
30
20
10
0
12
38
Existing
(2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge

Exhibit 5-22



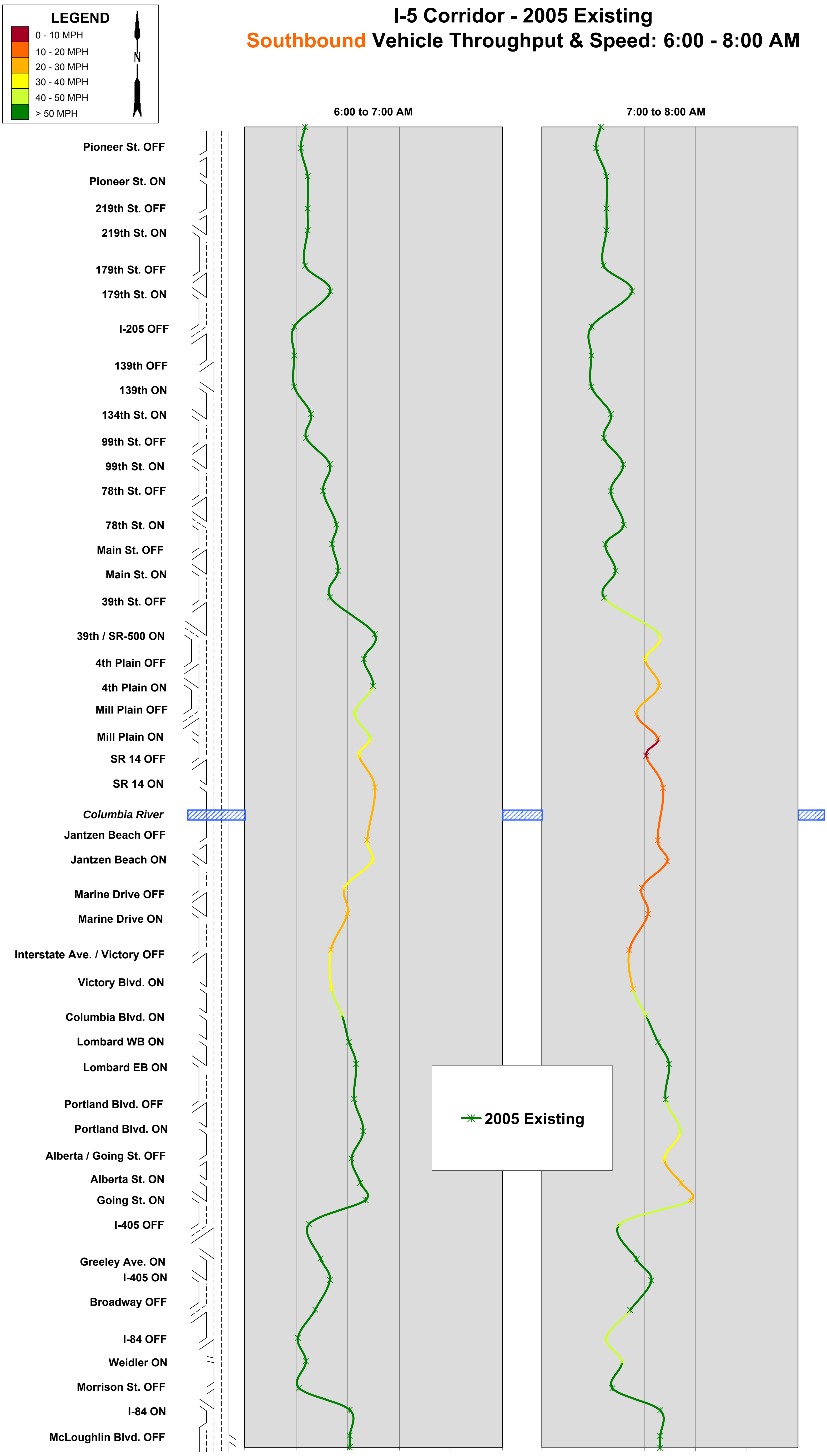
Southbound I-205 Travel Times
SR 500 to Bridge (Mid-point)
Bridge (Midpoint) to I-84
SR 500 to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
6
5
11
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge

Exhibit 5-23



Northbound I-205 Travel Times
I-84 to Bridge (Mid-point)
Bridge (Midpoint) to SR 500
I-84 to SR 500
2-Hour PM Peak Average Travel Time (min)
60
50
40
30
20
10
0
8
6
14
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge

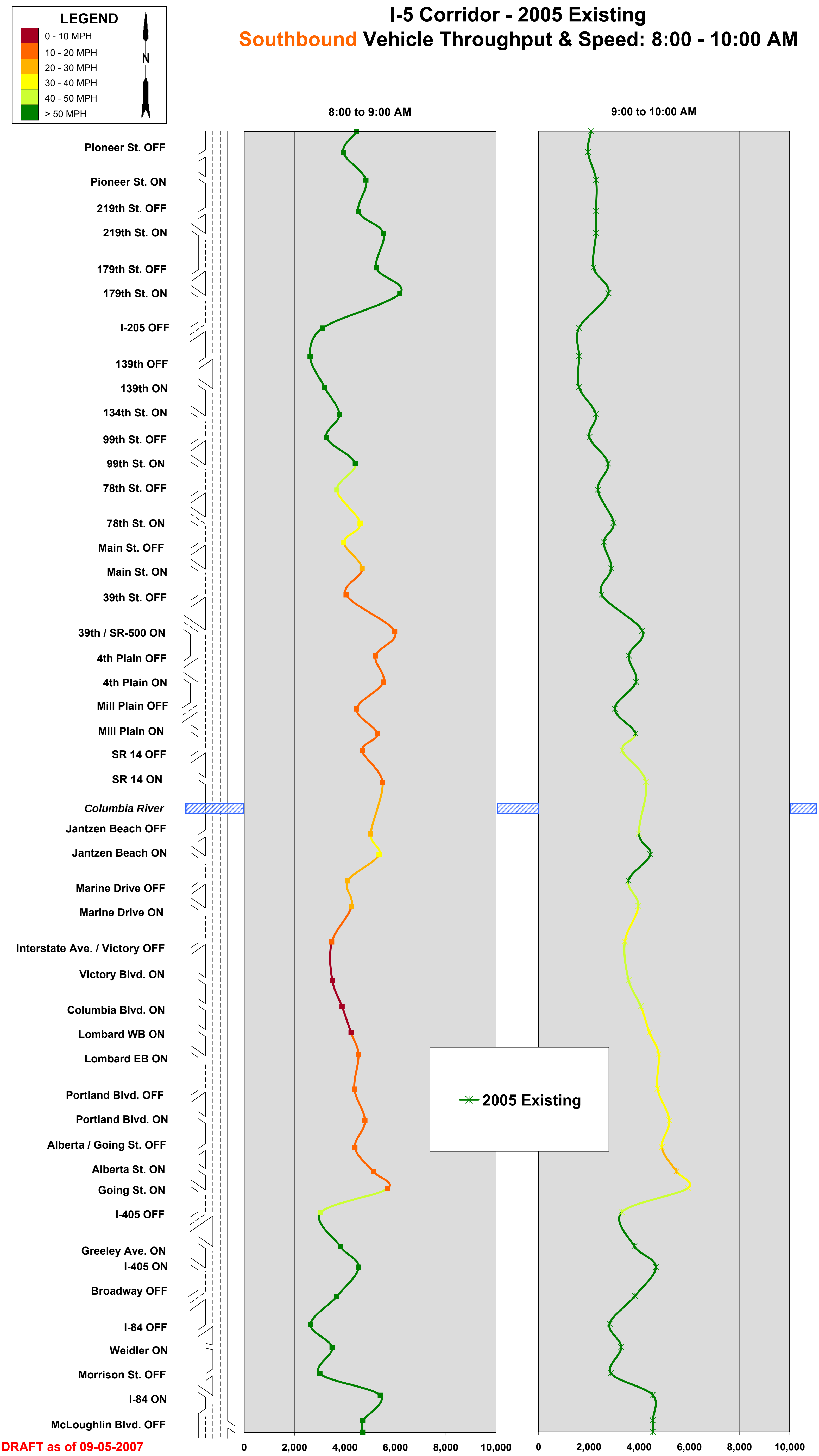
Exhibit 5-24



DRAFT as of 09-05-2007

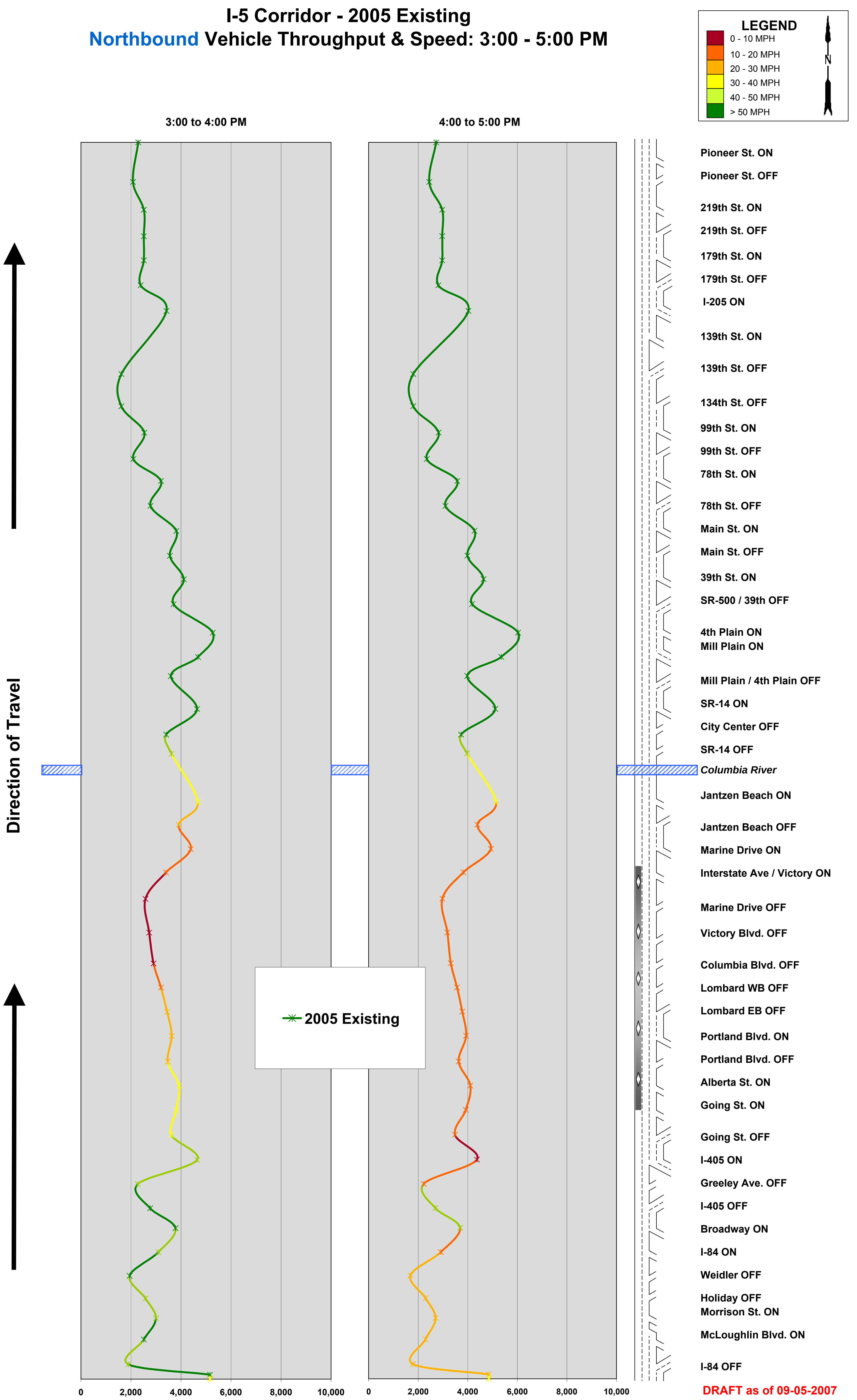
Continued on next page

Exhibit 5-24 - Continued



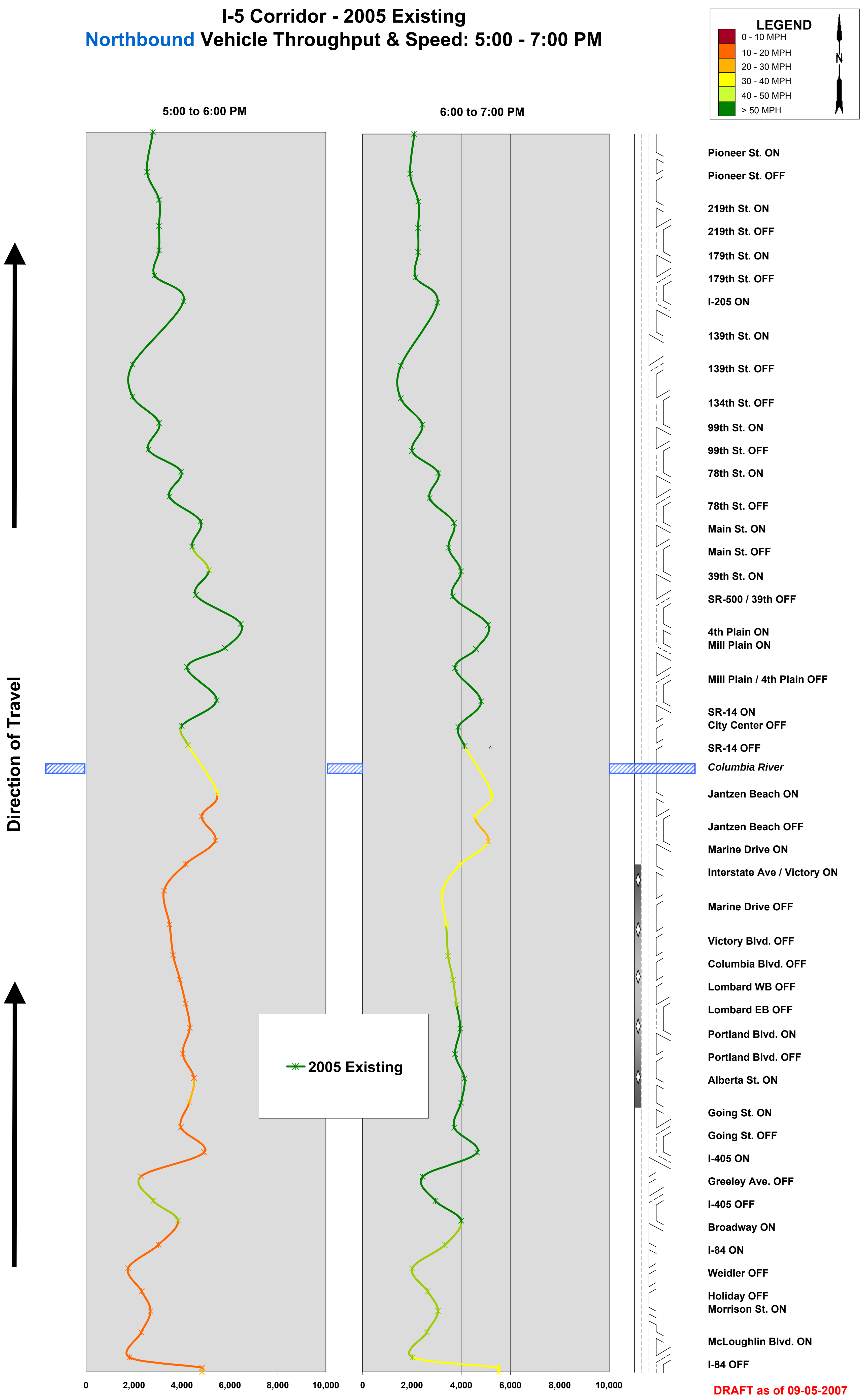
DRAFT as of 09-05-2007

Exhibit 5-25



Continued on next page

Exhibit 5-25 - Continued



DRAFT as of 09-05-2007

Exhibit 5-26

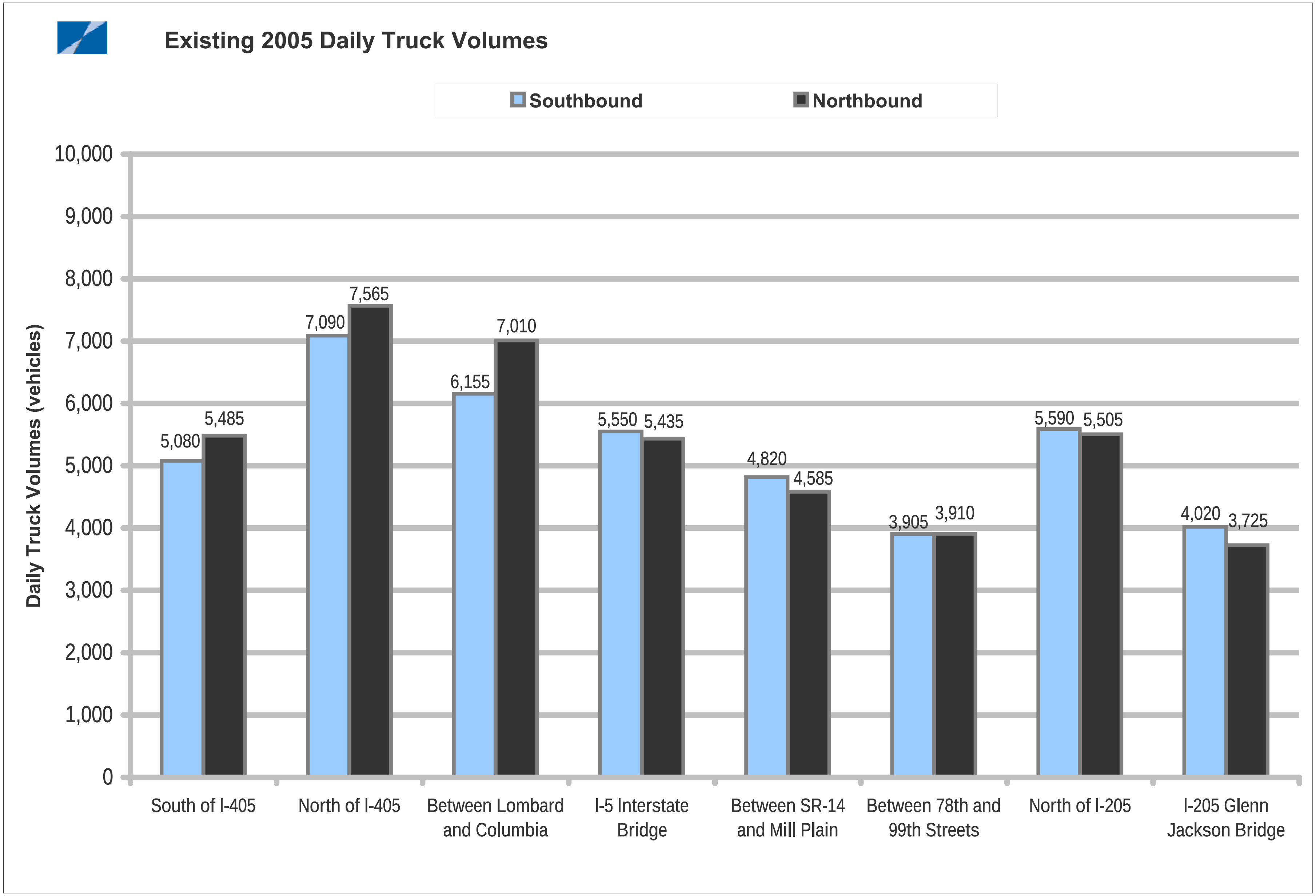

Existing 2005 Daily Truck Volumes
Southbound
Northbound
Daily Truck Volumes (vehicles)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
5,080
5,485
7,090
7,565
6,155
7,010
5,550
5,435
4,820
4,585
3,905
3,910
5,590
5,505
4,020
3,725
South of I-405
North of I-405
Between Lombard and Columbia
I-5 Interstate Bridge
Between SR-14 and Mill Plain
Between 78th and 99th Streets
North of I-205
I-205 Glenn Jackson Bridge

Exhibit 5-27

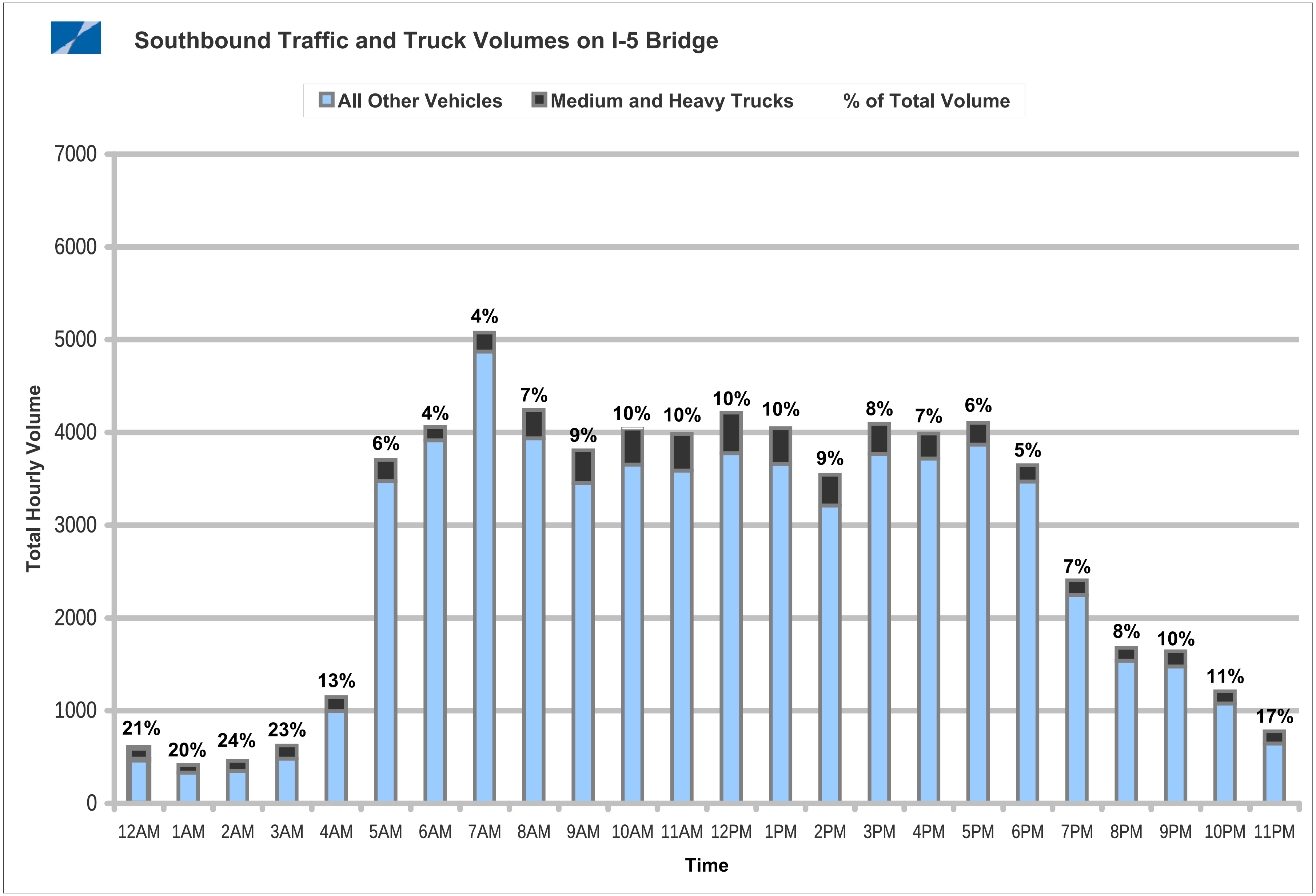
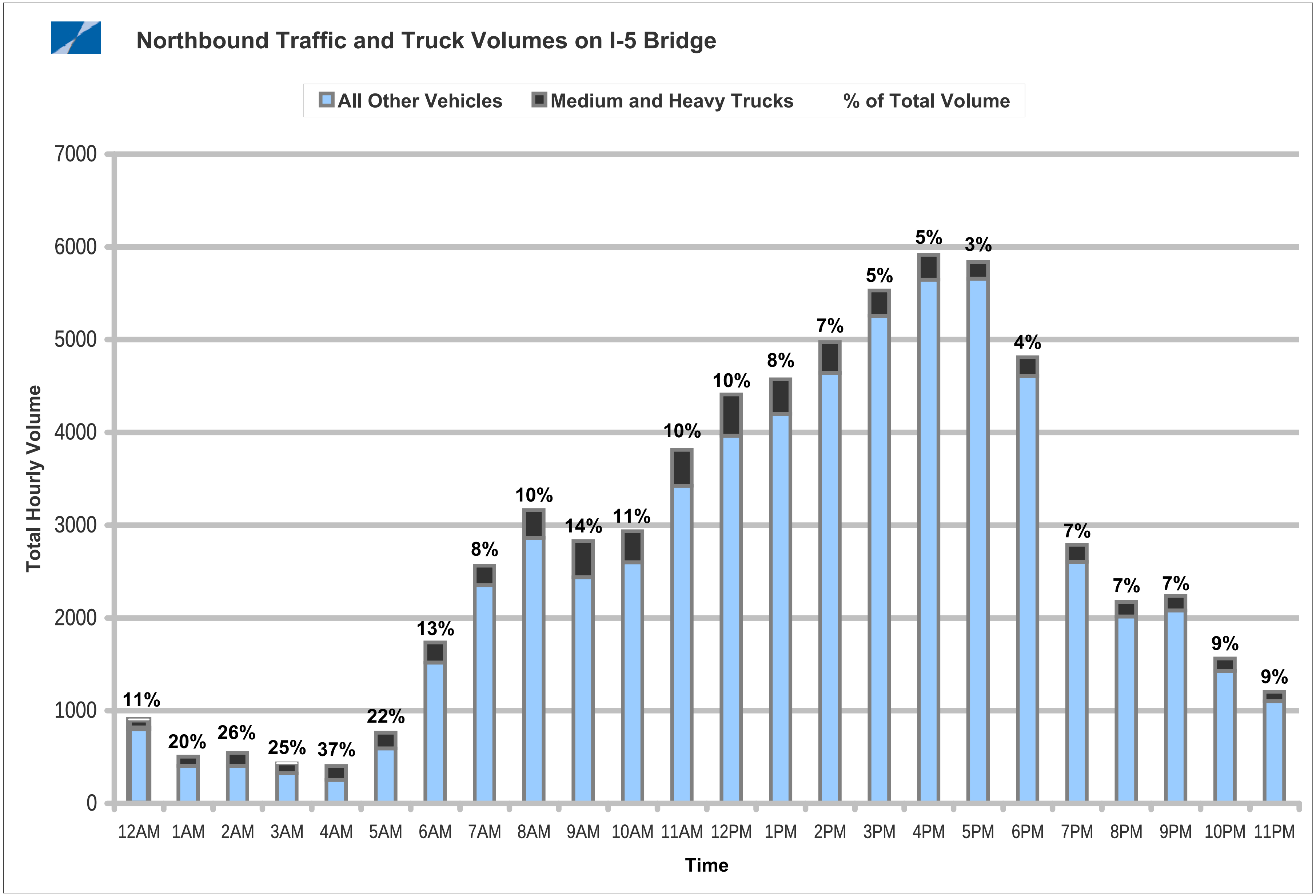
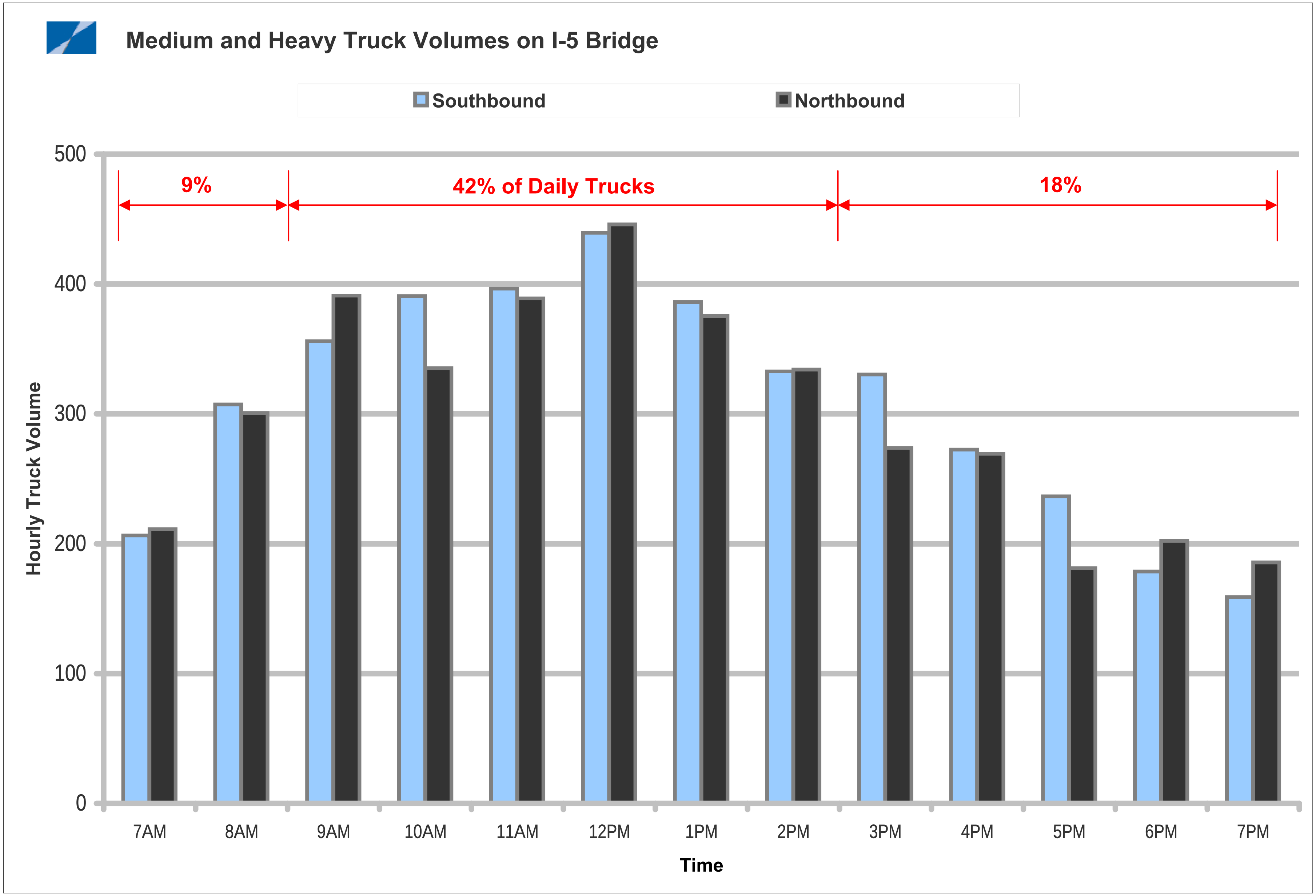

Southbound Traffic and Truck Volumes on I-5 Bridge
All Other Vehicles
Medium and Heavy Trucks
% of Total Volume
7000
6000
5000
4000
3000
2000
1000
0
Total Hourly Volume
21%
20%
24%
23%
13%
6%
4%
4%
7%
9%
10%
10%
10%
10%
9%
8%
7%
6%
5%
7%
8%
10%
11%
17%
12AM
1AM
2AM
3AM
4AM
5AM
6AM
7AM
8AM
9AM
10AM
11AM
12PM
1PM
2PM
3PM
4PM
5PM
6PM
7PM
8PM
9PM
10PM
11PM
Time

Exhibit 5-28



Northbound Traffic and Truck Volumes on I-5 Bridge
All Other Vehicles
Medium and Heavy Trucks
% of Total Volume
Total Hourly Volume
0
1000
2000
3000
4000
5000
6000
7000
11%
20%
26%
25%
37%
22%
13%
8%
10%
14%
11%
10%
10%
8%
7%
5%
5%
3%
4%
7%
7%
7%
9%
9%
12AM
1AM
2AM
3AM
4AM
5AM
6AM
7AM
8AM
9AM
10AM
11AM
12PM
1PM
2PM
3PM
4PM
5PM
6PM
7PM
8PM
9PM
10PM
11PM
Time

Exhibit 5-29



Medium and Heavy Truck Volumes on I-5 Bridge
Southbound
Northbound
9%
42% of Daily Trucks
18%
Hourly Truck Volume
0
100
200
300
400
500
7AM
8AM
9AM
10AM
11AM
12PM
1PM
2PM
3PM
4PM
5PM
6PM
7PM
Time

Exhibit 5-30

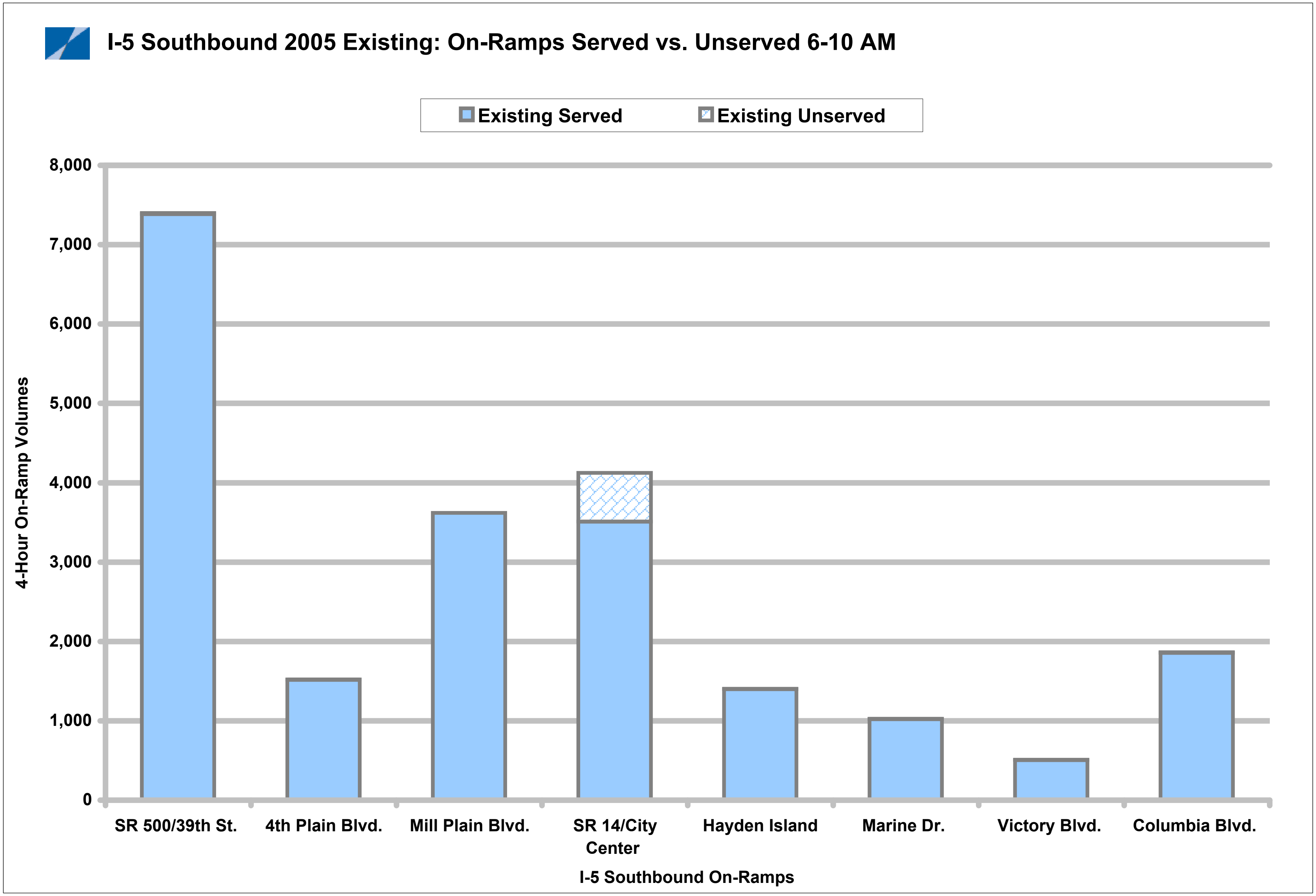
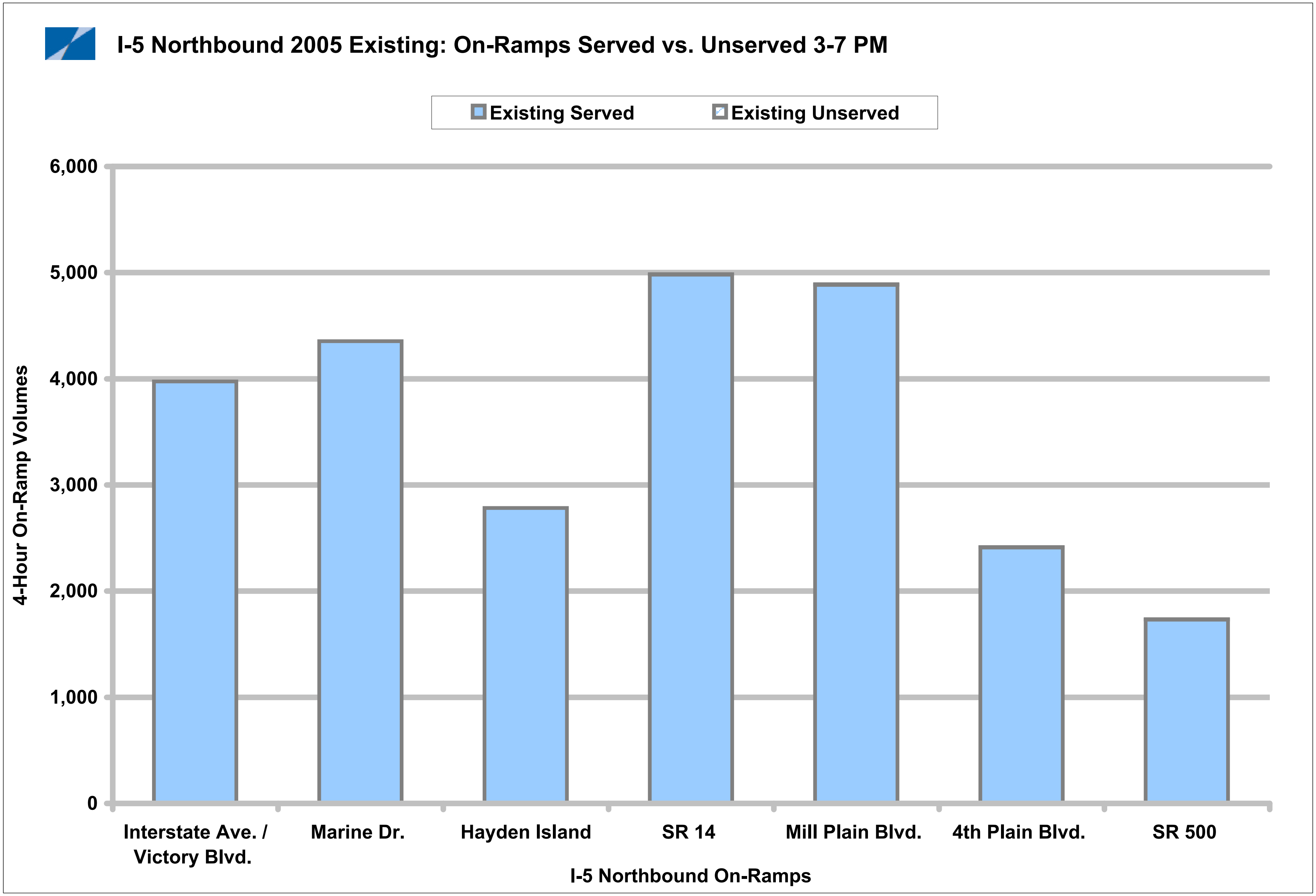
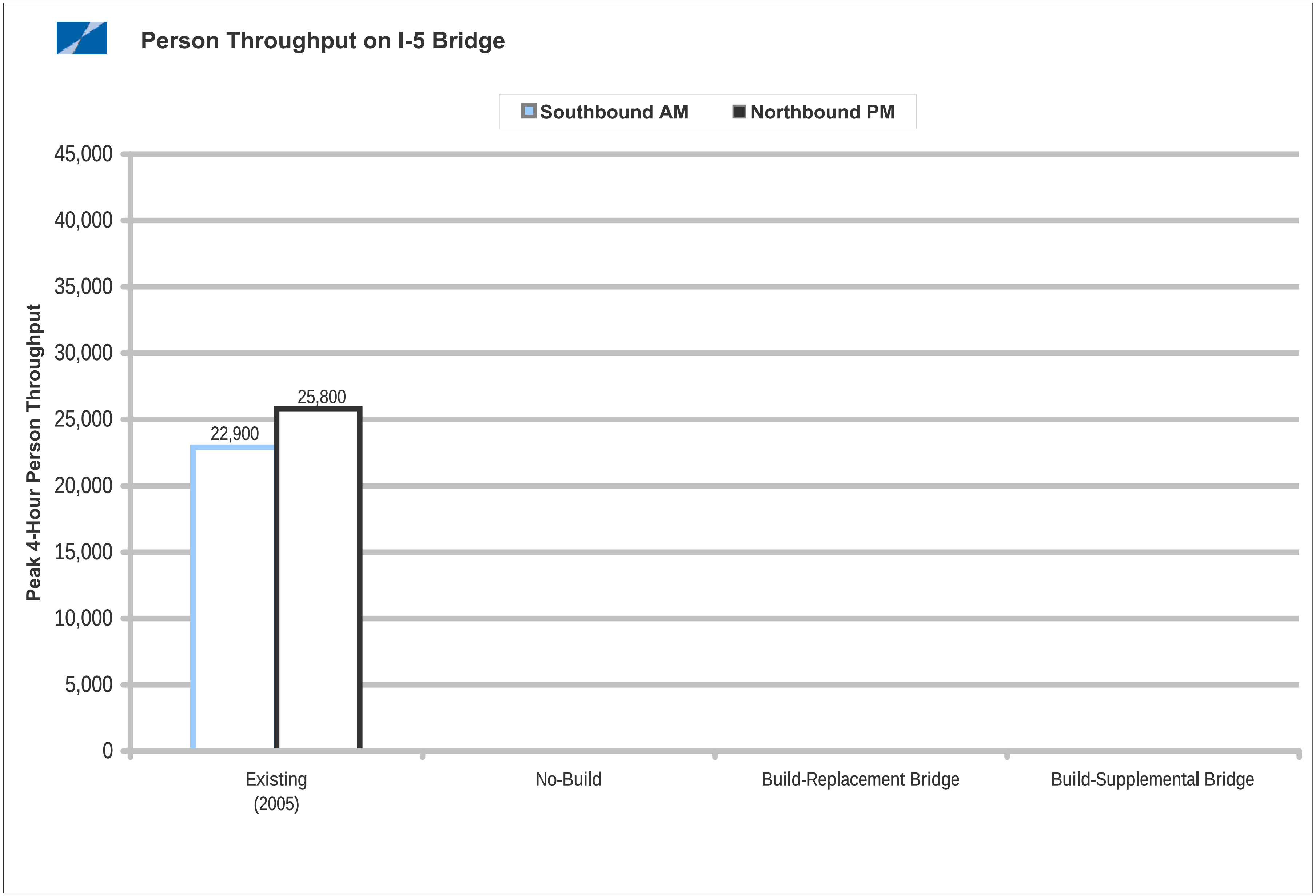

I-5 Southbound 2005 Existing: On-Ramps Served vs. Unserved 6-10 AM
Existing Served
Existing Unserved
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
4-Hour On-Ramp Volumes
SR 500/39th St.
4th Plain Blvd.
Mill Plain Blvd.
SR 14/City Center
Hayden Island
Marine Dr.
Victory Blvd.
Columbia Blvd.
I-5 Southbound On-Ramps

Exhibit 5-31



I-5 Northbound 2005 Existing: On-Ramps Served vs. Unserved 3-7 PM
Existing Served
Existing Unserved
6,000
5,000
4,000
3,000
2,000
1,000
0
4-Hour On-Ramp Volumes
Interstate Ave. / Victory Blvd.
Marine Dr.
Hayden Island
SR 14
Mill Plain Blvd.
4th Plain Blvd.
SR 500
I-5 Northbound On-Ramps

Exhibit 5-32



Person Throughput on I-5 Bridge
Southbound AM
Northbound PM
Peak 4-Hour Person Throughput
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
22,900
25,800
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge

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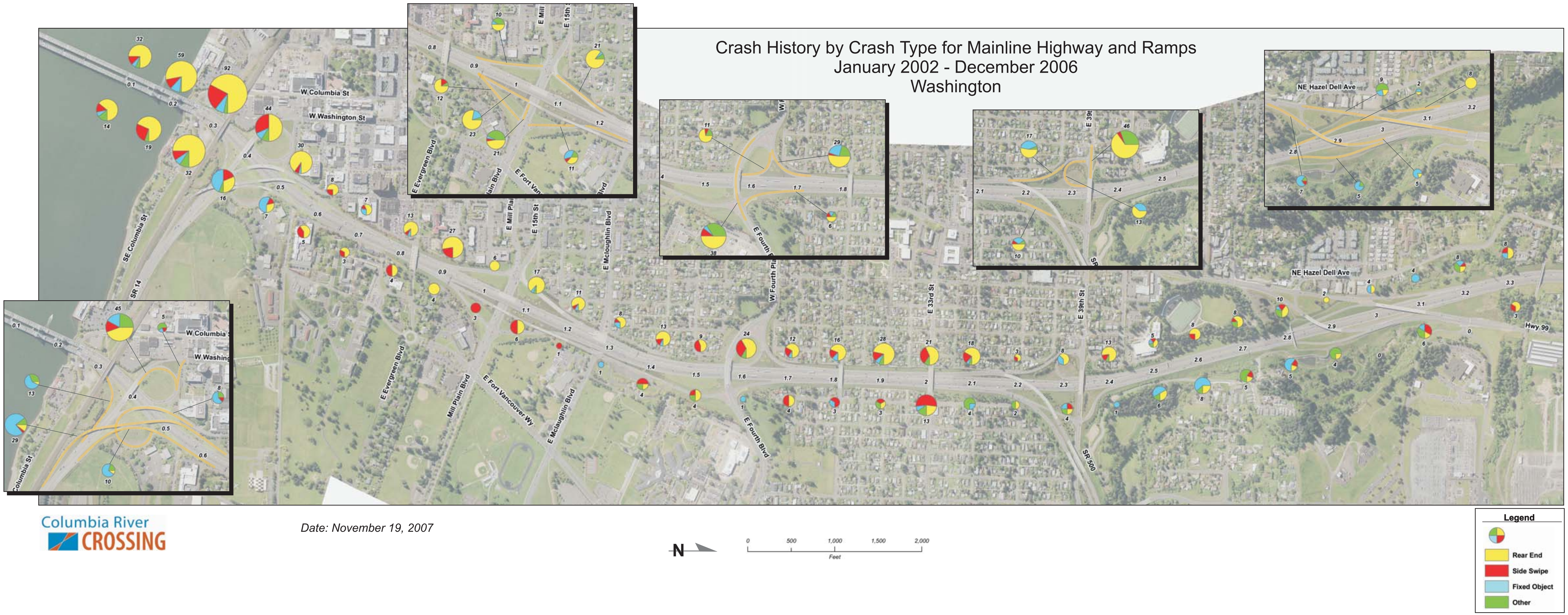
Exhibit 5-33



Columbia River CROSSING

Date: November 19, 2007

Exhibit 5-34

Crash History by Crash Type for Mainline Highway and Ramps
January 2002 - December 2006
Oregon

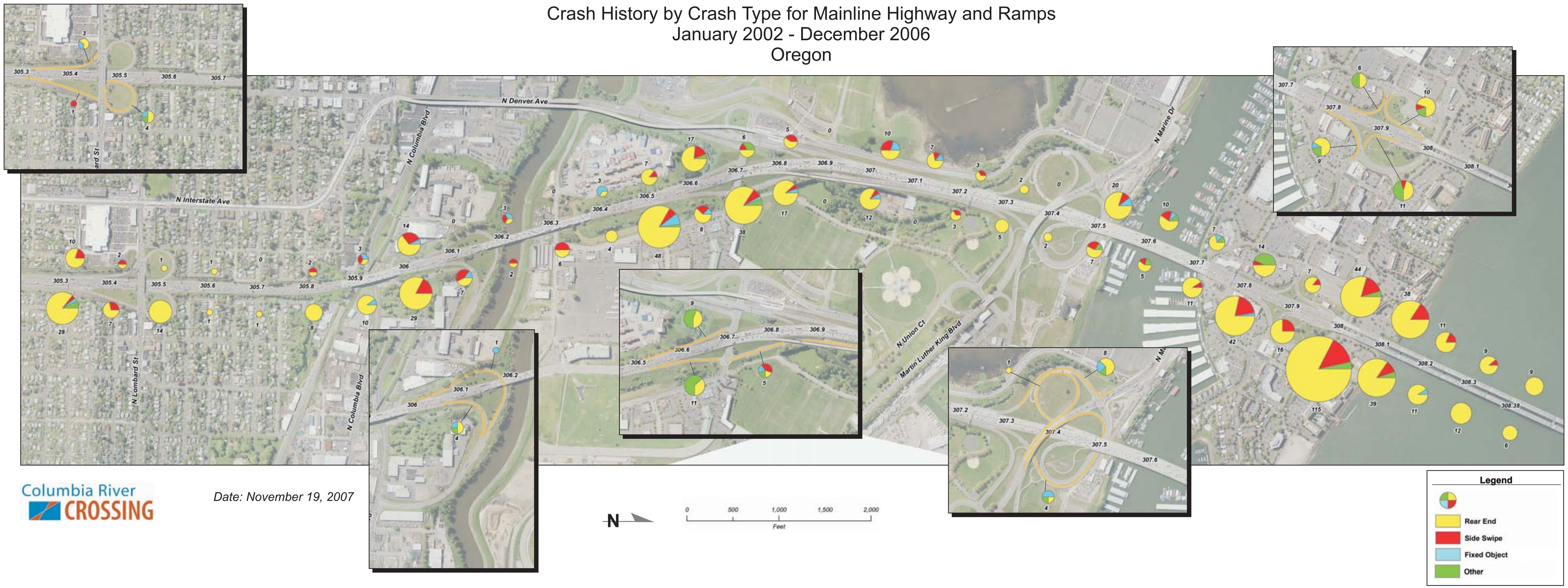
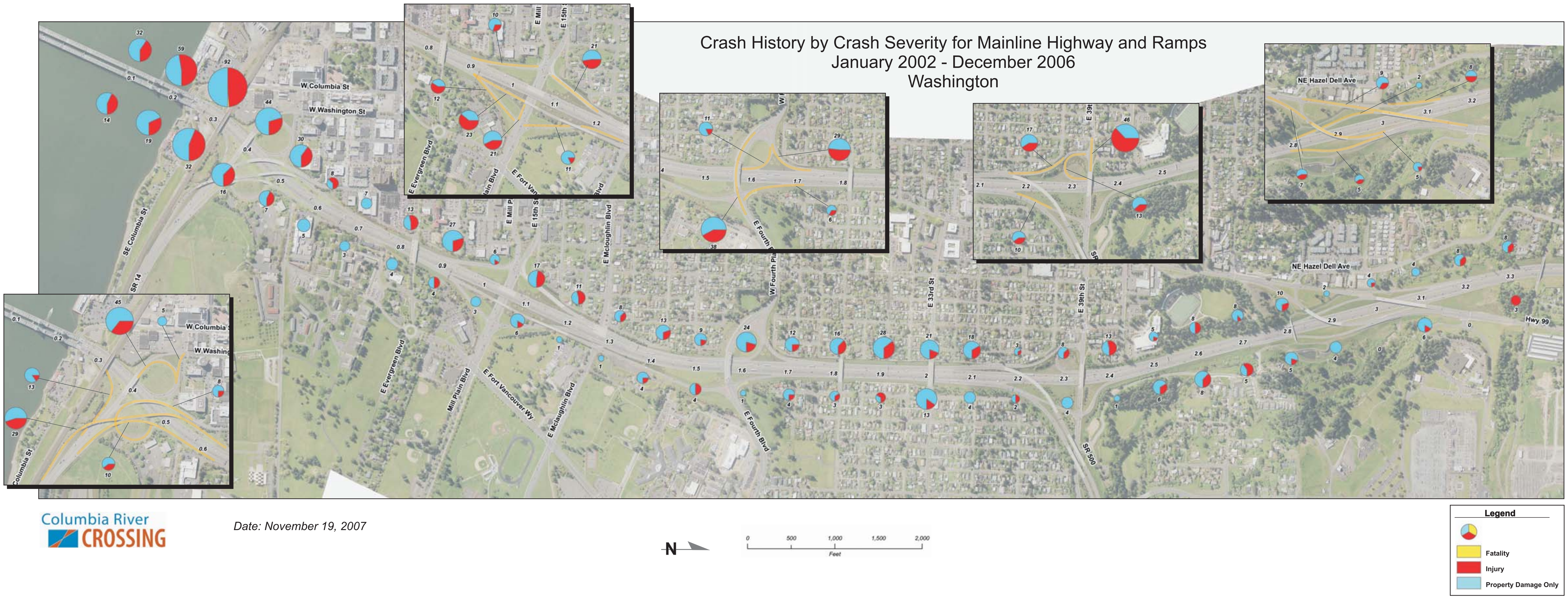
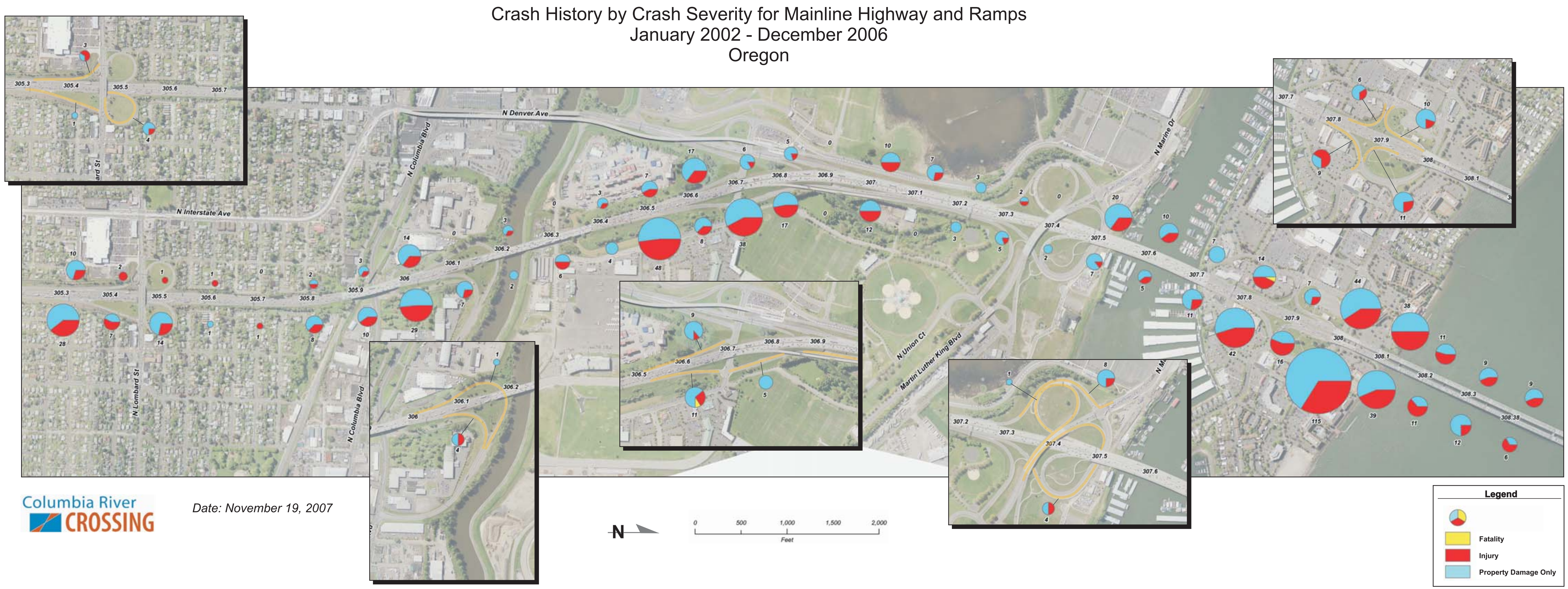


Exhibit 5-35



Crash History by Crash Severity for Mainline Highway and Ramps
January 2002 - December 2006
Washington
W Columbia St
W Washington St
SE Columbia St
SR 14
E Evergreen Blvd
Mill Plain Blvd
E Fort Vancouver Wy
E Mcloughlin Blvd
E 15th St
E Fourth Plain Blvd
E 33rd St
E 39th St
SR 500
NE Hazel Dell Ave
Hwy 99
Columbia River CROSSING
Date: November 19, 2007
N
0 500 1,000 1,500 2,000
Feet
Legend
Fatality
Injury
Property Damage Only

Exhibit 5-36



Crash History by Crash Severity for Mainline Highway and Ramps
January 2002 - December 2006
Oregon
N Denver Ave
N Interstate Ave
N Columbia Blvd
N Lombard St
N Marine Dr
N Union Ct
Martin Luther King Blvd
Columbia River CROSSING
Date: November 19, 2007
N
0
500
1,000
1,500
2,000
Feet
Legend
Fatality
Injury
Property Damage Only

Exhibit 5-37

Identified Deficiencies in Highway Geometrics							
#	State	Milepost Location	Direction	Description	Existing Dimension (ft)	Minimum Dimension (ft)	% of standard
Ramp-to-highway acceleration lane length							
1	WA	1.62	SB	Fourth Plain Blvd to I-5	1,250	1,420	88%
2	WA	0.47	SB	SR 14 WB to I-5	450	1,020	44%
3	OR	307.97	NB	Hayden Island on-ramp	211	2,201	10%
4	OR	307.76	SB	Hayden Island on-ramp	367	1,420	26%
5	OR	307.49	NB	Marine Drive on-ramp	367	1,420	26%
6	OR	306.51	SB	Victory Blvd on-ramp	437	750	58%
Highway-to-ramp deceleration lane length							
7	WA	0.39	NB	I-5 to 7th St/Downtown	385	460	84%
8	WA	0.28	NB	I-5 to SR 14 EB	170	430	40%
9	OR	307.99	SB	Hayden Island off-ramp	447	660	68%
10	OR	307.77	NB	Hayden Island off-ramp	289	520	56%
11	OR	307.47	SB	Marine Drive off-ramp	637	1,229	52%
Ramp-to-ramp separation length							
12	WA	0.30	NB	I-5 to SR 14 EB to I-5 to 7th St/Downtown	633	1,000	63%
Turning roadway - ramp merge							
13	WA	2.12	NB	I-5 39th St off-ramp to SR 500 off-ramp	528	800	66%
14	WA	0.87	NB	I-5 Mill Plain off-ramp to 4th Plain off-ramp	53	600	9%
Turning roadway - ramp split							
15	WA	2.20	SB	I-5 39th St on-ramp to SR 500 on-ramp	370	800	46%
Highway vertical alignment							
16	WA	0.30-0.47	Both	I-5 mainline sag vertical curve	400	533	75%
17	WA	0.00-0.30	Both	I-5 mainline sag vertical curve	400	963	42%
18	Both	308.10 to 0.20	Both	I-5 Bridge crest vertical curve	531	3,796	14%
Highway weaving area lane length							
19	WA	1.72-2.02	SB	SR 500 on-ramp to 4th Plain off-ramp	1,901	2,000	95%
20	WA	0.66-0.95	SB	Mill Plain on-ramp to SR 14 East	1,267	2,000	63%
21	OR	307.50-307.78	SB	Hayden Island on-ramp to Marine Drive off-ramp	1,855	2,000	93%
22	OR	307.49-307.76	NB	Marine Drive on-ramp to Hayden Island off-ramp	1,820	2,000	91%
23	OR	306-93-307.19	SB	Marine Drive on-ramp to Denver off-ramp	1,245	2,000	62%
Highway shoulder width							
24	WA	0.00-0.38	Both	inside and outside shoulders	0.5-6	10	5-60%
25	OR	307.90-308.38	NB	outside shoulder	0.5-2	12	4-17%
26	OR	307.86-308.38	SB	inside and outside shoulders	0.5-9.5	12	4-79%
27	OR	307.69-308.38	NB	inside shoulder	0.5-9.5	12	4-79%
28	OR	307.31-307.74	SB	inside and outside shoulders	0.5-6	12	4-50%
29	OR	307.03-307.29	NB	outside shoulder	1-4	12	8-33%
30	OR	306.59-307.45	NB	inside shoulder	0.5-6	12	4-50%
31	OR	305.22-307.31	SB	inside shoulder	0.5-6	12	4-50%
32	OR	305.82-306.65	SB	outside shoulder	0.5-9.5	12	4-79%
33	OR	306.54-306.59	NB	inside shoulder	0.5	12	4%
34	OR	306.10-306.53	NB	inside and outside shoulders	0.5-4	12	4-33%
35	OR	306.04-306.09	NB	outside shoulder	0.5-6	12	4-50%
36	OR	305.84-306.04	NB	inside shoulder	0.5	12	4%
37	OR	305.69-305.84	NB	outside shoulder taper	0.5-10	12	4-83%
38	OR	305.69-305.84	NB	inside shoulder taper	0.5-2	12	4-17%
39	OR	305.22-305.78	Both	Inside shoulder	2	12	17%
40	OR	305.22-305.47	SB	outside shoulder	1-4	12	8-33%

Exhibit 5-38

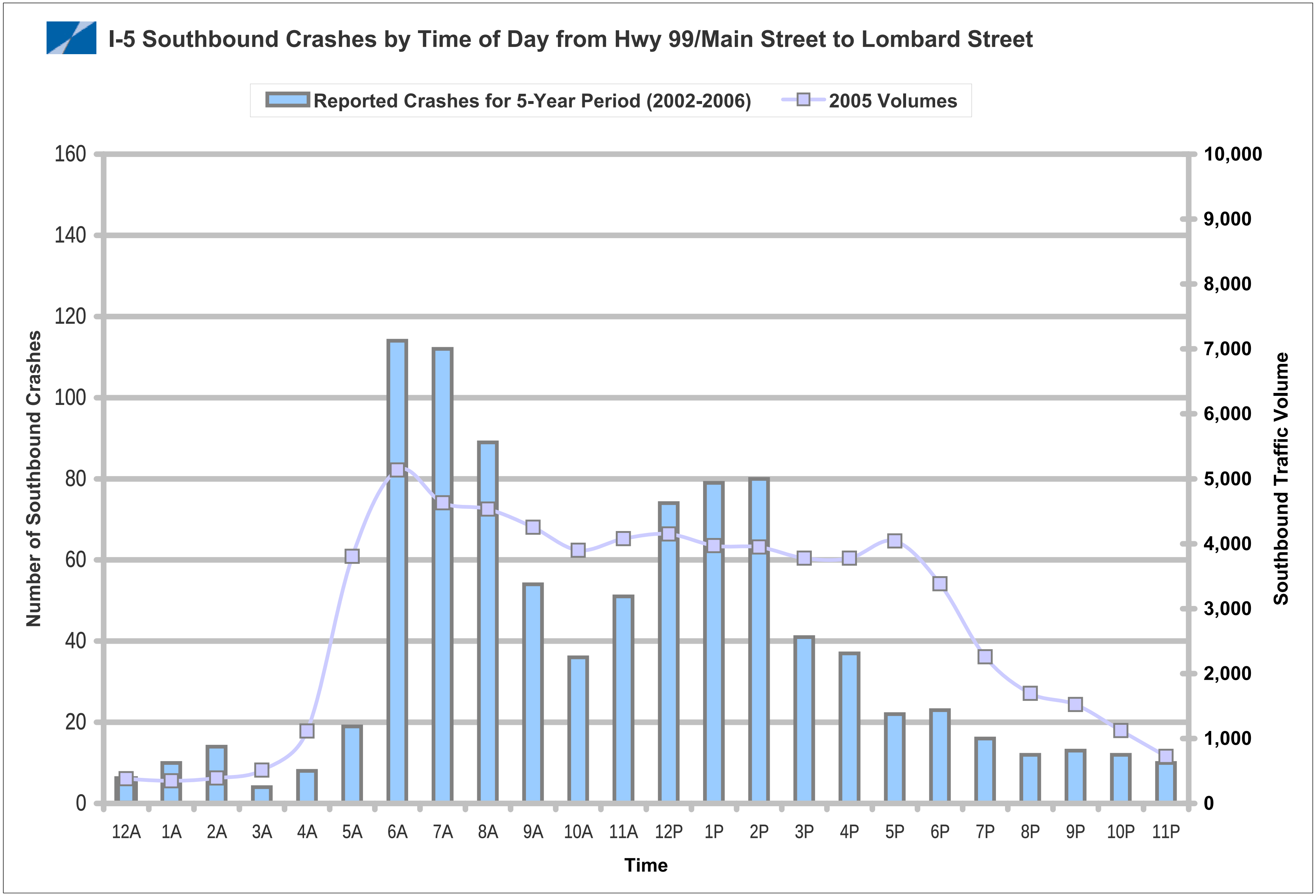
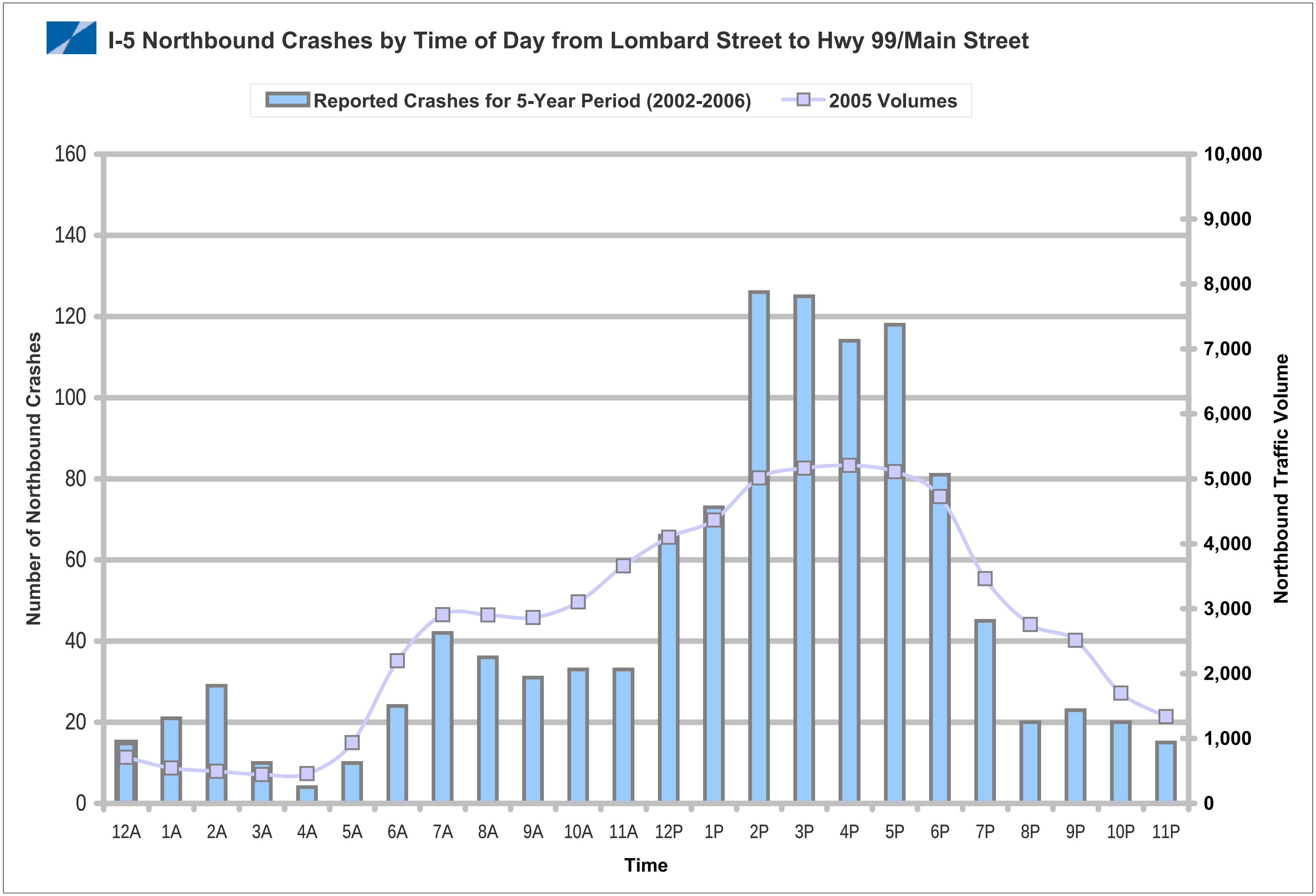

I-5 Southbound Crashes by Time of Day from Hwy 99/Main Street to Lombard Street
Reported Crashes for 5-Year Period (2002-2006)
2005 Volumes
Number of Southbound Crashes
160
140
120
100
80
60
40
20
0
Southbound Traffic Volume
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
12A 1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12P 1P 2P 3P 4P 5P 6P 7P 8P 9P 10P 11P
Time

Exhibit 5-39



I-5 Northbound Crashes by Time of Day from Lombard Street to Hwy 99/Main Street
Reported Crashes for 5-Year Period (2002-2006)
2005 Volumes
Number of Northbound Crashes
Northbound Traffic Volume
160
140
120
100
80
60
40
20
0
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
12A 1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12P 1P 2P 3P 4P 5P 6P 7P 8P 9P 10P 11P
Time

Exhibit 5-40

ODOT SPIS Locations 2004-2006				
Location	Mileposts	Number of Crashes	2007 SPIS Index	SPIS Rank
Victory Boulevard interchange	306.59 to 306.69	33	48.67	top 10%
Victory Boulevard interchange	306.63 to 306.75	33	48.67	top 10%
Oregon Slough Bridge	307.66 to 307.84	22	66.01	top 5%
Hayden Island interchange	307.81 to 308.17	78	77.12	top 5%
Interstate Bridge bridgehead	308.14 to 308.24	15	46.05	top 10%

Exhibit 5-41

Truck Collision Summary on I-5 from Lombard Street to Main Street/SR 99 (Jan. 1, 2002 - Dec. 31, 2006)							
Direction	Number of Fatalities	Number of Injuries	Collision Type				Number of Collisions
			Rear-end	Sideswipe	Fixed Object	Other	
Northbound	0	28	39	33	4	20	96
Southbound	1	49	69	67	4	19	159
Total	**1**	**77**	**108**	**100**	**8**	**39**	**255**
% of Total	0.4%	30%	42%	39%	3%	15%	

Source: *Crash Analysis Study Summary Working Paper*, Draft, 2007 CRC Project

Exhibit 5-42

Vancouver North-South Screenlines - AM Peak Hour Volumes	
Screenline	**Existing**
West of Franklin St	
Westbound Total	1,350
Eastbound Total	1,400
West of I-5	
Westbound Total	3,100
Eastbound Total	2,750
East of I-5	
Westbound Total	2,550
Eastbound Total	2,300

Vancouver East-West Screenlines - AM Peak Hour Volumes	
Screenline	**Existing**
North of Evergreen Blvd	
Southbound Total	950
Northbound Total	800
North of 15th St	
Southbound Total	1,300
Northbound Total	450
North of 4th Plain Blvd	
Southbound Total	1,500
Northbound Total	350
North of 39th St	
Southbound Total	800
Northbound Total	250

Exhibit 5-43

Vancouver North-South Screenlines - PM Peak Hour Volumes	
Screenline	**Existing**
West of Franklin St	
Westbound Total	1,550
Eastbound Total	1,750
West of I-5	
Westbound Total	2,900
Eastbound Total	4,200
East of I-5	
Westbound Total	2,550
Eastbound Total	4,050

Vancouver East-West Screenlines - PM Peak Hour Volumes	
Screenline	**Existing**
North of Evergreen Blvd	
Southbound Total	950
Northbound Total	1,200
North of 15th St	
Southbound Total	850
Northbound Total	950
North of 4th Plain Blvd	
Southbound Total	600
Northbound Total	950
North of 39th St	
Southbound Total	500
Northbound Total	650

Exhibit 5-44

Portland North-South Screenlines - AM Peak Hour Volumes	
Screenline	**Existing**
West of Denver Ave	
Westbound Total	3,300
Eastbound Total	2,800
West of Vancouver Ave	
Westbound Total	3,100
Eastbound Total	2,450
East of MLK Jr Blvd	
Westbound Total	3,850
Eastbound Total	2,450

Portland East-West Screenlines - AM Peak Hour Volumes	
Screenline	**Existing**
Columbia Slough	
Southbound Total	1,500
Northbound Total	1,200
North of Portland Blvd	
Southbound Total	1,950
Northbound Total	1,000
South of Alberta St	
Southbound Total	3,250
Northbound Total	1,450

Exhibit 5-45

Portland North-South Screenlines - PM Peak Hour Volumes	
Screenline	**Existing**
West of Denver Ave	
Westbound Total	2,800
Eastbound Total	3,950
West of Vancouver Ave	
Westbound Total	2,950
Eastbound Total	3,050
East of MLK Jr Blvd	
Westbound Total	3,100
Eastbound Total	3,950

Portland East-West Screenlines - PM Peak Hour Volumes	
Screenline	**Existing**
Columbia Slough	
Southbound Total	1,500
Northbound Total	1,800
North of Portland Blvd	
Southbound Total	1,750
Northbound Total	2,550
South of Alberta St	
Southbound Total	2,400
Northbound Total	4,050

Exhibit 5-46

13th
Port Way
Evergreen Blvd
8th St
6th St
Esther Short
BNSF Rail
SR 14
Columbia River
E Mill Plain Blvd
E Reserve St
E Evergreen Blvd
Fort Vancouver National Historic Site
Vancouver
Pearson Field
SE Columbia Way
5
14
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
Principal Arterial
Minor Arterial
Collector

Exhibit 5-47

Vancouver Intersection Performance Results

AM Peak Hour		2005 Existing Conditions							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	3rd/4th St. @ Columbia St	Westbound Left/Right	3.7	A	0.03	LOS E	Y	-	-
02	4th St. @ Columbia St.	Eastbound Left/Thru/Right	4.4	A	0.03	LOS E	Y	-	-
03	4th St. @ Washington St.	Eastbound Right	1.1	A	0.01	LOS E	Y	-	-
04	5th St. @ Columbia St.	Southbound Left	12.6	B	0.15	LOS E	Y	90	100 (SBL)
05	5th St. @ Washington St.	*Overall Intersection*	39.6	D	0.42	LOS E	Y	180	200 (EBR to I-5)
								215	225 (SBL)
06	6th St. @ Columbia St.	*Overall Intersection*	7.8	A	0.42	LOS E	Y	-	-
07	6th St. @ Washington St.	*Overall Intersection*	20.3	C	0.39	LOS E	Y	-	-
08	6th St. @ Main St.	Westbound Left/Thru/Right	6.7	A	0.36	LOS E	Y	-	-
09	6th St. @ Broadway	Southbound Right	1.8	A	0.02	LOS E	Y	-	-
10	6th St. @ C St.	Northbound Left/Thru	5.7	A	-	LOS E	Y	-	-
11	8th St. @ Esther St.	Southbound Left/Thru/Right	6.0	A	0.08	LOS E	Y	-	-
12	8th St. @ Columbia St.	*Overall Intersection*	10.8	B	0.51	LOS E	Y	-	-
13	8th St. @ Washington St.	*Overall Intersection*	5.4	A	0.55	LOS E	Y	-	-
14	8th St. @ Main St.	*Overall Intersection*	11.3	B	0.55	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left	6.6	A	0.22	LOS E	Y	-	-
16	8th St. @ C St.	*Overall Intersection*	10.0	A	0.48	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	5.6	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Eastbound Left/Thru/Right	5.4	A	0.05	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Left	6.4	A	0.01	LOS E	Y	-	-
20	9th St. @ Main St.	Northbound Left	6.2	A	0.05	LOS E	Y	50	75 (NBL)
21	9th St. @ Broadway	Southbound Thru/Right	5.6	A	0.27	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Northbound Left/Thru/Right	4.7	A	0.12	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	*Overall Intersection*	13.4	B	0.49	LOS E	Y	-	-
24	Evergreen Blvd. @ Washington St.	*Overall Intersection*	9.1	A	0.53	LOS E	Y	-	-
25	Evergreen Blvd. @ Main St.	*Overall Intersection*	7.9	A	0.53	LOS E	Y	-	-
26	Evergreen Blvd. @ Broadway	*Overall Intersection*	18.7	B	0.83	LOS E	Y	75	75 (WBL)
								100	100 (SBL)
								210	225 (SBTR)
27	Evergreen Blvd. @ C St.	*Overall Intersection*	11.9	B	0.83	LOS E	Y	-	-
28	11th St. @ Esther St.	Southbound Left/Thru/Right	4.3	A	0.03	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	6.9	A	0.14	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	6.0	A	0.07	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Thru/Right	4.7	A	0.08	LOS E	Y	-	-
32	11th St. @ Broadway	Eastbound Thru/Right	6.1	A	0.06	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	4.2	A	0.08	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	*Overall Intersection*	12.8	B	0.66	LOS E	Y	-	-
35	Mill Plain Blvd. @ Washington St.	*Overall Intersection*	7.2	A	0.40	LOS E	Y	-	-
36	Mill Plain Blvd. @ Main St.	*Overall Intersection*	4.7	A	0.57	LOS E	Y	-	-
37	Mill Plain Blvd. @ Broadway	*Overall Intersection*	12.2	B	0.51	LOS E	Y	190	200 (SBLT)
38	Mill Plain Blvd. @ C St.	*Overall Intersection*	8.3	A	0.34	LOS E	Y	-	-
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	*Overall Intersection*	18.6	B	0.58	LOS E	Y	350	375 (EBR)
								275	350 (WBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	*Overall Intersection*	21.8	C	0.54	LOS E	Y	75	100 (WBR)
41	15th St. @ Columbia St.	*Overall Intersection*	10.1	B	0.53	LOS E	Y	-	-
42	15th St. @ Washington St.	*Overall Intersection*	4.9	A	0.44	LOS E	Y	-	-
43	15th St. @ Main St.	*Overall Intersection*	7.5	A	0.48	LOS E	Y	-	-
44	15th St. @ Broadway	*Overall Intersection*	18.2	B	0.47	LOS E	Y	-	-
45	15th St. @ C St.	*Overall Intersection*	8.8	A	0.48	LOS E	Y	-	-
46	McLoughlin Blvd. @ Columbia St.	*Overall Intersection*	7.3	A	0.52	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	*Overall Intersection*	11.0	B	0.55	LOS E	Y	-	-
48	McLoughlin Blvd. @ Broadway	*Overall Intersection*	10.1	B	0.46	LOS E	Y	-	-
49	McLoughlin Blvd. @ Fort Vancouver Way	*Overall Intersection*	9.1	A	0.36	LOS D	Y	-	-
50	24th St. @ Columbia St.	Westbound Left/Thru/Right	8.4	A	0.12	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	6.6	A	0.06	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	*Overall Intersection*	18.8	B	0.61	LOS D	Y	-	-
53	4th Plain Blvd. @ Main St.	*Overall Intersection*	35.7	D	0.66	LOS D	Y	125	150 (WBL)
								200	200 (WBTR)
								75	100 (SBL)
								470	475 (SBTR)
54	4th Plain Blvd. @ Broadway	*Overall Intersection*	18.4	B	0.65	LOS D	Y	-	-
55	4th Plain Blvd. @ F St.	*Overall Intersection*	12.5	B	0.50	LOS D	Y	150	200 (EBL)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	*Overall Intersection*	8.8	A	0.46	LOS D	Y	-	-
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	*Overall Intersection*	12.3	B	0.51	LOS D	Y	75	150 (WBR)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	6.5	A	0.01	LOS D	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	*Overall Intersection*	13.2	B	0.41	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.07	LOS E	N	215	225 (SBTR)
61	28th St. @ Broadway	Northbound Thru/Right	1.0	A	-	LOS E	Y	-	-
62	29th St. @ Main St./Broadway	Eastbound Left/Thru/Right	23.8	C	-	LOS E	Y	-	-
63	33rd St. @ Main St.	*Overall Intersection*	18.3	B	0.54	LOS D	Y	50	75 (WBL)
								75	100 (SBL)
64	39th St. @ Main St.	*Overall Intersection*	28.5	C	0.69	LOS D	Y	75	125 (EBL)
								75	125 (WBL)
								215	225 (WBTR)
								125	175 (SBL)
65	39th St. @ F St.	Southbound Left/Thru/Right	22.6	C	0.12	LOS E	Y	50	75 (WBL)
66	39th St. @ H St.	*Overall Intersection*	8.2	A	0.54	LOS D	Y	135	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	Northbound Left	68.0	F	1.55	LOS E	N	1660	600 (NBL)
								125	200 (NBR)
68	39th St. @ I-5 NB On-/Off-Ramps	*Overall Intersection*	11.9	B	0.59	LOS D	Y	-	-
69	WSDOT/40th St. @ Main St.	*Overall Intersection*	4.5	A	0.44	LOS D	Y	-	-
70	45th St. @ Main St.	*Overall Intersection*	7.4	A	0.44	LOS D	Y	-	-
71	Hazel Dell @ Main St. (West)	*Overall Intersection*	9.7	A	0.50	LOS D	Y	-	-
72	Ross St. @ Main St.	*Overall Intersection*	4.6	A	0.29	LOS D	Y	-	-
73	Ross St. @ North Rd.	Northbound Left/Thru	6.0	A	0.24	LOS E	Y	-	-

(yellow)	Delay / LOS affected by freeway congestion
(blue)	Intersection queuing spills back into upstream intersection
Note 1	The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2	The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.
Y*	Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y**	Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 5-48

Vancouver Intersection Performance Results

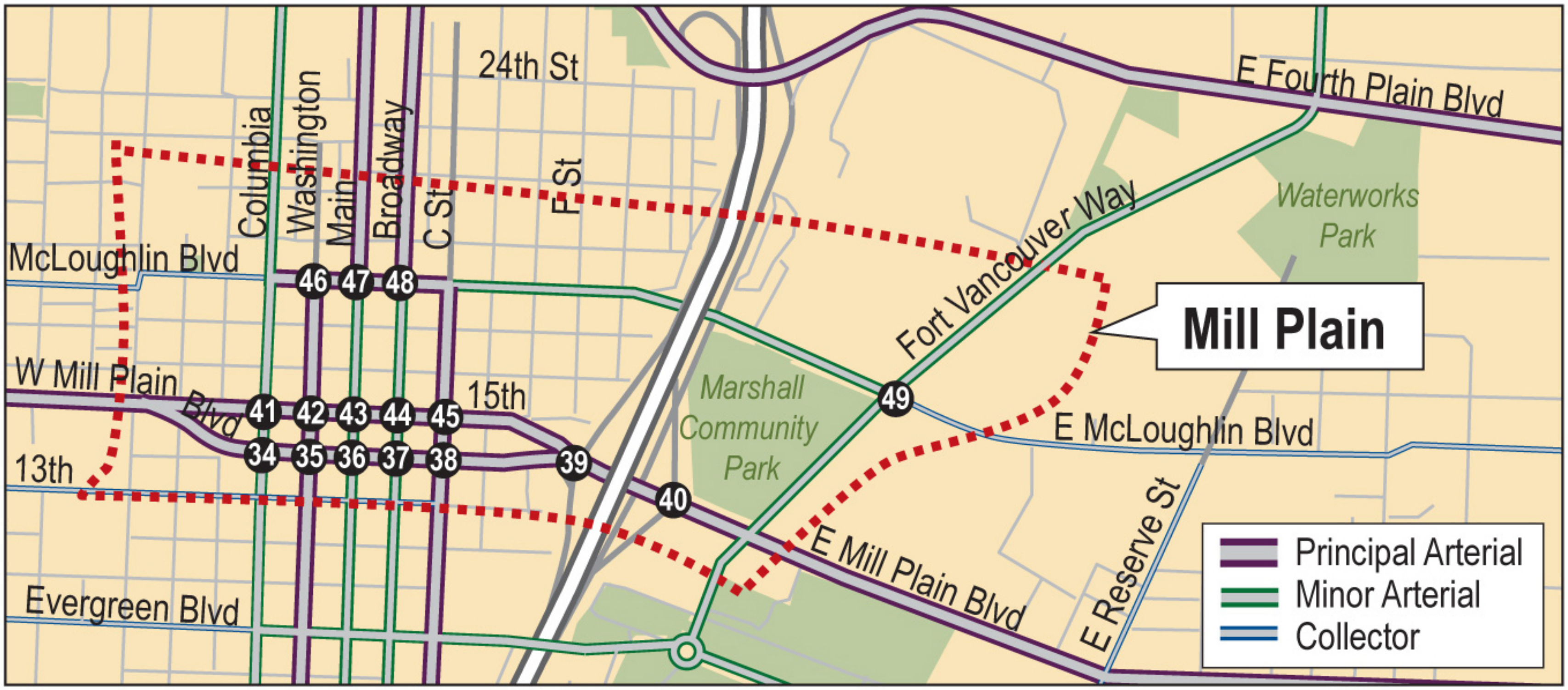
PM Peak Period		**2005 Existing Conditions**							
#	**Intersection**	**Approach/Movement**	**Delay (Seconds)**	**LOS**	**ICU / V/C[1]**	**Standard[2]**	**Meets Standard**	**Storage Length**	**95% Queue (ft)**
01	3rd/4th St. @ Columbia St	Westbound Left/Right	4.7	A	0.05	LOS E	Y	-	-
02	4th St. @ Columbia St.	Westbound Left/Thru/Right	4.8	A	0.05	LOS E	Y	-	-
03	4th St. @ Washington St.	Eastbound Right	1.6	A	0.01	LOS E	Y	-	-
04	5th St. @ Columbia St.	Southbound Left	3.6	A	0.22	LOS E	Y	-	-
05	5th St. @ Washington St.	***Overall Intersection***	8.1	A	0.34	LOS E	Y	-	-
06	6th St. @ Columbia St.	***Overall Intersection***	10.7	B	0.42	LOS E	Y	-	-
07	6th St. @ Washington St.	***Overall Intersection***	11.6	B	0.36	LOS E	Y	-	-
08	6th St. @ Main St.	Westbound Left/Thru/Right	6.1	A	0.32	LOS E	Y	-	-
09	6th St. @ Broadway	Southbound Right	4.6	A	0.22	LOS E	Y	-	-
10	6th St. @ C St.	Northbound Left/Thru	2.1	A	-	LOS E	Y	-	-
11	8th St. @ Esther St.	Northbound Left/Thru/Right	8.0	A	0.31	LOS E	Y	-	-
12	8th St. @ Columbia St.	***Overall Intersection***	15.1	B	0.74	LOS E	Y	-	-
13	8th St. @ Washington St.	***Overall Intersection***	9.5	A	0.58	LOS E	Y	75	125 (WBL)
14	8th St. @ Main St.	***Overall Intersection***	17.0	B	0.58	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Thru/Right	10.2	B	0.13	LOS E	Y	-	-
16	8th St. @ C St.	***Overall Intersection***	14.3	B	0.34	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	4.5	A	0.07	LOS E	Y	-	-
18	9th St. @ Columbia St.	Westbound Left/Thru/Right	6.3	A	0.18	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Thru	8.5	A	0.08	LOS E	Y	-	-
20	9th St. @ Main St.	Northbound Thru	6.7	A	0.34	LOS E	Y	50	50 (NBL)
21	9th St. @ Broadway	Southbound Thru/Right	6.2	A	0.24	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Southbound Left/Thru/Right	6.6	A	0.14	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	***Overall Intersection***	10.9	B	0.53	LOS E	Y	-	-
24	Evergreen Blvd. @ Washington St.	***Overall Intersection***	10.5	B	0.56	LOS E	Y	-	-
25	Evergreen Blvd. @ Main St.	***Overall Intersection***	9.7	A	0.56	LOS E	Y	-	-
26	Evergreen Blvd. @ Broadway	***Overall Intersection***	12.7	B	0.56	LOS E	Y	210	225 (SBTR)
27	Evergreen Blvd. @ C St.	***Overall Intersection***	13.0	B	0.56	LOS E	Y	-	-
28	11th St. @ Esther St.	Northbound Left/Thru/Right	6.3	A	0.11	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	8.9	A	0.34	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	7.0	A	0.21	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Thru/Right	7.5	A	0.41	LOS E	Y	-	-
32	11th St. @ Broadway	Eastbound Thru/Right	6.2	A	0.19	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	7.8	A	0.18	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	***Overall Intersection***	14.7	B	0.75	LOS E	Y	-	-
35	Mill Plain Blvd. @ Washington St.	***Overall Intersection***	8.2	A	0.45	LOS E	Y	-	-
36	Mill Plain Blvd. @ Main St.	***Overall Intersection***	12.4	B	0.62	LOS E	Y	100	150 (NBR)
37	Mill Plain Blvd. @ Broadway	***Overall Intersection***	16.6	B	0.70	LOS E	Y	-	-
38	Mill Plain Blvd. @ C St.	***Overall Intersection***	14.1	B	0.60	LOS E	Y	-	-
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	37.5	D	0.72	LOS E	Y	275	350 (WBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	26.8	C	0.86	LOS E	Y	610	725 (EBL)
								610	625 (EBT)
								75	125 (WBR)
41	15th St. @ Columbia St.	***Overall Intersection***	9.0	A	0.54	LOS E	Y	-	-
42	15th St. @ Washington St.	***Overall Intersection***	5.6	A	0.37	LOS E	Y	-	-
43	15th St. @ Main St.	***Overall Intersection***	9.0	A	0.59	LOS E	Y	-	-
44	15th St. @ Broadway	***Overall Intersection***	24.8	C	0.43	LOS E	Y	210	250 (WBL)
45	15th St. @ C St.	***Overall Intersection***	6.7	A	0.41	LOS E	Y	-	-
46	McLoughlin Blvd. @ Columbia St.	***Overall Intersection***	6.4	A	0.42	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	***Overall Intersection***	11.6	B	0.67	LOS E	Y	-	-
48	McLoughlin Blvd. @ Broadway	***Overall Intersection***	7.8	A	0.39	LOS E	Y	-	-
49	McLoughlin Blvd. @ Fort Vancouver Way	***Overall Intersection***	12.6	B	0.43	LOS D	Y	-	-
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	5.4	A	-	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	7.7	A	0.07	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	15.8	B	0.50	LOS D	Y	-	-
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	28.3	C	0.66	LOS D	Y	125	150 (WBL)
								200	200 (WBTR)
								75	100 (NBL)
								75	125 (NBR)
								75	125 (SBL)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	24.0	C	0.94	LOS D	Y	125	150 (WBL)
								495	500 (WBTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	7.1	A	0.57	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	11.3	B	0.54	LOS D	Y	-	-
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	16.0	B	0.63	LOS D	Y	75	150 (WBR)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	7.0	A	-	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	16.6	B	0.54	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	6.8	A	0.03	LOS E	Y	-	-
61	28th St. @ Broadway	Northbound Thru/Right	1.9	A	-	LOS E	Y	-	-
62	29th St. @ Main St./Broadway	Eastbound Left/Thru/Right	12.5	B	-	LOS E	Y	-	-
63	33rd St. @ Main St.	***Overall Intersection***	18.3	B	0.45	LOS D	Y	50	75 (EBL)
								50	75 (WBL)
64	39th St. @ Main St.	***Overall Intersection***	38.3	D	0.71	LOS D	Y	75	125 (EBL)
								490	500 (EBTR)
								75	100 (WBL)
								215	225 (WBTR)
								75	125 (NBL)
								125	175 (SBL)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.16	LOS E	N	50	75 (WBL)
								430	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	8.3	A	0.57	LOS D	Y	135	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	Northbound Left	30.0	D	-	LOS E	Y	55	100 (EBR)
								125	175 (NBR)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	23.1	C	0.76	LOS D	Y	75	125 (NBR)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	4.9	A	0.33	LOS D	Y	-	-
70	45th St. @ Main St.	***Overall Intersection***	9.1	A	0.44	LOS D	Y	-	-
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	8.5	A	0.45	LOS D	Y	-	-
72	Ross St. @ Main St.	***Overall Intersection***	8.5	A	0.46	LOS D	Y	60	75 (WBL)
								60	75 (WBR)
73	Ross St. @ North Rd.	Northbound Left/Thru	6.3	A	-	LOS E	Y	-	-

Delay / LOS affected by freeway congestion
Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.

Exhibit 5-49



24th St
Columbia
Washington
Main
Broadway
C St
F St
McLoughlin Blvd
W Mill Plain Blvd
15th
13th
Evergreen Blvd
Marshall Community Park
Waterworks Park
Fort Vancouver Way
E Fourth Plain Blvd
E McLoughlin Blvd
E Mill Plain Blvd
E Reserve St
Mill Plain
34
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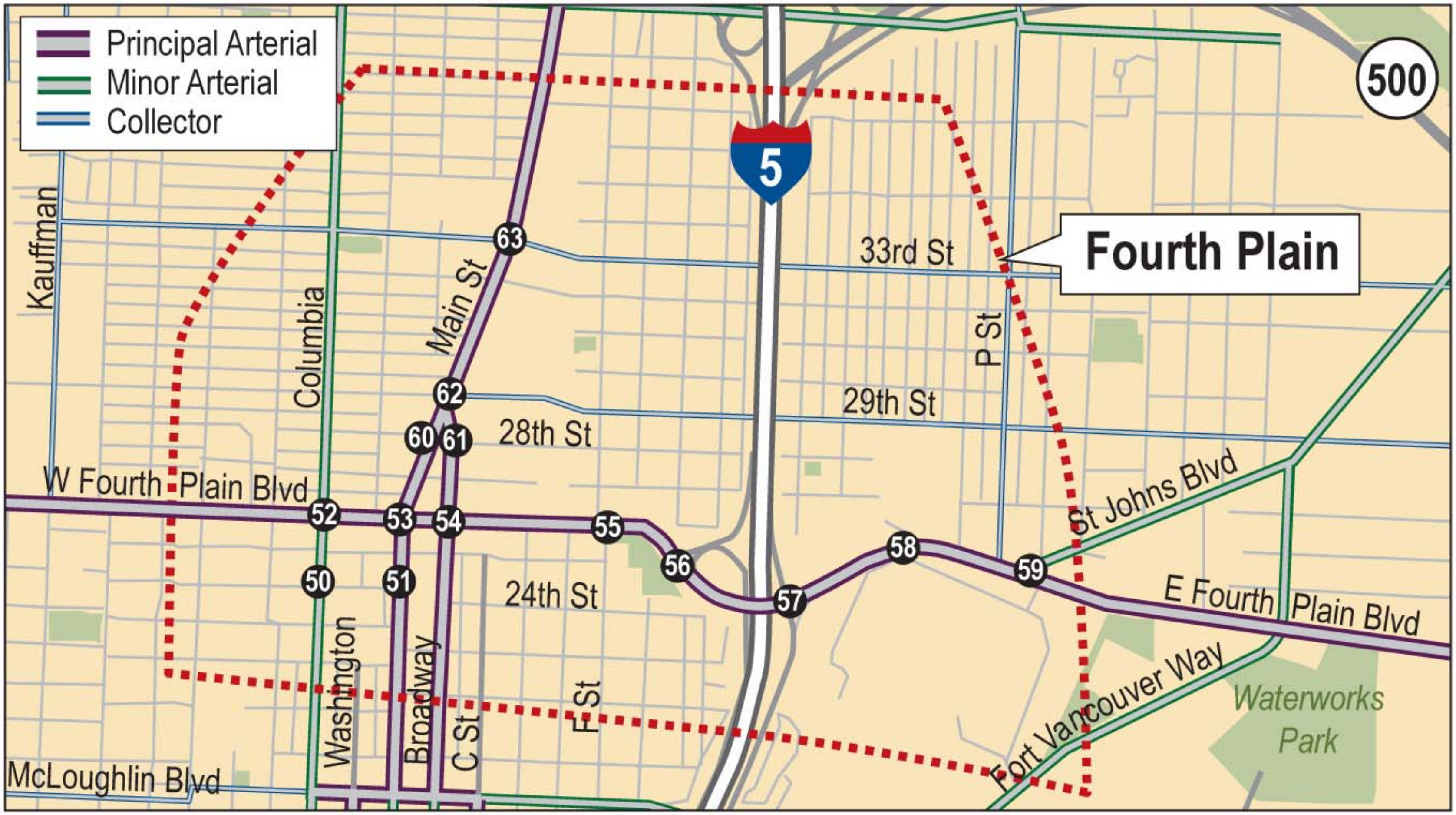
Principal Arterial
Minor Arterial
Collector

Exhibit 5-50



Principal Arterial
Minor Arterial
Collector
Fourth Plain
5
500
Kauffman
Columbia
Main St
Washington
Broadway
C St
F St
P St
33rd St
29th St
28th St
24th St
W Fourth Plain Blvd
E Fourth Plain Blvd
St Johns Blvd
Fort Vancouver Way
McLoughlin Blvd
Waterworks Park
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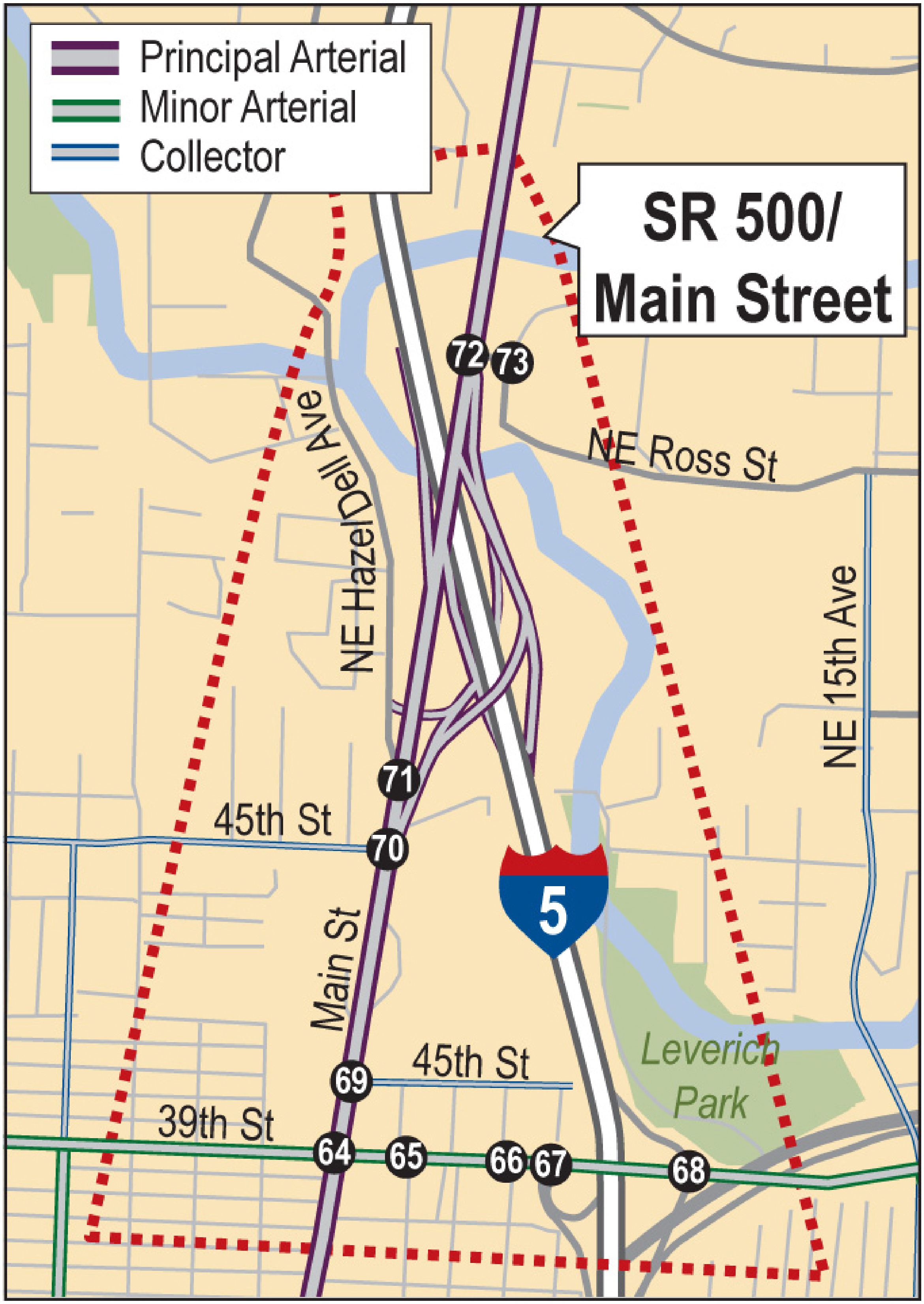
Exhibit 5-51



Principal Arterial
Minor Arterial
Collector
SR 500/
Main Street
NE Hazel Dell Ave
NE Ross St
NE 15th Ave
45th St
Main St
45th St
39th St
Leverich
Park
5
72
73
71
70
69
64
65
66
67
68

Exhibit 5-52

Hayden Island
N Hayden Island Dr
5
Columbia River
Hayden Island
24
25
N Marine Dr
OREGON
Principal Arterial
Minor Arterial
Urban Collector
Minor Collector

Exhibit 5-53

Portland Intersection Performance Results

AM Peak Hour			2005 Existing Conditions						
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	24.2	C	0.83	LOS D	Y	125	200 (WBL)
02	Going and Interstate	***Overall Intersection***	31.7	C	0.75	LOS D	Y	125	250 (WBL)
								125	150 (NBL)
03	Alberta and Interstate	***Overall Intersection***	18.0	B	0.72	LOS D	Y	100	125 (SBL)
04	Alberta and SB I-5 Off-Ramp	Westbound Left	18.4	C	0.73	0.85	Y	175	175 (WBLT)
05	Alberta and NB I-5 Off-Ramp	Westbound Thru/Right	13.0	B	0.51	0.85	Y	-	-
06	Alberta and MLK Jr.	***Overall Intersection***	20.3	C	0.78	LOS D	Y	75	125 (WBR)
								100	125 (NBL)
07	Portland and Interstate	***Overall Intersection***	18.2	B	0.54	LOS D	Y	-	-
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	18.3	B	0.52	0.85	Y	190	225 (WBL)
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	11.8	B	0.39	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	17.5	B	0.66	LOS D	Y	-	-
11	Lombard and Interstate	***Overall Intersection***	27.8	C	0.66	0.99	Y	150	175 (WBL)
12	Lombard and I-5 SB On-Ramps	Eastbound Thru/Right	4.8	A	0.31	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	8.5	A	0.48	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	61.4	E	0.79	0.99	Y	100	125 (EBL)
								100	175 (WBL)
								100	175 (NBL)
								150	300 (SBL)
15	Interstate and Argyle	***Overall Intersection***	22.2	C	0.61	LOS D	Y	75	125 (EBR)
								50	75 (NBL)
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	17.6	B	0.62	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	32.7	C	0.72	0.99	Y	100	200 (NBL)
								225	250 (SBL)
18	Victory and Expo Road	Southbound Left/Thru	5.2	A	0.04	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Westbound Left/Thru	1.1	A	0.17	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	4.0	A	0.10	0.85	Y	-	-
21	Union Ct and I-5 NB Off-Ramp	Eastbound Left	7.1	A	0.24	0.85	Y	-	-
22	Union Ct/Marine Way and Vancouver Way	Northwest Thru/Right	7.1	A	0.36	LOS E	Y	-	-
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	32.8	C	0.66	0.85	Y	200	275 (NBL)
								125	200 (SBR)
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	11.0	B	0.35	0.85	Y	-	-
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	8.2	A	0.35	LOS D	Y	-	-

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1).
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Exhibit 5-54

Portland Intersection Performance Results

PM Peak Hour		2005 Existing Conditions							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	30.5	C	0.89	LOS D	Y	125	150 (EBL)
								125	175 (NBL)
								125	150 (SBL)
02	Going and Interstate	***Overall Intersection***	33.8	C	0.72	LOS D	Y	125	150 (NBL)
03	Alberta and Interstate	***Overall Intersection***	25.1	C	0.76	LOS D	Y	125	175 (NBL)
04	Alberta and SB I-5 Off-Ramp	Westbound Left	12.0	B	0.75	0.85	Y	-	-
05	Alberta and NB I-5 Off-Ramp	Eastbound Left	11.7	B	0.71	0.85	Y	-	-
06	Alberta and MLK Jr.	***Overall Intersection***	38.0	D	0.88	LOS D	Y	75	150 (WBR)
								100	150 (NBL)
								100	150 (SBL)
07	Portland and Interstate	***Overall Intersection***	32.0	C	0.71	LOS D	Y	100	150 (WBL)
								175	225 (NBL)
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	15.0	B	0.48	0.85	Y	-	-
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	12.7	B	0.42	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	16.5	B	0.75	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	***Overall Intersection***	32.4	C	0.76	0.99	Y	100	175 (NBR)
12	Lombard and I-5 SB On-Ramps	Eastbound Thru/Right	3.7	A	0.36	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	10.7	B	0.42	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	74.0	E	0.85	0.99	Y	100	150 (EBL)
								100	175 (WBL)
								100	225 (NBL)
								150	300 (SBL)
15	Interstate and Argyle	***Overall Intersection***	17.6	B	0.61	LOS D	Y	75	125 (EBR)
								50	75 (NBL)
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	12.6	B	0.58	0.85	Y	150	175 (WBR)
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	39.3	D	0.71	0.99	Y	150	175 (WBL)
								100	225 (NBL)
								225	300 (SBL)
18	Victory and Expo Road	Southbound Left/Thru	7.1	A	0.37	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Eastbound Thru	5.5	A	0.27	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	56.9	E	0.32	0.85	Y	290	325 (EBL)
								200	250 (WBTR)
21	Union Ct and I-5 NB Off-Ramp	Eastbound Left/Thru	33.1	D	0.30	0.85	Y	200	250 (EBL)
22	Union Ct/Marine Way and Vancouver Way	Northeast Left/Thru	48.9	E	0.66	LOS E	Y	370	500 (NBTR)
								75	100 (SBLTR)
								370	400 (NBR)
								55	75 (SWL)
								55	75 (SWTR)
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	55.7	E	0.69	0.85	Y	275	325 (EBL)
								373	1150 (WBR)
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	20.2	C	0.61	0.85	Y	115	225 (WBLT)
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	12.9	B	0.44	LOS D	Y	-	-

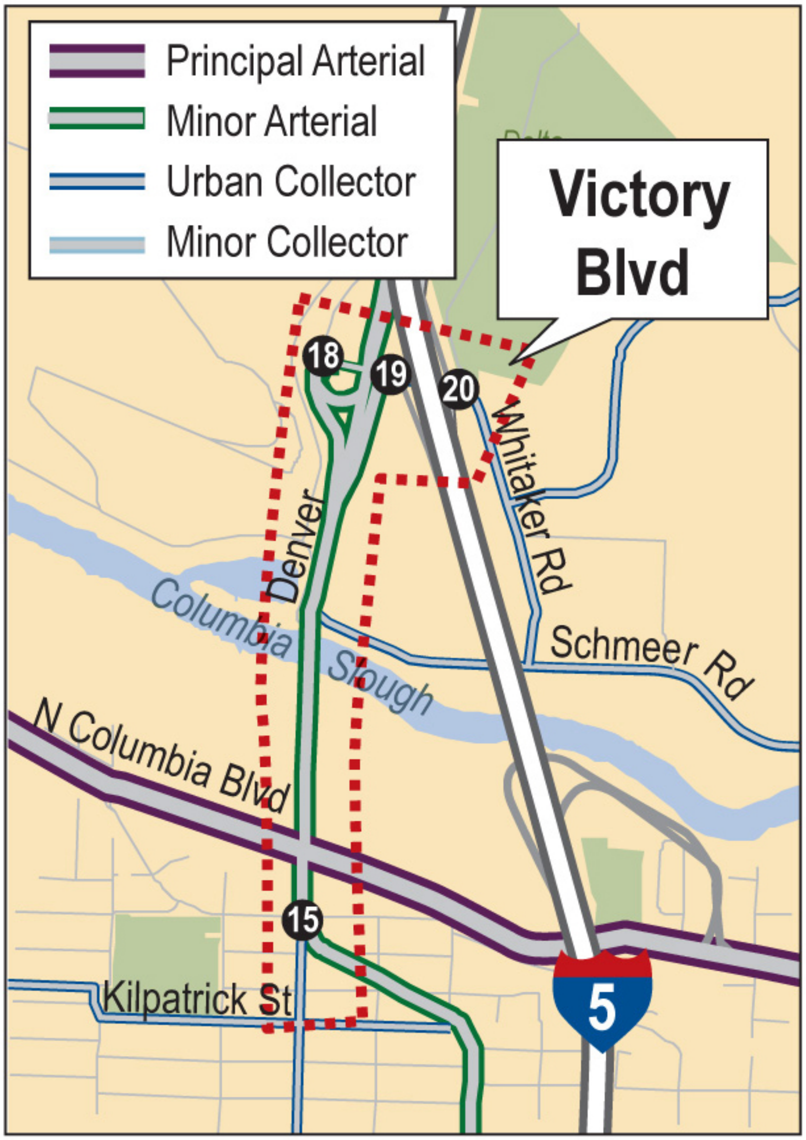
Delay / LOS affected by freeway congestion
Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1).
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Exhibit 5-55

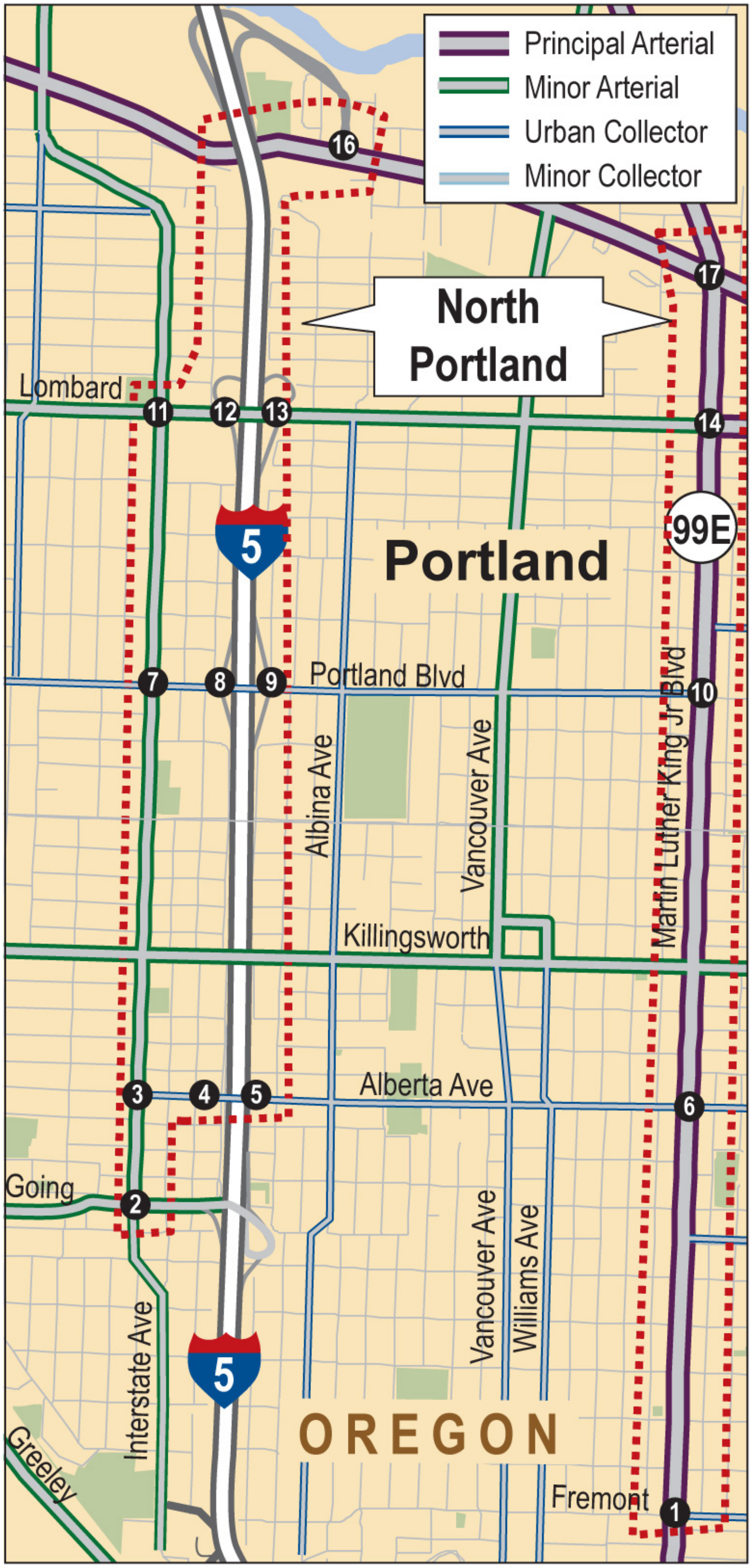
OREGON
N Marine Dr
Columbia River
North Portland Harbor
Marine Drive
23
22
21
N Marine Dr
Portland
5
Delta Park
MLK Jr Blvd
Vancouver Way
Union Ct
99E
Principal Arterial
Minor Arterial
Urban Collector
Minor Collector

Exhibit 5-56



Principal Arterial
Minor Arterial
Urban Collector
Minor Collector
Victory Blvd
18
19
20
15
Denver
Whitaker Rd
Columbia Slough
Schmeer Rd
N Columbia Blvd
Kilpatrick St
5

Exhibit 5-57



Principal Arterial
Minor Arterial
Urban Collector
Minor Collector
North Portland
Portland
Lombard
Portland Blvd
Killingsworth
Alberta Ave
Going
Greeley
Fremont
Albina Ave
Vancouver Ave
Williams Ave
Interstate Ave
Martin Luther King Jr Blvd
99E
5
5
OREGON
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3
4
5
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7
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9
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11
12
13
14
16
17

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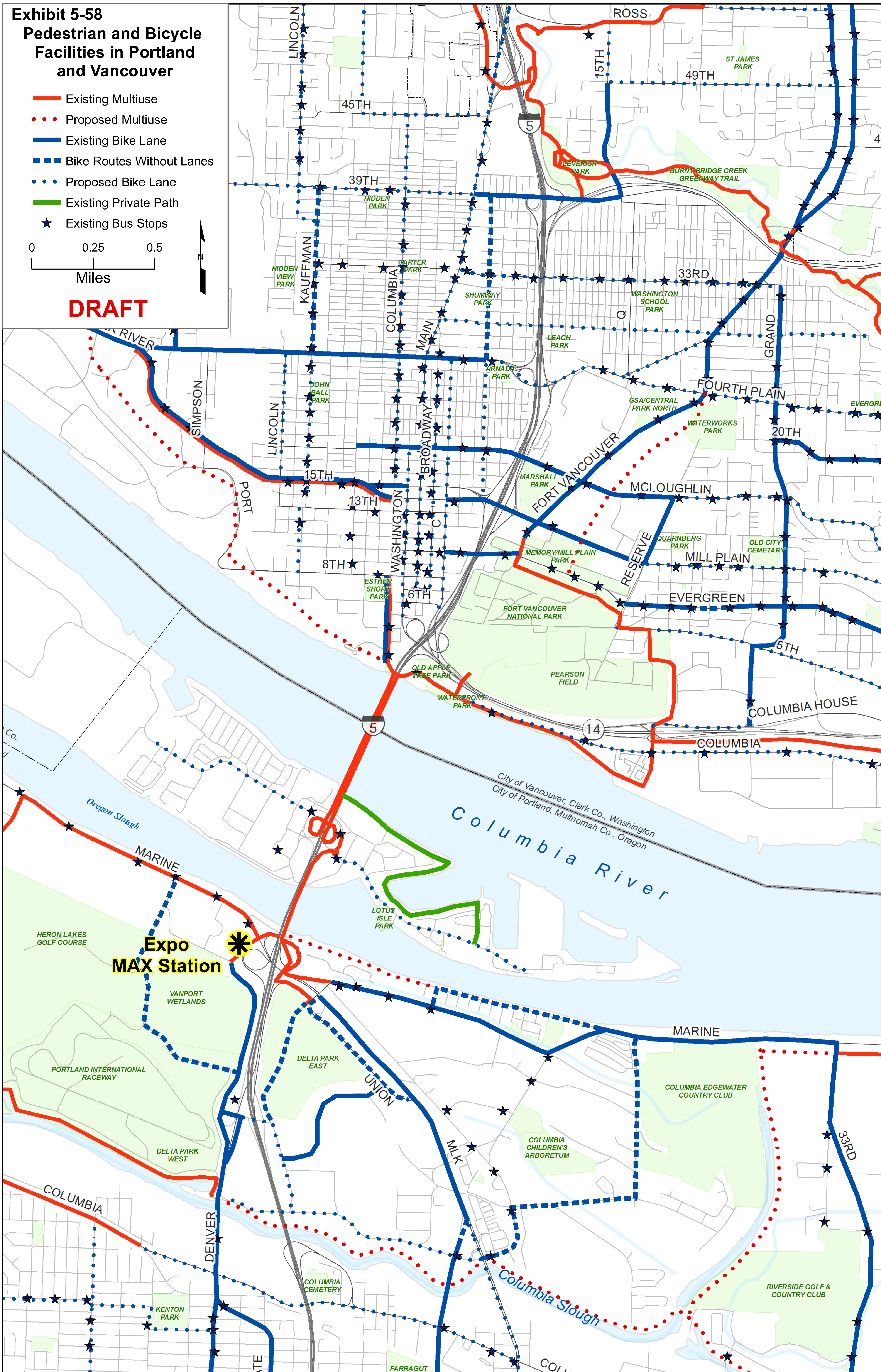

Exhibit 5-58
Pedestrian and Bicycle Facilities in Portland and Vancouver

Analysis by J. Koloszar; Analysis Date: 11-Jul-2007; Plot Date: 11-Jul-2007; File Name: Trails_CG030b.mxd; Sources: Portland TSP, Vancouver TSP, Clark County Trails Map

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Exhibit 5-59

Count Locations: All three river crossings
Count Date: Tuesday, September 11, 2007
Count Time: 6 AM to 8 PM
Weather: Sunny and clear

I-5 and I-205 Columbia River Crossing Bicycle and Pedestrian Volumes (September 11, 2007)

	SB			NB			Hourly Totals		
Hour	**Bike**	**Ped**	**Total**	**Bike**	**Ped**	**Total**	**Bikes**	**Peds**	**Volume**
6:00 AM	16	1	17	14	3	17	30	4	34
7:00 AM	36	0	36	30	0	30	66	0	66
8:00 AM	13	2	15	21	2	23	34	4	38
9:00 AM	31	4	35	14	1	15	45	5	50
10:00 AM	12	3	15	5	3	8	17	6	23
11:00 AM	10	1	11	6	1	7	16	2	18
12:00 PM	8	0	8	10	2	12	18	2	20
1:00 PM	5	3	8	16	2	18	21	5	26
2:00 PM	5	7	12	4	6	10	9	13	22
3:00 PM	12	2	14	23	0	23	35	2	37
4:00 PM	16	3	19	22	5	27	38	8	46
5:00 PM	20	2	22	46	7	53	66	9	75
6:00 PM	27	0	27	42	9	51	69	9	78
7:00 PM	16	1	17	12	4	16	28	5	33
14-Hour Totals	**227**	**29**	**256**	**265**	**45**	**310**	**492**	**74**	**566**

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Exhibit 5-60

Bicycle and Pedestrian Existing Conditions

Annotations

1. The approach to the bridge is narrow, has limited signage and no crosswalk.
2. The bridge pathway access point is only 41" wide, and is separated from traffic by a 26" barrier.
3. The east pathway access point pavement is broken and uneven. The path is separated from traffic by a 26" barrier. A telephone pole is placed in the middle of the bike path.
4. Access to/from the bridge is via a steep path with inadequate height railings. SE Columbia Way has no crosswalks or bike lanes. Signage is minimal.
5. The bridge path narrows to 42" at the lift gate. Fixed objects such as protruding cables and chain link gates pose a hazard.
6. The bridge pathway is 4 feet wide. The railing is low – 41". Lighting is poor. Debris and bird dropping litter the path. Noise and emissions from passing traffic make the trip uncomfortable. Heavy trucks make the bridge vibrate. There is not enough separation from the traffic stream. There is a general perception that conditions are unsafe and substandard. There is no safe place to stop and enjoy the view.
7. Railing is 44" high, but there is an open space between the bottom of the railing and the path.
8. Bridge access point is narrow, with a 24" barrier separating the path from traffic. The turn-off onto Hayden Island is sharp. Landscaping has overgrown and narrowed the path.
9. Directional signage is missing, confusing or contradictory. The tunnel underneath the freeway can be intimidating at night and needs lighting improvements.
10. The barrier separating the path from traffic stream is only 26". Pathway is too narrow for two bikes to pass.
11. Path is overgrown. Signage points bikers and pedestrians to the less safe bridge east pathway.
12. Pedestrian push button is inaccessible for wheelchair users. Little to no room on curb for multiple bicyclists and walkers. Signal cycle is overly long.
13. Lack of safety at Tomahawk Drive crosswalk. Exiting vehicles have poor visibility and short sight distances. There is no crosswalk signal.
14. Path from Harbor Bridge to Interstate Bridge is circuitous and confusing and lacks a direct connection. There are a high number of vehicle and pedestrian/bicyclist conflicts. High heavy vehicle percentage creates a less comfortable environment.
15. The Portland Harbor Bridge traffic barrier ranges from a standard height of 54" to a low of 39". Headlight glare from oncoming vehicles making biking southbound at night difficult. Expansion joints and poorly patched utility work make for uneven obstacle-laden path.
16. Paths and grassy areas littered with trash – no garbage cans in the area. Circuitous paths and poor accessibility.
17. Narrow, cracked sidewalks at Marine Drive intersection. Long signal cycles. Number of heavy trucks and high traffic speeds make area intimidating.
18. Sidewalk to Expo Center MAX station is narrow and roadway has no shoulder. Path to MAX station is too narrow and has too many sharp curves. The MAX station lacks curb cutouts. Lack of signage pointing toward station.
19. Path alongside northbound on-ramp has poor sight-distances and needs re-striping. Directional signage is damaged and confusing.
20. Access to Delta Park has no crosswalk. Stop bar is located too close to intersection.
21. Delta Park pavement is bumpy, poorly patched, and makes riding uncomfortable.
22. Intersection near Union 76 lacks crosswalks, bike lanes and is difficult for bicyclists to access Delta Park without taking a long circuitous path.

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6. No-Build Alternative (Alternative 1)

6.1 Description of Transportation System

The No-Build Alternative was developed to quantify the transportation impacts in the year 2030 of not building the CRC project within the Bridge Influence Area. As such, it serves as the basis of comparison for transportation performance of the build alternatives.

The CRC project uses 2030 as the horizon year for all alternatives. The No-Build Alternative includes planned improvements up to the year 2030 for which need, commitment, financing, and public and political support are identified and are reasonably expected to be implemented. All transportation improvements included in the No-Build Alternative are included in either Metro's 2025 RTP (including amendments) or the RTC's 2030 Metropolitan Transportation Plan (MTP).

With the exception of the southbound I-5 widening to three lanes from Lombard Street to Victory Boulevard, the No-Build Alternative does not assume any major capacity projects on Interstate 5 within the Bridge Influence Area. Outside the Bridge Influence Area, a major capacity improvement is planned for the Rose Quarter area which involves braiding the I-84 and Broadway/Weidler on- and off-ramp in both the northbound and southbound direction. In addition, there are some minor I-5 capacity enhancements and several major maintenance projects specifically identified in the financially constrained regional transportation plans of both Metro and RTC.

Metro has an adopted 2025 Regional Transportation Plan (RTP), which was used to develop the No-Build Alternative. Metro has compiled a list of projects for the years 2026-2030, which have been approved by Metro's Transportation Policy Alternatives Committee (TPAC).

RTC's MTP has been updated to reflect a 2030 horizon year. The plan was adopted by the RTC in December 2005.

Annual system-wide increases in TriMet's transit service hours are forecast to be between 1.0 percent and 1.5 percent per year, consistent with the RTP 2025 financially constrained transit network.

C-TRAN fixed route service hours will remain constant through 2010, based on current funding that preserves existing levels of service for the foreseeable future (Preservation Plan through 2011). However, C-TRAN will experience a 2.0 percent average annual decrease in fixed route service hours from 2011 to 2030, although commuter service across the Columbia River is expected to remain relatively constant.

6.2 I-5 and I-205 Performance

This section summarizes highway performance for the No-Build Alternative (2030). It explains how existing transportation conditions would change by 2030 if no improvements proposed by this project occur.

6.2.1 Daily Traffic Levels

By 2030, the average weekday traffic across the I-5 bridge is forecast to reach 184,000 vehicles per day, an increase of 37 percent over current conditions. Daily traffic levels on the I-205 bridge are projected to rise to 210,000 vehicles per day, an increase of 44 percent over current volumes. **Exhibit 6-1** summarizes ADT volumes on the I-5 bridge, the I-205 bridge, and the total river crossing.

6.2.2 Traffic Demand – Vehicles

This section compares traffic conditions in 2030 with the No-Build Alternative to existing conditions, for the four-hour morning and afternoon/evening peaks.

6.2.2.1 Vehicle Demands on I-5

Exhibit 6-2 compares forecast morning peak traffic demand for southbound I-5 to existing traffic volumes. Southbound traffic demand on the I-5 bridge would increase by 5,200 vehicles during the morning peak, a 26-percent increase over existing demand. Traffic demand would continue to be well in excess of I-5's available capacity, resulting in substantially increased congestion. Corridor-wide, the highest growth is projected to occur in northern Clark County (100 percent) and the lowest growth projected for North Portland (less than 5 percent). The growth projected within the Bridge Influence Area ranges from 20 percent to 35 percent.

Slightly higher growth is forecast for northbound I-5 during the morning peak as shown in **Exhibit 6-3**. Under the No-Build Alternative, northbound traffic demand at the Interstate Bridge is expected to increase by 5,700 vehicles, or 51 percent. Corridor-wide, the highest growth is projected to occur in northern Clark County (60 to 145 percent) and the lowest growth in North Portland (20 to 35 percent). The Bridge Influence Area growth forecasts range from 45 percent to 65 percent.

During the afternoon/evening peak, southbound I-5 traffic demand is forecast to increase by 4,000 vehicles at the Interstate Bridge, a 27 percent increase. Growth rates for southbound I-5 traffic demand during the afternoon/evening peak are forecast to range from 10 to 20 percent in North Portland, 20 to 40 percent within the Bridge Influence Area, and from 40 to over 100 percent in northern Clark County as shown in **Exhibit 6-4**.

Northbound traffic demand is forecast to increase by 6,900 vehicles at the Interstate Bridge, or 32 percent, during the afternoon/evening peak. The resulting traffic demand will continue to be well above I-5's available capacity, resulting in increased congestion. The highest growth in the I-5 corridor is forecast in northern Clark County (from 30 to 100 percent) and the lowest increases are projected in North Portland (from 10 to 30 percent) as shown in **Exhibit 6-5**. The Bridge Influence Area growth forecasts range from 30 to 35 percent.

6.2.2.2 Vehicle Demands on I-205

Exhibit 6-6 compares existing and No-Build traffic demand for southbound I-205. Weekday southbound I-5 morning peak traffic demand is projected to increase through the corridor by between 10 and 90 percent, with the highest growth in Vancouver.

Slightly higher growth is forecast for northbound I-205 during the morning peak, as shown in **Exhibit 6-7**. Growth is expected to range from 15 to 140 percent, with the highest growth forecast for Vancouver.

Growth rates for southbound I-205 afternoon/evening peak traffic demand are forecast to range from 15 to 95 percent along the I-205 corridor. These trends are shown in **Exhibit 6-8**. Forecast growth rates for northbound I-205 afternoon/evening peak traffic demand shown in **Exhibit 6-9** are estimated to range from remaining flat to 95 percent.

6.2.3 Traffic Demand – Truck Freight

Truck volume forecasts for 2030 are prepared based on the *Portland/Vancouver International and Domestic Trade Capacity Analysis* growth forecasts for cargo. **Exhibit 6-10** presents the regional cargo forecasts by mode, and the resulting growth for each mode. All cargo is estimated to increase by 2.0 percent per year, and truck transport as a mode share of all cargo transport is expected to increase from 67 percent in 2000 to 73 percent in 2030. The compound average annual growth rate for truck traffic, calculated for the period 2000 to 2030, is estimated at 2.3 percent per year.

Previous analysis showed that rail does not have the capacity to accommodate shifts of freight from truck to rail (*Feasibility of Diverting Truck Freight to Rail in the Columbia River Corridor,* Draft Technical Memorandum, CRC, April 2005). This supports the assumption that freight traffic cannot easily shift modes, and the growth in truck volumes will continue.

With more severe peak period congestion expected, more truck drivers may avoid the peak periods and travel during midday or nighttime hours to increase the reliability of the trip's travel time. At the same time, truck freight must move more freight volume each day to meet customer schedules and operating hours. The daily truck volume forecast to cross the I-5 bridge would increase from 10,975 under existing conditions to 19,405 under No-Build conditions (9,800 southbound and 9,600 northbound), an increase of over 8,400 trucks or 77 percent. Not all trucks will be able to shift outside of the peak congestion periods resulting in increased travel times and costs to customers.

Exhibit 6-11 shows total truck throughput during the morning and afternoon/evening peaks, the midday period (10 a.m. to 3 p.m.), and nighttime hours (7 p.m. to 6 a.m.) across the Interstate Bridge. It is expected that truck volumes will continue to increase during congested periods, but at a lower rate; more trucks will move to midday or nighttime hours to avoid congested conditions. With approximately 7.75 hours of congestion northbound and 7.25 hours of congestion southbound, the No-Build

Alternative would have a significant impact on truck travel time and reliability. Approximately 7,400 trucks are projected to travel across the Interstate Bridge during congested conditions with the No-Build Alternative.

6.2.3.1 Truck Operating Characteristics

As discussed, the rate of growth for truck traffic is expected to be greater than for general-purpose traffic, which would increase the proportion of trucks in the traffic stream. Trucks consume approximately double the highway capacity compared to passenger cars; therefore, in the future, the proportion of capacity used by trucks will be greater than today. The degradation in operations caused by slow-moving trucks at interchanges due to geometric conditions (uphill ramp grades, super-elevation, and merge distances) would occur at a faster rate in the future due to the increases in truck volumes.

6.2.3.2 Oversized Loads

Oversize truck loads are expected to increase, but this would depend on the specific products shipped. For example, the current shipments of wind turbines may reduce in the future, but other specialized products could increase the number of oversized loads. Oversize loads would experience the same level of congestion and reduction in travel speed as all trucks. Oversize loads attempt to avoid peak period conditions more than general truck traffic (and permit conditions may require that they avoid peak commute periods). With the No-Build Alternative, there would be an additional 9 hours of congestion near the Interstate Bridge to avoid.

6.2.4 Effect of Congestion

This section compares conditions in 2030 under the No-Build Alternative with existing conditions.

6.2.4.1 Duration of Congestion on Southbound I-5

Southbound congestion on the Interstate Bridge is expected to increase from 2 hours to over 7 hours (see **Exhibit 6-12**). One of these hours would develop during the afternoon/evening peak (reverse commute).

The Delta Park project (which will widen I-5 south from two to three lanes between Victory Boulevard and Columbia Boulevard) would eliminate the Delta Park lane drop bottleneck. However, congestion and vehicular queuing would still exist through this portion of highway from the existing capacity constraint north of the I-405 split.

Southbound congestion north of the I-405 split would increase from 2.5 to 11.5 hours, with over four hours of this forecast to occur during the afternoon/evening peak. The southbound bottleneck located near I-5's lane drop in the Rose Quarter is forecast to increase slightly from just under 3 hours to 3.5 hours despite the planned I-84/Broadway/ Weidler ramp improvements.

6.2.4.2 Duration of Congestion on Northbound I-5

Northbound congestion on the Interstate Bridge is expected to increase from 4 hours to almost 8 hours (see **Exhibit 6-13**) from an increase in traffic volume trying to utilize the existing limited capacity across the Interstate Bridge.

Northbound congestion near the I-405/Rose Quarter weaving area would increase from just over 3 hours today to nearly 7 hours. More than half of the increased congestion (2.5 hours) would occur during the morning peak. Northbound congestion in the weaving area located on the Marquam Bridge upstream from the off-ramp to I-84 would increase from 5 hours to approximately 7 hours.

6.2.5 Travel Times

This section compares forecast travel times for the No-Build Alternative in 2030 with existing conditions, using the two-hour morning and afternoon/evening peaks.

6.2.5.1 Travel Time along I-5

During the morning peak, southbound I-5 travel times are forecast to increase by three minutes (20 percent) for a vehicle trip along I-5 from SR 500 to Columbia Boulevard, and by 15 minutes (50 percent) for a vehicle trip from 179th Street to I-84 as shown in **Exhibit 6-14**. The 50 percent increase in travel time for the longer segment is due to the increase in congestion levels along I-5.

During the afternoon/evening peak, northbound I-5 travel times are forecast to increase by two minutes (15 percent) for a trip from Columbia Boulevard to SR 500 and by six minutes (16 percent) for a vehicle trip from I-84 to 179th Street, as shown in **Exhibit 6-15**. Northbound travel times are forecast to increase due to increased congestion in the two existing bottleneck locations (Interstate Bridge and I-405/Rose Quarter weave).

6.2.5.2 Travel Time along I-205

During the morning peak, southbound I-205 travel times are forecast to increase by 21 minutes (almost 200 percent) for a vehicle trip along I-205 from SR 500 to I-84, as shown in **Exhibit 6-16**. The substantial increase in travel times would be due to the increased congestion forecast for southbound I-205 during the morning peak.

During the afternoon/evening peak, northbound I-205 travel times are forecast to increase by ten minutes (70 percent) for a vehicle-trip from I-84 to SR 500, as shown in **Exhibit 6-17**. The increase in travel times would be caused by increase in volume and resulting congestion for northbound I-205 during the afternoon/evening peak.

6.2.6 Service Volumes

This section compares forecast service volumes for the No-Build Alternative in 2030 with existing conditions, using the four-hour morning and afternoon/evening peaks.

6.2.6.1 Vehicle Throughput (Served Volume) on Southbound I-5

During the morning peak, southbound vehicle throughput along I-5 near the Pioneer Street interchange is expected to double from 9,000 vehicles to over 18,000 vehicles (see **Exhibit 6-18**). The 100 percent increase in vehicle throughput would result primarily due to forecast land use changes identified for northern Clark County.

Vehicle throughput near the SR 500 interchange is forecast to increase by 3,500 vehicles (20 percent) for No-Build conditions compared to existing conditions. Although the No-Build Alternative would serve more volume, it would not serve the actual forecast demand due to downstream bottlenecks located at the I-5 bridge and north of the I-405 split.

Similarly, the southbound vehicle throughput across the Interstate Bridge is forecast to increase by 3,000 vehicles (16 percent). However, the entire forecast demand would not be served due to the southbound bottlenecks on I-5 at the Interstate Bridge and north of the I-405 split.

Peak period vehicle throughput along I-5 near I-405 is forecast to be similar under both No-Build conditions and existing conditions. During the morning peak both conditions are forecast to serve 20,000 vehicles. Similar to I-5 near SR 500 and the Interstate Bridge, I-5 north of the I-405 split would not serve all of its forecast demand due to the two identified southbound bottlenecks.

6.2.6.2 Vehicle Throughput (Served Volume) on Northbound I-5

During the afternoon/evening peak, northbound vehicle throughput along I-5 near I-405 is forecast to be slightly less compared to existing conditions (see **Exhibit 6-19**). The vehicle throughput is forecast to decrease by 2,000 vehicles (negative 15 percent) due to increased downstream congestion at the Interstate Bridge lasting over the entire four-hour afternoon/evening peak versus under existing conditions only lasting around two hours.

Vehicle throughput across the Interstate Bridge is forecast to be similar under both No-Build and existing conditions. Under both scenarios, around 21,000 vehicles would be served. Similar to I-5 near I-405, the Interstate Bridge would not serve all of its forecast demand (only serves 72 percent) due to the Interstate Bridge bottleneck.

Vehicle throughput near the SR 500 interchange is forecast to increase by 1,700 vehicles (70 percent). Although the No-Build Alternative would serve a larger volume, it would not serve the entire forecast demand due to upstream bottlenecks located at the Interstate Bridge, I-405, and the Rose Quarter.

Northbound vehicle throughput near the Pioneer Street interchange is forecast to nearly double from 9,900 to over 18,000 vehicles. The 85 percent increase in vehicle throughput would result primarily from forecast land use changes for northern Clark County.

6.2.7 Served vs. Unserved Ramp Volumes

This section compares ramp service levels for the No-Build Alternative in 2030 with existing conditions, using the four-hour morning and afternoon/evening peaks.

6.2.7.1 Southbound I-5

During the morning peak, the number of southbound on-ramps within the I-5 Bridge Influence Area unable to serve their traffic demands would increase from one (SR 14/City Center) under existing conditions to three (SR 500/39th Street, Mill Plain Boulevard, and SR 14/City Center) under No-Build conditions, as shown in **Exhibit 6-20**. During the morning peak, 2,600 vehicles at SR 500, 450 vehicles at Mill Plain Boulevard, and 900 vehicles at SR 14/City Center would not be served, resulting in ramp back-ups, and local street congestion. This increase would result primarily because of increased congestion forecast for southbound I-5 during the morning peak.

6.2.7.2 Northbound I-5

During the afternoon/evening peak, the number of northbound on-ramps unable to serve their traffic demands would increase from none under existing conditions to five (Interstate Avenue/Victory Boulevard, Marine Drive, Hayden Island, Mill Plain Boulevard, and Fourth Plain Boulevard) under No Build conditions, as shown in **Exhibit 6-21**. During the afternoon/evening peak, 1,700 vehicles at Interstate Avenue/Victory Boulevard, 650 vehicles at Marine Drive, 1,150 vehicles at Hayden Island, 1,350 vehicles at Mill Plain Boulevard, and 100 vehicles at Fourth Plain Boulevard would not be served, resulting in ramp back-ups and local street congestion. This increase would result primarily because of the increased congestion forecast for northbound I-5 during the afternoon/evening peak.

6.2.8 Person Throughput

Under No-Build conditions, about 24,600 persons in southbound vehicles would cross the I-5 bridge during the morning four-hour peak, an increase of 15 percent over existing conditions. About 1,900 persons in buses are forecast to cross during this period.

About 24,400 persons in northbound vehicles would cross the I-5 bridge during the afternoon/evening four-hour peak. This is similar to how many cross during existing conditions. About 2,050 persons in buses are forecast to cross during this period. **Exhibit 6-22** shows person-throughput data.

6.2.9 Safety

6.2.9.1 Prediction of Future Collision Potential

The existence of non-standard geometric design features, the presence and duration of current congested traffic conditions, and the occurrence of bridge lifts/traffic stops all contribute to the high number of vehicular collisions and the high collision rate currently experienced in the Bridge Influence Area.

The number of collisions is likely to substantially increase (by approximately 80 percent over existing conditions) as the existing non-standard features would remain on I-5 and its ramps, traffic levels would increase, the duration of congestion would lengthen, and bridge lifts/traffic stops would continue at their current rate or increase in the future.

Exhibit 6-23 shows predicted future collisions along northbound I-5 assuming no improvements are made within the Bridge Influence Area (existing non-standard geometric features remain and no traffic capacity is added) and traffic demands increase to forecast 2030 levels. Similar results are expected southbound on I-5 within the Bridge Influence Area.

6.3 Local Streets

6.3.1 Travel Demand

This section compares existing and future local street travel demand under the No-Build Alternative, using the morning and afternoon/evening peak one-hour period.

6.3.1.1 Vancouver Screenlines – Morning Peak Hour

During the morning peak hour, westbound traffic west of I-5 is forecast to increase between 60 and 120 percent, with the largest growth forecast for western Vancouver as shown in **Exhibit 6-24**. Eastbound traffic west of I-5 is forecast to increase between 40 and 60 percent, with the largest increase for western Vancouver due to large population and growth increases forecast for this part of the city. Eastbound and westbound traffic just east of I-5 is forecast to increase by about 50 percent over existing conditions.

During the morning peak, southbound traffic in Vancouver is forecast to increase between 85 and 105 percent. Northbound traffic in Vancouver is forecast to increase between 30 and 70 percent, with the highest growth forecast for downtown Vancouver.

6.3.1.2 Vancouver Screenlines – Afternoon/Evening Peak Hour

During the afternoon/evening peak, westbound traffic west of I-5 is forecast to increase between 55 and 70 percent, with the largest growth forecast for western Vancouver as shown in **Exhibit 6-25**. Eastbound traffic west of I-5 is forecast to increase between 55 and 105 percent, again with the largest increase for western Vancouver due to large population and growth increases forecast for this part of the city. East of I-5, eastbound traffic is forecast to increase more (55 percent) compared to westbound traffic (40 percent) over existing conditions.

During the afternoon/evening peak, southbound traffic in Vancouver is forecast to increase between 30 and 50 percent, with the highest growth forecast for downtown Vancouver. Northbound traffic in Vancouver is forecast to increase between 70 and 95 percent, with the highest growth forecast for downtown Vancouver.

6.3.1.3 Portland Screenlines – Morning Peak Hour

During the morning peak hour, eastbound and westbound traffic west of I-5 is forecast to increase between 25 and 40 percent over existing conditions, as shown in **Exhibit 6-26**. East of I-5, eastbound and westbound traffic is forecast to increase between 20 and 30 percent over existing conditions.

During the morning peak, southbound traffic in Portland is forecast to increase between 15 and 20 percent. Northbound traffic in Portland is forecast to increase between 30 and 70 percent, with the highest growth forecast near Alberta Street.

6.3.1.4 Portland Screenlines – Afternoon/Evening Peak Hour

During the afternoon/evening peak, eastbound and westbound traffic west of I-5 is forecast to increase between 25 and 40 percent over existing conditions, as shown in **Exhibit 6-27**. East of I-5, eastbound and westbound traffic is forecast to increase between 20 and 25 percent over existing conditions.

During the morning peak, southbound traffic in Portland is forecast to increase between 25 and 40 percent, with the highest growth forecast near Rosa Parks Way and Alberta Street. Northbound traffic in Portland is forecast to increase between 15 and 20 percent.

6.3.2 Intersection Service Levels

This section compares intersection levels-of-service under existing conditions and the No-Build Alternative, using the morning and afternoon/evening peak one-hour period.

6.3.2.1 Vancouver Service Levels – Morning and Afternoon/Evening Peak Hours

6.3.2.1.1 SR 14/City Center Interchange Area

The No-Build roadway network includes projects from RTC's MTP. Projects in the SR 14/City Center area include converting Broadway and Main Streets from one-way to two-way streets. In addition, the expansion of Third/Fourth Street and Columbia Way will add new intersections. The SR 14/City Center interchange area has 36 study intersections, of which three would be new intersections that do not currently exist.

As shown in **Exhibit 6-28**, during the morning peak, 30 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions. The three new intersections would operate acceptably. Three intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-29**, during the afternoon/evening peak, 27 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions. The three new intersections would operate acceptably. Six intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations.

As shown in **Exhibit 6-28**, during the morning peak, 21 of the study intersections would operate with acceptable vehicle queuing when compared to the existing conditions. All three of the new intersections would operate with acceptable vehicle queuing. Twelve intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

As shown in **Exhibit 6-29**, during the afternoon/evening peak, 21 of the study intersections would operate with acceptable vehicle queuing. All three of the new intersections would operate with acceptable vehicle queuing. Twelve intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.1.2 Mill Plain Boulevard Interchange Area

The No-Build roadway network includes projects from RTC's MTP. Additionally, a signal pre-emption project on Mill Plain Boulevard at 15th Street would improve truck access to the Port from I-5. The Mill Plain Boulevard interchange area consists of 16 study intersections, all of which currently exist.

As shown in **Exhibit 6-28**, during the morning peak, all 16 study intersections would operate acceptably with improved, similar, or slightly degraded conditions. No intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-29**, during the afternoon/evening peak, nine of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. Seven intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations.

As shown in **Exhibit 6-28**, during the morning peak, nine of the study intersections would operate with acceptable vehicle queuing when compared to the existing conditions. Seven intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

As shown in **Exhibit 6-29**, during the afternoon/evening peak, two of the study intersections would operate with acceptable vehicle queuing. Fourteen intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.1.3 Fourth Plain Boulevard Interchange Area

The No-Build roadway network includes projects from RTC's MTP. Fourth Plain Boulevard would be widened to a five-lane cross section from the southbound on-/off-ramps to the west. The Fourth Plain Boulevard interchange area consists of 14 study intersections, all of which currently exist.

As shown in **Exhibit 6-28**, during the morning peak, 11 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions. Three intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations.

As shown in **Exhibit 6-29**, during the afternoon/evening peak, three of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. Eleven intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-28**, during the morning peak, eight of the study intersections would operate with acceptable vehicle queuing when compared to existing conditions. Six intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

As shown in **Exhibit 6-29**, during the afternoon/evening peak, five of the study intersections would operate with acceptable vehicle queuing. Nine intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.1.4 SR 500/Main Street/39th Street Interchange Area

The No-Build roadway network includes projects from RTC's MTP. The SR 500/Main Street/39th Street interchange area consists of ten study intersections, all of which currently exist.

As shown in **Exhibit 6-28**, during the morning peak, two of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions. Eight intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-29**, during the afternoon/evening peak, four of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the existing conditions. Six intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations.

As shown in **Exhibit 6-28**, during the morning peak, all ten of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

As shown in **Exhibit 6-29**, during the afternoon/evening peak, three of the study intersections would operate with acceptable vehicle queuing when compared to existing conditions. Seven intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.2 Portland Service Levels – Morning and Afternoon/Evening Peak Hours

6.3.2.2.1 Hayden Island Interchange Area

Under the No-Build scenario, the Hayden Island interchange area roadway network would remain in the same configuration as existing conditions. The interchange area consists of two study intersections.

As shown in **Exhibit 6-30**, during the morning peak hour, both of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, one of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions. The other would degrade from acceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-30**, during the morning peak, both intersections would operate with acceptable vehicle queuing. As shown in **Exhibit 6-31**, during the afternoon/evening peak, both of the intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.2.2 Marine Drive Interchange Area

Under the No-Build scenario, the Marine Drive interchange area would remain in the same configuration as existing conditions. The interchange area consists of three study intersections.

As shown in **Exhibit 6-30**, during the morning peak, all three of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, two of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. One intersection would degrade from acceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-30**, during the morning peak, two of the study intersections would operate with acceptable vehicle queuing. One intersection would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, all three of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.2.3 Victory Boulevard Interchange Area

Under the No-Build scenario, the Victory Boulevard interchange area would remain in the same configuration as existing conditions. The interchange area consists of four study intersections.

As shown in **Exhibit 6-30**, during the morning peak, all four of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, two of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions. Two intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-30**, during the morning peak, three of the study intersections would operate with acceptable vehicle queuing as compared to existing conditions. One intersection would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, one of the study intersections would operate with acceptable vehicle queuing. Three intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.2.4 Interstate Avenue Analysis Area

Under the No-Build scenario, the Interstate Avenue analysis area would remain in the same configuration as existing conditions. The interchange area consists of four study intersections.

As shown in **Exhibit 6-30**, during the morning peak, all four of study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, three of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. One intersection would degrade from acceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-30**, during the morning peak, two study intersections would operate with acceptable vehicle queuing. Two intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, one of the study intersections would operate with acceptable vehicle queuing as compared to existing conditions. Three intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.2.5 Martin Luther King Jr. Boulevard Analysis Area

Under the No-Build scenario, the Martin Luther King Jr. Boulevard analysis area would remain in the same configuration as existing conditions. The interchange area consists of five study intersections.

As shown in **Exhibit 6-30**, during the morning peak, four of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. One intersection would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations under the No-Build Alternative.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, three of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. Two intersections would degrade from acceptable or unacceptable operations under existing conditions to unacceptable operations.

As shown in **Exhibit 6-30**, during the morning peak, all study intersections would operate with acceptable vehicle queuing. As shown in **Exhibit 6-31**, during the afternoon/evening peak two of the study intersections would operate with acceptable vehicle queuing. Three intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.3.2.2.6 I-5 Ramp Terminals Analysis Area

Under the No-Build scenario, the I-5 Ramp Terminals analysis area would remain in the same configuration as existing conditions, with the exception of the Alberta Street southbound and northbound ramp terminals. These ramp terminals would be signalized and have a westbound left-turn lane at the southbound terminal, and an eastbound left-turn lane at the northbound terminal. The interchange area would continue to consist of seven study intersections.

As shown in **Exhibits 6-30 and 6-31**, during the morning and afternoon/evening peaks, all seven of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to existing conditions. During the morning peak, all seven study intersections would operate with acceptable vehicle queuing.

As shown in **Exhibit 6-31**, during the afternoon/evening peak, five of the study intersections would operate with acceptable vehicle queuing as compared to existing conditions. Two intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which does not occur under existing conditions.

6.4 Pedestrian and Bicycle Circulation

Although pedestrian and bicycle use for the year 2030 has not been modeled, pedestrian and bicycle trips across the Columbia River are expected to substantially increase as traffic congestion worsens and only limited transit service improvements are provided.

Under the No-Build Alternative, an increased number of pedestrians and bicyclists would face the same or more difficult conditions when crossing the Columbia River. Along the narrow sidewalks, increased conflicts would arise between pedestrians and other pedestrians, pedestrians and bicyclists, and bicyclists and other bicyclists. In addition, increased conflicts would result when pedestrians and bicyclists interact with motor vehicles, such as when accessing the Interstate Bridge or Portland Harbor Bridge in Vancouver, on Hayden Island, or in the Marine Drive interchange area.

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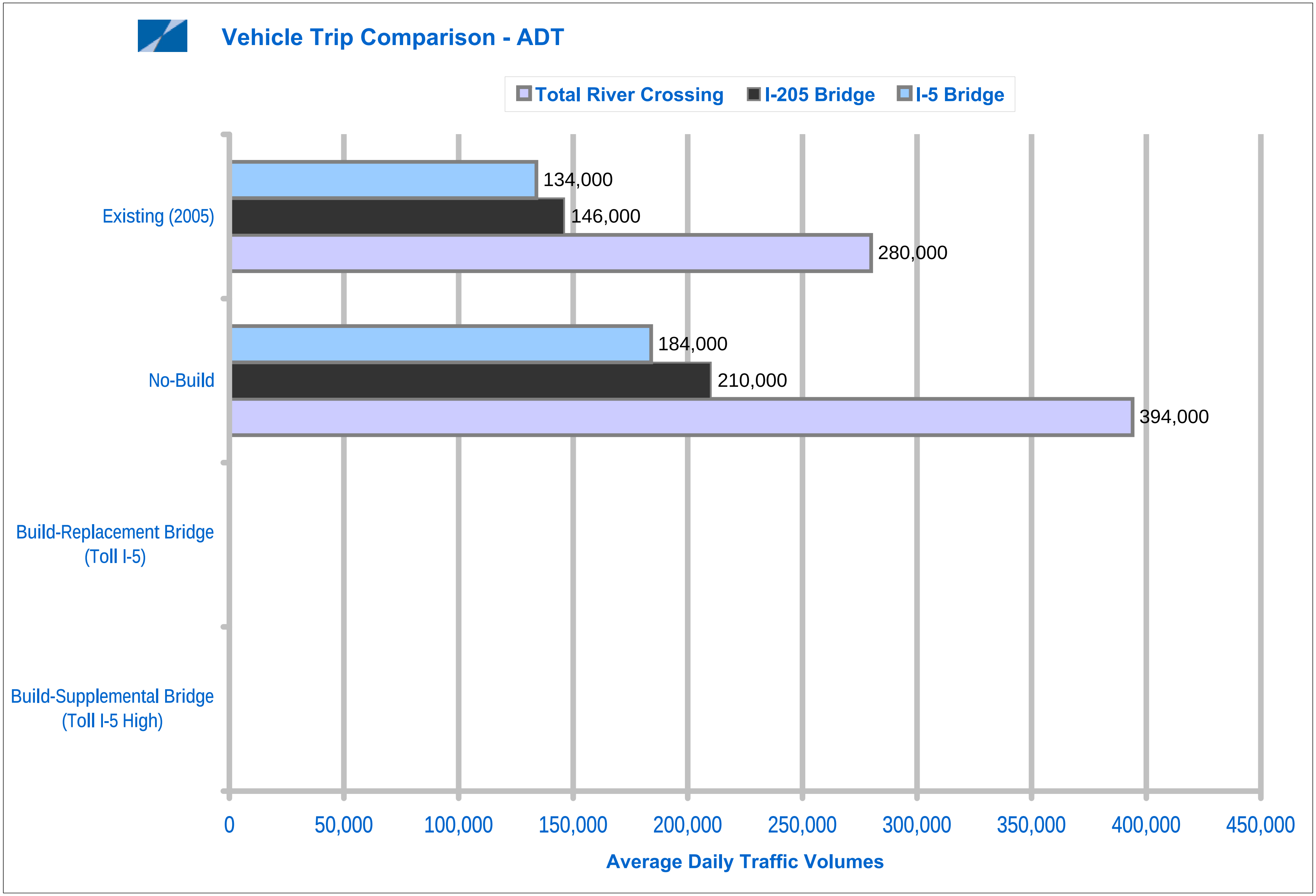
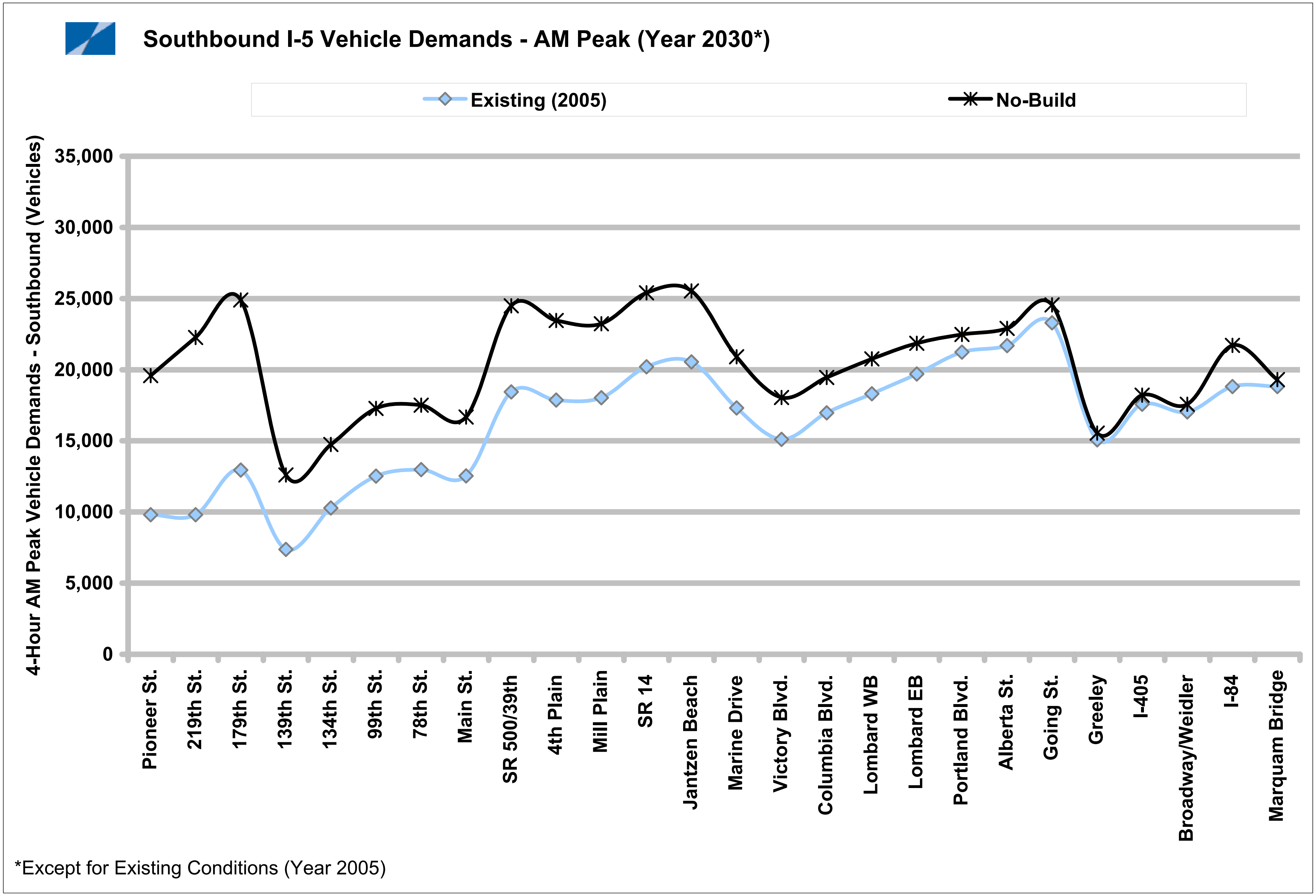
Exhibit 6-1



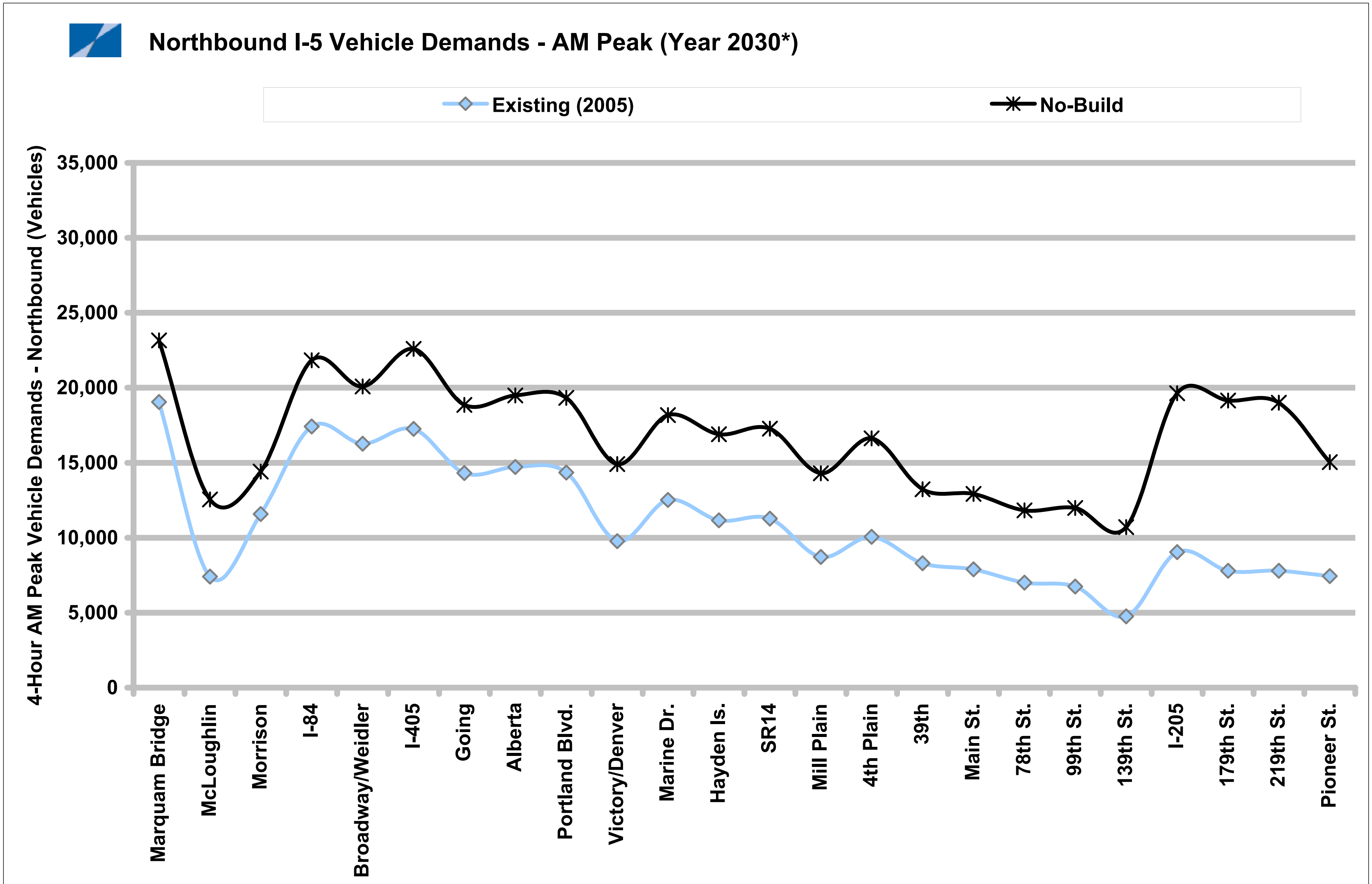
Vehicle Trip Comparison - ADT
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
No-Build
Build-Replacement Bridge (Toll I-5)
Build-Supplemental Bridge (Toll I-5 High)
134,000
146,000
280,000
184,000
210,000
394,000
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
Average Daily Traffic Volumes

Exhibit 6-2



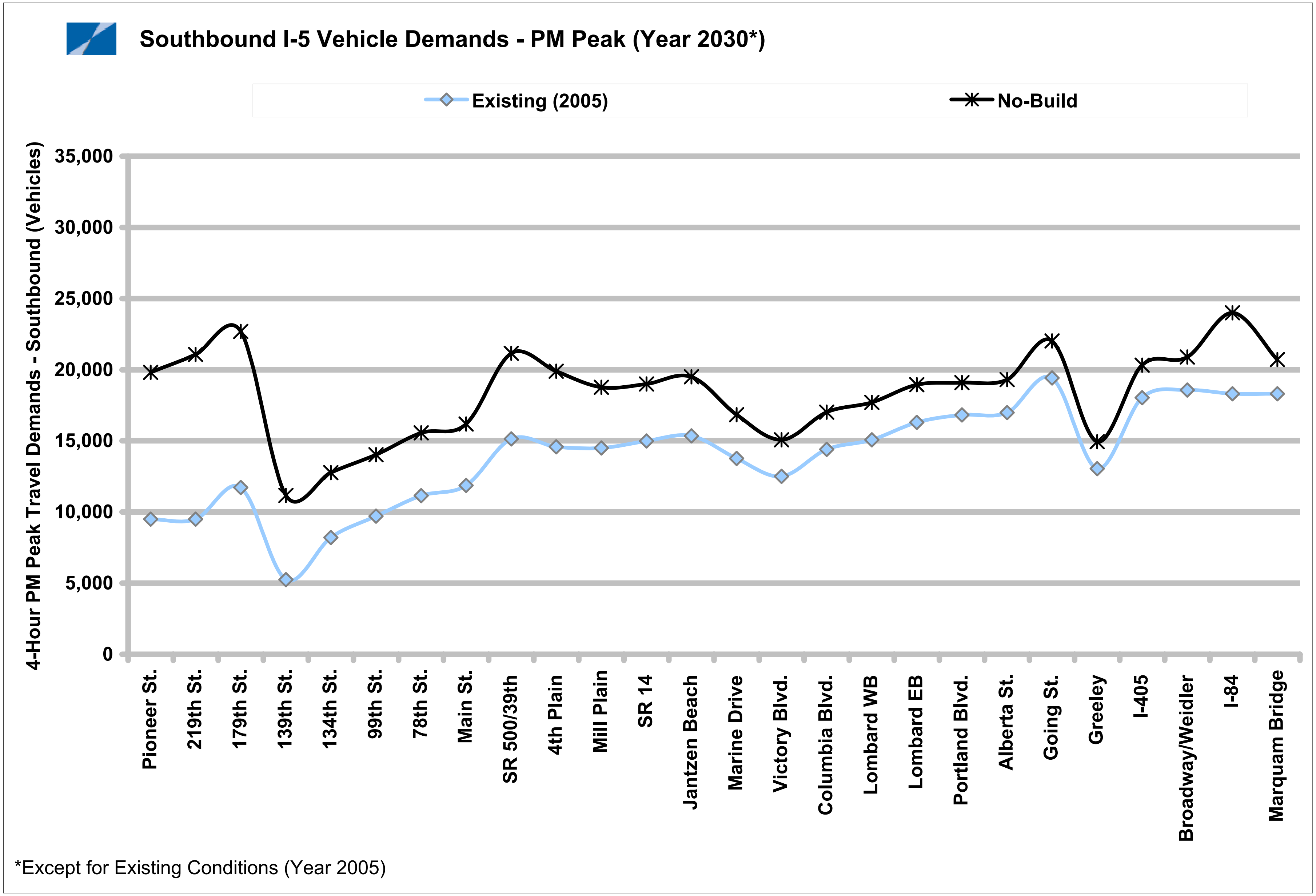
Southbound I-5 Vehicle Demands - AM Peak (Year 2030*)
Existing (2005)
No-Build
4-Hour AM Peak Vehicle Demands - Southbound (Vehicles)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Pioneer St.
219th St.
179th St.
139th St.
134th St.
99th St.
78th St.
Main St.
SR 500/39th
4th Plain
Mill Plain
SR 14
Jantzen Beach
Marine Drive
Victory Blvd.
Columbia Blvd.
Lombard WB
Lombard EB
Portland Blvd.
Alberta St.
Going St.
Greeley
I-405
Broadway/Weidler
I-84
Marquam Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 6-3



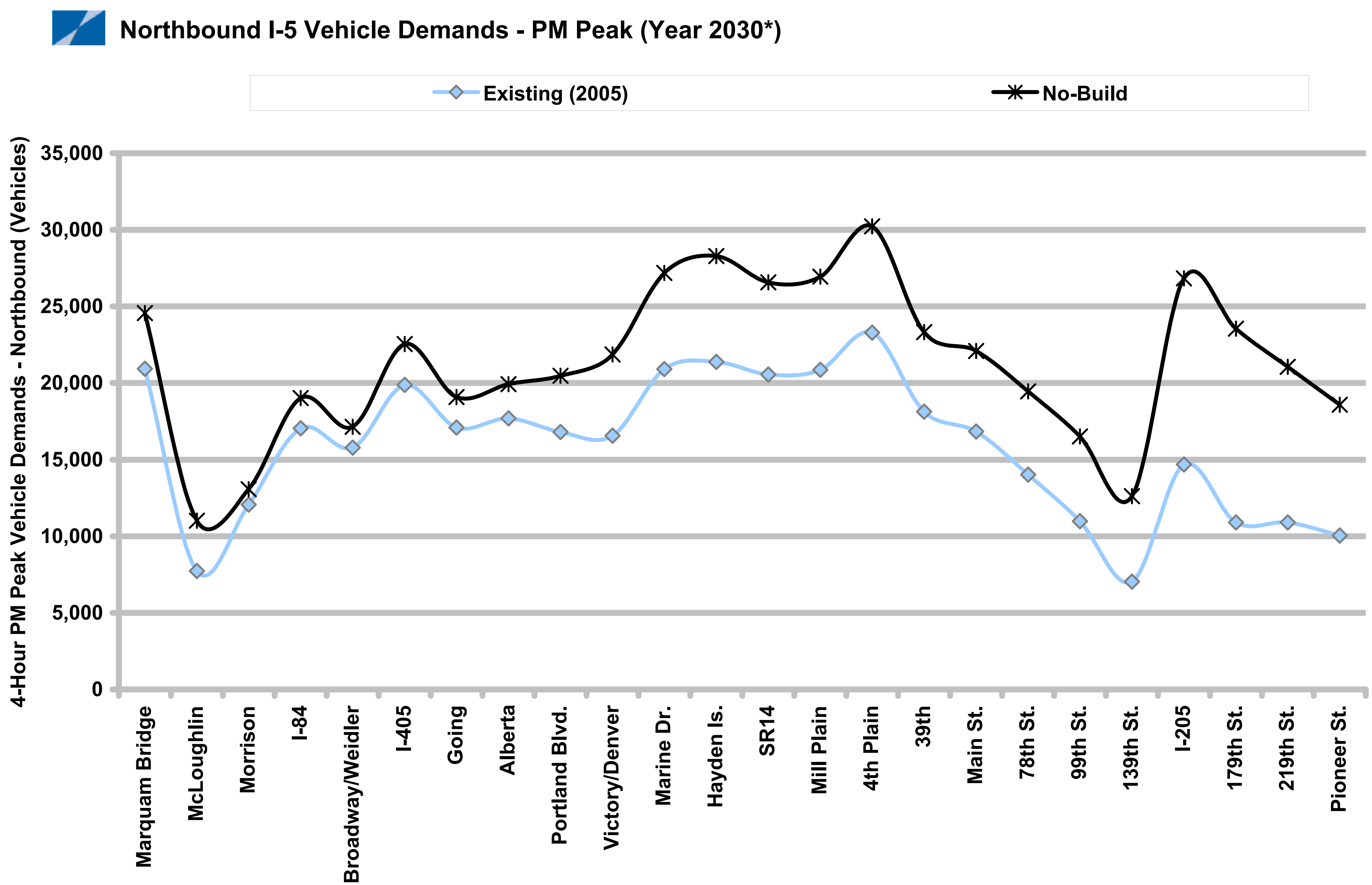
*Except for Existing Conditions (Year 2005)

Exhibit 6-4



Southbound I-5 Vehicle Demands - PM Peak (Year 2030*)
Existing (2005)
No-Build
4-Hour PM Peak Travel Demands - Southbound (Vehicles)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Pioneer St.
219th St.
179th St.
139th St.
134th St.
99th St.
78th St.
Main St.
SR 500/39th
4th Plain
Mill Plain
SR 14
Jantzen Beach
Marine Drive
Victory Blvd.
Columbia Blvd.
Lombard WB
Lombard EB
Portland Blvd.
Alberta St.
Going St.
Greeley
I-405
Broadway/Weidler
I-84
Marquam Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 6-5



*Except for Existing Conditions (Year 2005)

Exhibit 6-6

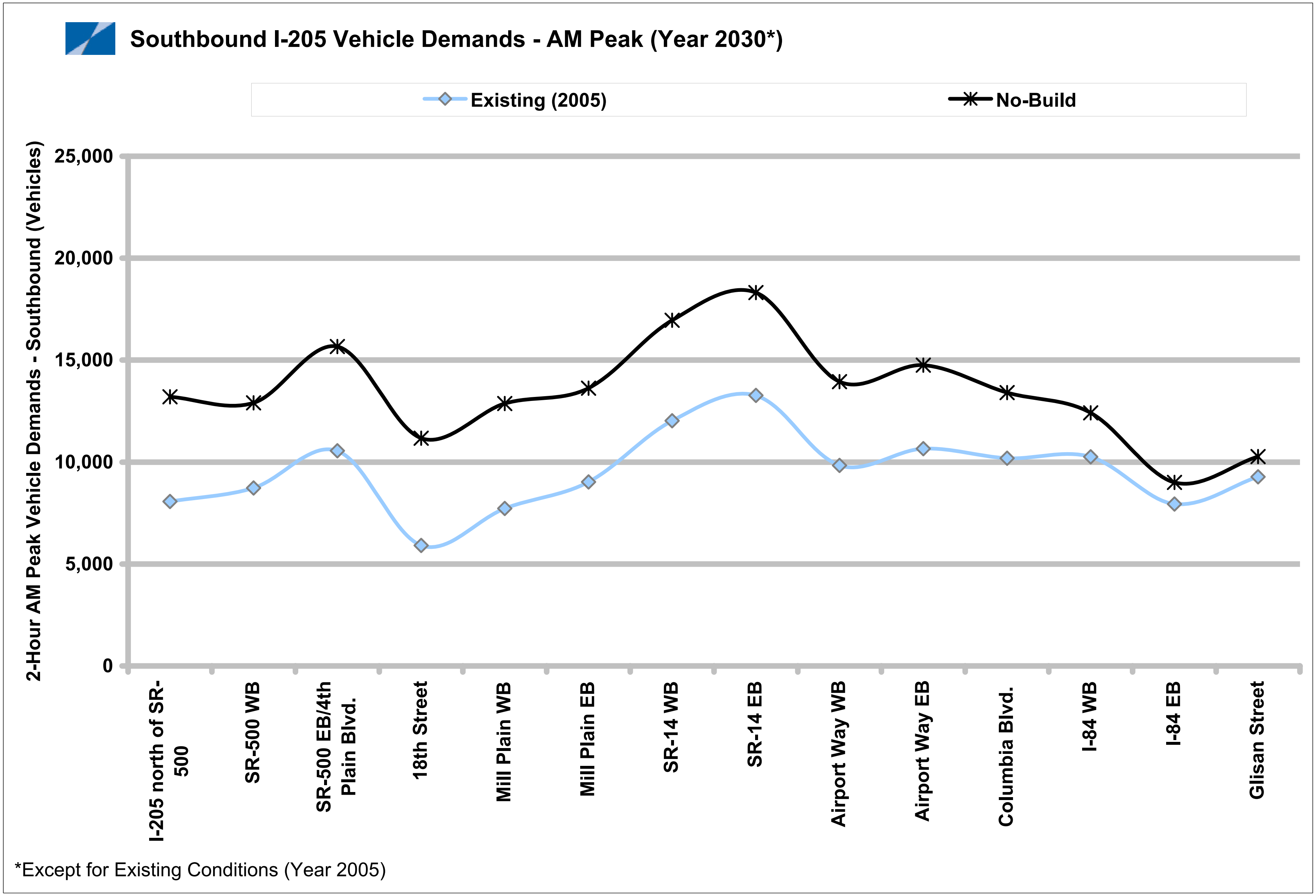

Southbound I-205 Vehicle Demands - AM Peak (Year 2030*)
Existing (2005)
No-Build
2-Hour AM Peak Vehicle Demands - Southbound (Vehicles)
25,000
20,000
15,000
10,000
5,000
0
I-205 north of SR-500
SR-500 WB
SR-500 EB/4th Plain Blvd.
18th Street
Mill Plain WB
Mill Plain EB
SR-14 WB
SR-14 EB
Airport Way WB
Airport Way EB
Columbia Blvd.
I-84 WB
I-84 EB
Glisan Street
*Except for Existing Conditions (Year 2005)

Exhibit 6-7

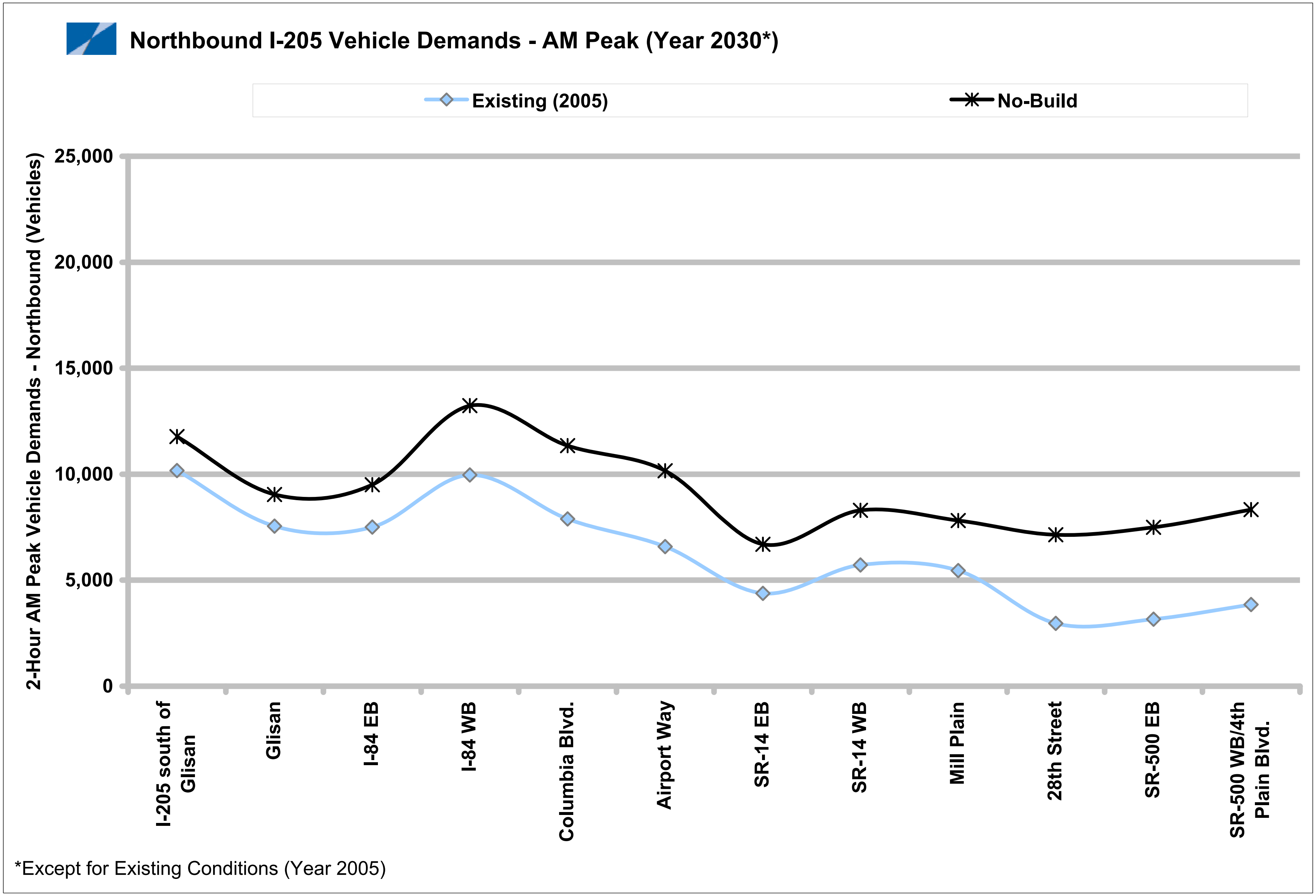
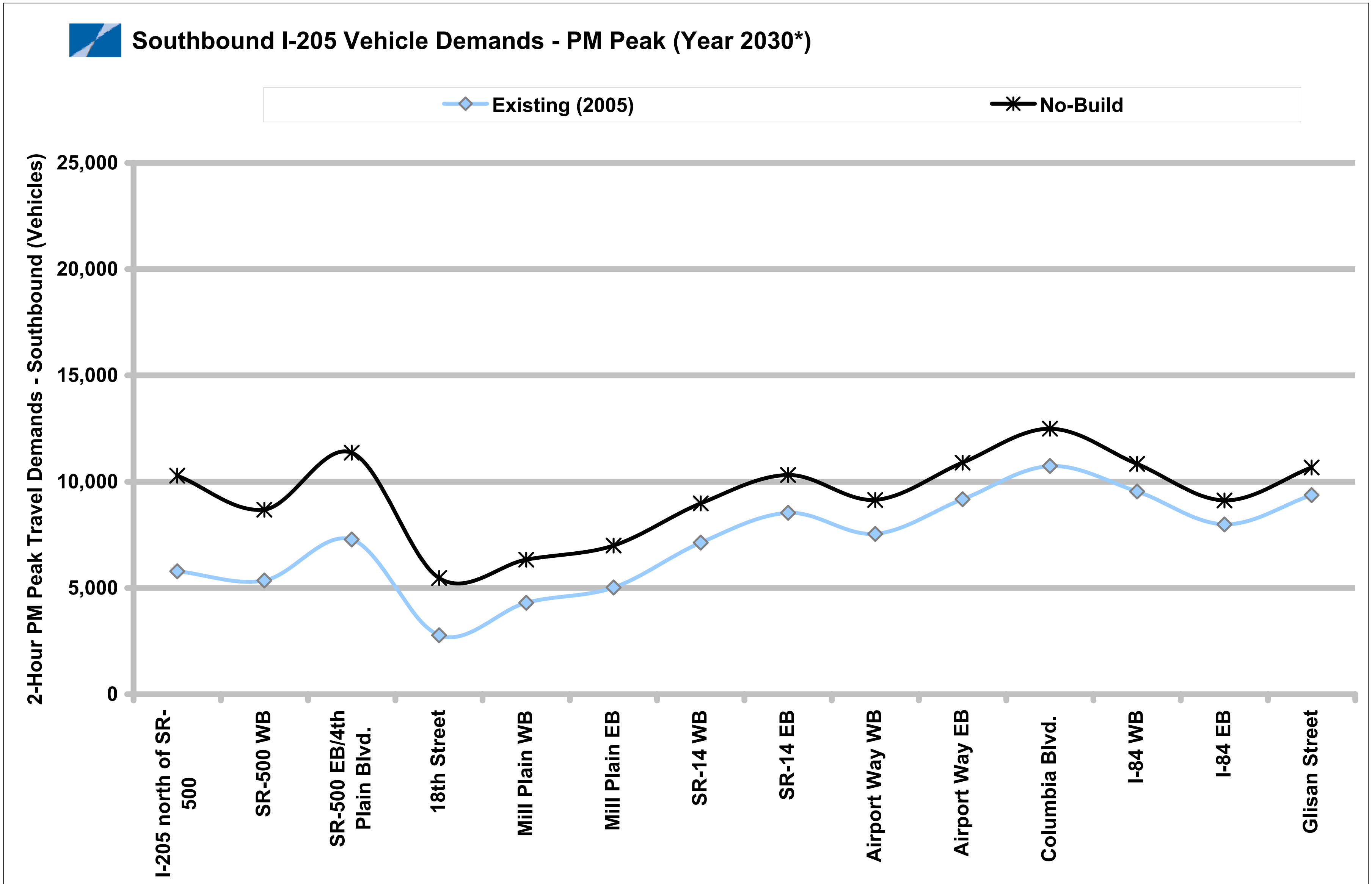
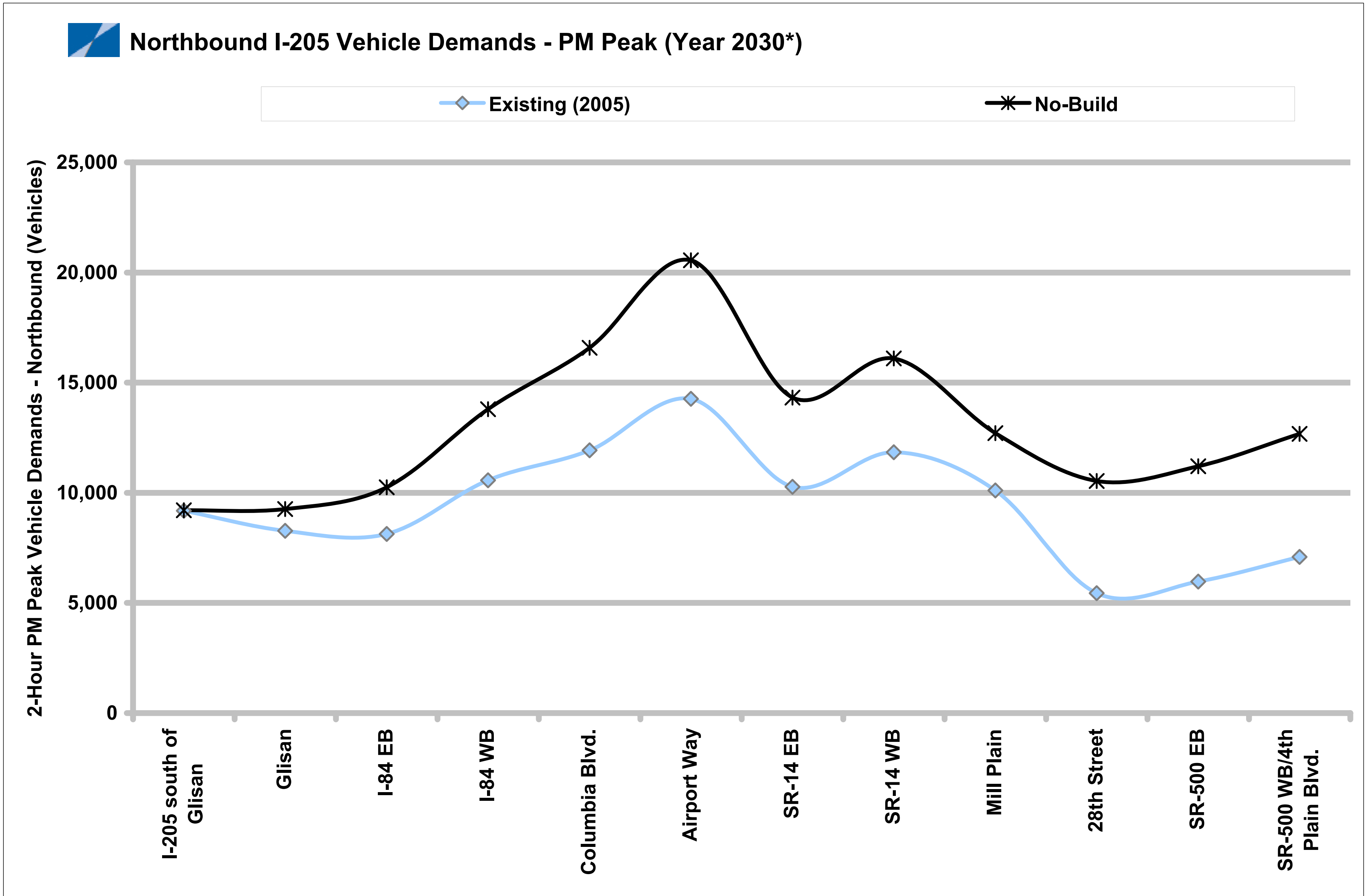

Northbound I-205 Vehicle Demands - AM Peak (Year 2030*)
Existing (2005)
No-Build
2-Hour AM Peak Vehicle Demands - Northbound (Vehicles)
25,000
20,000
15,000
10,000
5,000
0
I-205 south of Glisan
Glisan
I-84 EB
I-84 WB
Columbia Blvd.
Airport Way
SR-14 EB
SR-14 WB
Mill Plain
28th Street
SR-500 EB
SR-500 WB/4th Plain Blvd.
*Except for Existing Conditions (Year 2005)

Exhibit 6-8



*Except for Existing Conditions (Year 2005)

Exhibit 6-9



*Except for Existing Conditions (Year 2005)

Exhibit 6-10

Portland-Vancouver Region Freight Cargo Forecasts by Mode					
	Year 2000 Volume		Year 2030 Volume		2000-2030
Mode	**Tons (millions)**	**Market Share**	**Tons (millions)**	**Market Share**	**Growth Rate**
Truck	197.2	67%	390.5	73%	2.3% / year
Rail	32.9	11%	50.9	10%	1.5% / year
Ocean	28.4	10%	40.3	8%	1.2% / year
Barge	15.1	5%	19.8	4%	0.9% / year
Pipeline	22.2	7%	28.8	5%	0.9% / year
Air	0.4	< 1 percent	1.3	< 1 percent	4.0% / year
TOTAL	**296.2**	**100%**	**531.6**	**100%**	**2.0% / year**

Source: Portland/Vancouver International and Domestic Trade Capacity Analysis 2006. Provided by Metro Planning Department, Deena Platman, Senior Transportation Planner, August 22, 2007.

Exhibit 6-11

Peak Period 2030 Truck Volume - 2030 No-Build				
	Existing 2005		2030 No-Build	
Hours	Southbound	Northbound	Southbound	Northbound
AM Peak Period 6 AM - 10 AM	1,015	1,120	1,140	2,195
Midday Peak Period 10 AM - 3 AM	1,945	1,880	3,525	2,900
PM Peak Period 3 PM - 7 PM	1,020	925	2,350	1,635
Night 7 PM - 6 AM	1,570	1,500	2,790	2,870
Daily Total	**5,550**	**5,425**	**9,805**	**9,600**

Source: Portland/Vancouver International and Domestic Trade Capacity Analysis, 2006 and CRC Project, September 2007

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Exhibit 6-12

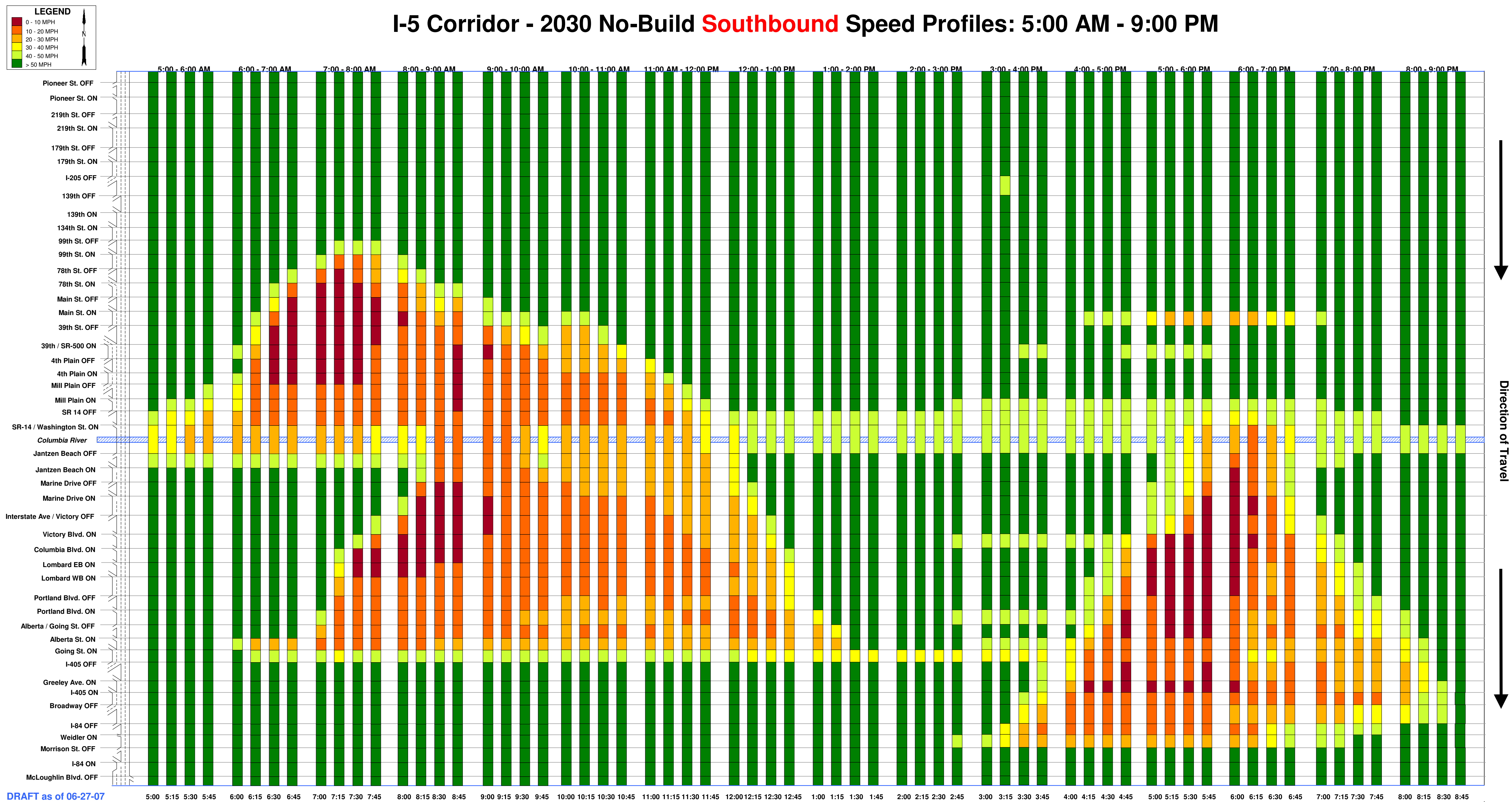

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Exhibit 6-13

I-5 Corridor - 2030 No Build Northbound Speed Profiles: 5:00 AM - 9:00 PM

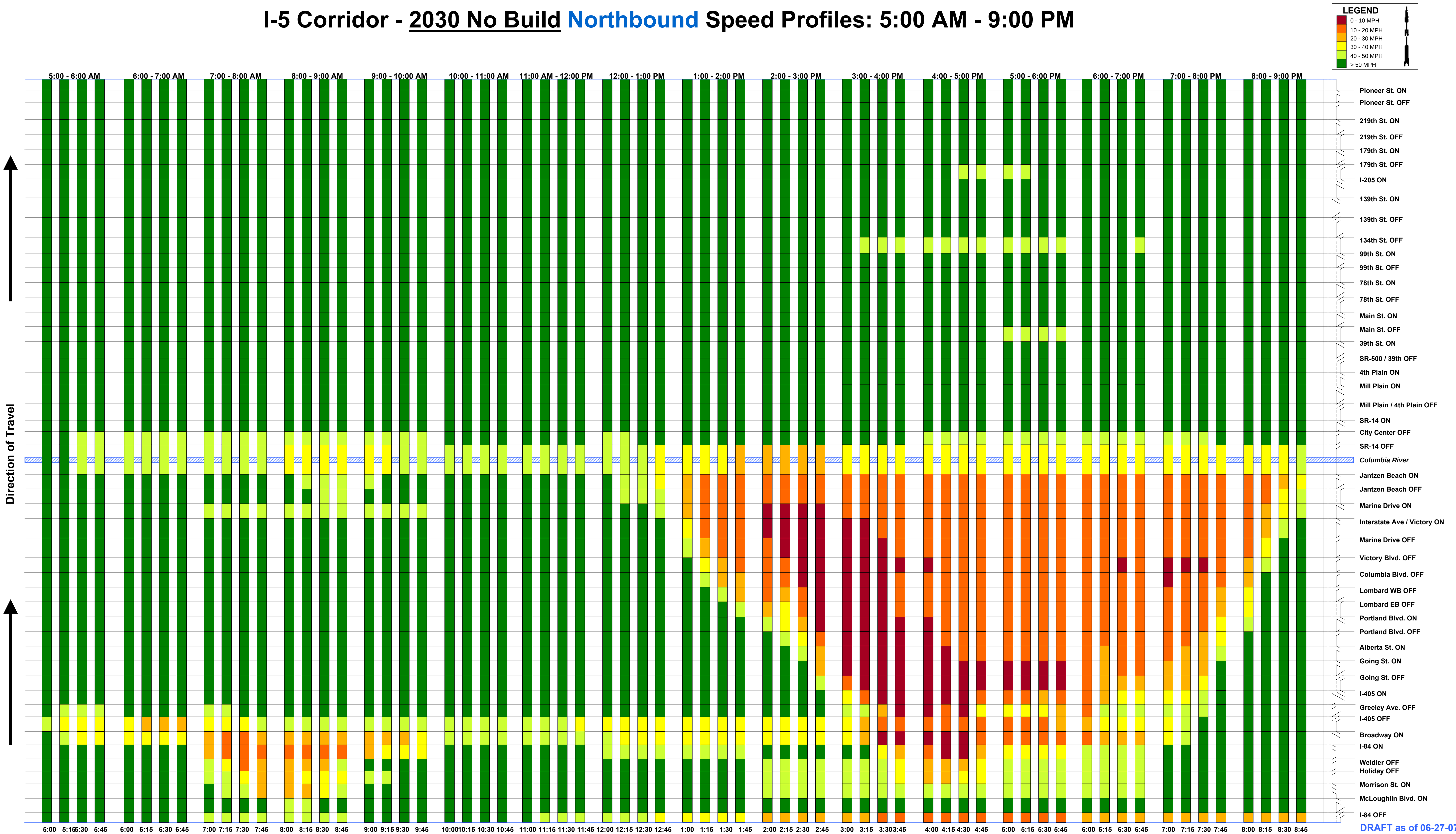

Exhibit 6-14

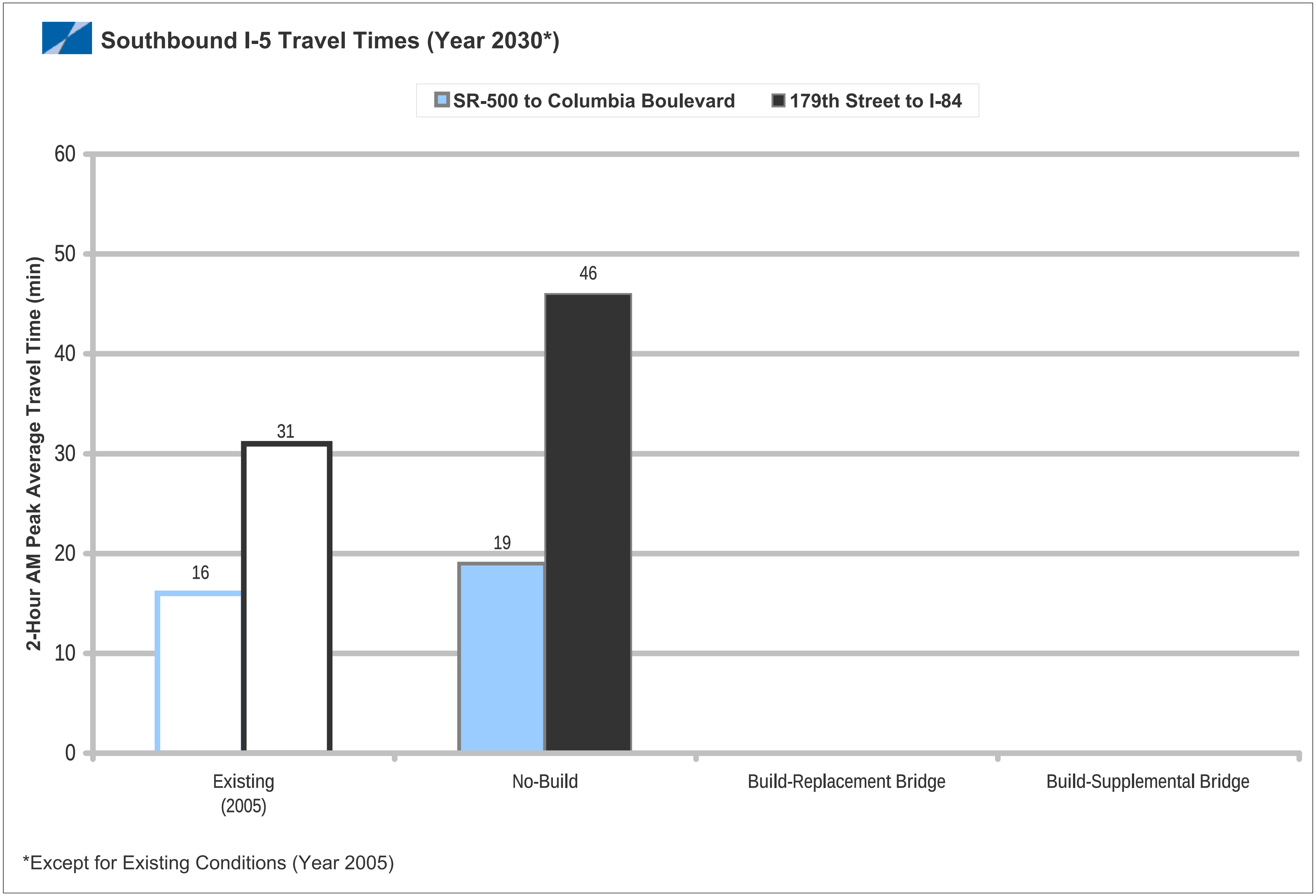
Southbound I-5 Travel Times (Year 2030*)
SR-500 to Columbia Boulevard
179th Street to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
16
31
19
46
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 6-15

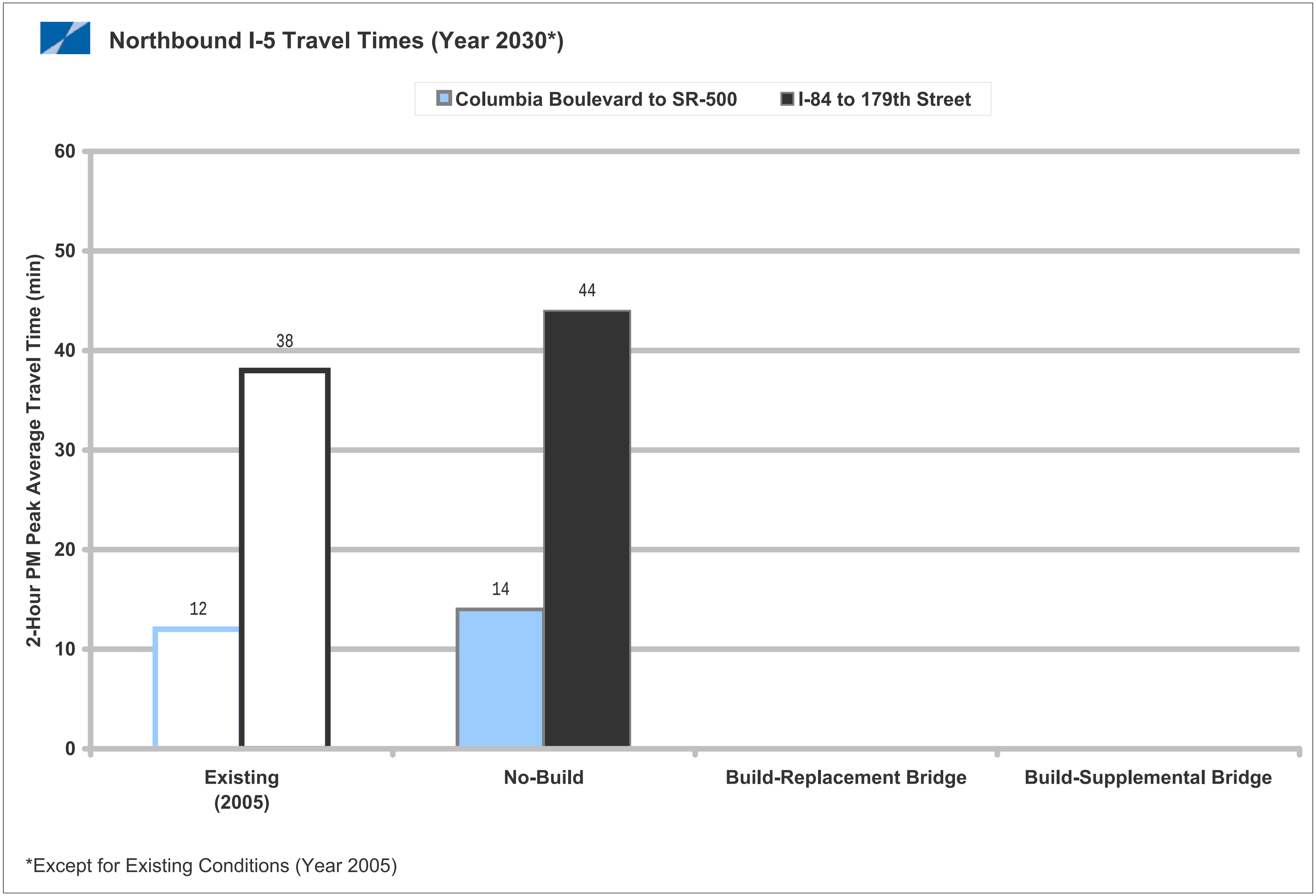
Northbound I-5 Travel Times (Year 2030*)
Columbia Boulevard to SR-500
I-84 to 179th Street
2-Hour PM Peak Average Travel Time (min)
0
10
20
30
40
50
60
12
38
14
44
Existing
(2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 6-16

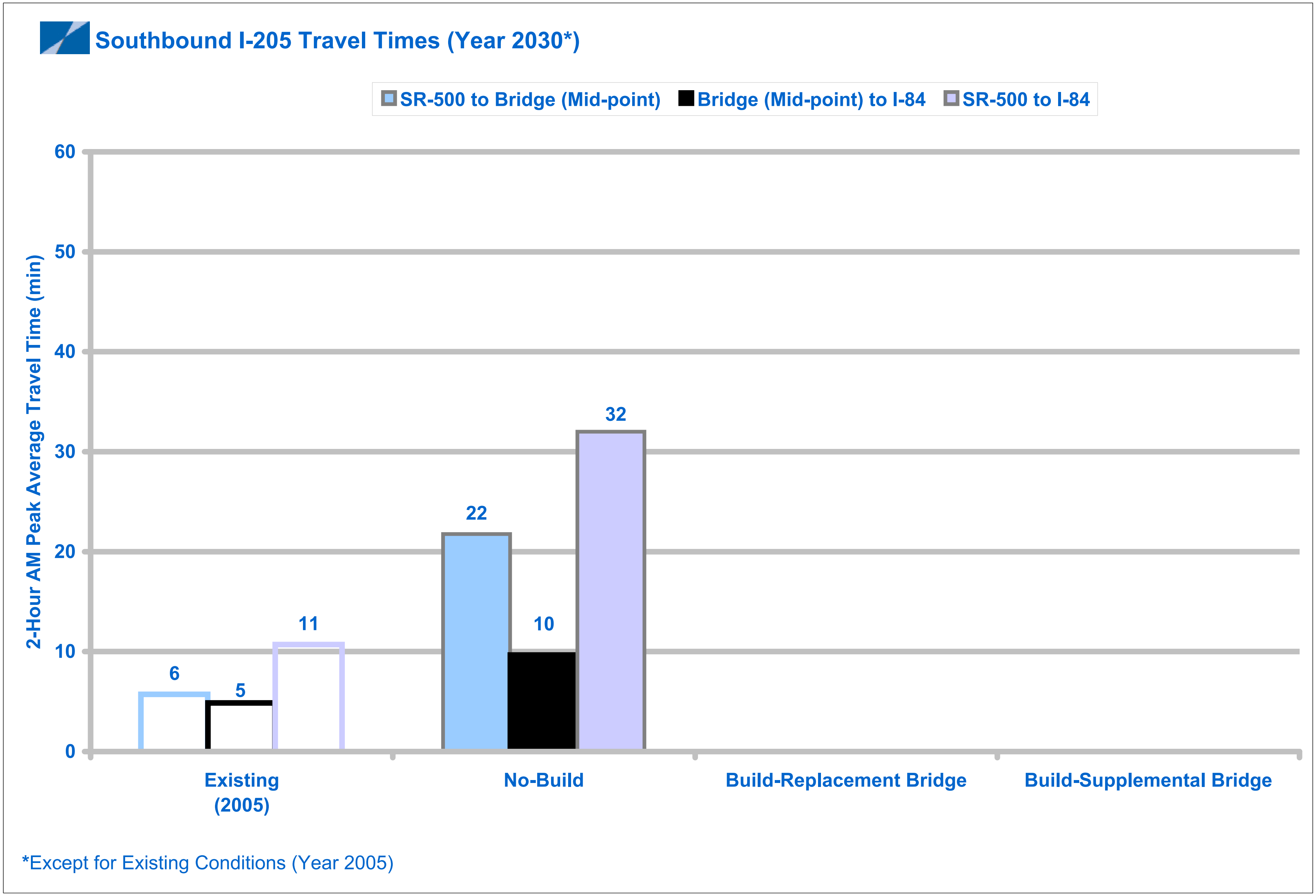
Southbound I-205 Travel Times (Year 2030*)
SR-500 to Bridge (Mid-point)
Bridge (Mid-point) to I-84
SR-500 to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
6
5
11
22
10
32
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 6-17

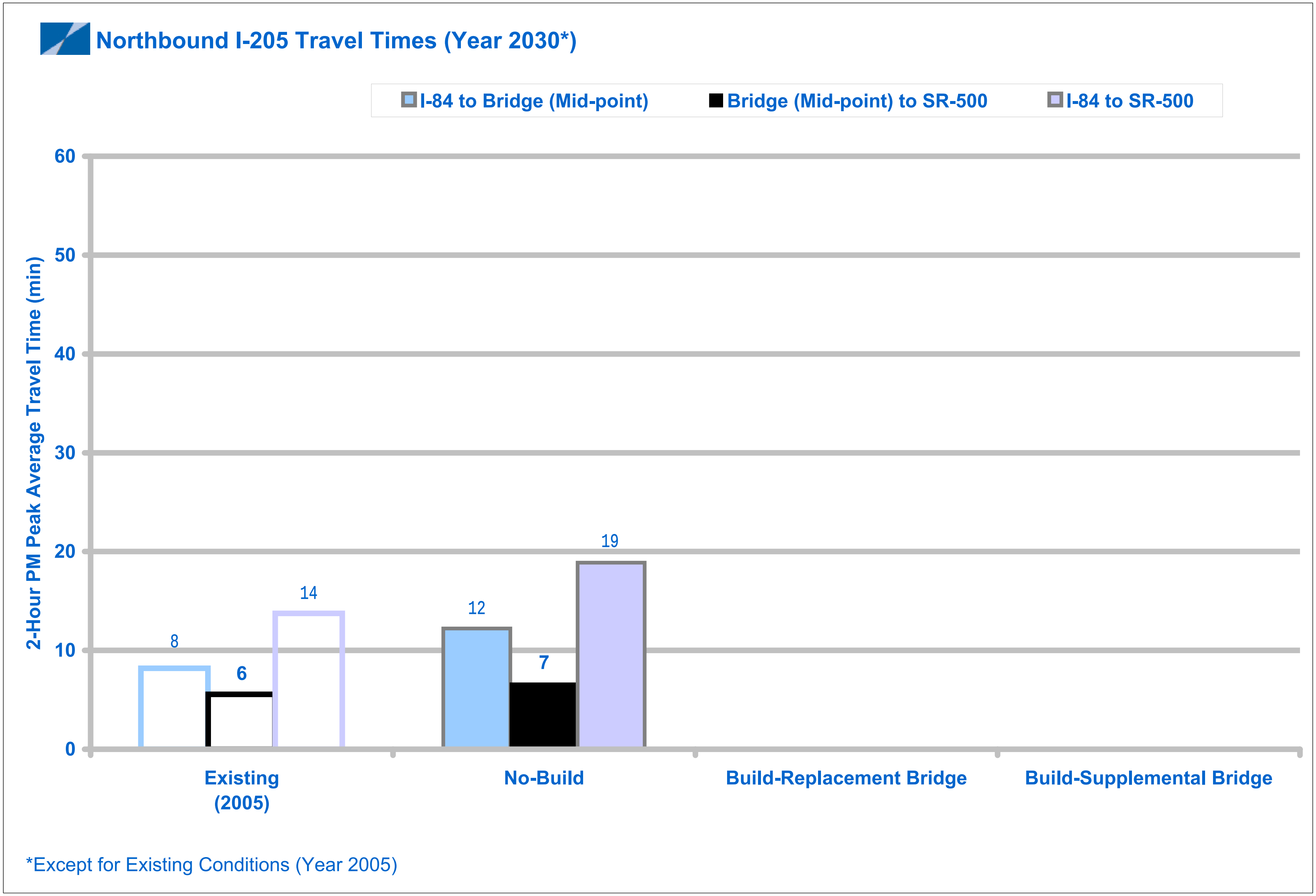
Northbound I-205 Travel Times (Year 2030*)
I-84 to Bridge (Mid-point)
Bridge (Mid-point) to SR-500
I-84 to SR-500
2-Hour PM Peak Average Travel Time (min)
60
50
40
30
20
10
0
8
6
14
12
7
19
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 6-18

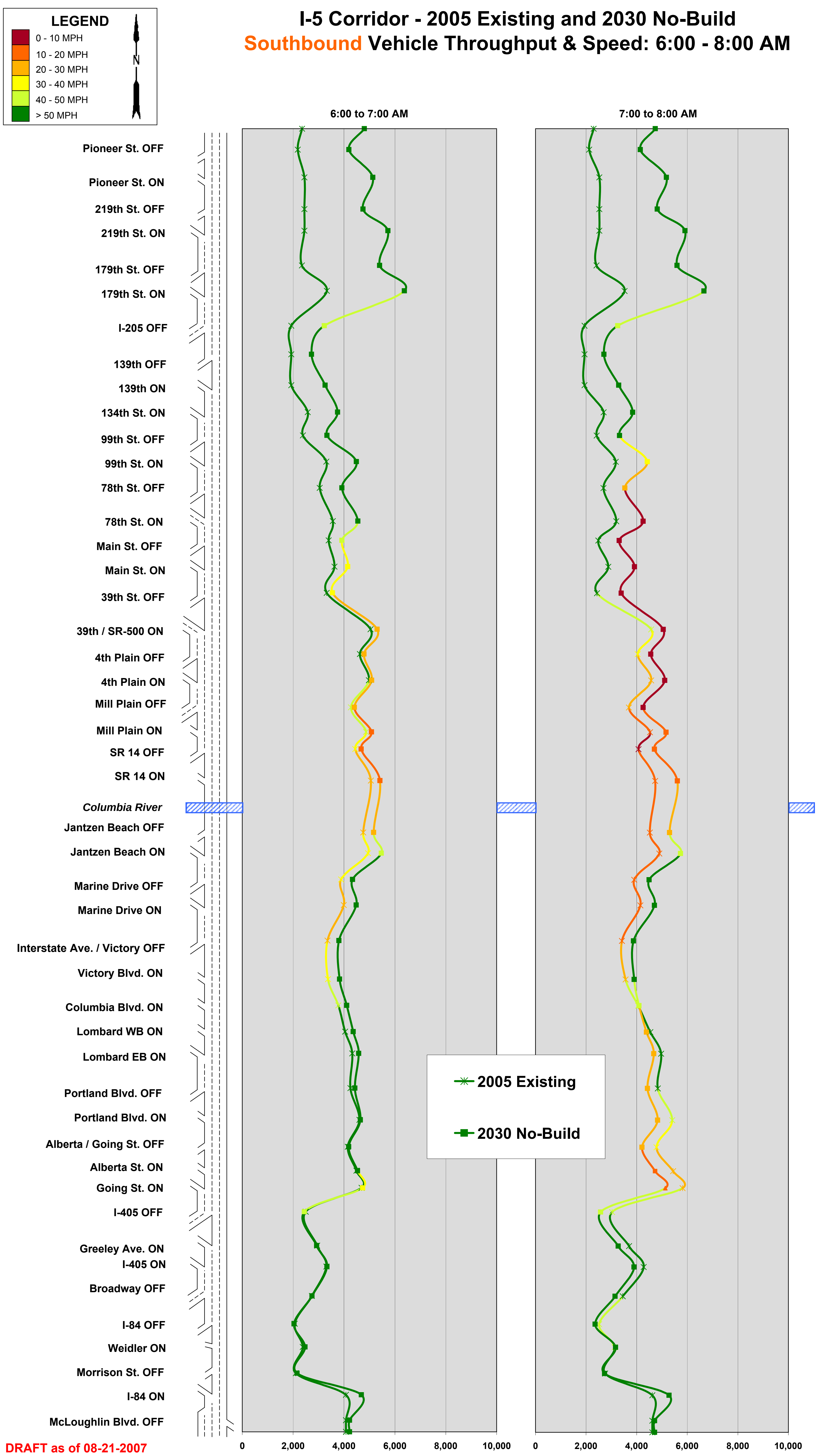

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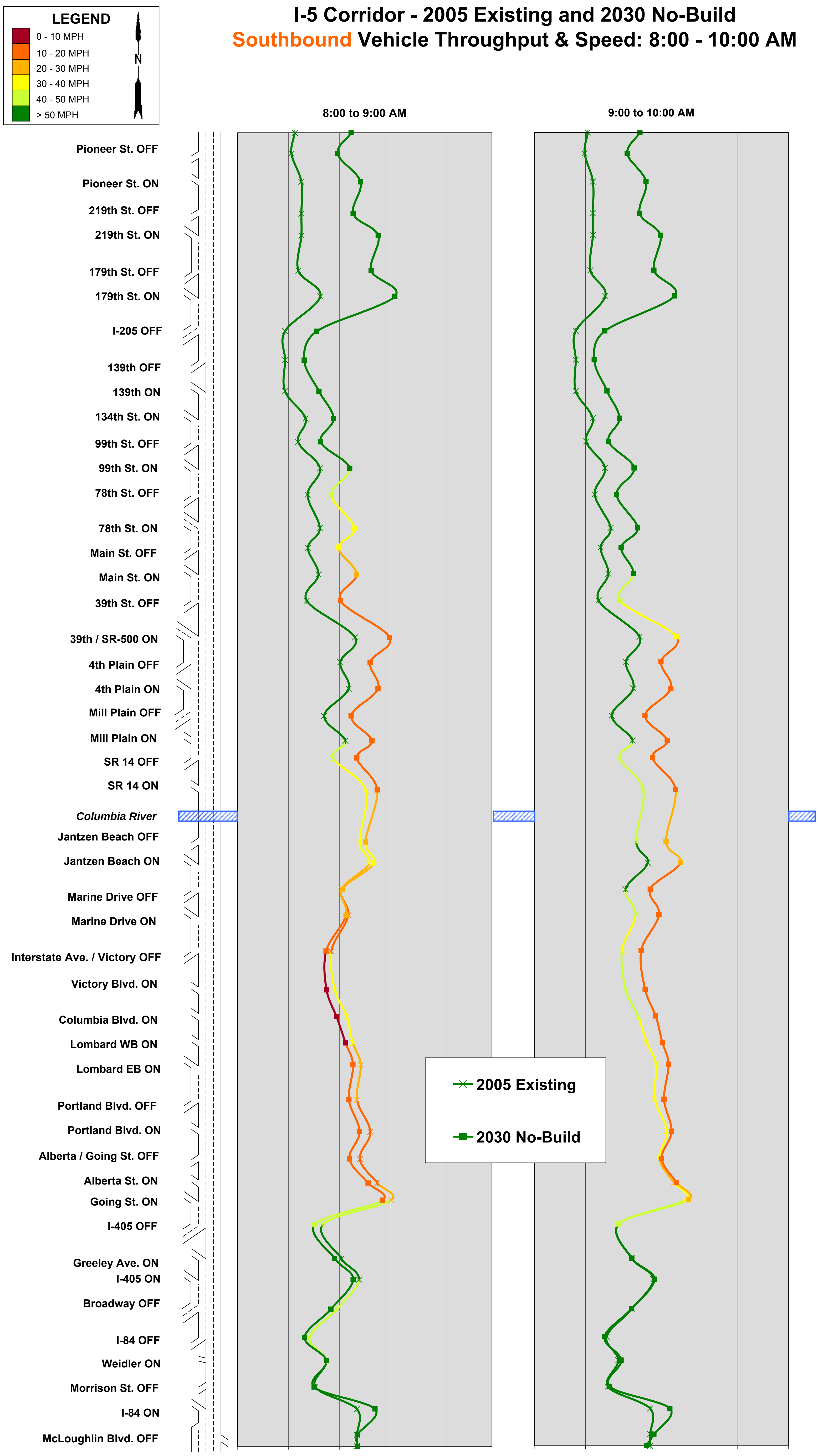
Exhibit 6-18 - Continued



DRAFT as of 08-21-2007

Exhibit 6-19

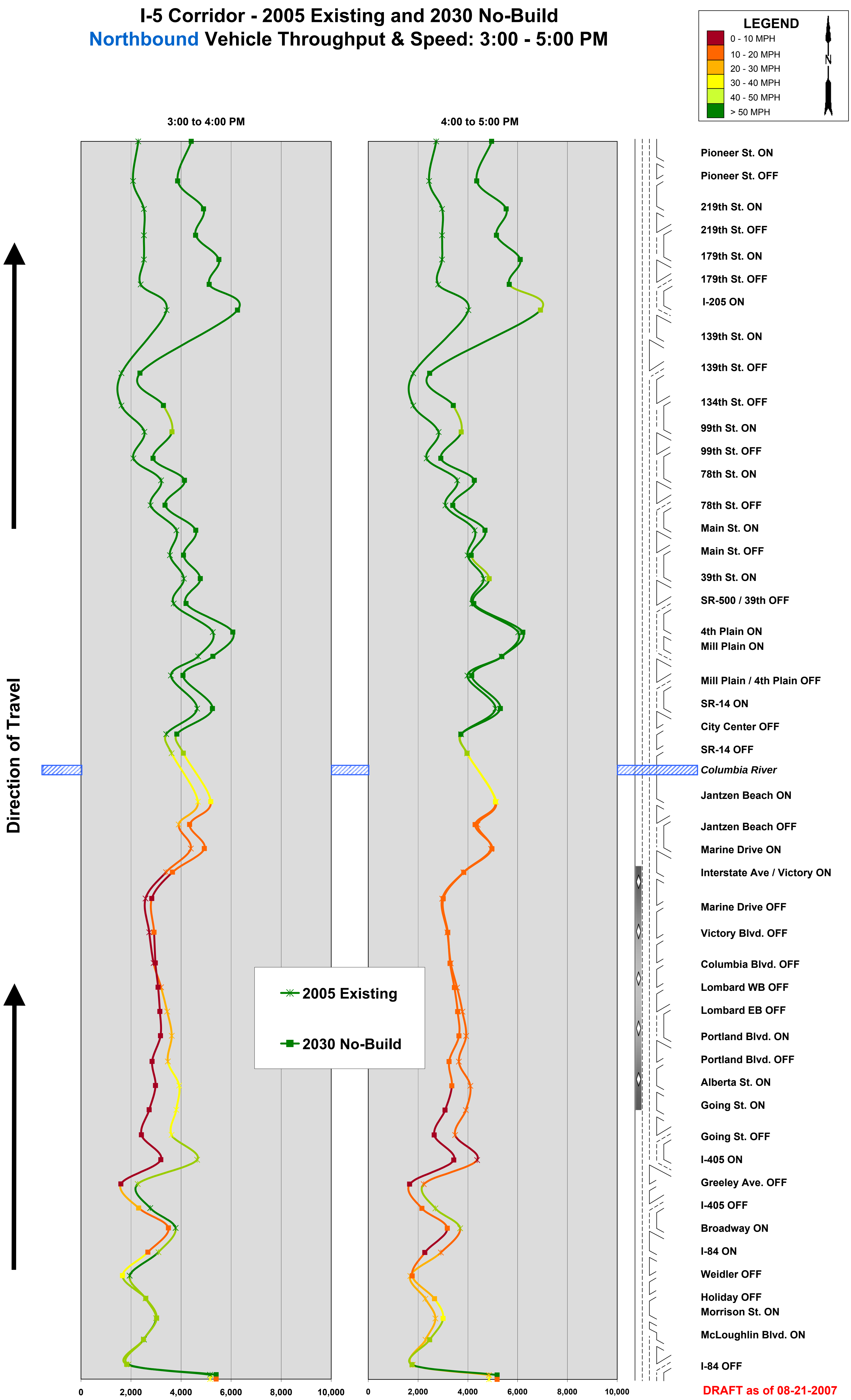


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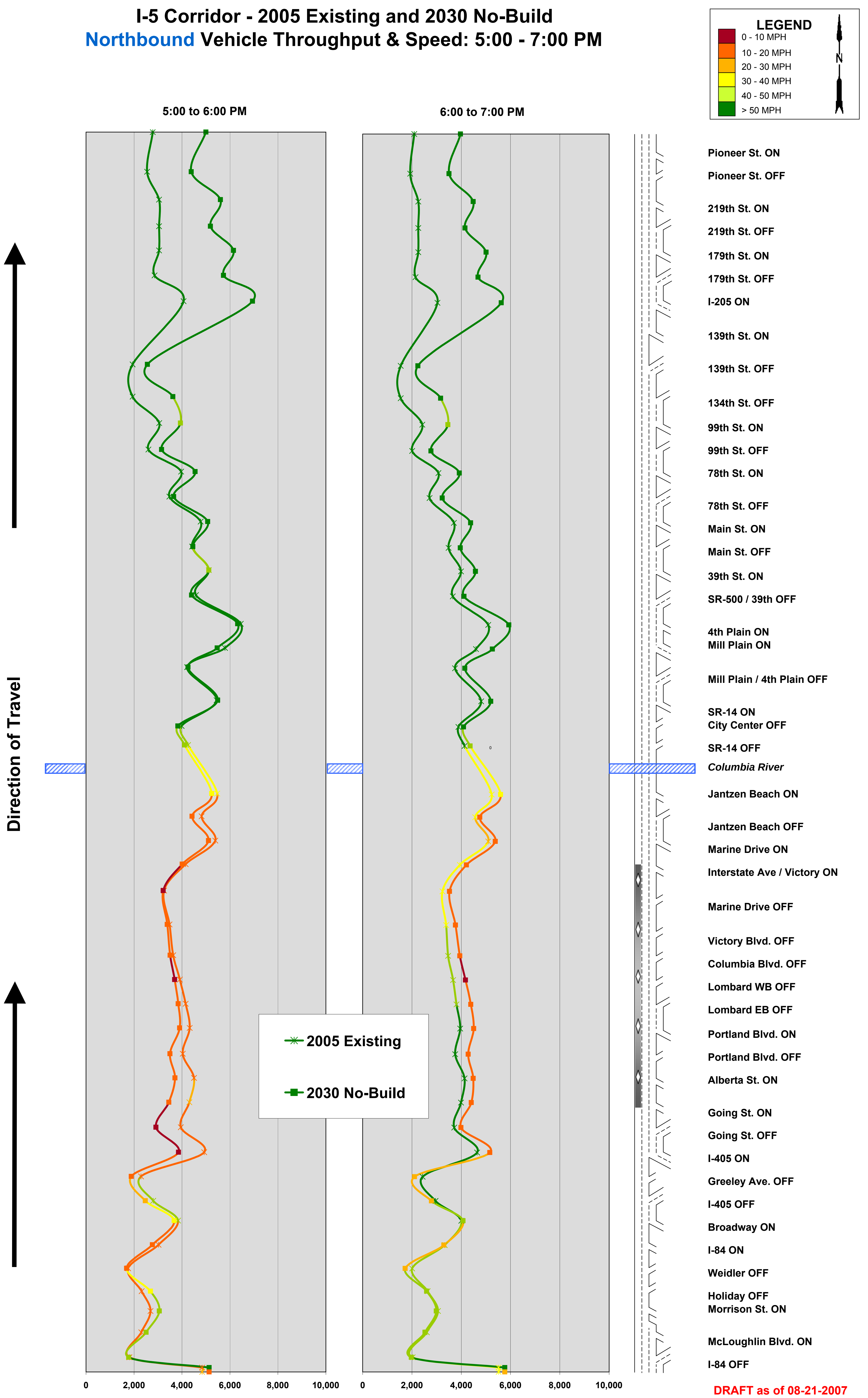
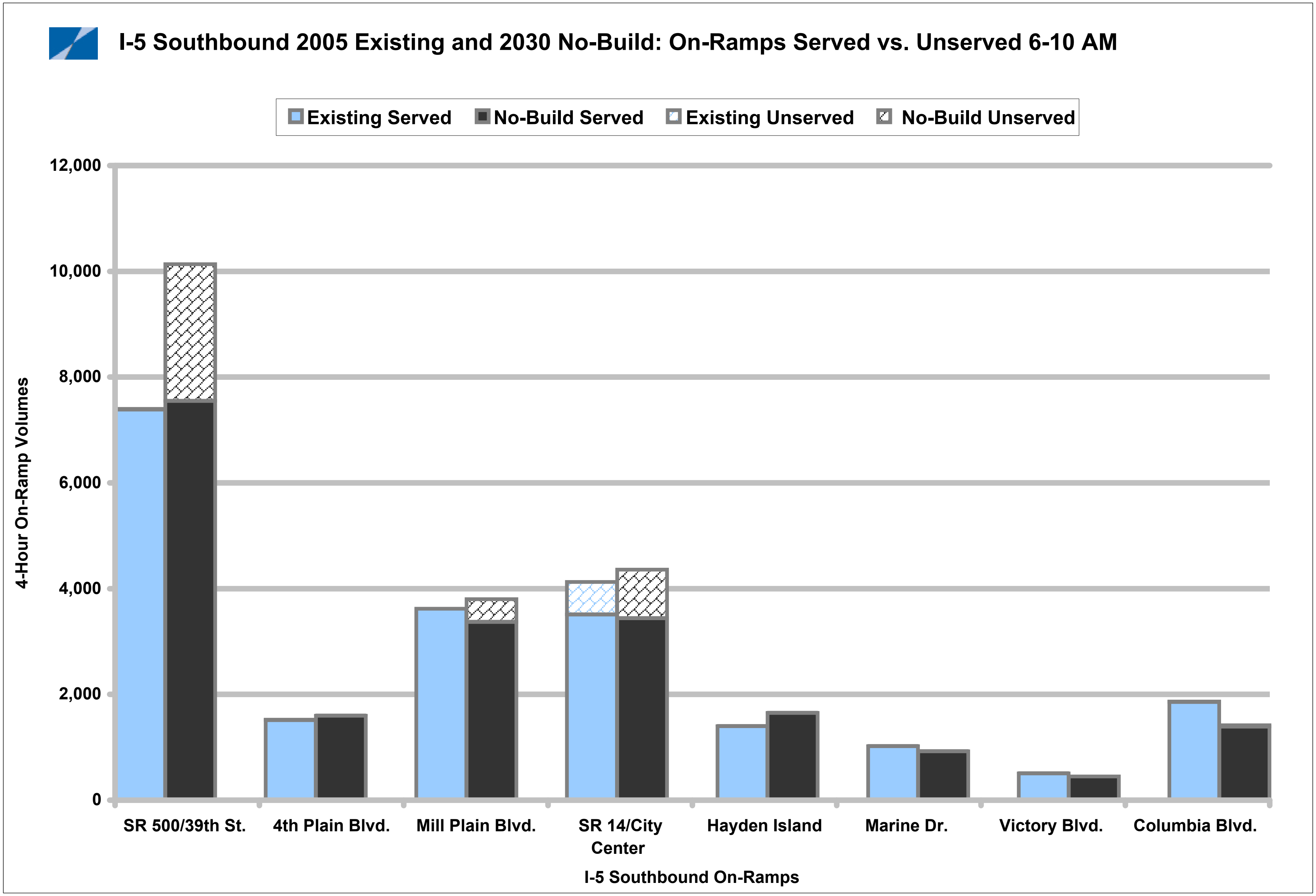
Exhibit 6-19 - Continued



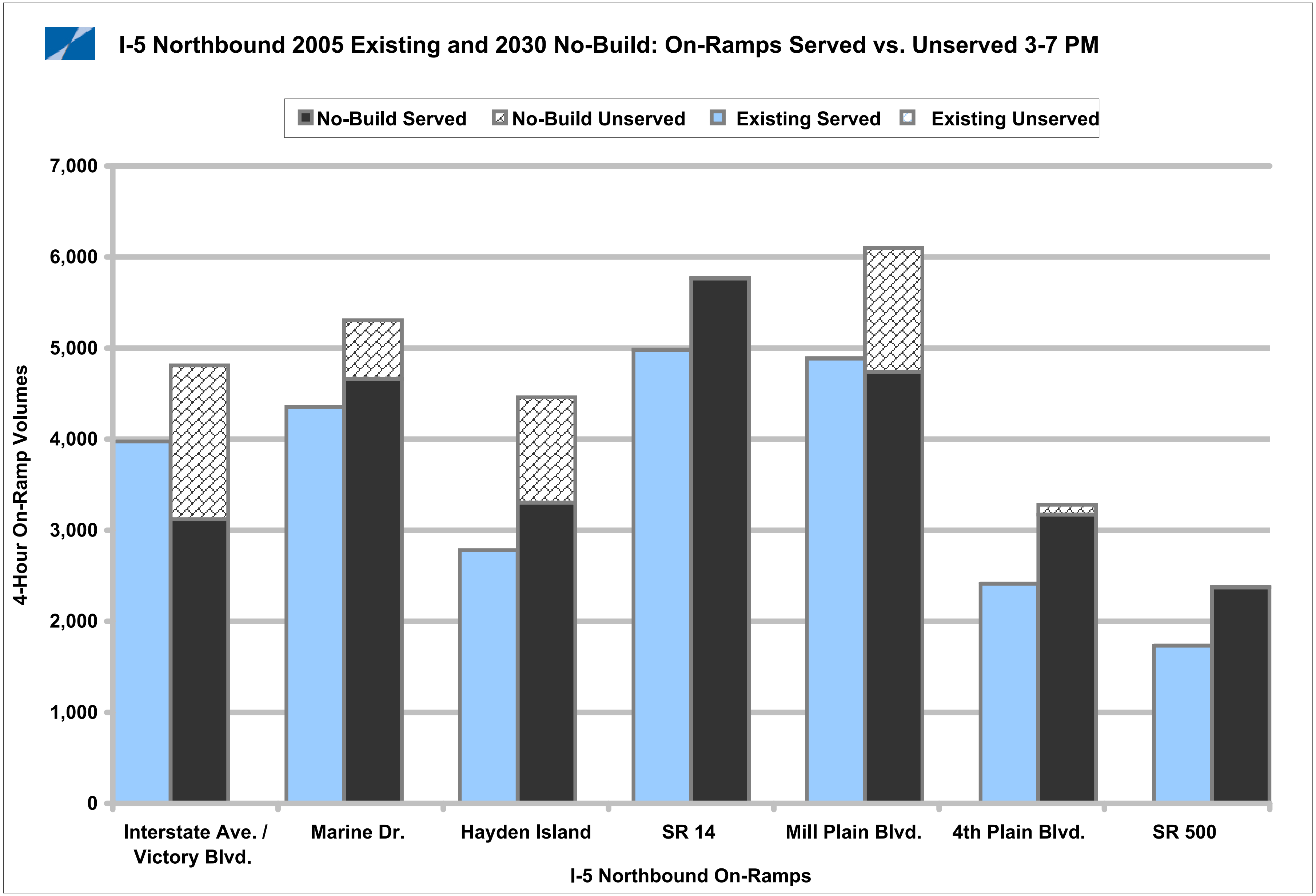
DRAFT as of 08-21-2007

Exhibit 6-20



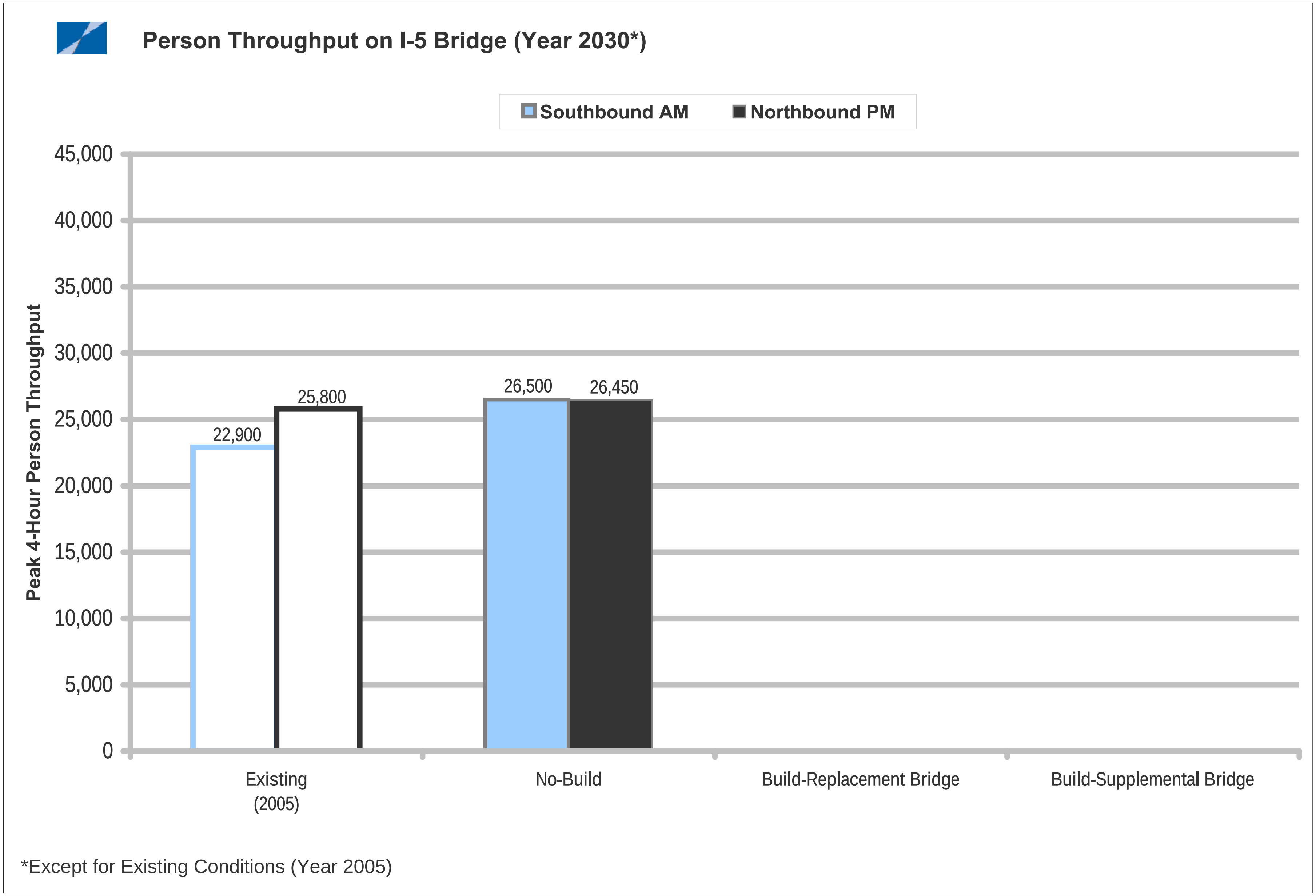
I-5 Southbound 2005 Existing and 2030 No-Build: On-Ramps Served vs. Unserved 6-10 AM
Existing Served
No-Build Served
Existing Unserved
No-Build Unserved
12,000
10,000
8,000
6,000
4,000
2,000
0
4-Hour On-Ramp Volumes
SR 500/39th St.
4th Plain Blvd.
Mill Plain Blvd.
SR 14/City Center
Hayden Island
Marine Dr.
Victory Blvd.
Columbia Blvd.
I-5 Southbound On-Ramps

Exhibit 6-21



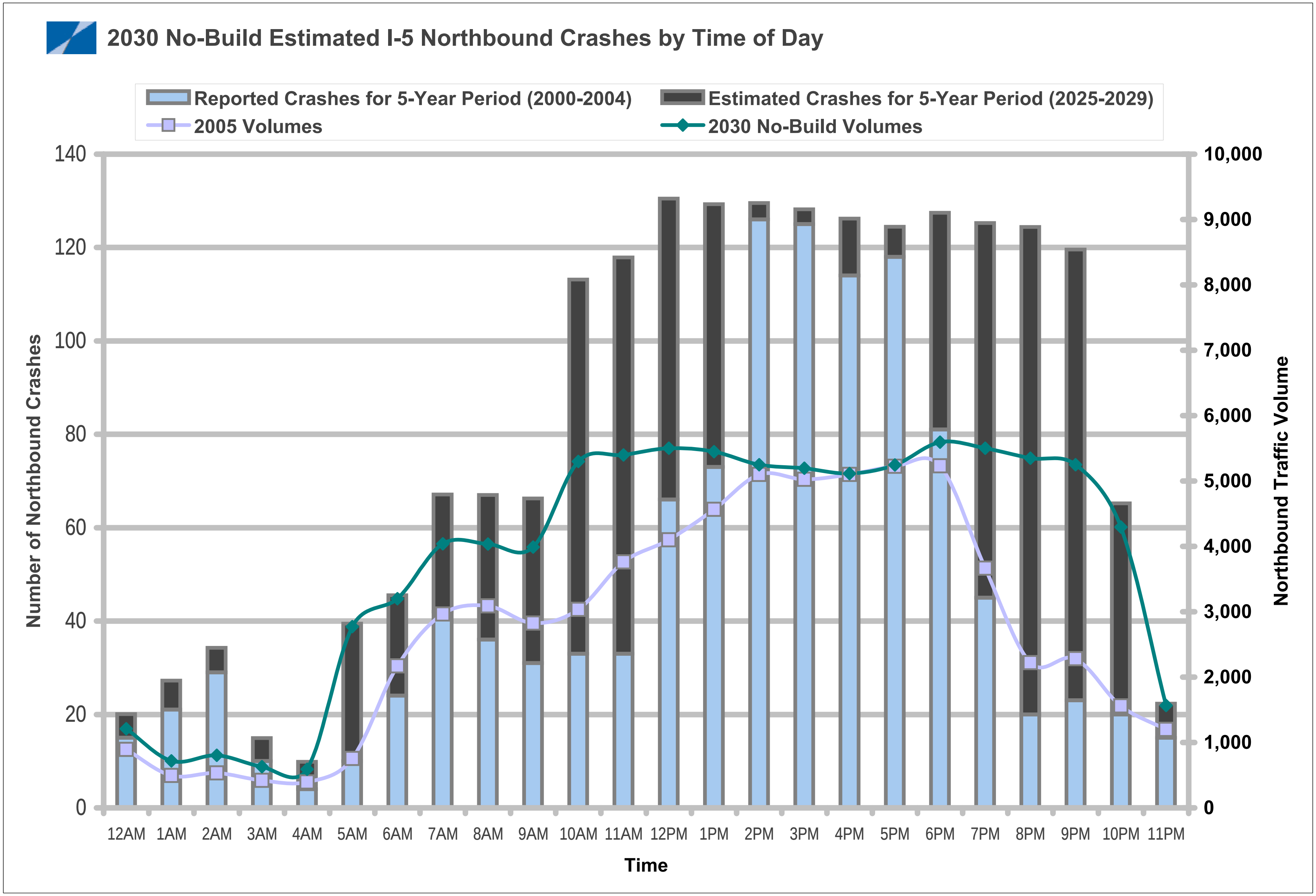
I-5 Northbound 2005 Existing and 2030 No-Build: On-Ramps Served vs. Unserved 3-7 PM
No-Build Served
No-Build Unserved
Existing Served
Existing Unserved
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
4-Hour On-Ramp Volumes
Interstate Ave. / Victory Blvd.
Marine Dr.
Hayden Island
SR 14
Mill Plain Blvd.
4th Plain Blvd.
SR 500
I-5 Northbound On-Ramps

Exhibit 6-22



Person Throughput on I-5 Bridge (Year 2030*)
Southbound AM
Northbound PM
Peak 4-Hour Person Throughput
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
22,900
25,800
26,500
26,450
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 6-23



2030 No-Build Estimated I-5 Northbound Crashes by Time of Day
Reported Crashes for 5-Year Period (2000-2004)
Estimated Crashes for 5-Year Period (2025-2029)
2005 Volumes
2030 No-Build Volumes
Number of Northbound Crashes
Northbound Traffic Volume
0
20
40
60
80
100
120
140
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
12AM 1AM 2AM 3AM 4AM 5AM 6AM 7AM 8AM 9AM 10AM 11AM 12PM 1PM 2PM 3PM 4PM 5PM 6PM 7PM 8PM 9PM 10PM 11PM
Time

Exhibit 6-24

Vancouver North-South Screenlines - AM Peak Hour Volumes			
Screenline	**Existing**	**No-Build**	**Difference**
West of Franklin St			
Westbound Total	1,350	2,950	119%
Eastbound Total	1,400	2,200	57%
West of I-5			
Westbound Total	3,100	5,000	61%
Eastbound Total	2,750	3,800	38%
East of I-5			
Westbound Total	2,550	3,950	55%
Eastbound Total	2,300	3,400	48%

Vancouver East-West Screenlines - AM Peak Hour Volumes			
Screenline	**Existing**	**No-Build**	**Difference**
North of Evergreen Blvd			
Southbound Total	950	1,800	89%
Northbound Total	800	1,350	69%
North of 15th St			
Southbound Total	1,300	2,650	104%
Northbound Total	450	650	44%
North of 4th Plain Blvd			
Southbound Total	1,500	2,750	83%
Northbound Total	350	450	29%
North of 39th St			
Southbound Total	800	1,550	94%
Northbound Total	250	350	40%

Exhibit 6-25

Vancouver North-South Screenlines - PM Peak Hour Volumes			
Screenline	**Existing**	**No-Build**	**Difference**
West of Franklin St			
Westbound Total	1,550	2,600	68%
Eastbound Total	1,750	3,600	106%
West of I-5			
Westbound Total	2,900	4,450	53%
Eastbound Total	4,200	6,550	56%
East of I-5			
Westbound Total	2,550	3,550	39%
Eastbound Total	4,050	6,350	57%

Vancouver East-West Screenlines - PM Peak Hour Volumes			
Screenline	**Existing**	**No-Build**	**Difference**
North of Evergreen Blvd			
Southbound Total	950	1,350	42%
Northbound Total	1,200	2,300	92%
North of 15th St			
Southbound Total	850	1,250	47%
Northbound Total	950	1,700	79%
North of 4th Plain Blvd			
Southbound Total	600	800	33%
Northbound Total	950	1,600	68%
North of 39th St			
Southbound Total	500	650	30%
Northbound Total	650	1,200	85%

Exhibit 6-26

Portland North-South Screenlines - AM Peak Hour Volumes			
Screenline	**Existing**	**No-Build**	**Difference**
West of Denver Ave			
Westbound Total	3,300	4,600	39%
Eastbound Total	2,800	3,550	27%
West of Vancouver Ave			
Westbound Total	3,100	3,800	23%
Eastbound Total	2,450	3,100	27%
East of MLK Jr Blvd			
Westbound Total	3,850	4,550	18%
Eastbound Total	2,450	3,100	27%

Portland East-West Screenlines - AM Peak Hour Volumes			
Screenline	**Existing**	**No-Build**	**Difference**
Columbia Slough			
Southbound Total	1,500	1,800	20%
Northbound Total	1,200	1,550	29%
North of Portland Blvd			
Southbound Total	1,950	2,200	13%
Northbound Total	1,000	1,400	40%
South of Alberta St			
Southbound Total	3,250	3,800	17%
Northbound Total	1,450	2,500	72%

Exhibit 6-27

Portland North-South Screenlines - PM Peak Hour Volumes			
Screenline	**Existing**	**No-Build**	**Difference**
West of Denver Ave			
Westbound Total	2,800	3,550	27%
Eastbound Total	3,950	5,550	41%
West of Vancouver Ave			
Westbound Total	2,950	3,550	20%
Eastbound Total	3,050	3,800	25%
East of MLK Jr Blvd			
Westbound Total	3,100	3,800	23%
Eastbound Total	3,950	4,750	20%

Portland East-West Screenlines - PM Peak Hour Volumes			
Screenline	**Existing**	**No-Build**	**Difference**
Columbia Slough			
Southbound Total	1,500	1,850	23%
Northbound Total	1,800	2,050	14%
North of Portland Blvd			
Southbound Total	1,750	2,400	37%
Northbound Total	2,550	2,900	14%
South of Alberta St			
Southbound Total	2,400	3,350	40%
Northbound Total	4,050	4,750	17%

Exhibit 6-28

Vancouver Intersection Performance Results

AM Peak Hour		2005 Existing Conditions								2030 No-Build (Alternative 1)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way									Eastbound Left	5.9	A	0.01	LOS E	Y	-	-
*	Columbia St. @ Columbia Way									Eastbound Left	5.3	A	0.06	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Westbound Left/Right	3.7	A	0.03	LOS E	Y	-	-	Eastbound Left/Right	5.2	A	0.05	LOS E	Y	-	-
*	3rd/4th St. @ Esther St.									Westbound Left/Right	4.2	A	0.12	LOS E	Y	-	-
02	4th St. @ Columbia St.	Eastbound Left/Thru/Right	4.4	A	0.03	LOS E	Y	-	-	Northbound Thru/Right	0.4	A	0.11	LOS E	Y	-	-
03	4th St. @ Washington St.	Eastbound Right	1.1	A	0.01	LOS E	Y	-	-	Eastbound Right	2.8	A	0.04	LOS E	Y	-	-
04	5th St. @ Columbia St.	Southbound Left	12.6	B	0.15	LOS E	Y	90	100 (SBL)	Southbound Left	53.8	F	0.16	LOS E	N	90	100 (SBL)
																210	225 (SBT)
05	5th St. @ Washington St.	Overall Intersection	39.6	D	0.42	LOS E	Y	180	200 (EBR to I-5)	Overall Intersection	49.2	D	0.44	LOS E	Y	185	200 (EBR to I-5)
								215	225 (SBL)							210	225 (SBL)
																210	225 (SBT)
06	6th St. @ Columbia St.	Overall Intersection	7.8	A	0.42	LOS E	Y	-	-	Overall Intersection	26.5	C	0.47	LOS E	Y	185	225 (WBL)
07	6th St. @ Washington St.	Overall Intersection	20.3	C	0.39	LOS E	Y	-	-	Overall Intersection	61.6	E	0.49	LOS E	Y	220	225 (WBLT)
																490	500 (SBT)
08	6th St. @ Main St.	Westbound Left/Thru/Right	6.7	A	0.36	LOS E	Y	-	-	Westbound Left/Thru/Right	27.9	D	0.87	LOS E	Y	230	250 (WBLT)
09	6th St. @ Broadway	Southbound Right	1.8	A	0.02	LOS E	Y	-	-	Southbound Right	32.1	D	0.44	LOS E	Y	-	-
10	6th St. @ C St.	Northbound Left/Thru	5.7	A	-	LOS E	Y	-	-	Northbound Left/Thru	79.0	F	-	LOS E	N	850	850 (NBLT)
11	8th St. @ Esther St.	Southbound Left/Thru/Right	6.0	A	0.08	LOS E	Y	-	-	Southbound Left/Thru/Right	8.7	A	0.31	LOS E	Y	-	-
12	8th St. @ Columbia St.	Overall Intersection	10.8	B	0.51	LOS E	Y	-	-	Overall Intersection	15.4	B	0.98	LOS E	Y	195	200 (WBLTR)
13	8th St. @ Washington St.	Overall Intersection	5.4	A	0.55	LOS E	Y	-	-	Overall Intersection	25.4	C	0.59	LOS E	Y	100	125 (WBL)
																205	225 (SBLT)
14	8th St. @ Main St.	Overall Intersection	11.3	B	0.55	LOS E	Y	-	-	Overall Intersection	12.6	B	0.71	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left	6.6	A	0.22	LOS E	Y	-	-	Southbound Left/Thru/Right	10.7	B	-	LOS E	Y	-	-
16	8th St. @ C St.	Overall Intersection	10.0	A	0.48	LOS E	Y	-	-	Overall Intersection	16.5	B	0.58	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	5.6	A	0.08	LOS E	Y	-	-	Westbound Left/Thru/Right	4.4	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Eastbound Left/Thru/Right	5.4	A	0.05	LOS E	Y	-	-	Westbound Left/Thru/Right	7.8	A	0.19	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Left	6.4	A	0.01	LOS E	Y	-	-	Westbound Left	67.4	F	0.06	LOS E	N	-	-
20	9th St. @ Main St.	Northbound Left	6.2	A	0.05	LOS E	Y	50	75 (NBL)	Eastbound Left/Thru/Right	5.9	A	0.07	LOS E	Y	-	-
21	9th St. @ Broadway	Southbound Thru/Right	5.6	A	0.27	LOS E	Y	-	-	Eastbound Left/Right	4.8	A	0.05	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Northbound Left/Thru/Right	4.7	A	0.12	LOS E	Y	-	-	Northbound Left/Thru/Right	7.8	A	0.18	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	Overall Intersection	13.4	B	0.49	LOS E	Y	-	-	Overall Intersection	15.3	B	0.73	LOS E	Y	205	225 (WBTR)
24	Evergreen Blvd. @ Washington St.	Overall Intersection	9.1	A	0.53	LOS E	Y	-	-	Overall Intersection	22.9	C	0.61	LOS E	Y	75	100 (WBL)
																210	225 (SBTR)
25	Evergreen Blvd. @ Main St.	Overall Intersection	7.9	A	0.53	LOS E	Y	-	-	Overall Intersection	17.0	B	0.77	LOS E	Y	220	225 (WBLTR)
26	Evergreen Blvd. @ Broadway	Overall Intersection	18.7	B	0.83	LOS E	Y	75	75 (WBL)	Overall Intersection	15.8	B	0.78	LOS E	Y	75	125 (WBL)
								100	100 (SBL)							210	225 (WBTR)
								210	225 (SBTR)								
27	Evergreen Blvd. @ C St.	Overall Intersection	11.9	B	0.83	LOS E	Y	-	-	Overall Intersection	15.7	B	0.68	LOS E	Y	-	-
28	11th St. @ Esther St.	Southbound Left/Thru/Right	4.3	A	0.03	LOS E	Y	-	-	Southbound Left/Thru/Right	4.7	A	0.06	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	6.9	A	0.14	LOS E	Y	-	-	Westbound Left/Thru/Right	12.1	B	0.42	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	6.0	A	0.07	LOS E	Y	-	-	Westbound Left/Thru	26.2	C	0.38	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Thru/Right	4.7	A	0.08	LOS E	Y	-	-	Westbound Left/Thru/Right	14.1	B	0.23	LOS E	Y	-	-
32	11th St. @ Broadway	Eastbound Thru/Right	6.1	A	0.06	LOS E	Y	-	-	Westbound Left/Thru/Right	8.6	A	0.20	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	4.2	A	0.08	LOS E	Y	-	-	Eastbound Left/Thru	6.4	A	0.26	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	Overall Intersection	12.8	B	0.66	LOS E	Y	-	-	Overall Intersection	18.9	B	0.82	LOS E	Y	75	150 (SBL)
																210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	Overall Intersection	7.2	A	0.40	LOS E	Y	-	-	Overall Intersection	7.8	A	0.49	LOS E	Y	-	-
36	Mill Plain Blvd. @ Main St.	Overall Intersection	4.7	A	0.57	LOS E	Y	-	-	Overall Intersection	13.1	B	1.10	LOS E	Y	70	150 (SBL)
																210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	Overall Intersection	12.2	B	0.51	LOS E	Y	190	200 (SBLT)	Overall Intersection	10.3	B	0.90	LOS E	Y	70	75 (SBL)
																200	200 (SBT)
38	Mill Plain Blvd. @ C St.	Overall Intersection	8.3	A	0.34	LOS E	Y	-	-	Overall Intersection	6.5	A	0.43	LOS E	Y	-	-
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	Overall Intersection	18.6	B	0.58	LOS E	Y	350	375 (EBR)	Overall Intersection	15.3	B	0.78	LOS E	Y	275	350 (WBL)
								275	350 (WBL)								
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	Overall Intersection	21.8	C	0.54	LOS E	Y	75	100 (WBR)	Overall Intersection	36.3	D	0.88	LOS E	Y	75	125 (WBR)
																590	600 (NBLT)
																325	500 (NBR)
41	15th St. @ Columbia St.	Overall Intersection	10.1	B	0.53	LOS E	Y	-	-	Overall Intersection	24.9	C	0.82	LOS E	Y	-	-
42	15th St. @ Washington St.	Overall Intersection	4.9	A	0.44	LOS E	Y	-	-	Overall Intersection	11.6	B	0.58	LOS E	Y	-	-
43	15th St. @ Main St.	Overall Intersection	7.5	A	0.48	LOS E	Y	-	-	Overall Intersection	23.4	C	1.10	LOS E	Y	195	200 (WBLT)
44	15th St. @ Broadway	Overall Intersection	18.2	B	0.47	LOS E	Y	-	-	Overall Intersection	20.5	C	0.90	LOS E	Y	205	225 (WBLT)
45	15th St. @ C St.	Overall Intersection	8.8	A	0.48	LOS E	Y	-	-	Overall Intersection	13.5	B	0.59	LOS E	Y	-	-
46	McLoughlin Blvd. @ Columbia St.	Overall Intersection	7.3	A	0.52	LOS E	Y	-	-	Overall Intersection	14.6	B	0.82	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	Overall Intersection	11.0	B	0.55	LOS E	Y	-	-	Overall Intersection	21.9	C	0.91	LOS E	Y	-	-
48	McLoughlin Blvd. @ Broadway	Overall Intersection	10.1	B	0.46	LOS E	Y	-	-	Overall Intersection	22.5	C	0.69	LOS E	Y	75	125 (WBL)
																105	125 (WBR)
49	McLoughlin Blvd. @ Fort Vancouver Way	Overall Intersection	9.1	A	0.36	LOS D	Y	-	-	Overall Intersection	12.3	B	0.50	LOS D	Y	-	-
50	24th St. @ Columbia St.	Westbound Left/Thru/Right	8.4	A	0.12	LOS E	Y	-	-	Eastbound Left/Thru/Right	17.7	C	0.07	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	6.6	A	0.06	LOS E	Y	-	-	Eastbound Left/Right	8.9	A	0.09	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	Overall Intersection	18.8	B	0.61	LOS D	Y	-	-	Overall Intersection	33.3	C	0.83	LOS D	Y	150	175 (WBL)
																75	100 (SBL)
53	4th Plain Blvd. @ Main St.	Overall Intersection	35.7	D	0.66	LOS D	Y	125	150 (WBL)	Overall Intersection	43.9	D	0.87	LOS D	Y	170	225 (WBL)
								200	200 (WBTR)							195	200 (WBT)
								75	100 (SBL)							75	125 (SBL)
								470	475 (SBTR)							470	475 (SBTR)
54	4th Plain Blvd. @ Broadway	Overall Intersection	18.4	B	0.65	LOS D	Y	-	-	Overall Intersection	> 100	F	0.80	LOS D	N	195	200 (EBLT)
																125	150 (WBL)
																495	500 (WBT)
																440	450 (SBLTR)
55	4th Plain Blvd. @ F St.	Overall Intersection	12.5	B	0.50	LOS D	Y	150	200 (EBL)	Overall Intersection	21.3	C	0.58	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	Overall Intersection	8.8	A	0.46	LOS D	Y	-	-	Overall Intersection	23.4	C	0.69	LOS D	Y	200	275 (EBL)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	Overall Intersection	12.3	B	0.51	LOS D	Y	75	150 (WBR)	Overall Intersection	19.5	B	0.61	LOS D	Y	75	125 (WBR)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	6.5	A	0.01	LOS E	Y	-	-	Eastbound Left	7.0	A	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	Overall Intersection	13.2	B	0.41	LOS D	Y	-	-	Overall Intersection	19.8	B	0.51	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.07	LOS E	N	215	225 (SBTR)	Eastbound Left/Thru/Right	> 100	F	0.18	LOS E	N	215	275 (EBL)
61	28th St. @ Broadway	Northbound Thru/Right	1.0	A	-	LOS E	Y	-	-	Westbound Left	23.6	C	0.32	LOS E	Y	-	-
62	29th St. @ Main St./Broadway	Eastbound Left/Thru/Right	23.8	C	-	LOS E	Y	-	-	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	1000	1000 (SBTR)
63	33rd St. @ Main St.	Overall Intersection	18.3	B	0.54	LOS D	Y	50	75 (WBL)	Overall Intersection	51.0	D	0.83	LOS D	Y	50	75 (EBL)
								75	100 (SBL)							50	100 (WBL)
																75	125 (NBL)
																75	125 (SBL)
64	39th St. @ Main St.	Overall Intersection	28.5	C	0.69	LOS D	Y	75	125 (EBL)	Overall Intersection	> 100	F	1.06	LOS D	N	75	125 (EBL)
								75	125 (WBL)							1310	1325 (EBTR)
								215	225 (WBTR)							75	150 (WBL)
								125	175 (SBL)							215	225 (WBTR)
																75	125 (NBL)
																125	200 (SBL)
																360	375 (SBT)
65	39th St. @ F St.	Southbound Left/Thru/Right	22.6	C	0.12	LOS E	Y	50	75 (WBL)	Northbound Left/Thru/Right	> 100	F	0.18	LOS E	N	305	325 (NBLR)
																50	75 (WBL)
																430	450 (WBTR)
																325	400 (SBLR)
66	39th St. @ H St.	Overall Intersection	8.2	A	0.54	LOS D	Y	135	150 (WBTR)	Overall Intersection	39.7	D	0.74	LOS D	Y	430	450 (EBTR)
																135	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	Northbound Left	68.0	F	1.55	LOS E	N	1660	600 (NBL)	Overall Intersection	> 100	F	0.67	LOS D	N	135	150 (EBT)
								125	200 (NBR)							55	125 (EBR)
																715	725 (WBT)
																1660	1700 (NBL)
																125	275 (NBR)
68	39th St. @ I-5 NB On-/Off-Ramps	Overall Intersection	11.9	B	0.59	LOS D	Y	-	-	Overall Intersection	> 100	F	0.88	LOS D	N	1170	1175 (WBTR)
																790	800 (NBLT)
																75	100 (NBR)
69	WSDOT/40th St. @ Main St.	Overall Intersection	4.5	A	0.44	LOS D	Y	-	-	Overall Intersection	> 100	F	0.66	LOS D	N	150	225 (SBL)
																1170	1175 (SBT)
70	45th St. @ Main St.	Overall Intersection	7.4	A	0.44	LOS D	Y	-	-	Overall Intersection	41.1	D	0.74	LOS D	Y	260	275 (SBT)
71	Hazel Dell @ Main St. (West)	Overall Intersection	9.7	A	0.50	LOS D	Y	-	-	Overall Intersection	> 100	F	0.80	LOS D	N	2105	2125 (SB - F/I-5)
																1570	1575 (SB - F/Main)
72	Ross St. @ Main St.	Overall Intersection	4.6	A	0.29	LOS D	Y	-	-	Overall Intersection	> 100	F	0.53	LOS D	N	60	100 (WBL)
																225	275 (SBL)
																1290	1600 (SBT)
73	Ross St. @ North Rd.	Northbound Left/Thru	6.0	A	0.24	LOS E	Y	-	-	Northbound Left/Thru	> 100	F	0.57	LOS E	N	-	-

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.

* Intersection not modeled in existing conditions scenario

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 6-29

Vancouver Intersection Performance Results

PM Peak Period		2005 Existing Conditions								2030 No-Build (Alternative 1)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way									Eastbound Left	6.3	A	0.08	LOS E	Y	-	-
*	Columbia St. @ Columbia Way									Eastbound Left	7.0	A	0.10	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Westbound Left/Right	4.7	A	0.05	LOS E	Y	-	-	Eastbound Left/Right	7.4	A	0.17	LOS E	Y	-	-
*	3rd/4th St. @ Esther St.									Southbound Left/Thru	2.9	A	0.01	LOS E	Y	-	-
02	4th St. @ Columbia St.	Westbound Left/Thru/Right	4.8	A	0.05	LOS E	Y	-	-	Northbound Thru/Right	0.9	A	0.25	LOS E	Y	-	-
03	4th St. @ Washington St.	Eastbound Right	1.6	A	0.01	LOS E	Y	-	-	Eastbound Right	2.6	A	0.02	LOS E	Y	-	-
04	5th St. @ Columbia St.	Southbound Left	3.6	A	0.22	LOS E	Y	-	-	Southbound Left	15.7	C	0.43	LOS E	Y	90	150 (SBL)
05	5th St. @ Washington St.	***Overall Intersection***	8.1	A	0.34	LOS E	Y	-	-	***Overall Intersection***	18.3	B	0.54	LOS E	Y	180	225 (EBR to SR-14)
																210	225 (SBT)
*	6th St. @ Esther St.	Eastbound Left/Thru/Right	n/a	-	0.12	LOS E	-	-	-	Eastbound Left/Thru/Right	n/a	-	0.16	LOS E	-	-	-
06	6th St. @ Columbia St.	***Overall Intersection***	10.7	B	0.42	LOS E	Y	-	-	***Overall Intersection***	25.1	C	0.75	LOS E	Y	75	100 (SBL)
07	6th St. @ Washington St.	***Overall Intersection***	11.6	B	0.36	LOS E	Y	-	-	***Overall Intersection***	30.5	C	0.59	LOS E	Y	220	225 (WBLT)
08	6th St. @ Main St.	Westbound Left/Thru/Right	6.1	A	0.32	LOS E	Y	-	-	Westbound Left/Thru/Right	11.4	B	0.48	LOS E	Y	-	-
09	6th St. @ Broadway	Southbound Right	4.6	A	0.22	LOS E	Y	-	-	Southbound Right	5.6	A	0.27	LOS E	Y	-	-
10	6th St. @ C St.	Northbound Left/Thru	2.1	A	-	LOS E	Y	-	-	Northbound Left/Thru	4.6	A	0.74	LOS E	Y	-	-
11	8th St. @ Esther St.	Northbound Left/Thru/Right	8.0	A	0.31	LOS E	Y	-	-	Northbound Left/Thru/Right	> 100	F	0.64	LOS E	N	-	-
12	8th St. @ Columbia St.	***Overall Intersection***	15.1	B	0.74	LOS E	Y	-	-	***Overall Intersection***	51.4	D	1.22	LOS E	Y	500	500 (EBLTR)
																215	225 (SBLTR)
13	8th St. @ Washington St.	***Overall Intersection***	9.5	A	0.58	LOS E	Y	75	125 (WBL)	***Overall Intersection***	19.0	B	0.60	LOS E	Y	100	125 (WBL)
14	8th St. @ Main St.	***Overall Intersection***	17.0	B	0.58	LOS E	Y	-	-	***Overall Intersection***	18.9	B	0.66	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Thru/Right	10.2	B	0.13	LOS E	Y	-	-	Southbound Left/Thru/Right	12.1	B	0.54	LOS E	Y	-	-
16	8th St. @ C St.	***Overall Intersection***	14.3	B	0.34	LOS E	Y	-	-	***Overall Intersection***	20.6	C	0.48	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	4.5	A	0.07	LOS E	Y	-	-	Eastbound Left/Thru/Right	97.0	F	0.03	LOS E	N	-	-
18	9th St. @ Columbia St.	Westbound Left/Thru/Right	6.3	A	0.18	LOS E	Y	-	-	Eastbound Left/Thru/Right	82.7	F	0.24	LOS E	N	-	-
19	9th St. @ Washington St.	Westbound Thru	8.5	A	0.08	LOS E	Y	-	-	Westbound Thru	15.4	C	0.11	LOS E	Y	-	-
20	9th St. @ Main St.	Northbound Thru	6.7	A	0.34	LOS E	Y	50	50 (NBL)	Eastbound Left/Thru/Right	8.9	A	0.06	LOS E	Y	-	-
21	9th St. @ Broadway	Southbound Thru/Right	6.2	A	0.24	LOS E	Y	-	-	Northbound Left/Thru	9.3	A	0.25	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Southbound Left/Thru/Right	6.6	A	0.14	LOS E	Y	-	-	Southbound Left/Thru/Right	9.5	A	0.18	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	***Overall Intersection***	10.9	B	0.53	LOS E	Y	-	-	***Overall Intersection***	21.1	C	0.73	LOS E	Y	100	125 (EBL)
24	Evergreen Blvd. @ Washington St.	***Overall Intersection***	10.5	B	0.56	LOS E	Y	-	-	***Overall Intersection***	13.5	B	0.65	LOS E	Y	75	100 (WBL)
25	Evergreen Blvd. @ Main St.	***Overall Intersection***	9.7	A	0.56	LOS E	Y	-	-	***Overall Intersection***	17.8	B	0.67	LOS E	Y	215	225 (NBLTR)
26	Evergreen Blvd. @ Broadway	***Overall Intersection***	12.7	B	0.56	LOS E	Y	210	225 (SBTR)	***Overall Intersection***	20.3	C	0.64	LOS E	Y	220	225 (NBLTR)
27	Evergreen Blvd. @ C St.	***Overall Intersection***	13.0	B	0.56	LOS E	Y	-	-	***Overall Intersection***	34.7	C	0.75	LOS E	Y	75	125 (EBL)
28	11th St. @ Esther St.	Northbound Left/Thru/Right	6.3	A	0.11	LOS E	Y	-	-	Northbound Left/Thru/Right	6.0	A	0.15	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	8.9	A	0.34	LOS E	Y	-	-	Eastbound Left/Thru/Right	28.9	D	0.54	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	7.0	A	0.21	LOS E	Y	-	-	Eastbound Thru/Right	40.8	E	0.24	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Thru/Right	7.5	A	0.41	LOS E	Y	-	-	Eastbound Left/Thru/Right	81.7	F	0.20	LOS E	N	-	-
32	11th St. @ Broadway	Eastbound Thru/Right	6.2	A	0.19	LOS E	Y	-	-	Westbound Left/Thru/Right	> 100	F	0.43	LOS E	N	215	225 (WBLTR)
																210	225 (NBLTR)
33	11th St. @ C St.	Eastbound Left/Thru	7.8	A	0.18	LOS E	Y	-	-	Westbound Right	> 100	F	0.32	LOS E	N	205	225 (WBTR)
																215	225 (NBT)
34	Mill Plain Blvd. @ Columbia St.	***Overall Intersection***	14.7	B	0.75	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.78	LOS E	N	810	825 (EBLTR)
																150	250 (NBR)
																75	125 (SBL)
																210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	***Overall Intersection***	8.2	A	0.45	LOS E	Y	-	-	***Overall Intersection***	68.7	E	0.59	LOS E	Y	215	225 (EBTR)
																210	225 (SBT)
36	Mill Plain Blvd. @ Main St.	***Overall Intersection***	12.4	B	0.62	LOS E	Y	100	150 (NBR)	***Overall Intersection***	> 100	F	1.22	LOS E	N	210	225 (EBT)
																765	775 (NBTR)
																70	100 (SBL)
37	Mill Plain Blvd. @ Broadway	***Overall Intersection***	16.6	B	0.70	LOS E	Y	-	-	***Overall Intersection***	85.8	F	0.85	LOS E	N	210	225 (EBT)
																770	775 (NBTR)
																70	125 (SBL)
38	Mill Plain Blvd. @ C St.	***Overall Intersection***	14.1	B	0.60	LOS E	Y	-	-	***Overall Intersection***	81.0	F	0.84	LOS E	N	205	225 (EBT)
																765	775 (NBTR)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	37.5	D	0.72	LOS E	Y	275	350 (WBL)	***Overall Intersection***	94.0	F	0.92	LOS E	N	795	800 (EBT)
																350	525 (EBR)
																275	400 (WBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	26.8	C	0.86	LOS E	Y	610	725 (EBL)	***Overall Intersection***	35.3	D	0.97	LOS E	Y	450	450 (WBT)
								610	625 (EBT)							75	150 (WBR)
								75	125 (WBR)							325	375 (NBR)
41	15th St. @ Columbia St.	***Overall Intersection***	9.0	A	0.54	LOS E	Y	-	-	***Overall Intersection***	12.4	B	0.78	LOS E	Y	210	225 (NBT)
42	15th St. @ Washington St.	***Overall Intersection***	5.6	A	0.37	LOS E	Y	-	-	***Overall Intersection***	20.6	C	0.43	LOS E	Y	210	250 (WBL)
43	15th St. @ Main St.	***Overall Intersection***	9.0	A	0.59	LOS E	Y	-	-	***Overall Intersection***	14.9	B	1.22	LOS E	Y	195	200 (WBT)
44	15th St. @ Broadway	***Overall Intersection***	24.8	C	0.43	LOS E	Y	210	250 (WBL)	***Overall Intersection***	18.8	B	0.85	LOS E	Y	205	225 (WBT)
																70	150 (NBL)
																25	75 (SBR)
45	15th St. @ C St.	***Overall Intersection***	6.7	A	0.41	LOS E	Y	-	-	***Overall Intersection***	31.7	C	0.55	LOS E	Y	195	200 (NBLT)
46	McLoughlin Blvd. @ Columbia St.	***Overall Intersection***	6.4	A	0.42	LOS E	Y	-	-	***Overall Intersection***	59.1	E	0.73	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	***Overall Intersection***	11.6	B	0.67	LOS E	Y	-	-	***Overall Intersection***	93.8	F	0.86	LOS E	N	500	500 (EBLTR)
																755	775 (NBLTR)
48	McLoughlin Blvd. @ Broadway	***Overall Intersection***	7.8	A	0.39	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.55	LOS E	N	75	125 (EBL)
																220	225 (EBTR)
																105	175 (WBR)
49	McLoughlin Blvd. @ Fort Vancouver Way	***Overall Intersection***	12.6	B	0.43	LOS D	Y	-	-	***Overall Intersection***	14.3	B	0.50	LOS D	Y	-	-
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	5.4	A	-	LOS E	Y	-	-	Eastbound Left/Thru/Right	6.9	A	0.02	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	7.7	A	0.07	LOS E	Y	-	-	Eastbound Left/Right	> 100	F	0.13	LOS E	N	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	15.8	B	0.50	LOS D	Y	-	-	***Overall Intersection***	> 100	F	0.74	LOS D	N	760	775 (EBTR)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	28.3	C	0.66	LOS D	Y	125	150 (WBL)	***Overall Intersection***	76.4	E	0.84	LOS D	N	250	325 (EBL)
								200	200 (WBTR)							495	500 (EBTR)
								75	100 (NBL)							170	225 (WBL)
								75	125 (NBR)							195	200 (WBT)
								75	125 (SBL)							75	100 (NBL)
																425	425 (NBT)
																75	150 (NBR)
																75	125 (SBL)
																470	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	24.0	C	0.94	LOS D	Y	125	150 (WBL)	***Overall Intersection***	> 100	F	1.05	LOS D	N	195	200 (EBTR)
								495	500 (WBTR)							125	175 (WBL)
																495	550 (WBT)
																1800	1800 (NBLTR)
55	4th Plain Blvd. @ F St.	***Overall Intersection***	7.1	A	0.57	LOS D	Y	150	150 (EBT)	***Overall Intersection***	11.0	B	0.57	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	11.3	B	0.54	LOS D	Y	-	-	***Overall Intersection***	36.6	D	0.92	LOS D	Y	200	275 (EBL)
																555	575 (EBT)
																850	850 (WBT)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	16.0	B	0.63	LOS D	Y	75	150 (WBR)	***Overall Intersection***	> 100	F	0.88	LOS D	N	275	350 (EBL)
																850	850 (EBT)
																840	850 (WBT)
																75	150 (WBR)
																3225	3200 (NBLT)
																600	900 (NBR)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	7.0	A	-	LOS E	Y	-	-	Eastbound Left	50.2	F	0.01	LOS E	N	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	16.6	B	0.54	LOS D	Y	-	-	***Overall Intersection***	69.5	E	0.66	LOS D	N	170	225 (EBL)
																805	825 (EBT)
																150	175 (NBL)
60	28th St. @ Main St.	Eastbound Left/Thru/Right	6.8	A	0.03	LOS E	Y	-	-	Eastbound Left/Thru/Right	> 100	F	0.05	LOS E	N	215	225 (SBTR)
61	28th St. @ Broadway	Northbound Thru/Right	1.9	A	-	LOS E	Y	-	-	Northbound Thru/Right	52.8	F	0.37	LOS E	N	-	-
62	29th St. @ Main St./Broadway	Eastbound Left/Thru/Right	12.5	B	-	LOS E	Y	-	-	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	150	150 (WBLTR)
																430	450 (EBLTR)
																215	225 (NBTR)
																100	100 (SBTR)
																210	300 (NWR)
63	33rd St. @ Main St.	***Overall Intersection***	18.3	B	0.45	LOS D	Y	50	75 (EBL)	***Overall Intersection***	> 100	F	0.66	LOS D	N	50	100 (EBL)
								50	75 (WBL)							770	775 (EBTR)
																50	100 (WBL)
																600	600 (WBTR)
																1000	1000 (NBT)
																75	100 (SBL)
64	39th St. @ Main St.	***Overall Intersection***	38.3	D	0.71	LOS D	Y	75	125 (EBL)	***Overall Intersection***	> 100	F	1.10	LOS D	N	75	150 (EBL)
								490	500 (EBTR)							1270	1275 (EBTR)
								75	100 (WBL)							75	125 (WBL)
								215	225 (WBTR)							215	225 (WBTR)
								75	125 (NBL)							75	125 (NBL)
								125	175 (SBL)							1570	1575 (NBTR)
																125	175 (SBL)
																360	375 (SBT)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.16	LOS E	N	-	-	Northbound Left/Thru/Right	> 100	F	0.61	LOS E	N	305	325 (NBLR)
								50	75 (WBL)							215	225 (EBTR)
								430	450 (WBTR)							50	75 (WBL)
																430	450 (WBTR)
66	39th St. @ H St.	***Overall Intersection***	8.3	A	0.57	LOS D	Y	135	150 (WBTR)	***Overall Intersection***	> 100	F	0.85	LOS D	N	430	450 (EBTR)
																135	150 (WBTR)
																310	325 (SBLTR)
67	39th St. @ I-5 SB On-/Off-Ramps	Northbound Left	30.0	D	-	LOS E	Y	-	-	***Overall Intersection***	48.0	D	0.86	LOS D	Y	135	150 (EBT)
								55	100 (EBR)							55	125 (EBR)
								125	175 (NBR)							710	725 (WBT)
																1660	1175 (NBR)
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	23.1	C	0.76	LOS D	Y	75	125 (NBR)	***Overall Intersection***	> 100	F	0.95	LOS D	N	300	350 (EBL)
																710	725 (EBT)
																1170	1175 (WBTR)
																790	800 (NBLT)
																75	125 (NBR)
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	4.9	A	0.33	LOS D	Y	-	-	***Overall Intersection***	80.4	F	0.59	LOS D	N	1170	1175 (SBT)
70	45th St. @ Main St.	***Overall Intersection***	9.1	A	0.44	LOS D	Y	-	-	***Overall Intersection***	17.6	B	0.55	LOS D	Y	-	-
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	8.5	A	0.45	LOS D	Y	-	-	***Overall Intersection***	29.7	C	0.67	LOS D	Y	1135	375 (SB - F/I-5)
																1550	425 (SB - F/Main)
72	Ross St. @ Main St.	***Overall Intersection***	8.5	A	0.46	LOS D	Y	60	75 (WBL)	***Overall Intersection***	16.0	B	0.70	LOS D	Y	60	75 (WBL)
								60	75 (WBR)							60	75 (WBR)
73	Ross St. @ North Rd.	Northbound Left/Thru	6.3	A	-	LOS E	Y	-	-	Southbound Thru/Right	70.1	F	0.38	LOS E	N	-	-

(yellow)	Delay / LOS affected by freeway congestion
(blue)	Intersection queuing spills back into upstream intersection
Note 1	The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2	The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.
*	Intersection not modeled in existing conditions scenario
Y*	Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y**	Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 6-30

Portland Intersection Performance Results

AM Peak Hour		2005 Existing Conditions								2030 No-Build (Alternative 1)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	24.2	C	0.83	LOS D	Y	125	200 (WBL)	***Overall Intersection***	87.6	F	0.93	LOS D	N	125	250 (WBL)
02	Going and Interstate	***Overall Intersection***	31.7	C	0.75	LOS D	Y	125	250 (WBL)	***Overall Intersection***	52.9	D	0.88	LOS D	Y	125	275 (WBL)
								125	150 (NBL)							125	150 (NBL)
																355	450 (EBL)
03	Alberta and Interstate	***Overall Intersection***	18.0	B	0.72	LOS D	Y	100	125 (SBL)	***Overall Intersection***	27.5	C	0.73	LOS D	Y	100	150 (SBL)
04	Alberta and SB I-5 Off-Ramp	Westbound Left	18.4	C	0.73	0.85	Y	175	175 (WBLT)	***Overall Intersection***	46.3	D	0.78	0.85	Y	75	125 (WBL)
																175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	Westbound Thru/Right	13.0	B	0.51	0.85	Y	-	-	***Overall Intersection***	53.9	D	0.43	0.85	Y	75	100 (EBL)
06	Alberta and MLK Jr.	***Overall Intersection***	20.3	C	0.78	LOS D	Y	75	125 (WBR)	***Overall Intersection***	39.8	D	0.89	LOS D	Y	75	125 (WBR)
								100	125 (NBL)							100	150 (NBL)
																100	125 (SBL)
07	Portland and Interstate	***Overall Intersection***	18.2	B	0.54	LOS D	Y	-	-	***Overall Intersection***	20.6	C	0.62	LOS D	Y	100	125 (WBL)
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	18.3	B	0.52	0.85	Y	190	225 (WBL)	***Overall Intersection***	18.8	B	0.53	0.85	Y	125	150 (SWR)
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	11.8	B	0.39	0.85	Y	-	-	***Overall Intersection***	12.6	B	0.44	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	17.5	B	0.66	LOS D	Y	-	-	***Overall Intersection***	14.7	B	0.70	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	***Overall Intersection***	27.8	C	0.66	0.99	Y	150	175 (WBL)	***Overall Intersection***	> 100	F	0.90	0.99	Y	150	325 (WBL)
																225	275 (NBL)
																150	275 (EBL)
																1155	1175 (EBTR)
																555	1100 (WBTR)
12	Lombard and I-5 SB On-Ramps	Eastbound Thru/Right	4.8	A	0.31	0.85	Y	-	-	Westbound Thru	12.9	B	0.42	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	8.5	A	0.48	0.85	Y	-	-	Northbound Right	16.8	C	0.57	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	61.4	E	0.79	0.99	Y	100	125 (EBL)	***Overall Intersection***	> 100	F	0.88	0.99	Y	100	175 (EBL)
								100	175 (WBL)							100	175 (WBL)
								100	175 (NBL)							100	200 (NBL)
								150	300 (SBL)							150	300 (SBL)
15	Interstate and Argyle	***Overall Intersection***	22.2	C	0.61	LOS D	Y	75	125 (EBR)	***Overall Intersection***	26.7	C	0.69	LOS D	Y	75	125 (EBR)
								50	75 (NBL)							50	125 (NBL)
																150	150 (NBT)
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	17.6	B	0.62	0.85	Y	150	200 (WBR)	***Overall Intersection***	14.9	B	0.63	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	32.7	C	0.72	0.99	Y	100	200 (NBL)	***Overall Intersection***	37.2	D	0.89	0.99	Y	100	200 (NBL)
								225	250 (SBL)							225	250 (SBL)
18	Victory and Expo Road	Southbound Left/Thru	5.2	A	0.04	LOS E	Y	-	-	Westbound Left/Thru/Right	3.1	A	0.12	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Westbound Left/Thru	1.1	A	0.17	0.85	Y	-	-	Westbound Left/Thru	1.3	A	0.21	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	4.0	A	0.10	0.85	Y	-	-	***Overall Intersection***	5.0	A	0.13	0.85	Y	-	-
21	Union Ct and I-5 NB Off-Ramp	Eastbound Left	7.1	A	0.24	0.85	Y	-	-	Eastbound Left	8.4	A	0.28	0.85	Y	-	-
22	Union Ct/Marine Way and Vancouver Way	Northwest Thru/Right	7.1	A	0.36	LOS E	Y	-	-	Northeast Left/Thru	8.4	A	0.55	LOS E	Y	-	-
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	32.8	C	0.66	0.85	Y	200	275 (NBL)	***Overall Intersection***	> 100	F	0.83	0.85	Y	200	2075 (NBL)
								125	200 (SBR)							275	350 (EBL)
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	11.0	B	0.35	0.85	Y	-	-	***Overall Intersection***	11.2	B	0.35	0.85	Y	-	-
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	8.2	A	0.35	LOS D	Y	-	-	***Overall Intersection***	9.5	A	0.32	LOS D	Y	-	-

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1).
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Exhibit 6-31

Portland Intersection Performance Results

PM Peak Hour		2005 Existing Conditions								2030 No-Build (Alternative 1)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	30.5	C	0.89	LOS D	Y	125	150 (EBL)	***Overall Intersection***	93.6	F	0.99	LOS D	N	125	175 (EBL)
								125	175 (NBL)							125	150 (NBL)
								125	150 (SBL)							125	200 (SBL)
																125	175 (WBL)
02	Going and Interstate	***Overall Intersection***	33.8	C	0.72	LOS D	Y	125	150 (NBL)	***Overall Intersection***	65.2	E	0.84	LOS D	N	125	225 (NBL)
																125	250 (WBL)
03	Alberta and Interstate	***Overall Intersection***	25.1	C	0.76	LOS D	Y	125	175 (NBL)	***Overall Intersection***	38.8	D	0.94	LOS D	Y	125	225 (NBL)
																100	150 (SBL)
																965	1150 (NBTR)
04	Alberta and SB I-5 Off-Ramp	Westbound Left	12.0	B	0.75	0.85	Y	-	-	***Overall Intersection***	19.5	B	0.52	0.85	Y	75	125 (WBL)
																175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	Eastbound Left	11.7	B	0.71	0.85	Y	-	-	***Overall Intersection***	17.3	B	0.74	0.85	Y	75	125 (EBL)
																175	175 (EBT)
06	Alberta and MLK Jr.	***Overall Intersection***	38.0	D	0.88	LOS D	Y	75	150 (WBR)	***Overall Intersection***	71.9	E	0.91	LOS D	N	100	200 (NBL)
								100	150 (NBL)							100	200 (SBL)
								100	150 (SBL)								
07	Portland and Interstate	***Overall Intersection***	32.0	C	0.71	LOS D	Y	100	150 (WBL)	***Overall Intersection***	36.3	D	0.75	LOS D	Y	100	200 (WBL)
								175	225 (NBL)							175	225 (NBL)
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	15.0	B	0.48	0.85	Y	-	-	***Overall Intersection***	17.2	B	0.52	0.85	Y	125	175 (SWR)
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	12.7	B	0.42	0.85	Y	-	-	***Overall Intersection***	9.3	A	0.40	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	16.5	B	0.75	LOS D	Y	100	150 (NBL)	***Overall Intersection***	16.8	B	0.84	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	***Overall Intersection***	32.4	C	0.76	0.99	Y	100	175 (NBR)	***Overall Intersection***	> 100	F	0.95	0.99	Y	100	200 (NBR)
																250	275 (SBL)
																150	250 (EBL)
																150	300 (WBL)
																225	300 (NBL)
																1150	1150 (EBTR)
12	Lombard and I-5 SB On-Ramps	Eastbound Thru/Right	3.7	A	0.36	0.85	Y	-	-	Westbound Thru	7.6	A	0.56	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	10.7	B	0.42	0.85	Y	-	-	Northbound Right	14.9	B	0.55	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	74.0	E	0.85	0.99	Y	100	150 (EBL)	***Overall Intersection***	> 100	F	0.99	0.99	Y	100	200 (EBL)
								100	175 (WBL)							100	200 (WBL)
								100	225 (NBL)							100	225 (NBL)
								150	300 (SBL)							150	250 (SBL)
																1320	1325 (SBTR)
																1730	1750 (EBTR)
15	Interstate and Argyle	***Overall Intersection***	17.6	B	0.61	LOS D	Y	75	125 (EBR)	***Overall Intersection***	> 100	F	0.63	LOS D	N	1300	1300 (EBLT)
								50	75 (NBL)							50	125 (NBL)
																125	125 (NBT)
																75	150 (EBR)
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	12.6	B	0.58	0.85	Y	150	175 (WBR)	***Overall Intersection***	11.7	B	0.57	0.85	Y	-	-
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	39.3	D	0.71	0.99	Y	150	175 (WBL)	***Overall Intersection***	83.5	F	0.74	0.99	Y	350	450 (WBL)
								100	225 (NBL)							100	225 (NBL)
								225	300 (SBL)							225	400 (SBL)
																150	450 (EBR)
18	Victory and Expo Road	Southbound Left/Thru	7.1	A	0.37	LOS E	Y	-	-	Southbound Left/Thru	76.6	F	0.45	LOS E	N	-	-
19	Victory Blvd and I-5 SB On-Ramp	Eastbound Thru	5.5	A	0.27	0.85	Y	-	-	Eastbound Thru	27.7	D	0.28	0.85	Y	75	75 (EBT)
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	56.9	E	0.32	0.85	Y	290	325 (EBL)	***Overall Intersection***	> 100	F	0.31	0.85	Y	290	775 (EBL)
								200	250 (WBTR)							850	850 (WBT)
																200	225 (WBR)
21	Union Ct and I-5 NB Off-Ramp	Eastbound Left/Thru	33.1	D	0.30	0.85	Y	200	250 (EBL)	Northbound Thru	> 100	F	0.20	0.85	Y	200	300 (EBL)
																1195	1550 (EBR)
22	Union Ct/Marine Way and Vancouver Way	Northeast Left/Thru	48.9	E	0.66	LOS E	Y	370	500 (NBTR)	Northeast Left/Thru	95.4	F	0.82	LOS E	N	75	200 (SBLTR)
								75	100 (SBLTR)							370	2500 (NBTL)
								370	400 (NBR)							370	2500 (NBTR)
								55	75 (SWL)							55	100 (SWL)
								55	75 (SWTR)							55	150 (SWTR)
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	55.7	E	0.69	0.85	Y	275	325 (EBL)	***Overall Intersection***	> 100	F	0.82	0.85	Y	275	400 (EBL)
								373	1150 (WBR)							2130	2150 (EBT)
																373	2925 (WBR)
																200	1525 (NBLT)
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	20.2	C	0.61	0.85	Y	115	225 (WBLT)	***Overall Intersection***	24.8	C	0.80	0.85	Y	115	225 (WBLT)
																75	125 (WBR)
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	12.9	B	0.44	LOS D	Y	-	-	***Overall Intersection***	69.8	E	0.67	LOS D	N	70	100 (WBLR)
																150	200 (SBL)
																820	825 (SBT)

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1).
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

7. Replacement Crossing (Alternatives 2 and 3)

7.1 Description of Replacement Alternatives

Alternatives 2 and 3 include construction of a new replacement crossing to carry highway traffic, high-capacity transit (HCT), express buses, and bicycles and pedestrians across the Columbia River. Developed as a mid-level structure, the new bridge would accommodate vertical clearance requirements above the Columbia River for marine traffic and Pearson Field airspace for air traffic. The mid-level height allows the bridge to be a fixed-span structure with no bridge lift. The new bridges could be built either upstream or downstream of the existing I-5 crossing. The existing bridges would be removed once the new bridges could accommodate traffic.

The replacement crossing option would provide five or six travel lanes in each direction. Use of managed lanes is being considered.

The HCT component of Alternative 2 comprises the best performing bus rapid transit (BRT) options plus local bus infrastructure and express bus service on I-5. The BRT service would not run buses to downtown Portland, but would involve a transfer to the TriMet Yellow Line MAX for continuation to downtown Portland. Express bus service is combined with BRT to better serve long-distance commuter markets by providing direct access to and from Clark County to downtown Portland during morning and afternoon/evening peak commute periods.

Under Alternative 3, light rail would serve as the high-capacity transit mode and involve a double-track extension from the Expo Center MAX Station in Portland to park and ride stations in downtown Vancouver. Express bus service on I-5 also would be part of this alternative to better serve long-distance commuter markets by providing direct access to and from Clark County to downtown Portland during morning and afternoon/evening peak commute periods.

7.2 I-5 and I-205 Performance

This section summarizes highway performance for Alternatives 2 and 3 (2030).

7.2.1 Daily Traffic Levels

The highway performance results described in this chapter assume that tolls would be collected at the I-5 crossing using an electronic toll collection system. For more information on toll collection or estimated daily traffic levels if no tolls were collected, or if tolls were collected at both the I-5 and I-205 crossings, see Chapter 9.

Under the replacement crossing, average weekday traffic across the I-5 crossing is expected to be 178,000 vehicles, lower than the 184,000 daily vehicle trips expected under No-Build conditions. Lower traffic would be due to vehicle-trip reductions from the provision of high-capacity transit and because of tolling. Interstate 205 traffic volumes would increase from 210,000 vehicles per day under the No-Build conditions to 213,000 vehicles with the replacement crossing. **Exhibit 7-1** summarizes ADT volumes on the I-5 bridge, the I-205 bridge, and the total river crossing.

7.2.2 Traffic Demand – Vehicles

This section compares traffic demand between the forecast No-Build and replacement crossing conditions in the year 2030, using four-hour peak periods.

7.2.2.1 Vehicle Demands on I-5

As shown in **Exhibit 7-2**, the replacement crossing would result in increased southbound vehicle demand north of the Interstate Bridge during the morning peak. Sections of southbound I-5 near the I-5 bridge would show minimal decreases in vehicle demand (less than 3 percent compared to No-Build conditions) due to the provision of high-capacity transit, tolling, and downstream congestion north of the I-405 split bottleneck. Traffic demands would decrease by 300 southbound vehicle trips (one percent) across the I-5 crossing during the morning peak.

Outside the Bridge Influence Area, traffic growth is forecast for northbound I-5 during the morning peak. However, vehicle demand is forecast to decrease (2 to 17 percent) in the Bridge Influence Area compared to No-Build conditions, as shown in **Exhibit 7-3**. Northbound traffic demand would decrease by 2,800 vehicle trips (16 percent) across the I-5 bridge during the morning peak.

Southbound I-5 afternoon/evening peak traffic demand forecasts show growth north of the Interstate Bridge, decreased volume south of the bridge in the Bridge Influence Area, and minimal growth in traffic demand south of Bridge Influence Area (see **Exhibit 7-4**). Traffic demand across the I-5 bridge during the afternoon/evening peak would decrease by 1,300 southbound vehicle trips (seven percent).

Northbound traffic demand along the entire length of the I-5 corridor are forecast to increase during the afternoon/evening peak for the replacement crossing, as shown in **Exhibit 7-5**. Northbound traffic demand would increase by 1,800 vehicle trips (six percent) across the I-5 bridge during the afternoon/evening peak.

7.2.2.2 Vehicle Demand on I-205

As shown in **Exhibit 7-6**, with the replacement crossing less traffic volume growth would occur along southbound I-205 during the morning peak than the No-Build Alternative. The provision of high-capacity transit and tolling on I-5 would reduce overall southbound volumes for both I-205 and I-5 during the morning peak. Vehicle demand would be lower by less than five percent throughout the I-205 corridor compared to No-Build conditions.

Forecast year replacement crossing peak demand for northbound I-205 is compared to the No-Build Alternative in **Exhibit 7-7**. Between the replacement crossing and the No-Build Alternative, weekday northbound I-205 morning peak traffic demand is forecast to increase throughout the entire corridor between one percent and 20 percent. The increased volume would be diverted from I-5 to I-205 due to the tolling of I-5 as well as the relatively free-flowing conditions forecast for I-205 during the morning peak.

Southbound I-205 afternoon/evening peak traffic demand growth forecasts are similar to northbound I-205 morning peak conditions, with small growth estimated throughout the I-205 corridor (see **Exhibit 7-8**). Similar to the northbound morning traffic demand, southbound I-205 volumes would increase during the afternoon/evening off-peak due to free-flowing conditions along southbound I-205.

Northbound I-205 traffic demand along the entire length of the corridor is forecast to decrease during the afternoon/evening peak for the replacement crossing compared to the No-Build Alternative, as shown in **Exhibit 7-9**. Although the replacement crossing would have tolling similar to morning conditions, the capacity improvements identified under the replacement crossing for I-5, combined with the forecast congestion along I-205, would result in the vehicle demand reduction along I-205. The northbound I-205 vehicle demand for the replacement crossing is forecast to be reduced by 10 percent or less compared to the No-Build Alternative.

7.2.3 Traffic Demand – Truck Freight

Daily truck travel demand would be similar for the No-Build and replacement alternatives because the movement of freight is substantially related to economic conditions in the region, and freight moved by trucks is not likely to shift travel modes due to congestion. However, truck demands by time of day would likely change because there would be fewer congested hours under the replacement crossing, resulting in more trucks during the commuter peak and midday hours.

Year 2030 daily truck volumes were distributed to each hour of the day to develop an hourly truck volume forecast for the replacement crossing. The hourly volumes are based on existing hourly truck volumes, predicted levels of congestion (see Section 7.2.4) and the number of congested hours. Congestion is defined in this report at travel speeds less than 30 mph.

The replacement crossing would result in higher volumes of trucks during midday operations compared to the No-Build Alternative. The reduction in congestion and truck travel occurring throughout the day would mean more flexibility in truck scheduling and improved reliability of truck shipments. **Exhibit 7-10** summarizes the truck volumes by time of day.

7.2.3.1 Truck Operating Characteristics

The rate in growth for truck traffic is predicted to be higher than the rate of growth for general purpose traffic, which would result in an increase in the proportion of trucks in the overall traffic stream. A truck consumes approximately twice the highway capacity as a passenger car; therefore, the proportion of highway capacity used by trucks will be greater than today. The replacement crossing would improve highway geometries such as uphill ramp grades, super-elevation, and merge distances to current standards. Truck speeds at interchanges and at the merge points with mainline I-5 would be higher than for the existing or No-Build conditions, resulting in reduced congestion from slow-moving trucks.

7.2.3.2 Oversized Loads

The replacement crossing would be constructed to meet standard clearance heights for a federal interstate facility and ramps would be designed for the wider turns required by oversized loads.

7.2.4 Effect of Congestion

This section compares congestion between the forecast No-Build and replacement crossing conditions in the year 2030, using four-hour peak periods.

7.2.4.1 Duration of Congestion on Southbound I-5

The replacement crossing would reduce congestion on the Interstate Bridge from 7.25 hours under No-Build conditions to 3.5 hours, as shown **in Exhibit 7-11**. Southbound traffic queues would no longer extend beyond Fourth Plain Boulevard for multiple hours each day. The traffic congestion remaining at the bridge would result, similar to No-Build conditions, because of an existing downstream bottleneck on I-5 just north of the I-405 split. The replacement crossing would not exacerbate or worsen this existing bottleneck, although the CRC improvements would enable an increase in vehicular throughput of about six percent along I-5 just north of the I-405 split.

The downstream bottleneck near the I-405 split would remain similar to No-Build conditions, experiencing 11.5 hours of congestion. Similarly, the effects of the southbound bottleneck located near the I-5 lane drop in the Rose Quarter would remain, with approximately 3.75 hours of congestion.

7.2.4.2 Duration of Congestion on Northbound I-5

The replacement crossing would eliminate the northbound I-5 crossing bottleneck. Northbound traffic queues would no longer extend to I-405 for multiple hours each day. The replacement crossing would reduce the duration of congestion at the I-5 crossing from 7.75 hours to less than 2 hours each day (see **Exhibit 7-12**).

The other two bottlenecks located near the I-405/Rose Quarter weaving area and the Marquam Bridge would operate similar to No-Build conditions.

7.2.5 Travel Times

This section compares travel times between the forecast No-Build and replacement crossing conditions in the year 2030, using two-hour peak periods.

7.2.5.1 Travel Time along I-5

The replacement crossing would result in a two minute (10 percent) increase in southbound I-5 travel time from SR 500 to Columbia Boulevard (see **Exhibit 7-13**). Although the bottleneck north of the I-405 split would occur under both the replacement and No-Build alternatives during the morning peak, the Interstate Bridge bottleneck moderates the flow southbound under the No-Build Alternative, allowing traffic south of the bridge to flow more freely.

The southbound morning peak travel time from SR 500 to Columbia Boulevard would be higher under the replacement crossing, but travel time for the longer segment from 179th Street to I-84 would be lower by five minutes (12 percent) compared to No-Build conditions. The elimination of the Interstate Bridge bottleneck would result in longer travel times within the Bridge Influence Area but the length and duration of congestion are forecast to be less under the replacement crossing. In addition, substantially more traffic volume would be served under the replacement crossing, as previously discussed.

As shown in **Exhibit 7-14**, northbound travel times during the two-hour afternoon/evening peak are forecast to improve by eight minutes (55 percent) from Columbia Boulevard to SR 500 and by 18 minutes (40 percent) from I-84 to 179th Street.

7.2.5.2 Travel Time along I-205

Southbound I-205 travel times during the two-hour morning peak are forecast to decrease by two minutes (six percent) from SR 500 to I-84 for the replacement crossing compared to the No-Build Alternative (see **Exhibit 7-15**). This would occur due to decreased demands along I-205 shifting to I-5.

Northbound I-205 travel times from I-84 to SR 500 would remain similar under both the replacement crossing and No-Build alternatives during the two-hour afternoon/evening peak (see **Exhibit 7-16**).

7.2.6 Service Volumes

This section compares service volumes between the forecast No-Build and replacement crossing conditions in the year 2030, using four-hour peak periods.

7.2.6.1 Vehicle Throughput (Served Volume) on Southbound I-5

As shown in **Exhibit 7-17**, southbound vehicle throughput along I-5 near the Pioneer Street interchange would be similar under the replacement crossing and No-Build alternatives (18,000 vehicles during the morning peak).

Southbound I-5 vehicle throughput near the SR 500 interchange during the morning peak would increase by almost 8,000 vehicles (35 percent) for the replacement crossing. Although the replacement crossing would serve more traffic volume, it would not serve the entire forecast demand due to a downstream bottleneck located north of the I-405 split. However, the percentage served would be higher than the No-Build Alternative.

Southbound I-5 vehicle throughput on the Interstate Bridge during the morning peak would increase by 2,000 vehicles (nine percent) over the No-Build Alternative, even though the vehicle demand between alternatives would remain constant. While the southbound Interstate Bridge bottleneck would be eliminated under the replacement crossing, recurrent traffic congestion from the downstream bottleneck located just north of the I-405 split would limit the traffic volume served across the I-5 bridge to about 95 percent of its demand.

In addition, southbound I-5 vehicle throughput north of the I-405 split would serve 1,200 more vehicles under the replacement crossing than the No-Build condition. Both alternatives are forecast to serve approximately 80 percent of their demand.

7.2.6.2 Vehicle Throughput (Served Volume) on Northbound I-5

During the afternoon/evening peak, northbound I-5 vehicle throughput north of I-405 would increase by over 4,000 vehicles (30 percent) compared to No-Build conditions (see **Exhibit 7-18**). Although the vehicle demand would be similar for the two alternatives, the replacement crossing would remove the bottleneck at Interstate Bridge, resulting in improved service volumes for northbound I-5.

Similarly, northbound I-5 vehicle throughputs on the Interstate Bridge and near SR 500 would increase substantially over the No-Build Alternative. The volume served would increase by 8,100 vehicles (40 percent) and 11,600 vehicles (47 percent), respectively.

Northbound vehicle throughputs along I-5 near the Pioneer Street interchange would be similar under replacement crossing and No-Build conditions (18,500 vehicles during the afternoon/evening peak).

7.2.7 Served vs. Unserved Ramp Volumes

This section compares ramp volumes between the forecast No-Build and replacement crossing conditions in the year 2030, using four-hour peak periods.

7.2.7.1 Served vs. Unserved Ramp Volumes on Southbound I-5

During the morning peak, the number of southbound on-ramps in the Bridge Influence Area that would have unserved volumes would decrease from three (SR 500/39th Street, Mill Plain Boulevard, and SR 14/City Center) under No-Build conditions to none under the replacement crossing, as shown in **Exhibit 7-19**. This decrease would be due to the reduced congestion forecast for southbound I-5 during the morning peak under the replacement crossing.

7.2.7.2 Served vs. Unserved Ramp Volumes on Northbound I-5

During the afternoon/evening peak, the number of northbound on-ramps in the Bridge Influence Area that would have unserved volumes would decrease from five (Interstate Avenue/Victory Boulevard, Marine Drive, Hayden Island, Mill Plain Boulevard and Fourth Plain Boulevard) to two (Mill Plain and Fourth Plain Boulevards) under the replacement crossing alternatives, as shown in **Exhibit 7-20**. The volume of unserved vehicles would be 850 vehicles at Mill Plain Boulevard and 450 vehicles at Fourth Plain Boulevard. This decrease would be due to the reduced congestion forecast for northbound I-5 during the afternoon/evening peak under the replacement crossing.

7.2.8 Person Throughput

Under the replacement crossing, in year 2030 about 27,400 persons in southbound vehicles would use the I-5 crossing during the morning peak, an increase of 11 percent over No-Build conditions. With the provision of high-capacity transit, up to 7,550 persons using transit are forecast to cross during this period.

Northbound, in year 2030 about 34,400 persons would use the I-5 replacement crossing during the afternoon/evening peak, an increase of 41 percent over No-Build conditions. With the provision of high-capacity transit, up to 7,250 persons using transit are forecast to cross during this period. **Exhibit 7-21** shows person throughput data.

7.2.9 Managed Lanes Along I-5

Managed lanes are a fairly common feature on major highways in large metropolitan areas. In contrast with general purpose lanes open to all users, managed lanes are for preferential or exclusive use and are most often reserved for high-occupancy vehicles (HOVs). On some highways, managed lanes can be used by motorcyclists and certain hybrid vehicles. Some areas of the country are experimenting with truck only managed lanes.

Managed lanes are intended to save time for bus riders, carpoolers, and motorcyclists by enabling them to bypass areas of traffic congestion. Managed lanes increase highway efficiency by moving more people in fewer vehicles than the full general purpose lane next to them. These lanes allow more reliable highway travel times and help carpools and buses stick to their schedules. Managed lanes reduce single-occupant vehicle trips, overall highway demand, and the burden on the environment from greenhouse gas emissions. Managed lanes are a crucial component of offering sustainable transportation alternatives to solo driving.

On I-5 a managed lane exists northbound between Going Street and Marine Drive. The 3.2-mile lane is reserved for high-occupancy vehicle (HOV) use between 3:00 and 6:00 p.m. on weekdays. During this three-hour period, vehicles with two or more people, buses, and motorcyclists are allowed to use the lane.

The No-Build, replacement, and supplemental crossing options all assume that this HOV lane, the majority of which is located south of the project area, would remain in place through the year 2030.

Including managed lanes on I-5 within the CRC project area would not offer operational benefits for most users, including carpools or trucks. This is due to a number of factors:

- Because of the substantial amount of traffic entering from on-ramps or exiting to off-ramps within the project area, many users would not be inclined to navigate to and from a managed lane located to the inside of the highway.

- A managed lane for southbound users would terminate into a general purpose lane just south of the CRC project area, but traffic is expected to back up through the general purpose lane throughout most of the morning peak period, which would cause congestion and back-ups within the managed lane.
- A managed lane for northbound users would not offer enough time savings to be effective. For example, under the replacement crossing all of the general purpose lanes are forecast to operate at nearly free-flow conditions, with less than two hours congestion.

For the above three reasons, it is likely that only a small portion of all HOV eligible users would use an inside managed lane along I-5 within the CRC project area. If managed lanes were positioned to be the outside lanes on the highway instead of the inside lanes, the significant volumes of traffic entering from on-ramps and/or exiting to off-ramps within the CRC area would create congestion and conflicts with managed lane users.

While managed lanes would not offer operational benefits for most users within the CRC project area, the replacement crossing could be flexible enough to allow future managed lanes within the project area that connect with a potential system-wide network of managed lanes north and south of the CRC area (e.g., between 179th Street and I-405).

7.2.10 Safety

The replacement crossing would address most of the non-standard geometric and safety design features for I-5's mainline and ramps within the Bridge Influence Area, including the existing short ramp merges/acceleration lanes, short weaving areas, vertical curves limiting sight distance, and narrow shoulders. The replacement crossing would also remove both Interstate Bridge lift spans. In addition, the replacement crossing would substantially reduce traffic congestion in the Bridge Influence Area compared to No-Build conditions.

Since the number of vehicular collisions in the I-5 Bridge Influence Area is related to the presence of non-standard design and safety features, especially when traffic levels are at or near congested conditions, and to the number and frequency of bridge closures associated with bridge lifts and maintenance, the replacement crossing would substantially improve traffic safety in the Bridge Influence Area.

7.3 Local Streets

7.3.1 Travel Demand

This section compares travel demand on local streets between the forecast No-Build and replacement crossing conditions in the year 2030, using one-hour peak periods.

7.3.1.1 Vancouver Screenlines – Morning Peak Hour

During the morning peak, eastbound and westbound traffic west of I-5 would increase between five and 15 percent over No-Build conditions as shown in **Exhibit 7-22**.

Eastbound and westbound traffic east of I-5 would decrease between five and ten percent over No-Build conditions.

During the morning peak, southbound traffic in Vancouver would decrease between 20 and 30 percent along most major streets. The decrease in southbound traffic would be caused by improvements to I-5 pulling highway traffic back to I-5 instead of Vancouver arterials.

Northbound traffic in Vancouver would increase between 15 and 115 percent along most major streets, except across Evergreen Boulevard which shows a slight decrease (less than ten percent). The volumes would be higher under No-Build conditions due to westbound traffic on SR 14 avoiding ramp congestion on SR 14 and instead traveling through downtown to enter I-5 at the downtown Vancouver on-ramp located on Washington Street.

7.3.1.2 Vancouver Screenlines – Afternoon/Evening Peak Hour

During the afternoon/evening peak, traffic volumes along key east-west local streets between 39th Street and Mill Plain Boulevard would increase between five and 15 percent over No-Build conditions as shown in **Exhibit 7-23**. Westbound traffic just east of I-5 would increase approximately ten percent and eastbound traffic just east of I-5 would decrease by approximately 20 percent compared to No-Build conditions.

During the afternoon/evening peak hour, southbound traffic in Vancouver would change by less than ten percent across three southern screenlines. At the screenline north of 39th Street, southbound traffic would increase by over 50 percent due to the modification to southbound highway access. Under the replacement crossing, the southbound off-ramp to 39th Street would be removed and replaced with the new southbound SR 500 off-ramp, which would cause traffic to shift from southbound I-5 to southbound Main Street to access the neighborhood, although the overall volume growth over No-Build conditions would be relatively small (less than 400 vehicles).

Northbound traffic in Vancouver would decrease between 10 and 30 percent over No-Build conditions, with the highest decrease in downtown Vancouver.

7.3.1.3 Portland Screenlines – Morning Peak Hour

During the morning peak, westbound traffic on both sides of the highway would decrease less than five percent compared to No-Build conditions as shown in **Exhibit 7-24**. Eastbound traffic on both sides of I-5 would increase up to 11 percent, with the higher growth forecast for the eastside of I-5.

During the morning peak, southbound traffic in Portland would decrease by up to six percent over No-Build conditions. Northbound traffic in Portland would increase or decrease between four percent and 20 percent compared to No-Build conditions.

7.3.1.4 Portland Screenlines – Afternoon/Evening Peak Hour

During the afternoon/evening peak, eastbound and westbound traffic on both sides of the highway would change by less than five percent compared to No-Build conditions as shown in **Exhibit 7-25**. Northbound and southbound traffic in Portland would change by less than 15 percent during the afternoon/evening peak hour.

7.3.2 Intersection Service Levels

This section compares intersection service levels between the forecast No-Build and replacement crossing conditions in the year 2030, using one-hour peak periods.

Exhibit 7-26 summarizes the applicable level-of-service and volume-to-capacity performance criteria used when comparing year 2030 project conditions against No-Build conditions for the study intersections. The criteria recognize that under No-Build conditions some local intersections may operate at unacceptable conditions and that mitigation would not be required under the replacement crossing options if the options caused no further degradation to these intersections.

In addition to intersection level-of-service and/or volume-to-capacity ratios, vehicular queuing impacts would be significant when under the replacement crossing a traffic lane's storage distance is exceeded, but would not be exceeded under No-Build conditions. Similarly, significant queuing impacts would result if the resulting vehicle queue extends into upstream intersection, but would not under No-Build conditions.

7.3.2.1 Vancouver Service Levels – Morning/Afternoon Peak Hour – Alternative 2, BRT, Vancouver Alignment

Alternative 2 includes building a BRT system from the Expo Center station across the Columbia River and continuing north through Vancouver. As part of the traffic operations analysis, intersection operations were analyzed using a Vancouver BRT alignment. The Vancouver alignment would touch down at Sixth Street, with a two-way guideway on Washington Street north to McLoughlin Boulevard. The guideway would then move east along McLoughlin Boulevard, where it would turn north with the two-way guideway on Broadway. Broadway would be converted to one-way northbound traffic. At 29th Street and Main Street, the guideway would run along the center of Main Street up to the Lincoln Park and Ride and would require the elimination of two vehicular travel lanes (one per direction) along Main Street. It was assumed that the guideway would cross immediately to the west of the intersection at 39th Street and Main Street.

As a second option, the BRT Vancouver alignment could run as a one-way couplet in downtown Vancouver and/or between 16th Street and 29th Street. The downtown Vancouver couplet would accommodate southbound BRT and two southbound vehicular travel lanes along Washington Street, and northbound BRT and two northbound vehicular travel lanes along Broadway Street. The couplet between 16th Street and 29th Street would accommodate southbound BRT and one vehicular travel lane along Main Street, and northbound BRT and one northbound vehicular travel lane along Broadway Street. Vehicular operations would be expected to be similar to those of the double track alignment discussed below.

For Alternative 2, all intersections that allow movements to cross the BRT guideway would be signalized. Traffic signal pre-emption would not be provided under this alternative as there would be three to five times more buses using the fixed guideway corridors under the bus rapid transit option than trains under the light rail option. Signal pre-emption for the substantial volume of buses under the bus rapid transit option would have resulted in significant impacts to Vancouver's local street operations.

The Vancouver transit alignment proposes park and ride lots at Kiggins Bowl, Lincoln Park, and Clark College. Approximately 150, 1,800, and 460 parking spaces would be provided at these locations, respectively. The park and ride lots would accommodate transit users driving to the lot, parking and then transferring to transit, as well as those being dropped off by others (kiss-and-ride). Peak hour vehicle-trip generation for each of these lots is a combination of park and ride trips (entered during the morning peak and departed during the afternoon/evening peak) and kiss-and-ride trips (entering and exiting during each peak). **Exhibit 7-27** summarizes the estimated vehicle-trip generation for each lot, excluding feeder and local buses serving the lots and is differentiated by park and ride trips (parking trips) and kiss-and-ride trips (drop-off and pick-up trips). As shown in **Exhibit 7-27**, Kiggins Bowl would generate an estimated 85 morning and 75 afternoon/evening peak trips; Lincoln Park 1,190 morning and 1,170 afternoon/evening peak trips; and Clark College 255 morning and 230 afternoon/evening peak hour trips.

7.3.2.1.1 SR 14/City Center Interchange Area

The proposed interchange configuration for the replacement crossing would result in new intersections for eastbound SR 14/Main Street and Fifth Street/Main Street. Fourth Street's intersections at Columbia Street and at Washington Street would be eliminated. In addition, Sixth Street's intersections at Broadway and at C Street would be unrestricted intersections without conflicting movements. The SR 14/City Center interchange area consists of 34 study intersections, of which two would be new intersections that do not exist currently or under No-Build conditions.

As shown in **Exhibit 7-28**, during the morning peak, 31 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative. The two new intersections would operate acceptably. One of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 2 with the BRT Vancouver alignment.

As shown in **Exhibit 7-29**, during the afternoon/evening peak, 30 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. The two new intersections would operate acceptably. Two of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 2 with the BRT Vancouver alignment.

As shown in **Exhibit 7-28**, during the morning peak, 24 of the study intersections would operate with acceptable vehicle queuing. Both new intersections would experience queuing extending past turn lane storage capacities or to upstream intersections. Eight intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-29**, during the afternoon/evening peak, 16 intersections would operate with acceptable vehicle queuing. Both of the new intersections and sixteen of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.1.1.1 Recommended Mitigation Measures

City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 2, BRT Vancouver alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Prohibit on-street parking during peaks (e.g. south side of Eighth Street)
- Convert two-way streets to one-way couplets

7.3.2.1.2 Mill Plain Boulevard Interchange Area

The proposed interchange configuration would result in a Single Point Urban Interchange (SPUI) for Mill Plain Boulevard access to I-5. As a result, the I-5 northbound and southbound on- and off-ramps would be combined into one intersection. The Mill Plain Boulevard interchange area consists of 17 study intersections, of which three would be new intersections that do not currently exist or would exist under No-Build conditions.

As shown in **Exhibit 7-28**, during the morning peak, eight of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. The three new intersections and six of the study intersections would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under Alternative 2 with the Vancouver transit alignment.

As shown in **Exhibit 7-29**, during the afternoon/evening peak, 12 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. Two of the three new intersections and two of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 2 with the Vancouver transit alignment.

As shown in **Exhibit 7-28**, during the morning peak, one of the study intersections would operate with acceptable vehicle queuing. The three new intersections and thirteen of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-29**, during the afternoon/evening peak, five of the study intersections would operate with acceptable vehicle queuing. The three new intersections and nine study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.1.2.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 2, Vancouver alignment:

- Extend/add turn pockets at key intersections
- Prohibit on-street parking during peaks (e.g. 15th Street and Mill Plain Boulevard)
- Monitor and adjust ramp meter rates at Mill Plain Boulevard on-ramps
- Monitor northbound left-turns on Main at 15th Street and on Columbia at 15th Street and prohibit when appropriate to provide southbound left and left/through lanes to Mill Plain Boulevard

7.3.2.1.3 Fourth Plain Boulevard Interchange Area

The Fourth Plain Boulevard interchange configuration would change the northbound on-ramp from a standard diamond configuration to a loop ramp configuration under Alternative 2 with the BRT Vancouver alignment. The Vancouver transit alignment would pass through the intersection of 28th Street at Broadway, and as a result this intersection would become unsignalized without conflicting movements and not included in the analysis. The Fourth Plain Boulevard interchange area consists of 13 study intersections, of which all exist under No-Build conditions.

As shown in **Exhibit 7-28**, during the morning peak, 10 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. Three would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under Alternative 2 with the Vancouver transit alignment.

As shown in **Exhibit 7-29**, during the afternoon/evening peak, 10 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. Three would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 2 with the Vancouver transit alignment.

As shown in **Exhibit 7-28**, during the morning peak, six of the study intersections would operate with acceptable vehicle queuing. Seven intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-29**, during the afternoon/evening peak, seven of the study intersections would operate with acceptable vehicle queuing. Six would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.1.3.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 2, Vancouver alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Consider one-way couplet system along Broadway and Main Streets for both high-capacity transit and traffic
- Reconfigure Fourth Plain Boulevard over-crossing to provide two through lanes in the westbound direction
- Designate Columbia Street as an arterial roadway

7.3.2.1.4 SR 500/Main Street/39th Street Interchange Area

The proposed transit alignment would result in two new intersections for the north entrance to the Lincoln Park and Ride and the entrance to the Kiggins Bowl Park and Ride. The intersection of 40th Street/WSDOT at Main Street would be the new south entrance to the Lincoln Park and Ride. SR 500/Main Street/39th Street interchange area consists of 12 study intersections, of which two would be new intersections not included in existing or No-Build conditions.

As shown in **Exhibit 7-28**, during the morning peak, all 10 of the study intersections and the two new intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative.

As shown in **Exhibit 7-29**, during the afternoon/evening peak, six of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. One of the two new intersections would operate acceptably. Four of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 2 with the Vancouver transit alignment.

As shown in **Exhibit 7-28**, during the morning peak, seven of the study intersections and the two new intersections would operate with acceptable vehicle queuing. Three study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-29**, during the afternoon/evening peak, seven of the study intersections would operate with acceptable vehicle queuing. One new intersection and three of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.1.4.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 2, Vancouver alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Grade separate HCT crossing at 39th Street and Main Street
- Upgrade 39th Street to 5-lane cross section from Main Street to I-5
- Reduce number of parking spaces at park and ride
- Designate Columbia Street as an arterial roadway

7.3.2.2 Vancouver Service Levels – Morning/Afternoon Peak Hour – Alternative 3, LRT, Vancouver Alignment

Alternative 3 includes the extension of the MAX LRT system from the Expo Center station across the Columbia River and continuing north into Vancouver. As part of the traffic operations analysis, intersection operations were analyzed considering a Vancouver LRT alignment. The Vancouver alignment would touch down at Sixth Street with a two-way guideway north to Washington Street up to the Mill Plain transit center between 15th and 16th Streets. The guideway would then move east along 16th Street where it would turn north with the two-way guideway on Broadway Street. Broadway would be converted to one-way northbound traffic. At 29th and Main Street, the guideway would then run along the center of Main Street up to the Lincoln Park and Ride and would eliminate two vehicular travel lanes (one per direction) along Main Street. It was assumed that the guideway would cross immediately west of the intersection at 39th and Main Street. As a component of the Lincoln Park and Ride facility, Main Street would be widened north of 39th Street to accommodate the traffic levels expected during peak hours.

As a second option, the Vancouver high-capacity alignment could run as a one-way couplet in downtown Vancouver and/or between 16th Street and 29th Street. The downtown Vancouver couplet would accommodate southbound LRT and two southbound vehicular travel lanes along Washington Street, and northbound LRT and two northbound vehicular travel lanes along Broadway Street. The couplet between 16th Street and 29th Street would accommodate southbound LRT and one vehicular travel lane along Main Street, and northbound LRT and one northbound vehicular travel lane along Broadway Street. Vehicular operations would be expected to be similar to those of the double track alignment discussed below.

For Alternative 3 with the Vancouver alignment, all intersections that allow traffic to cross the LRT guideway would be signalized. It was assumed that LRT trains would receive signal priority and intersection signal timing was adjusted to account for these impacts.

The LRT Vancouver alignment proposes park and ride lots at Kiggins Bowl, Lincoln Park, and Clark College. Approximately 150, 1,800, and 460 parking spaces would be provided at these locations, respectively. The park and ride lots would accommodate transit users driving to the lot, parking and then transferring to transit, as well as those being dropped off by others (kiss-and-ride). Peak hour vehicle-trip generation for each of these lots is a combination of park and ride trips (entered during the morning peak and departed during the afternoon/evening peak) and kiss-and-ride trips (entering and exiting during each peak). **Exhibit 7-30** summarizes the estimated vehicle-trip generation for each lot, excluding feeder and local buses serving the lots, and is differentiated by park and ride trips (parking trips) and kiss-and-ride trips (drop-off and pick-up trips). As shown in **Exhibit 7-30**, Kiggins Bowl would generate an estimated 85 morning and 75 afternoon/evening peak trips; Lincoln Park 1,190 morning and 1,170 afternoon/evening peak trips; and Clark College 255 morning and 230 afternoon/evening peak trips.

7.3.2.2.1 SR 14/City Center Interchange Area

The proposed interchange configuration would result in new intersections for eastbound SR 14/Main Street and Fifth Street/Main Street. Fourth Street's intersections at Columbia Street and at Washington Street would be eliminated. In addition, Sixth Street's intersections at Broadway and at C Street would be unrestricted intersections without conflicting movements. The SR 14/City Center interchange area consists of 34 study intersections, of which two would be new intersections that do not exist currently under No-Build conditions.

As shown in **Exhibit 7-31**, during the morning peak, all 32 of the study intersections and the two new intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative.

As shown in **Exhibit 7-32**, during the afternoon/evening peak, 31 of the study intersections and the two new intersections would operate acceptably with improved, similar, or slightly degraded conditions. One of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the Vancouver alignment.

As shown in **Exhibit 7-31**, during the morning peak, 27 of the study intersections would operate with acceptable vehicle queuing. One of the two new intersections and five of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-32**, during the afternoon/evening peak, 15 of the study intersections would operate with acceptable vehicle queuing. Both new intersections and 17 study intersections would experience queuing extending past turn lane storage capacity or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.2.1.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 3, Vancouver alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Prohibit on-street parking during peaks (e.g. south side of Eighth Street)
- Convert two-way streets to one-way couplets

7.3.2.2.2 Mill Plain Boulevard Interchange Area

The proposed interchange configuration would result in a SPUI for Mill Plain Boulevard access to I-5. As a result, the I-5 northbound and southbound on- and off-ramps would be combined into one intersection. The Mill Plain Boulevard interchange area consists of 17 study intersections, of which three would be new intersections that do not exist currently or under No-Build conditions.

As shown in **Exhibit 7-31**, during the morning peak, four of the study intersections and the three new intersections would operate acceptably with improved, similar, or slightly degraded conditions. Ten intersections would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the Vancouver alignment.

As shown in **Exhibit 7-32**, during the afternoon/evening peak, 12 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. The three new intersections and two of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the Vancouver alignment.

As shown in **Exhibit 7-31**, during the morning peak, two of the study intersections would operate with acceptable vehicle queuing. The three new intersections and twelve of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-32**, during the afternoon/evening peak, five of the study intersections would operate with acceptable vehicle queuing. The three new intersections and nine study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.2.2.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 3, Vancouver alignment:

- Extend/add turn pockets at key intersections
- Prohibit on-street parking during peaks (e.g. 15th Street and Mill Plain Boulevard)
- Monitor and adjust ramp meter rates at Mill Plain Boulevard on-ramps
- Monitor northbound left-turns on Main at 15th Street and on Columbia at 15th Street and prohibit when appropriate to provide southbound left and left/through lanes to Mill Plain Boulevard

7.3.2.2.3 Fourth Plain Boulevard Interchange Area

The Fourth Plain Boulevard interchange configuration would change the northbound on-ramp from a standard diamond configuration to a loop ramp configuration under

Alternative 3 with the LRT Vancouver alignment. The LRT Vancouver alignment would pass through the intersection of 28th Street at Broadway and as a result this intersection would become unsignalized without conflicting movements and not included in the analysis. The Fourth Plain Boulevard interchange area consists of 13 study intersections, all of which exist currently.

As shown in **Exhibit 7-31**, during the morning peak, six of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. Seven would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the Vancouver alignment.

As shown in **Exhibit 7-32**, during the afternoon/evening peak, 12 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. One would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the Vancouver alignment.

As shown in **Exhibit 7-31**, during the morning peak, two of the study intersections would operate with acceptable vehicle queuing. Eleven would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-32**, during the afternoon/evening peak, eight of the study intersections would operate with acceptable vehicle queuing. Five would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.2.3.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 3, Vancouver alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Consider one-way couplet system along Broadway and Main Streets for both high-capacity transit and traffic
- Reconfigure Fourth Plain Boulevard over-crossing to provide two through lanes in the westbound direction
- Designate Columbia Street as an arterial roadway

7.3.2.2.4 SR 500/Main Street/39th Street Interchange Area

The proposed transit alignment would result in two new intersections for the north entrance to the Lincoln Park and Ride and the entrance to the Kiggins Bowl Park and Ride. The intersection of 40th Street/WSDOT at Main Street would be the new south entrance to the Lincoln Park and ride. SR 500/Main Street/39th Street interchange area consists of 12 study intersections, of which two would be new intersections that do not exist currently or under No-Build conditions.

As shown in **Exhibit 7-31**, during the morning peak, all 10 of the study intersections and the two new intersections would operate acceptably with improved, similar, or slightly degraded conditions.

As shown in **Exhibit 7-32**, during the afternoon/evening peak, nine of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. One of the two new intersections would operate acceptably. One study intersection would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the Vancouver alignment.

As shown in **Exhibit 7-31**, during the morning peak, nine of the study intersections would operate with acceptable vehicle queuing. One of the two new intersections and one study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-32**, during the afternoon/evening peak, five of the study intersections would operate with acceptable vehicle queuing. Both of the new intersections and five of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.2.4.1 Recommended Mitigation Measures

City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 3, Vancouver alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Grade separate HCT crossing at 39th Street and Main Street
- Upgrade 39th Street to 5-lane cross section from Main Street to I-5
- Reduce number of parking spaces at park and ride
- Designate Columbia Street as an arterial roadway

7.3.2.3 Vancouver Service Levels – Morning/Afternoon Peak Hour – Alternative 3, LRT with Full-Length I-5 Transit Alignment

Alternative 3 with the I-5 transit alignment includes the extension of the MAX LRT system from the Expo Center station across the Columbia River into Vancouver. As part of the traffic operations analysis, intersection operations were analyzed considering an I-5 full-length LRT alignment. The I-5 transit alignment would touch down at Sixth Street with a two-way guideway on Washington Street north to McLoughlin Boulevard. At McLoughlin Boulevard, the guideway would run east toward I-5, pass underneath I-5, and would then turn north towards the Clark College Park and Ride. The alignment would then continue north along the east side of I-5, past the Fourth Plain Boulevard interchange, after which the guideway would cross over I-5 and terminate at the Kiggins Bowl Park and Ride. In addition, Main Street would be widened north of 45th Street to accommodate the traffic levels expected during peak hours.

As a second option, I-5 transit alignment could run as a one-way couplet in downtown Vancouver. The couplet would accommodate southbound LRT and two southbound vehicular travel lanes along Washington Street, and northbound LRT and two northbound vehicular travel lanes along Broadway Street. To access the north-south alignment, the transit route could run east along 16th Street to the Clark College Park and Ride facility. This alignment would require converting 16th Street to one-way westbound traffic. Vehicular operations would be expected to be similar to those of the double track and McLoughlin Street alignment discussed below.

For Alternative 3 with the I-5 transit alignment, intersections that allow traffic to cross the LRT guideway would be signalized. It was assumed that LRT trains would receive signal priority and intersection signal timing was adjusted to account for these impacts.

The I-5 transit alignment proposes park and ride lots at Kiggins Bowl and Clark College. Approximately 1,400 and 1,100 parking spaces would be provided at these locations, respectively. The park and ride lots would accommodate transit users driving to the lot, parking and then transferring to transit, as well as those being dropped off by others (kiss-and-ride). Peak hour vehicle-trip generation for each of these lots is a combination of park and ride trips (entered during the morning peak and departed during the afternoon/evening peak) and kiss-and-ride trips (entering and exiting during each peak). **Exhibit 7-33** summarizes the estimated vehicle-trip generation for each lot, excluding feeder and local buses serving the lots, and is differentiated by park and ride trips (parking trips) and kiss-and-ride trips (drop-off and pick-up trips). As shown in **Exhibit 7-33**, Kiggins Bowl would generate an estimated 925 morning and 840 afternoon/evening peak trips; and Clark College 725 morning and 715 afternoon/evening peak hour trips.

7.3.2.3.1 SR 14/City Center Interchange Area

The proposed interchange configuration would result in new intersections for eastbound SR 14/Main Street and Fifth Street/Main Street. Fourth Street's intersections at Columbia Street and at Washington Street would be eliminated. In addition, Sixth Street's intersections at Broadway and at C Street would be unrestricted intersections without conflicting movements. The SR 14/City Center interchange area consists of 34 study intersections, of which two would be new intersections that do not exist currently or under No-Build conditions.

As shown in **Exhibit 7-34**, during the morning peak, all 32 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. The two new intersections would operate acceptably.

As shown in **Exhibit 7-35**, during the afternoon/evening peak, 31 of the study intersections and the two new intersections would operate acceptably with improved, similar, or slightly degraded conditions. One of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the I-5 alignment.

As shown in **Exhibit 7-34**, during the morning peak, 27 of the study intersections would operate with acceptable vehicle queuing. One of the two new intersections and five of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-35**, during the afternoon/evening peak, 15 intersections would operate with acceptable vehicle queuing. Both new intersections and 17 of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.3.1.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 3, I-5 alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Prohibit on-street parking during peaks (e.g. south side of Eighth street)
- Convert two-way streets to one-way couplets

7.3.2.3.2 Mill Plain Boulevard Interchange Area

The proposed interchange configuration would result in a SPUI for Mill Plain Boulevard access to I-5. As a result, the I-5 northbound and southbound on- and off-ramps would be combined into one intersection. In addition, the addition of the Clark College Park and Ride would provide new access on McLoughlin Boulevard. The Mill Plain Boulevard interchange area consists of 18 study intersections, of which four would be new intersections that do not exist currently or under No-Build conditions.

As shown in **Exhibit 7-34**, during the morning peak, six of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. Three of the four new intersections and eight of the study intersections would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the I-5 transit alignment.

As shown in **Exhibit 7-35**, during the afternoon/evening peak, 12 of the study intersections and the four new intersections would operate acceptably with improved, similar, or slightly degraded conditions. Two of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the I-5 alignment.

As shown in **Exhibit 7-34**, during the morning peak, one study intersection would operate with acceptable vehicle queuing. Two of the four new intersections and 13 study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-35**, during the afternoon/evening peak, five of the study intersections and the four new intersections would operate with acceptable vehicle queuing. Nine of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.3.2.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 3, I-5 alignment:

- Extend/add turn pockets at key intersections
- Prohibit on-street parking during peaks (e.g. 15th Street and Mill Plain Boulevard)
- Monitor and adjust ramp meter rates at Mill Plain Boulevard on-ramps
- Monitor northbound left-turns on Main at 15th Street and on Columbia at 15th Street and prohibit when appropriate to provide southbound left and left/through lanes to Mill Plain Boulevard

7.3.2.3.3 Fourth Plain Boulevard Interchange Area

The proposed interchange configuration would add a direct connection to the I-5 northbound on- and off-ramps for the Clark College Park and Ride. The Fourth Plain Boulevard interchange area consists of 15 study intersections, of which one would be a new intersection that does not exist currently and would not under No-Build conditions.

As shown in **Exhibit 7-34**, during the morning peak, 10 of the study intersections and the new intersection would operate acceptably with improved, similar, or slightly degraded conditions. Four intersections would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the I-5 alignment.

As shown in **Exhibit 7-35**, during the afternoon/evening peak, all 15 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative.

As shown in **Exhibit 7-34**, during the morning peak, eight of the study intersections would operate with acceptable vehicle queuing. The new intersection and six of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-35**, during the afternoon/evening peak, 11 of the study intersections would operate with acceptable vehicle queuing. The new intersection and three of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.3.3.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 3, I-5 alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections

7.3.2.3.4 SR 500/Main Street/39th Street Interchange Area

The proposed transit alignment would result in one new intersection for the north entrance to the Kiggins Bowl Park and Ride. The southern entrance to the park and ride would be aligned with the intersection of 45th Street at Main Street. SR 500/Main Street/39th Street interchange area consists of 11 study intersections, of which one would be a new intersection that does not currently exist or would exist under No-Build conditions.

As shown in **Exhibit 7-34**, during the morning peak, all 10 of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative. The new intersection would operate acceptably.

As shown in **Exhibit 7-35**, during the afternoon/evening peak, nine of the study intersections and the new intersection would operate acceptably with improved, similar, or slightly degraded conditions. One intersection would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under Alternative 3 with the I-5 alignment.

As shown in **Exhibit 7-34**, during the morning peak, seven study intersections and the new intersection would operate with acceptable vehicle queuing. Three of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

As shown in **Exhibit 7-35**, during the afternoon/evening peak, seven of the study intersections would operate with acceptable vehicle queuing when compared to the No-Build Alternative. The one new intersection and three of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.3.4.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under Alternative 3, I-5 alignment:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Upgrade 39th Street to five-lane cross section from Main Street to I-5

7.3.2.4 Vancouver Service Levels – Morning/Afternoon Peak Hour– Alternative 3, Mill Plain Minimum Operable Segment (MOS)

Relative to the full-length alignments previously discussed, the Mill Plain MOS would involve the same alignment choices in downtown Vancouver – either a two-way Washington Street alignment or a Washington-Broadway couplet option – but with a northern high-capacity transit terminus at a proposed Mill Plain station near Broadway and 16th Street.

The Mill Plain MOS would include eight park and ride facilities with nearly 3,000 parking spaces (about 600 more spaces than the Vancouver full-length alignment). Satellite parking lots would be located north and east of downtown and would have access to the high-capacity transit stations via shuttle buses. The Kiggins Bowl park and ride lot would have 150 surface parking spaces and would generate about 85 morning and 75 afternoon/evening peak vehicle trips. The Lincoln Park and Ride would have 900 surface parking spaces and would generate about 600 morning and 590 afternoon/evening peak vehicle trips. The Clark College park and ride lot would have 460 parking spaces, generating about 250 morning and 230 afternoon/evening peak hour vehicle trips.

The Mill Plain MOS would reduce the number of Lincoln Park and Ride spaces by half, and it would include the same parking spaces and vehicle-trip generation at Kiggins Bowl and Clark College as the full-length Vancouver alignment.

In addition to the three satellite lots, five park and ride sites (two structures and three surface facilities) would be located along the transit alignment in downtown Vancouver. The Mill Plain Park and Ride structure would be located between 16th and 17th Streets and Broadway and Main Street. It would have 460 parking spaces, generating 255 morning and 230 afternoon/evening peak hour vehicle trips. The second parking structure would be located between Fourth and Fifth and Washington and Columbia Streets. It would have 550 parking spaces and would generate 305 morning and 275 afternoon/evening peak vehicle trips. In addition, three adjoining surface lots would be located near the SR 14 interchange (bounded by Fifth Street on the north, the railroad tracks on the south, I-5 on the east, and Columbia Street on the west), offering a total of 460 parking spaces and generating 255 morning and 235 afternoon/evening peak vehicle trips.

The total number of vehicle trips within downtown Vancouver would greatly increase under this alignment. An additional 1,470 park and ride spaces in downtown Vancouver would generate an additional 805 morning and 740 afternoon/evening peak vehicle trips. As a result, the traffic impacts to downtown streets would be exacerbated over the full-length alignment option, resulting in further increased vehicle delays and queuing on local streets. Limited access points to each of the park and ride lots (one per location) would reduce the arrival and departure capacities and would likely cause increased congestion on local streets near the lots.

The Mill Plain MOS would not require eliminating two vehicular travel lanes (one in each direction) along Main Street between 29th Street and the Lincoln Park and Ride lot. Maintaining the four vehicular travel lanes on Main Street would benefit local street operations in northern Vancouver.

7.3.2.4.1.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT to monitor traffic operations and pursue the following mitigation measures recommended under a Mill Plain MOS option:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections
- Prohibit on-street parking during peaks (e.g. Eighth Street, 15th Street, Mill Plain Boulevard)
- Monitor northbound left-turns on Main at 15th Street and on Columbia at 15th Street and prohibit when appropriate to provide southbound left and left/through lanes to Mill Plain Boulevard
- Monitor and adjust ramp meter rates at Mill Plain Boulevard on-ramps
- Convert two-way streets to one-way couplets
- Reduce the number of parking spaces at park and ride stations
- Provide multiple driveways to/from park and ride stations
- Increase shuttle bus service to park and ride stations to decrease automobile traffic generation

7.3.2.5 Vancouver Service Levels – Morning/Afternoon Peak Hour – Alternative 3, Clark College Minimum Operable Segment (MOS)

Relative to the full-length I-5 transit alignment previously discussed, the Clark College MOS would involve the same alignment design options in Vancouver – either a two-way Washington Street alignment or a Washington/Broadway couplet option – but with a northern terminus at Clark College instead of at Kiggins Bowl.

The Clark College MOS would include two park and ride facilities with a total of 1,250 parking spaces. The Kiggins Bowl Park and Ride surface lot would have 150 parking spaces and would generate about 85 morning and 75 afternoon/evening peak vehicle trips. Those parking at Kiggins Bowl would access the high-capacity transit stations via shuttle buses. The Clark College Park and Ride surface lot would have 1,100 parking spaces generating about 725 morning and 715 afternoon/evening peak vehicle trips.

Impacts related to the Clark College MOS would be similar to the I-5 full-length transit alignment. However, the roadway improvements proposed on Main Street north of 45th Street under the I-5 alignment would not be necessary under the Clark College MOS, as the Kiggins Bowl Park and Ride facility would be reduced by 1,250 park and ride spaces.

7.3.2.5.1 Recommended Mitigation Measures

The City of Vancouver and WSDOT would monitor traffic operations and pursue the following mitigation measures recommended under a Clark College MOS option:

- Monitor traffic volumes and signalize intersections as warranted
- Extend/add turn pockets at key intersections

- Prohibit on-street parking during peaks (e.g. Eighth Street, 15th Street, Mill Plain Boulevard)
- Monitor northbound left-turns on Main at 15th Street and on Columbia at 15th Street and prohibit when appropriate to provide southbound left and left/through lanes to Mill Plain Boulevard
- Monitor and adjust ramp meter rates at Mill Plain Boulevard on-ramps
- Convert two-way streets to one-way couplets
- Reduce number of parking spaces at park and ride stations
- Increase shuttle bus service to park and ride stations to decrease automobile traffic generation

7.3.2.6 Portland Service Levels – Morning/Afternoon Peak Hour

The proposed street network in Portland would be the same for Alternatives 2 and 3. The transit option of BRT in Alternative 2 and LRT in Alternative 3 would not have an impact on the configuration of the street system. The average number of LRT vehicles on the Interstate MAX (Yellow Line) during the morning and afternoon/evening peak hours would be the same under either alternative and would increase over existing service.

7.3.2.6.1 Hayden Island Interchange Area

Under the replacement crossing, the Hayden Island interchange would be completely reconstructed. The result would be a pair of new highway ramp terminals and a reconfigured street network. Thirteen potential new study intersections were analyzed.

As shown in **Exhibit 7-36**, during the morning peak, all of the proposed ODOT and PDOT intersections would operate acceptably as compared to the applicable standards. As shown in **Exhibit 7-37**, during the afternoon/evening peak, all of the proposed intersections would operate acceptably. During the morning and afternoon/evening peak hours, all of the study intersections would operate with acceptable vehicle queuing.

7.3.2.6.1.1 Recommended Mitigation Measures

As all intersections would operate acceptably, no traffic mitigation would be required.

7.3.2.6.2 Marine Drive Interchange Area

Under the replacement crossing, the Marine Drive interchange would be reconstructed as a SPUI. There are three design options for the Marine Drive interchange; each configuration is available for both the replacement and supplemental river crossing. These options include a “standard” design option that would retain most of the existing Marine Drive alignment, a “southern realignment” that would realign Marine Drive south of the Expo Center property, and the “diagonal realignment” design option. The southern design would introduce a traffic signal at the new intersection of Marine Drive and Force Avenue; the other designs would largely retain the existing configuration. Each design option would add free-flow access (no stop signs or signals) for the most frequently used connections between I-5 and Marine Drive. A connection between Martin Luther King Jr.

Boulevard and Vancouver Way would be built east of the SPUI interchange. Highway ramps in the interchange area would be reconstructed, resulting in the removal of the north leg of the Union Court and Vancouver Way intersection. The interchange area would consist of four new study intersections.

As shown in **Exhibit 7-36**, during the morning peak, all of the proposed ODOT and PDOT intersections would operate acceptably as compared to the applicable standards.

As shown in **Exhibit 7-37**, during the afternoon/evening peak, both ODOT and one PDOT intersection would operate acceptably. One of the proposed PDOT intersections would operate unacceptably.

As shown in **Exhibit 7-36**, during the morning peak, both proposed ODOT and one PDOT intersection would operate with acceptable vehicle queuing. One PDOT intersection would experience queuing extending past turn lane storage capacities or to upstream intersections. As shown in **Exhibit 7-37**, during the afternoon/evening peak, all of the proposed study intersections would operate with acceptable vehicle queuing.

7.3.2.6.2.1 Recommended Mitigation Measures

The following measures are recommended to mitigate unacceptable operations under the replacement crossing:

- Signalize Union Court and Vancouver Way and optimize for critical movements

7.3.2.6.3 Victory Boulevard Interchange Area

Under the replacement crossing, the Victory Boulevard interchange area would remain in the same configuration as the No-Build Alternative. The interchange area consists of four study intersections.

As shown in **Exhibit 7-36** and **Exhibit 7-37**, during the morning and afternoon/evening peaks, all four of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative. All of the proposed study intersections would operate with acceptable vehicle queuing when compared to the No-Build Alternative.

7.3.2.6.3.1 Recommended Mitigation Measures

As all intersections would operate acceptably, no traffic mitigation would be required.

7.3.2.6.4 Interstate Avenue Analysis Area

Under the replacement crossing, the Interstate Avenue analysis area would remain the same as the No-Build Alternative. The analysis area consists of four study intersections.

As shown in **Exhibit 7-36**, during the morning peak, three of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. One would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under the replacement crossing.

As shown in **Exhibit 7-37**, during the afternoon/evening peak, three of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. One would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under the replacement crossing.

As shown in **Exhibit 7-36**, during the morning peak, all of the study intersections would operate with acceptable vehicle queuing. As shown in **Exhibit 7-37**, during the afternoon/evening peak, two of the study intersections would operate with acceptable vehicle queuing. Two would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

7.3.2.6.4.1 Recommended Mitigation Measures

The following measures are recommended to mitigate unacceptable operations under the replacement crossing:

Going Street and Interstate Avenue:

- Optimize LRT pre-emption at intersections.
- Install advanced signal controllers to manage LRT pre-emption.
- Change westbound right into a through/right choice lane to allow traffic to continue westbound.

Rosa Parks Way and Interstate Avenue:

- Optimize LRT pre-emption at intersections.
- Install advanced signal controllers to manage LRT pre-emption.

7.3.2.6.5 Martin Luther King Jr. Boulevard Analysis Area

Under the replacement crossing, the Martin Luther King Jr. Boulevard analysis area would remain the same as the No-Build Alternative. The analysis area consists of five study intersections.

As shown in **Exhibit 7-36** and **Exhibit 7-37**, during the morning and afternoon/evening peaks, all five of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. All five of the study intersections would operate with acceptable vehicle queuing when compared to the No-Build Alternative.

7.3.2.6.5.1 Recommended Mitigation Measures

As all intersections would operate acceptably, no traffic mitigation would be required.

7.3.2.6.6 I-5 Ramp Terminals Analysis Area

Under the replacement crossing, the I-5 Ramp Terminals analysis area would remain in the same configuration as the No-Build Alternative. The interchange area consists of seven study intersections.

As shown in **Exhibit 7-36** and **Exhibit 7-37**, during morning and afternoon/evening peaks, all of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions. All of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative.

7.3.2.6.6.1 Recommended Mitigation Measures

As all intersections would operate acceptably, no traffic mitigation would be required.

7.4 Pedestrian and Bicycle Circulation

Alternatives 2 and 3 would substantially improve pedestrian and bicycle connectivity within the CRC project area by providing a continuous grade-separated multi-use pathway from downtown Vancouver to the Marine Drive area, without requiring pedestrian and bicycle users to navigate Haden Island at-grade.

The replacement crossing was evaluated with a multi-use pathway west of and adjacent to the transit guideway. The pathway would be continuous and above-grade from approximately Sixth Street in Vancouver to just north of Marine Drive. It would pass under Marine Drive and connect to the Expo Center. The pathway would be a minimum of 16 feet wide between its barriers and could separate, through pavement markings, pedestrian and bicycle traffic.

The replacement crossing would provide access to Vancouver via a ramp to a roadway in the downtown area. A second potential connection in Vancouver, closer to the Columbia River, would provide access to waterfront attractions and the multi-use path along the shore with an elevator. On Hayden Island, the pathway would be accessible via an elevator and stairs located at the high-capacity transit station. In addition, potential stairs at the north and south ends of the island may be provided. Note that Hayden Island access points are being studied as a part of the City of Portland’s separate Hayden Island planning efforts.

At the Marine Drive interchange, the multi-use path would have access to the Expo Center transit station and to the 40-Mile Loop trail running along North Portland Harbor. Additional connections to Delta Park, and bicycle routes along Union Court and Martin Luther King Jr. Boulevard would be maintained or improved with off-street facilities, ramps and stairs. The connections proposed by the CRC project would be coordinated with ongoing planning efforts in Vancouver, Hayden Island and near Marine Drive.

Today, pedestrians and bicyclists cross North Portland Harbor on a multi-use pathway on the east side of the harbor bridge. The proposed crossing for the replacement bridge option would remove access at this location and require users to travel out of direction to access the new pathway along the high-capacity transit alignment. A potential mitigation measure to alleviate the circuitous routing would be to construct a pedestrian pathway on the east side of the harbor bridge. In addition, a longer-range measure to install a pedestrian sidewalk on the east side of the eastern span of the replacement crossing could be considered.

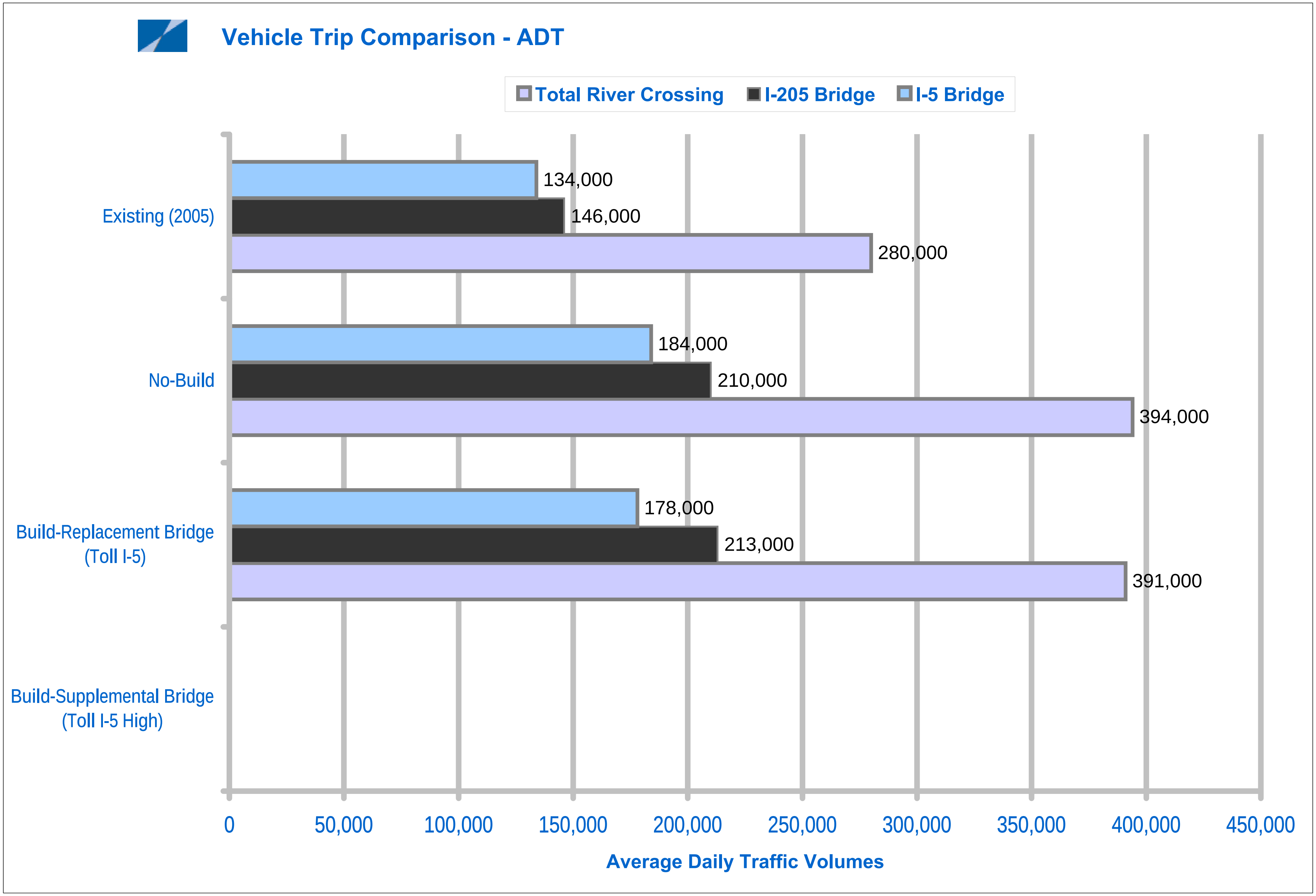
A design option for the replacement river crossing could accommodate transit, pedestrians, and bicyclists on two rather than three bridges over the Columbia River. This option, referred to as the Stacked Transit/Highway Bridge (STHB) would place the multi-use pathway on a cantilevered structure under the eastern edge of the northbound bridge. Similar to the supplemental crossing, ramps to the east of I-5 would connect the pathway to Columbia Way in Vancouver and Tomahawk Island Drive on Hayden Island. An above-grade multi-use pathway would be provided west of I-5 alongside the high-capacity transit guideway between Tomahawk Island Drive and Marine Drive. Pedestrians and bicyclists using both pathways would need to travel along Tomahawk Island Drive, under I-5, and through at-grade intersections.

An alternative design option for the STHB crossing would suspend the pathway under the western edge of the southbound bridge. This would enable a more direct pathway similar to that proposed under the replacement crossing. Further evaluation would be required to determine if this option is feasible due to potential bridge loading issues with highway and transit loads combined on one structure. Suspending the pathway under an edge of a bridge would shorten connections as the pathway's elevation would be lower than the roadway deck.

For the replacement crossing alternatives, connections consisting of ramps, stairs, or elevators would connect with existing and planned sidewalks and pathways in Vancouver, Hayden Island, and near Marine Drive. The connections would be coordinated with ongoing planning in those areas.

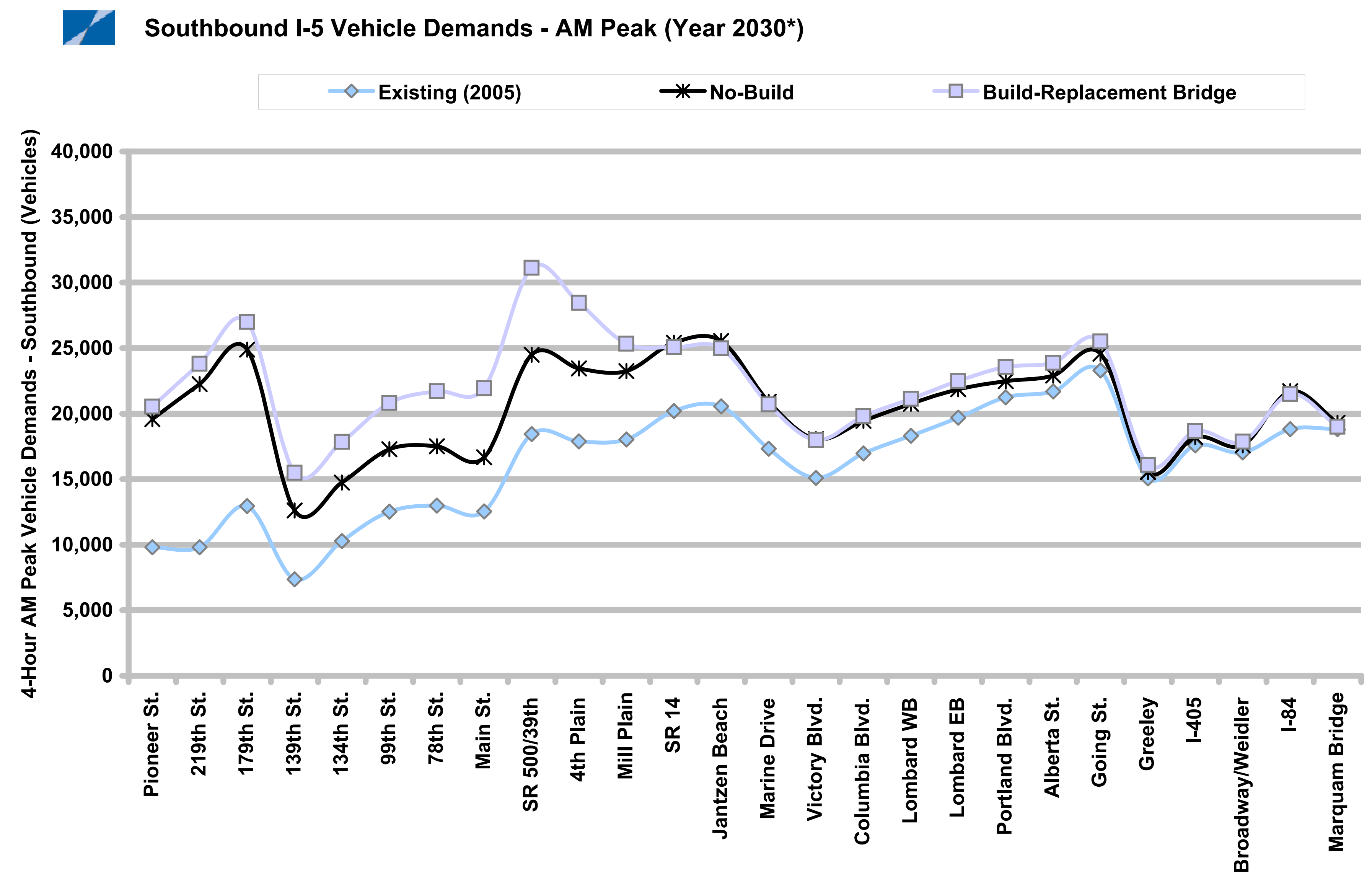
Further design of highway interchange components will be required to determine the long-term pedestrian and bicycle effects of potential designs.

Exhibit 7-1



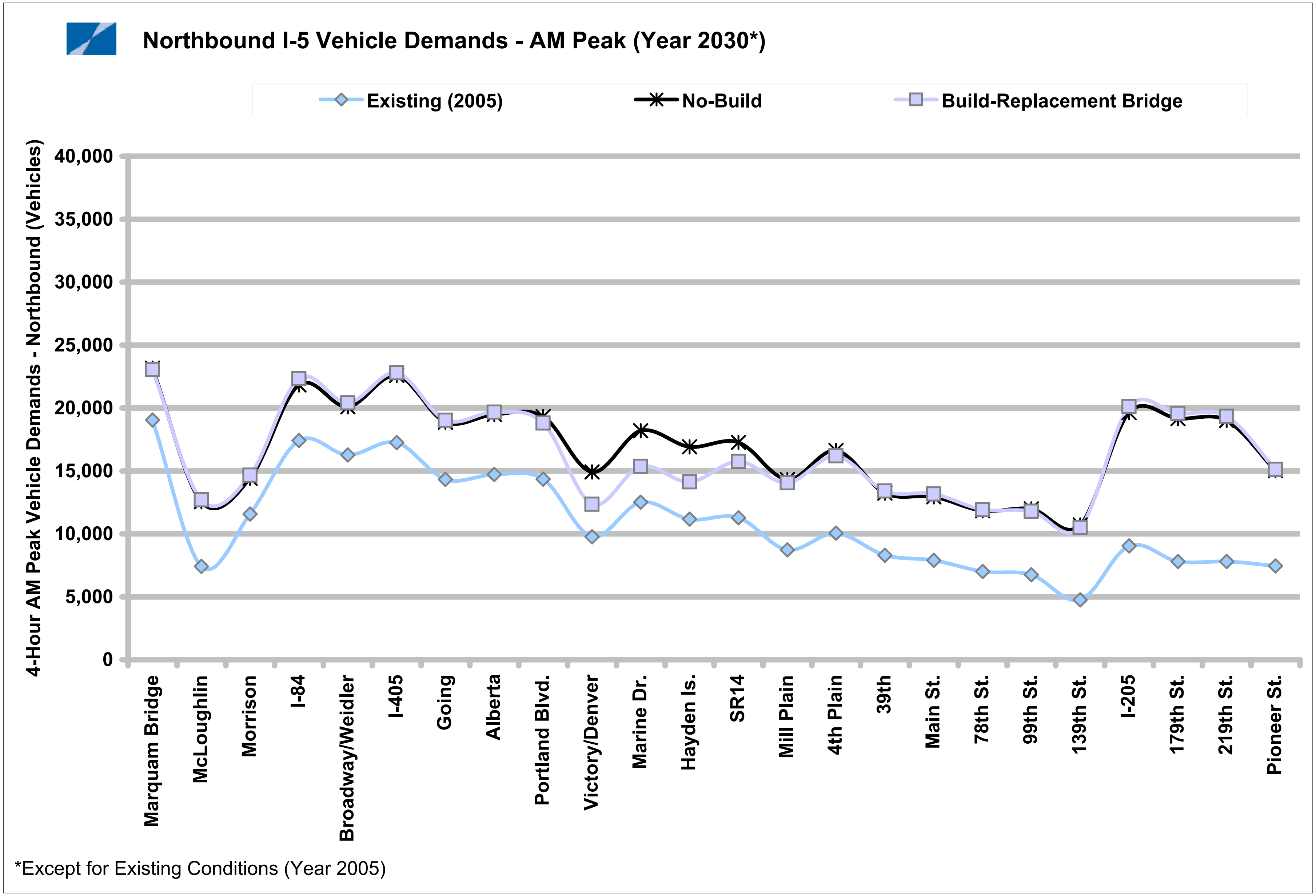
Vehicle Trip Comparison - ADT
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
134,000
146,000
280,000
No-Build
184,000
210,000
394,000
Build-Replacement Bridge (Toll I-5)
178,000
213,000
391,000
Build-Supplemental Bridge (Toll I-5 High)
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
Average Daily Traffic Volumes

Exhibit 7-2



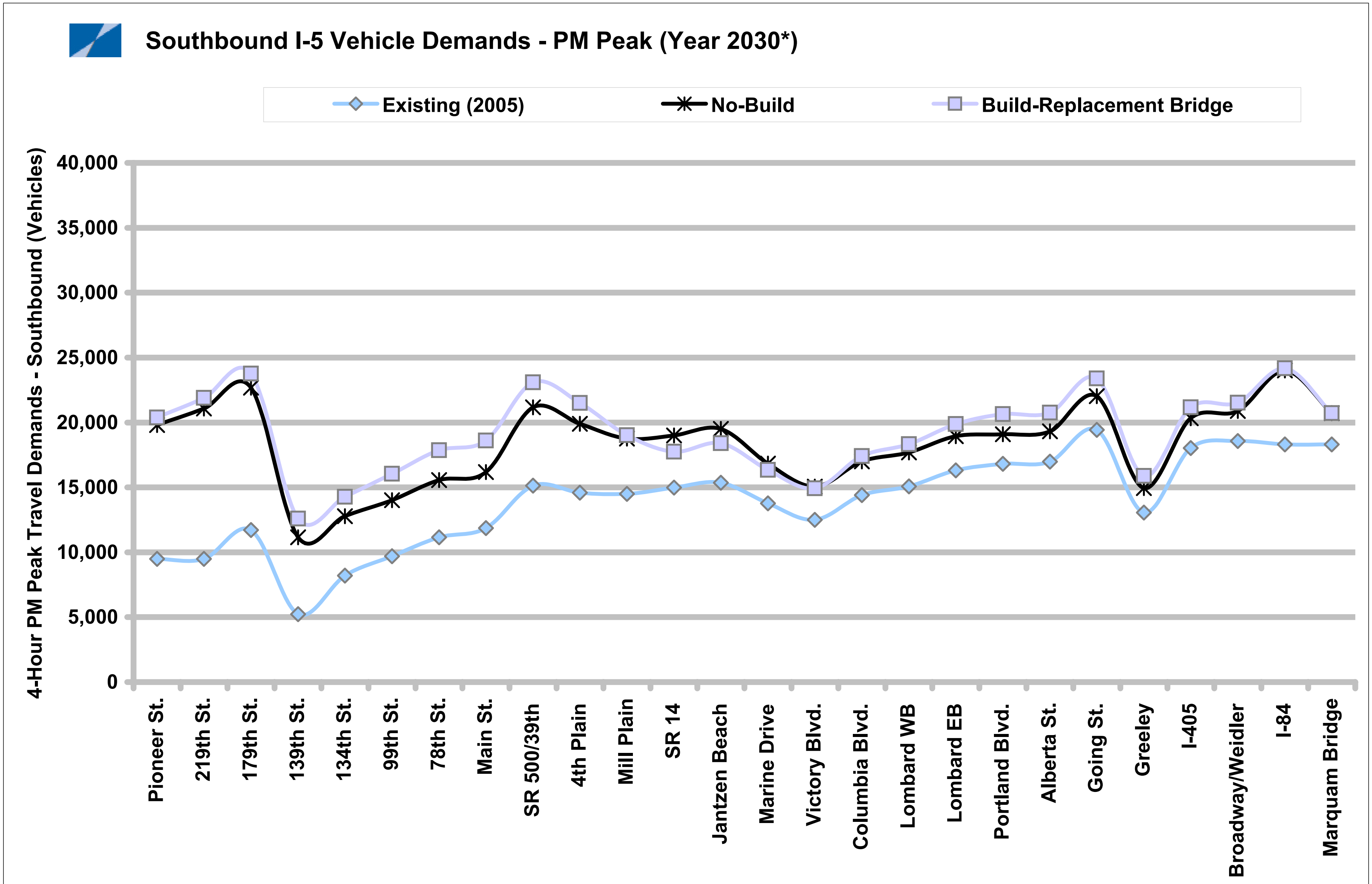
*Except for Existing Conditions (Year 2005)

Exhibit 7-3



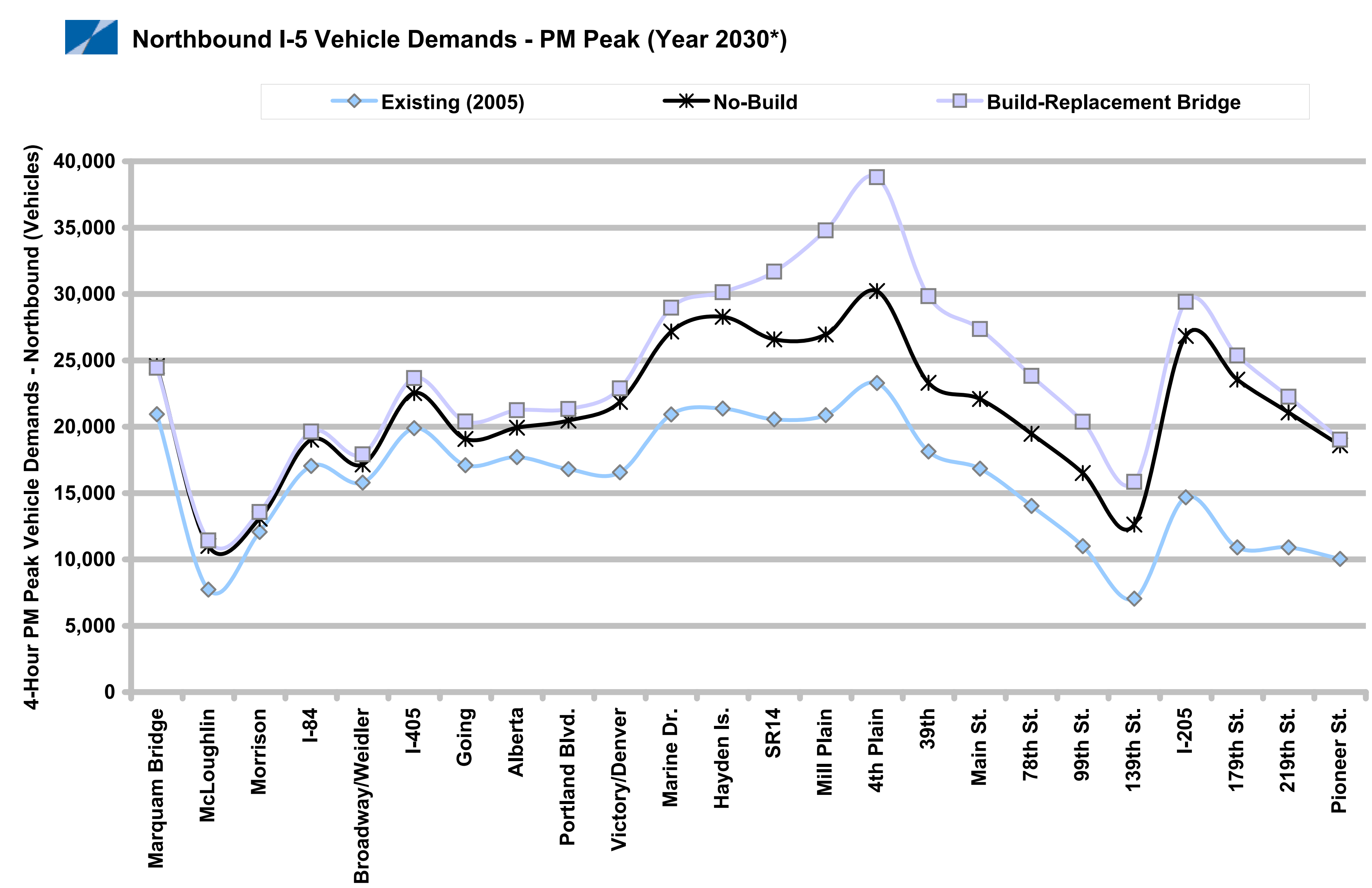
Northbound I-5 Vehicle Demands - AM Peak (Year 2030*)
Existing (2005)
No-Build
Build-Replacement Bridge
4-Hour AM Peak Vehicle Demands - Northbound (Vehicles)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Marquam Bridge
McLoughlin
Morrison
I-84
Broadway/Weidler
I-405
Going
Alberta
Portland Blvd.
Victory/Denver
Marine Dr.
Hayden Is.
SR14
Mill Plain
4th Plain
39th
Main St.
78th St.
99th St.
139th St.
I-205
179th St.
219th St.
Pioneer St.
*Except for Existing Conditions (Year 2005)

Exhibit 7-4



*Except for Existing Conditions (Year 2005)

Exhibit 7-5



*Except for Existing Conditions (Year 2005)

Exhibit 7-6

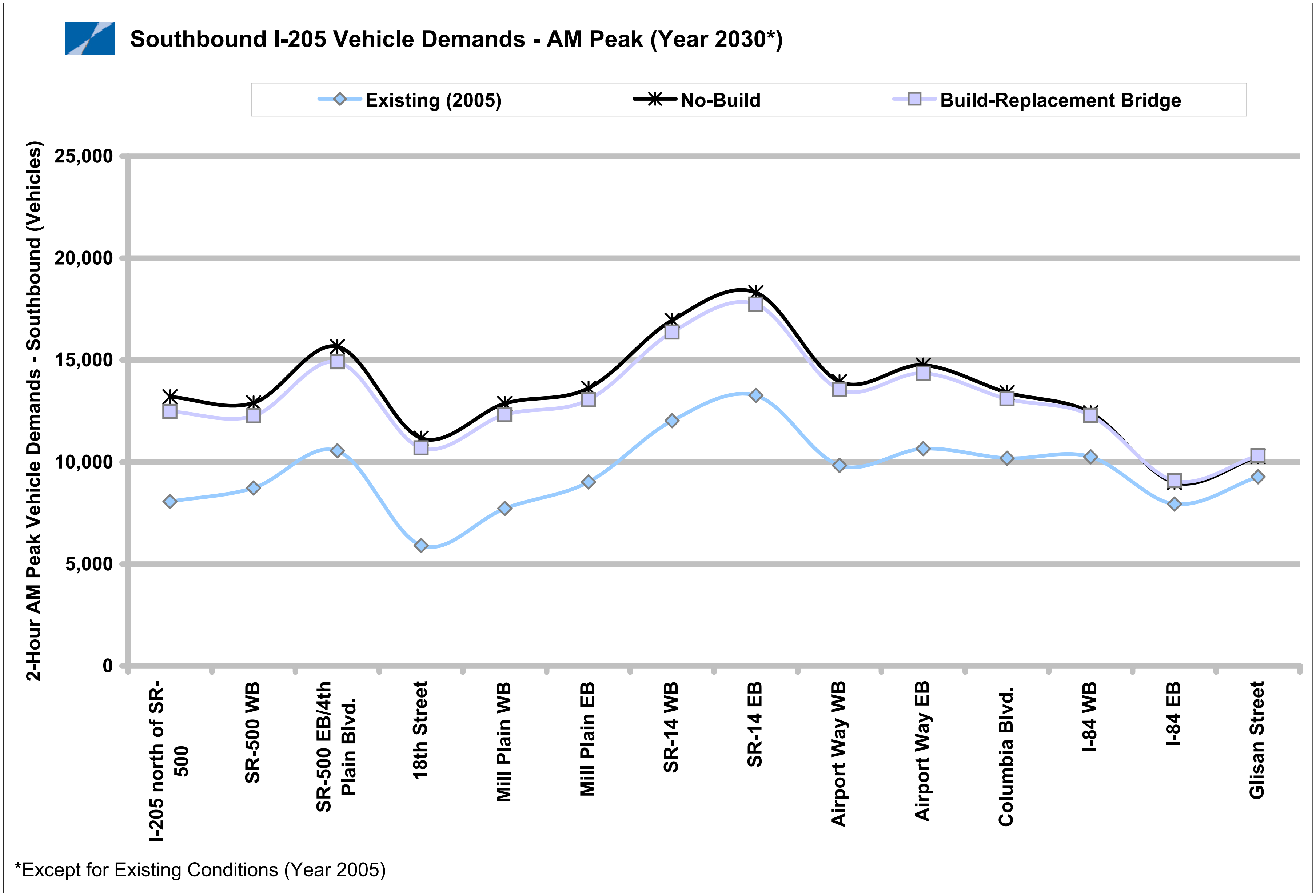
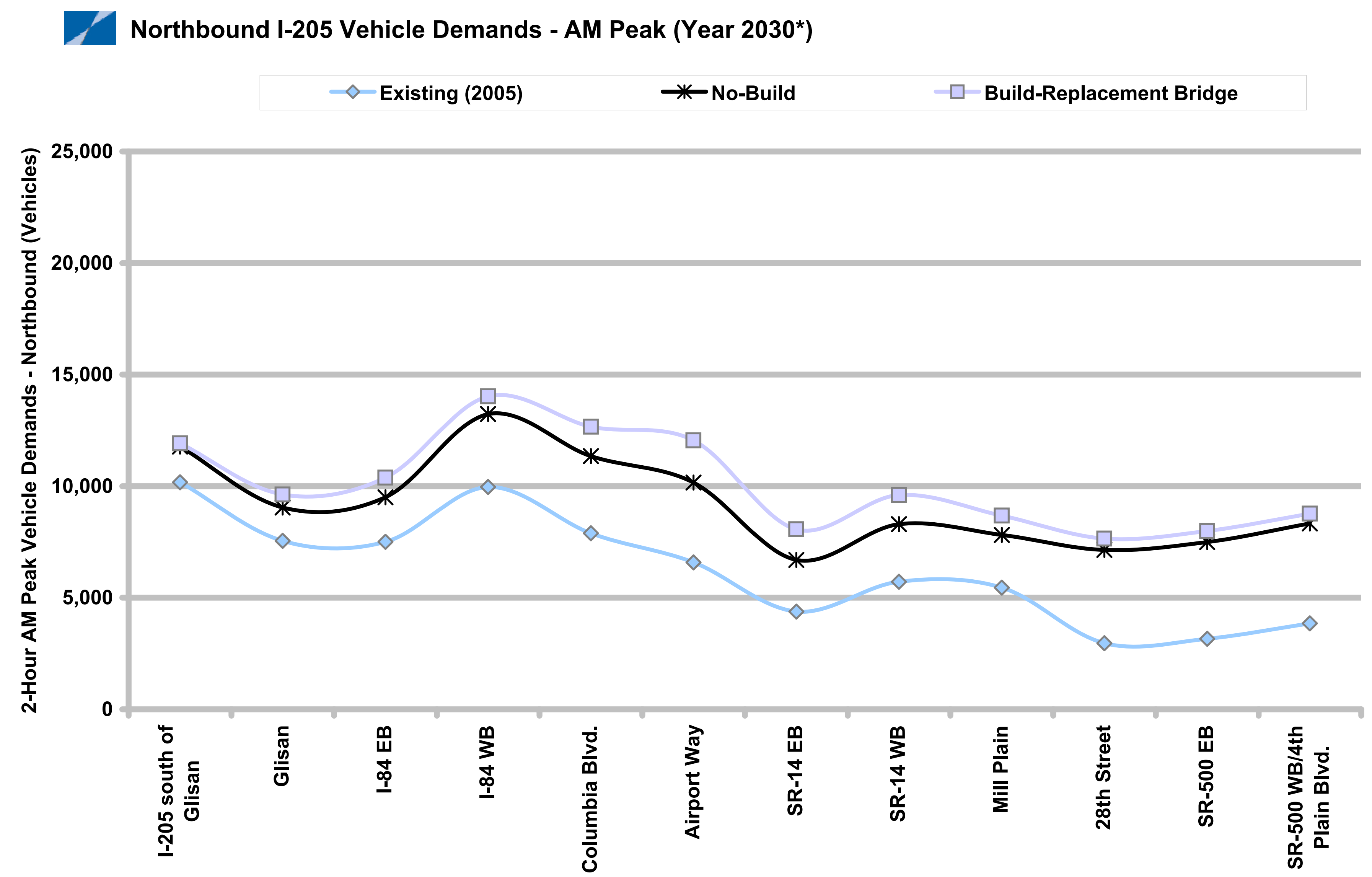
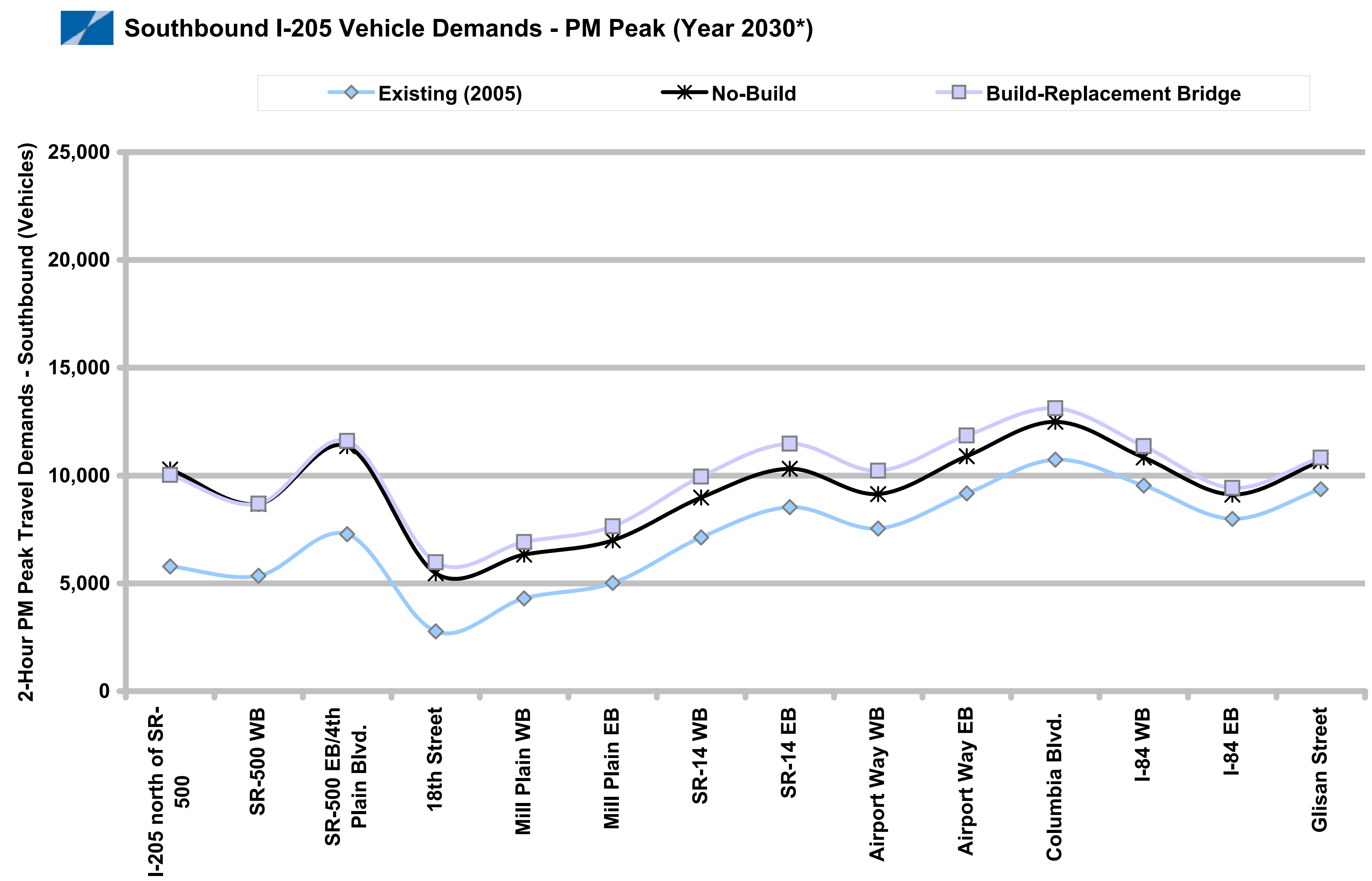

Southbound I-205 Vehicle Demands - AM Peak (Year 2030*)
Existing (2005)
No-Build
Build-Replacement Bridge
2-Hour AM Peak Vehicle Demands - Southbound (Vehicles)
25,000
20,000
15,000
10,000
5,000
0
I-205 north of SR-500
SR-500 WB
SR-500 EB/4th Plain Blvd.
18th Street
Mill Plain WB
Mill Plain EB
SR-14 WB
SR-14 EB
Airport Way WB
Airport Way EB
Columbia Blvd.
I-84 WB
I-84 EB
Glisan Street
*Except for Existing Conditions (Year 2005)

Exhibit 7-7



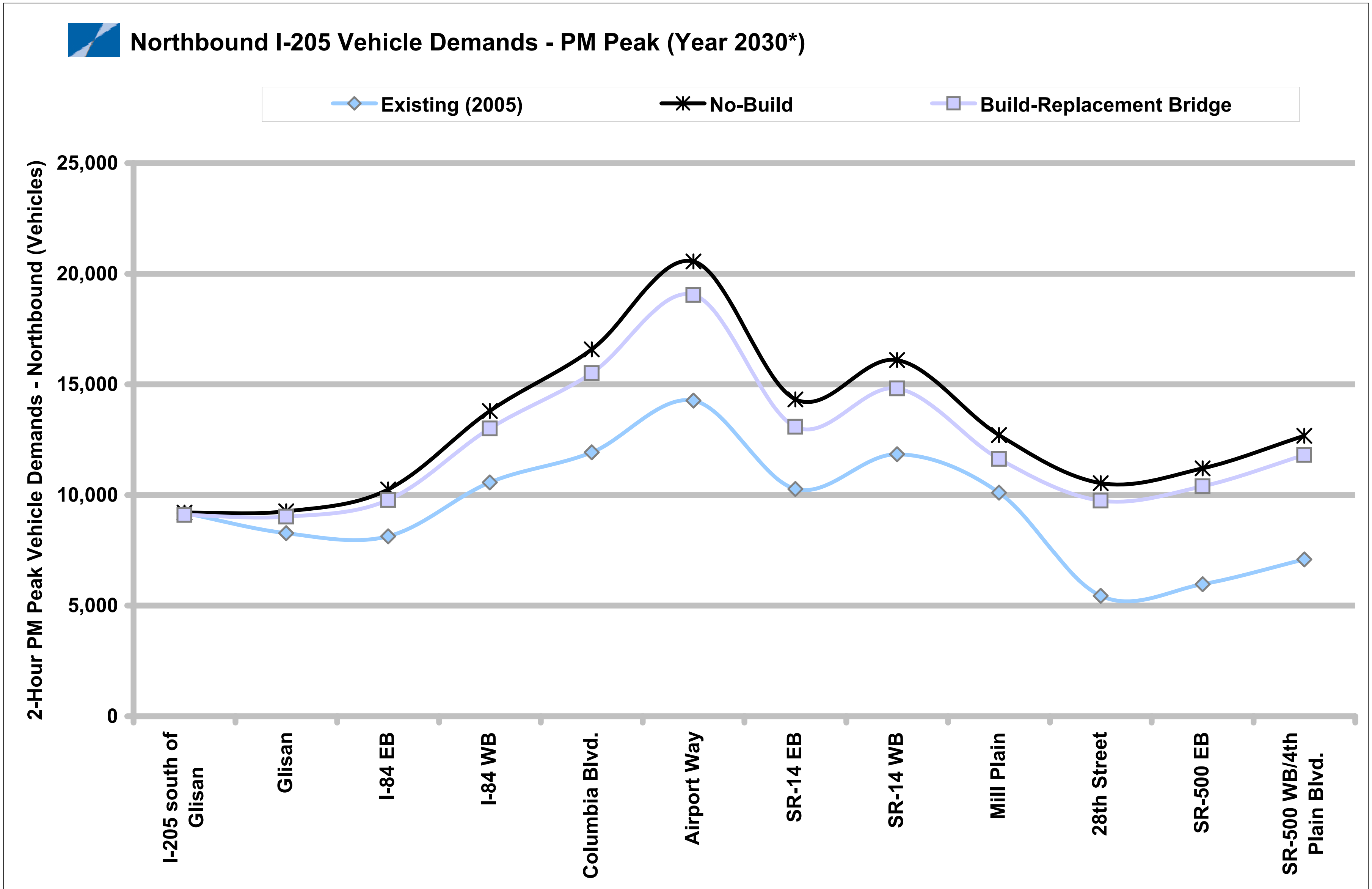
*Except for Existing Conditions (Year 2005)

Exhibit 7-8



*Except for Existing Conditions (Year 2005)

Exhibit 7-9



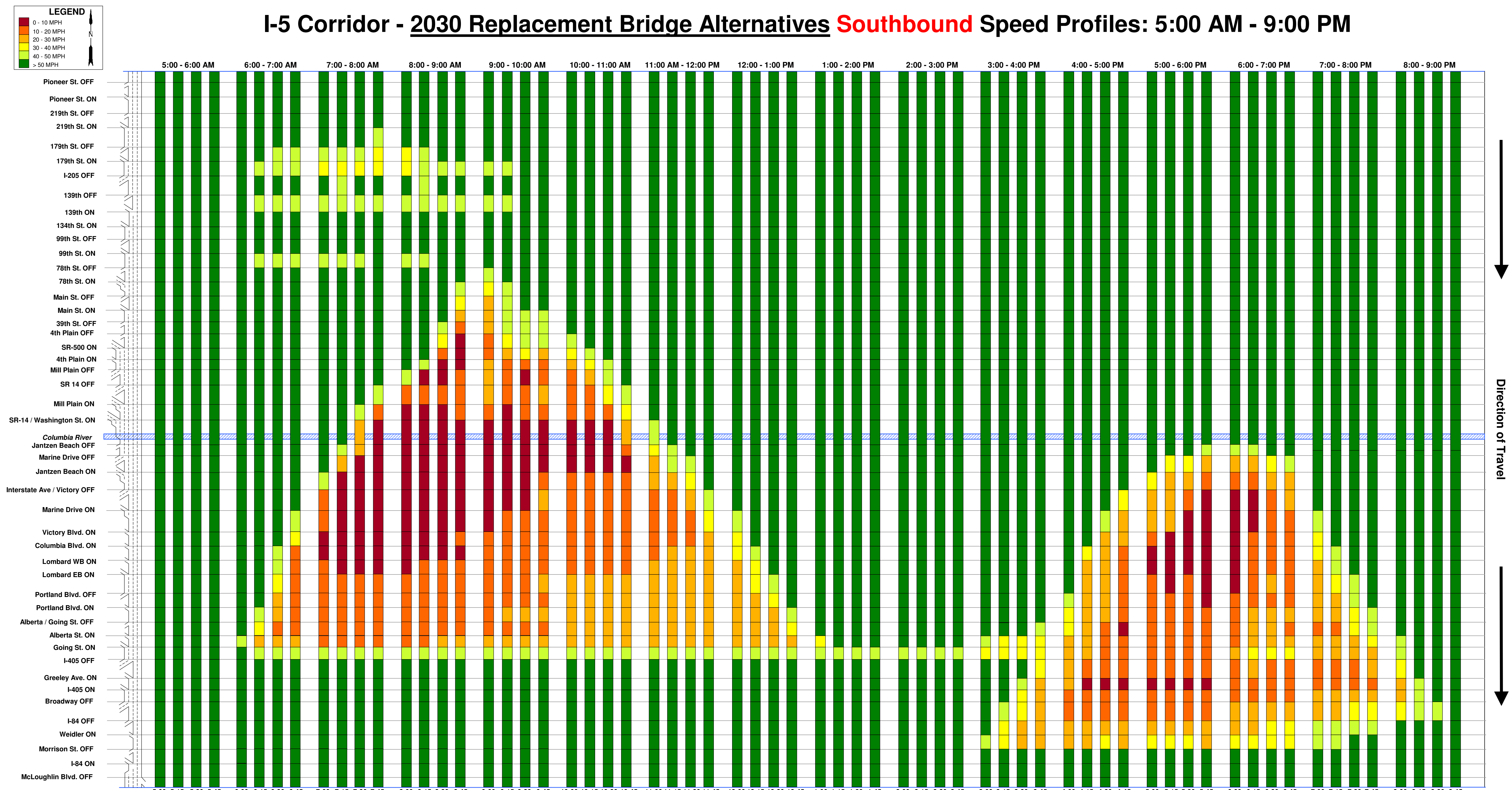
*Except for Existing Conditions (Year 2005)

Exhibit 7-10

Peak Period 2030 Truck Volume - Bridge Alternatives				
	No-Build		Replacement Bridge	
Hours	**Southbound**	**Northbound**	**Southbound**	**Northbound**
AM Peak Period 6 AM - 10 AM	1,140	2,195	1,175	1,960
Midday Peak Period 10 AM - 3 PM	3,525	2,900	3,505	3,225
PM Peak Period 3 PM - 7 PM	2,350	1,635	2,335	1,900
Night 7 PM - 6 AM	2,790	2,870	2,790	2,515
Daily Total	**9,805**	**9,600**	**9,805**	**9,600**
Number hours of congestion[1]	7.25	7.75	3.50	2.00
Number trucks traveling in congestion	2,220	3,075	1,275	770

Source: Portland/Vancouver International and Domestic Trade Capacity Analysis, 2006 and CRC Project, September 2007

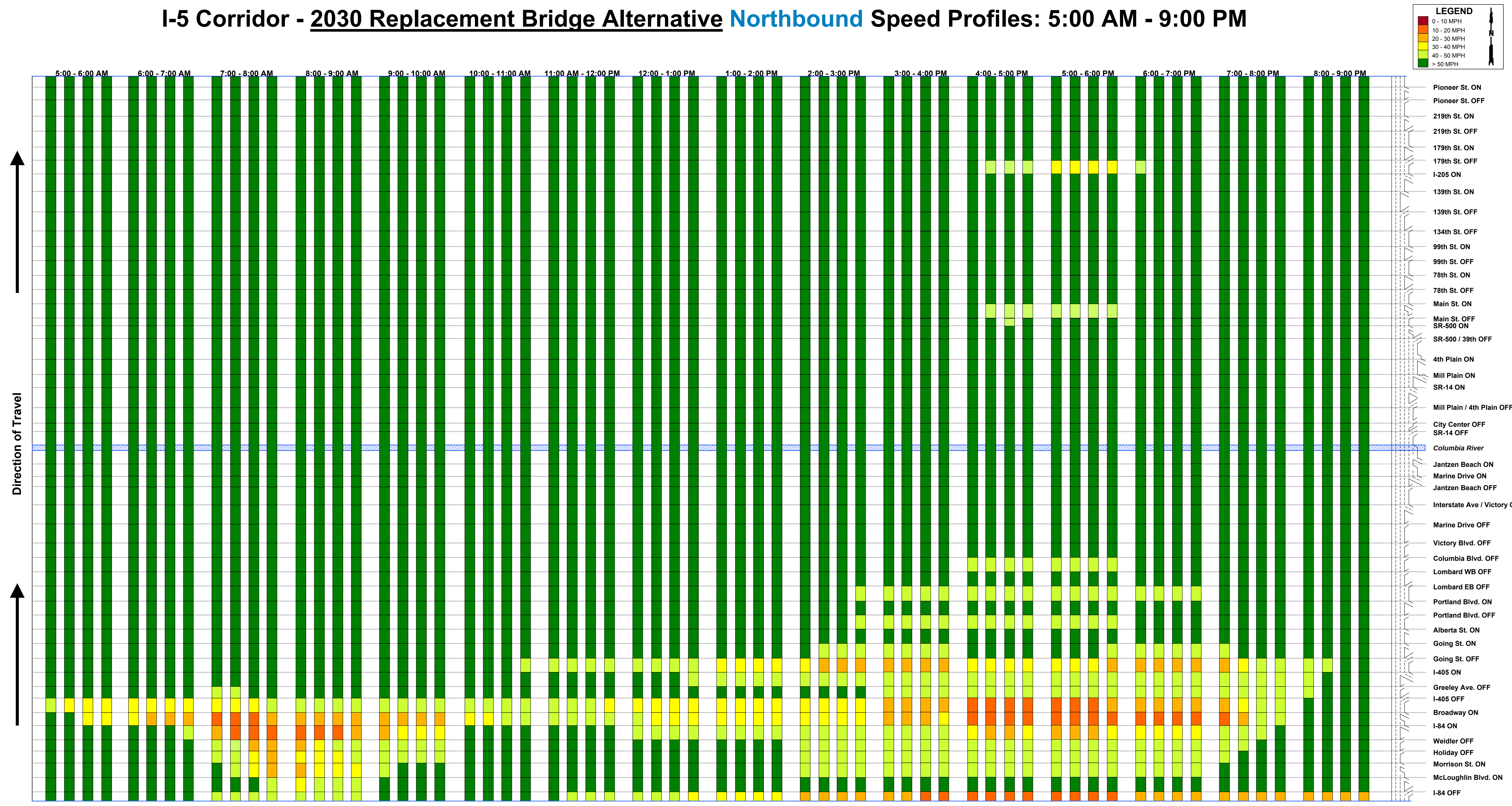
Exhibit 7-11



DRAFT as of 08-15-07

Exhibit 7-12

I-5 Corridor - 2030 Replacement Bridge Alternative Northbound Speed Profiles: 5:00 AM - 9:00 PM



DRAFT as of 08-15-07

Exhibit 7-13

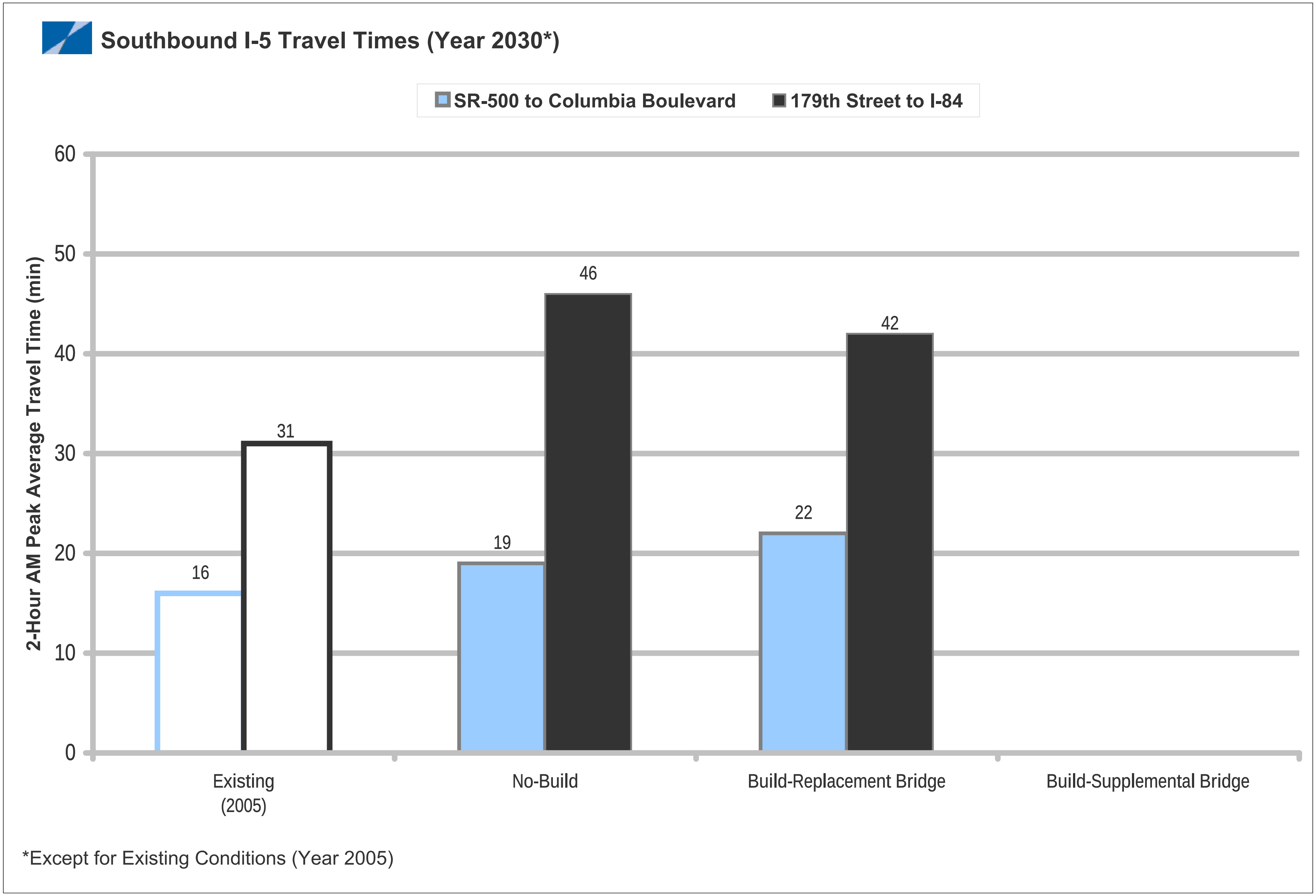
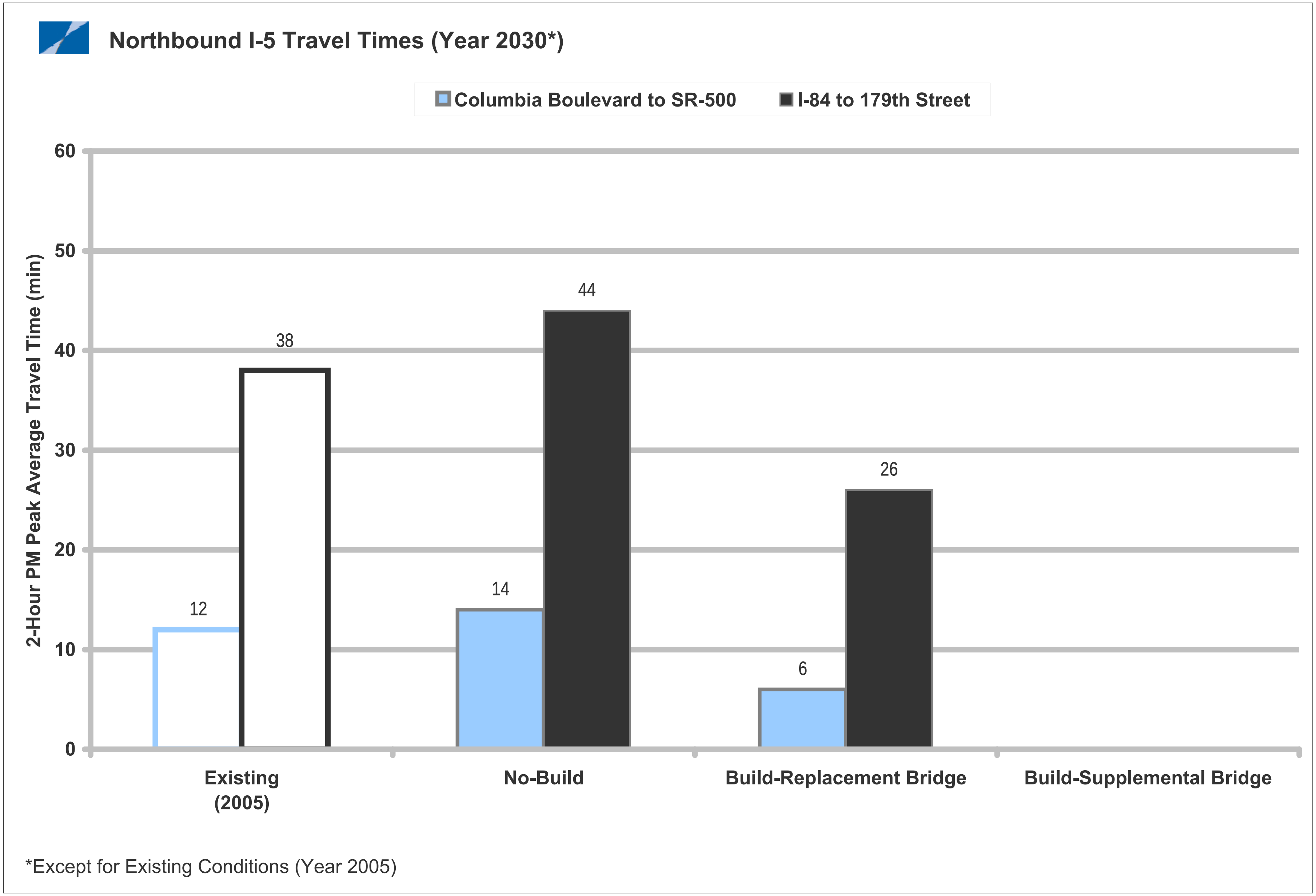

Southbound I-5 Travel Times (Year 2030*)
SR-500 to Columbia Boulevard
179th Street to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
16
31
19
46
22
42
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 7-14



Northbound I-5 Travel Times (Year 2030*)
Columbia Boulevard to SR-500
I-84 to 179th Street
2-Hour PM Peak Average Travel Time (min)
60
50
40
30
20
10
0
12
38
14
44
6
26
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 7-15

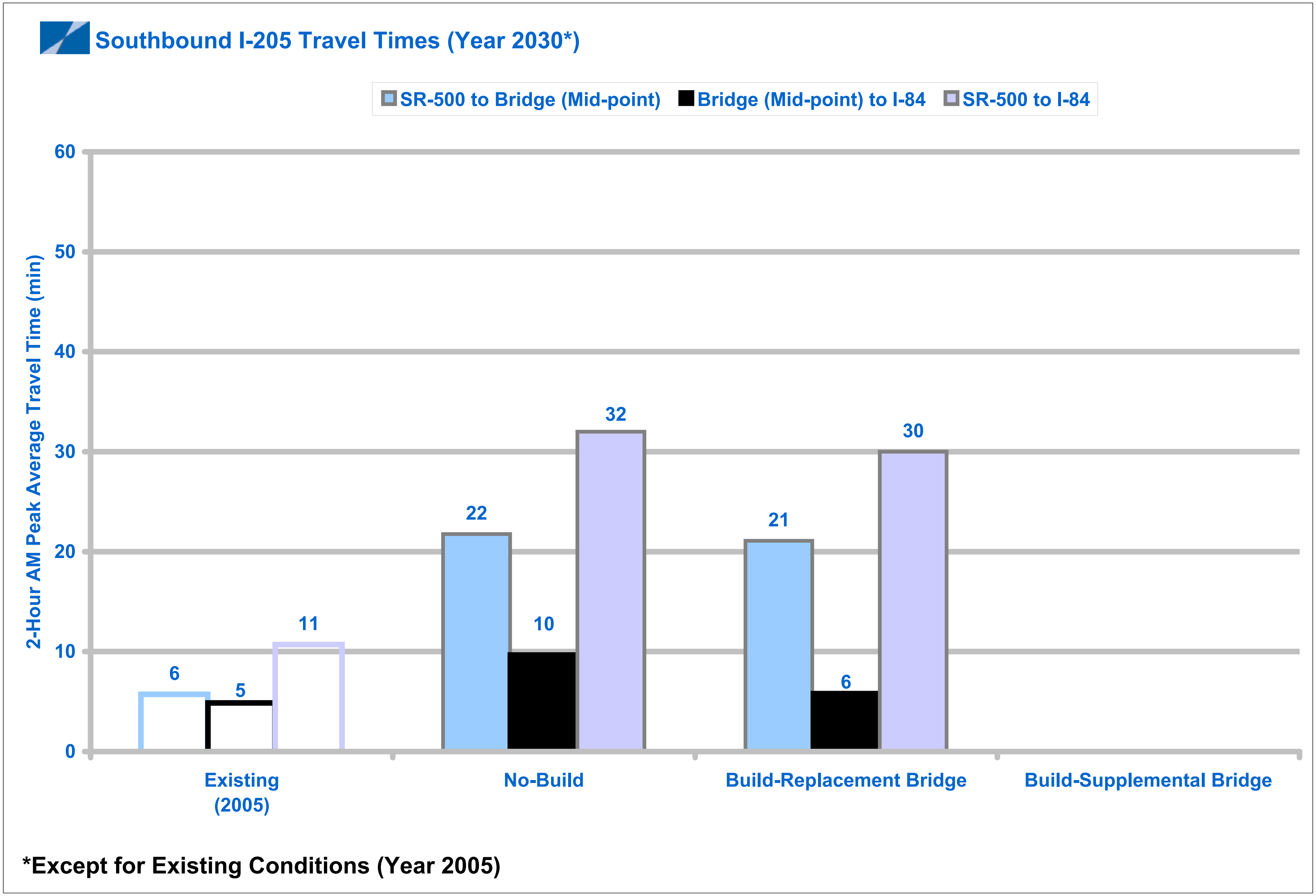
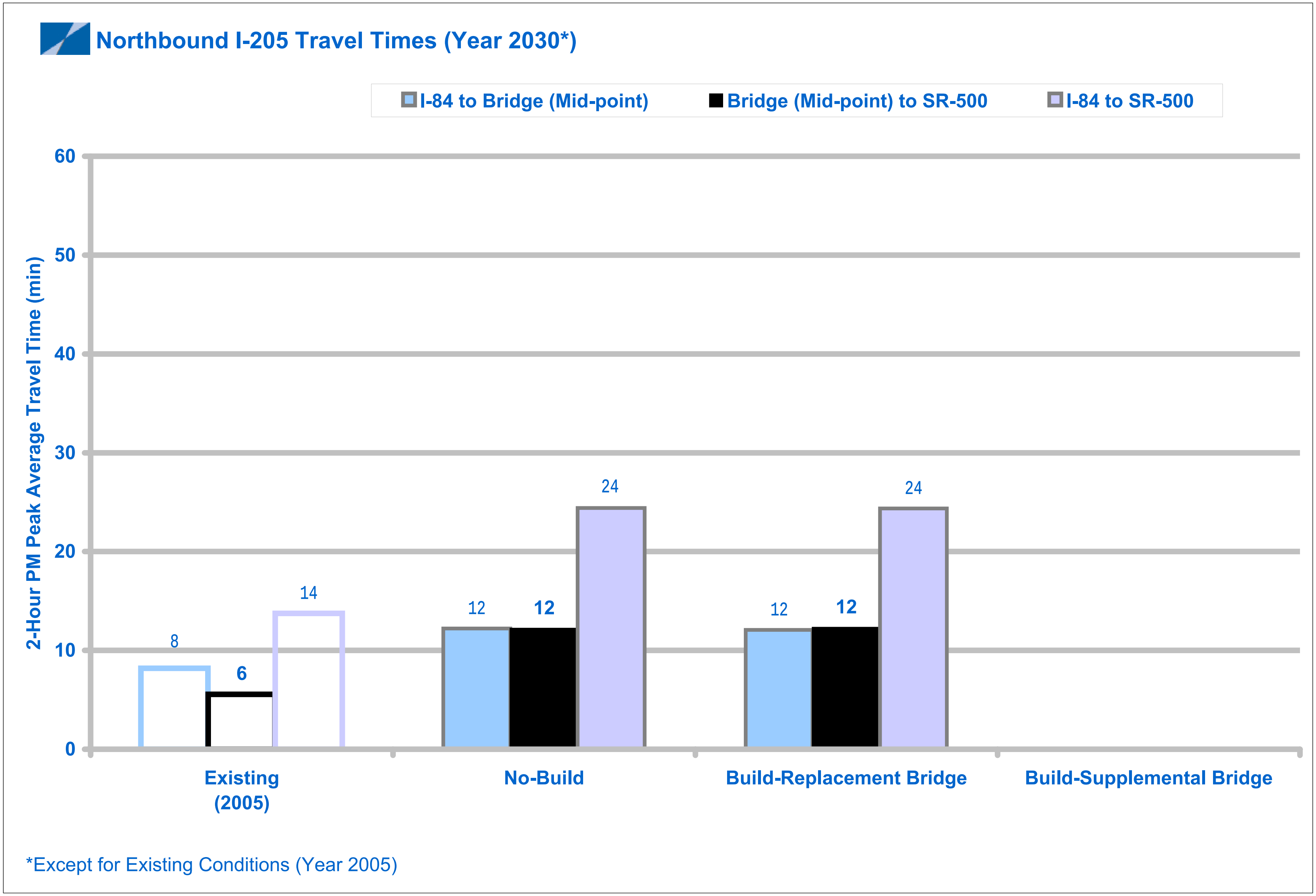

Southbound I-205 Travel Times (Year 2030*)
SR-500 to Bridge (Mid-point)
Bridge (Mid-point) to I-84
SR-500 to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
6
5
11
22
10
32
21
6
30
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 7-16



Northbound I-205 Travel Times (Year 2030*)
I-84 to Bridge (Mid-point)
Bridge (Mid-point) to SR-500
I-84 to SR-500
2-Hour PM Peak Average Travel Time (min)
60
50
40
30
20
10
0
8
6
14
12
12
24
12
12
24
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 7-17

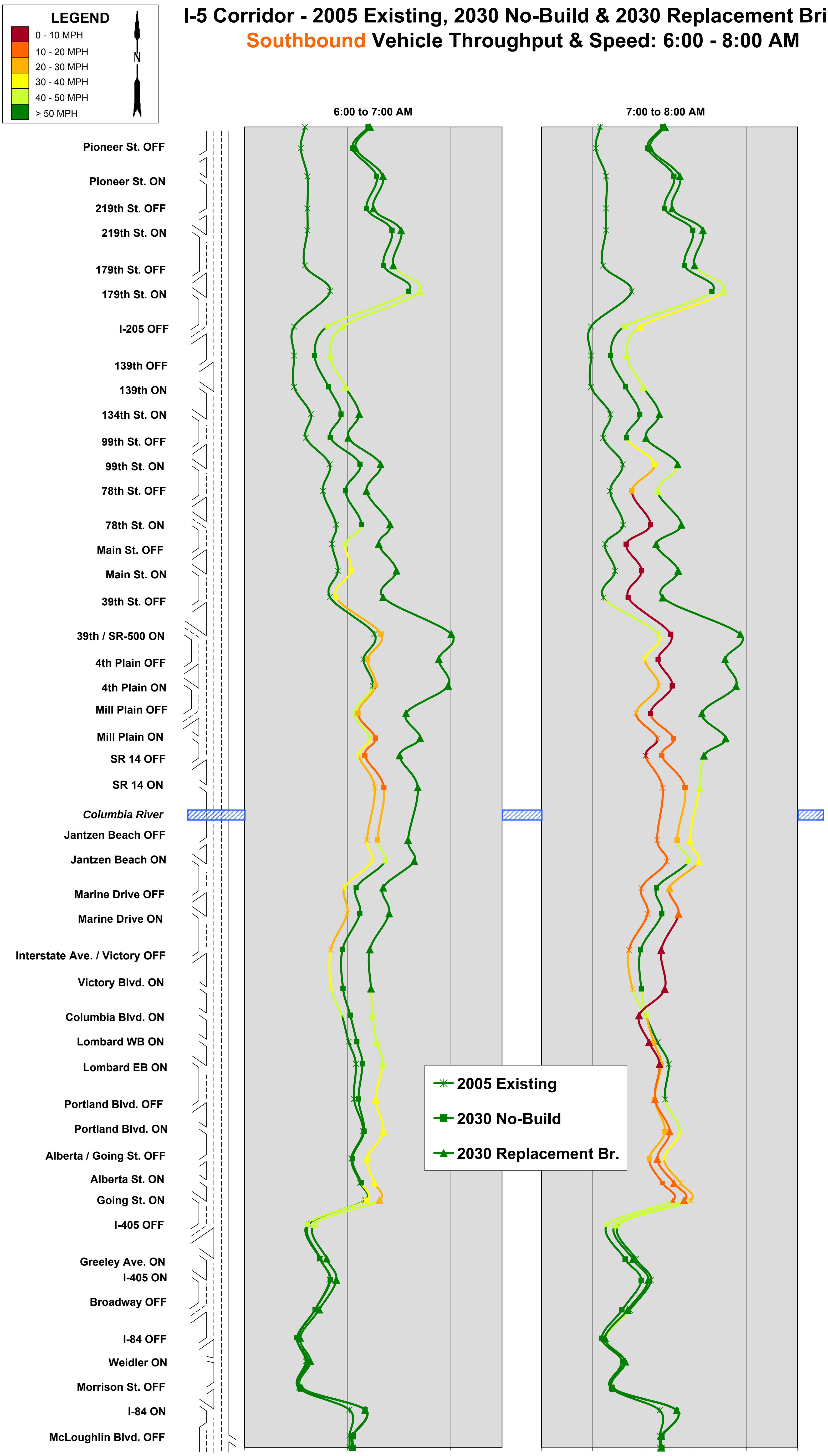


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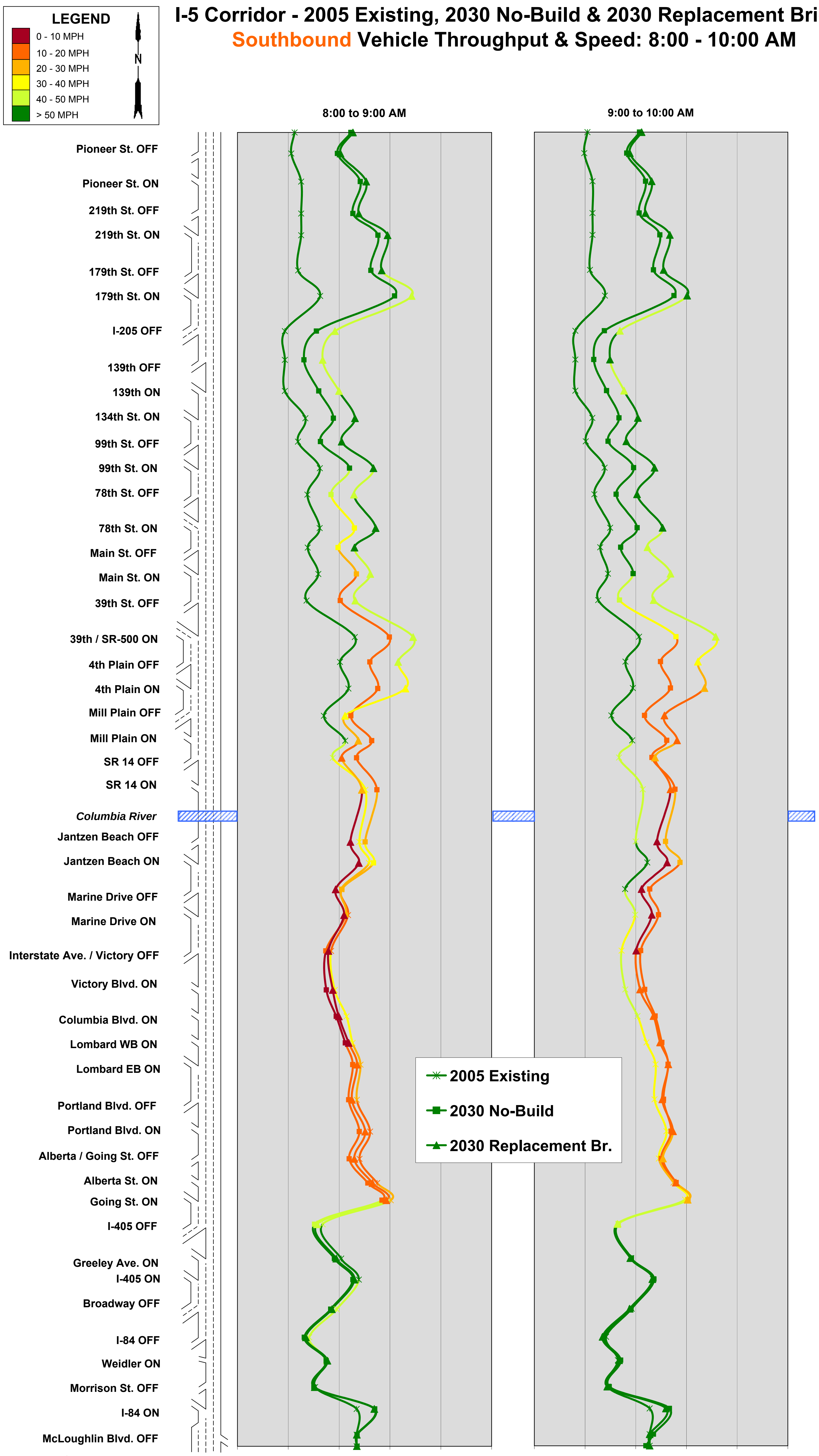
Exhibit 7-17 - continued



DRAFT as of 09-05-2007

Exhibit 7-18

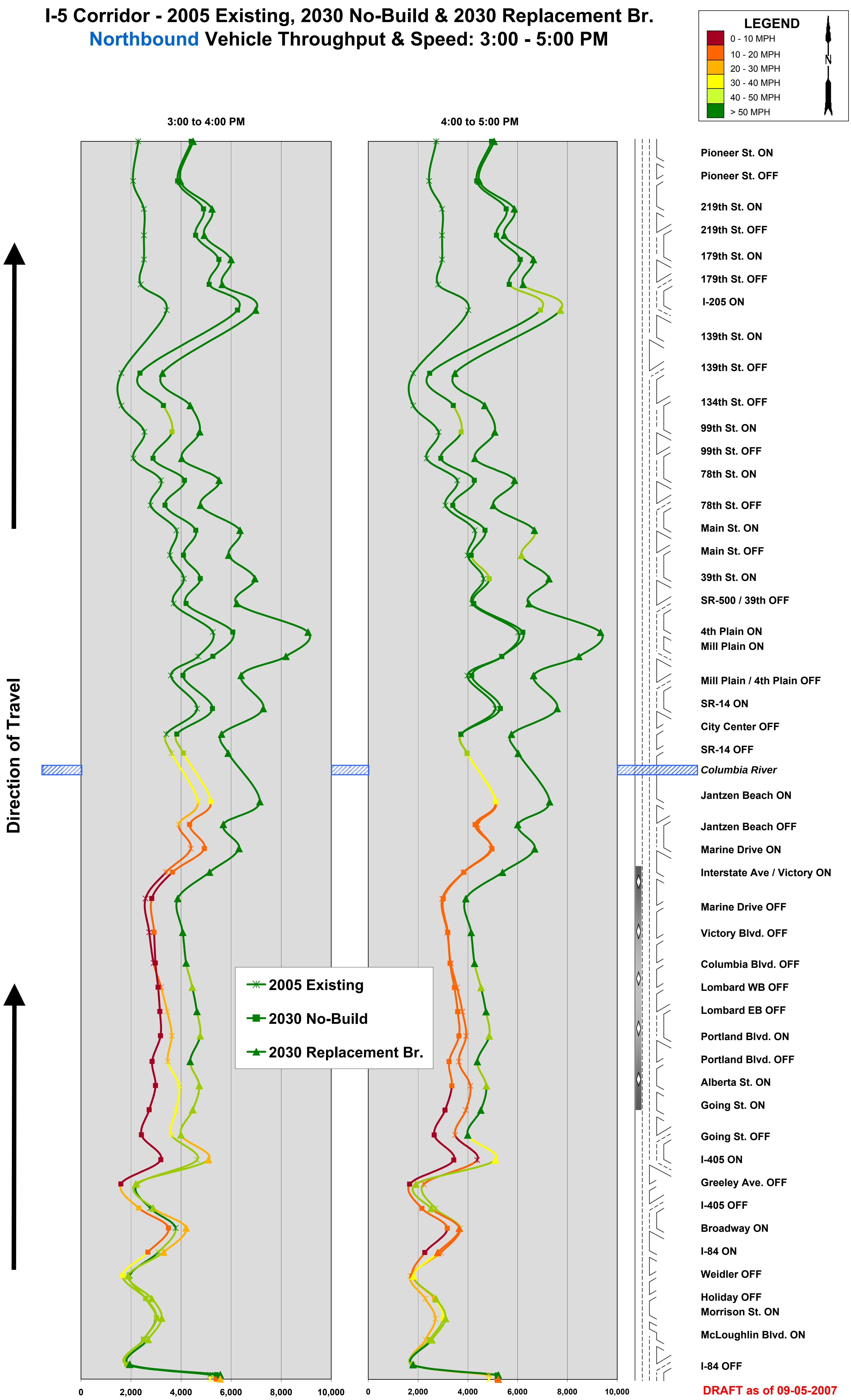


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Exhibit 7-18 - continued

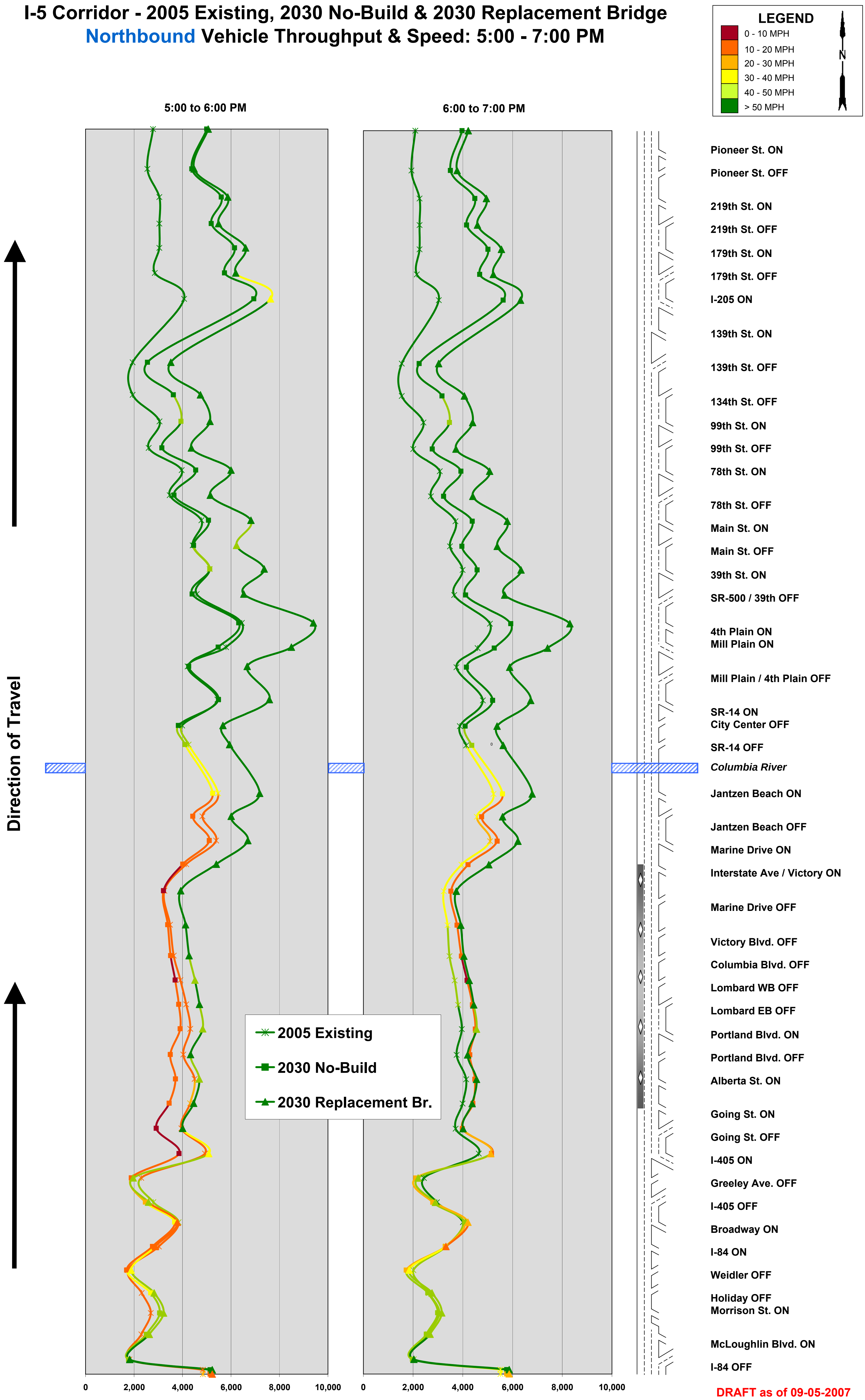


Exhibit 7-19

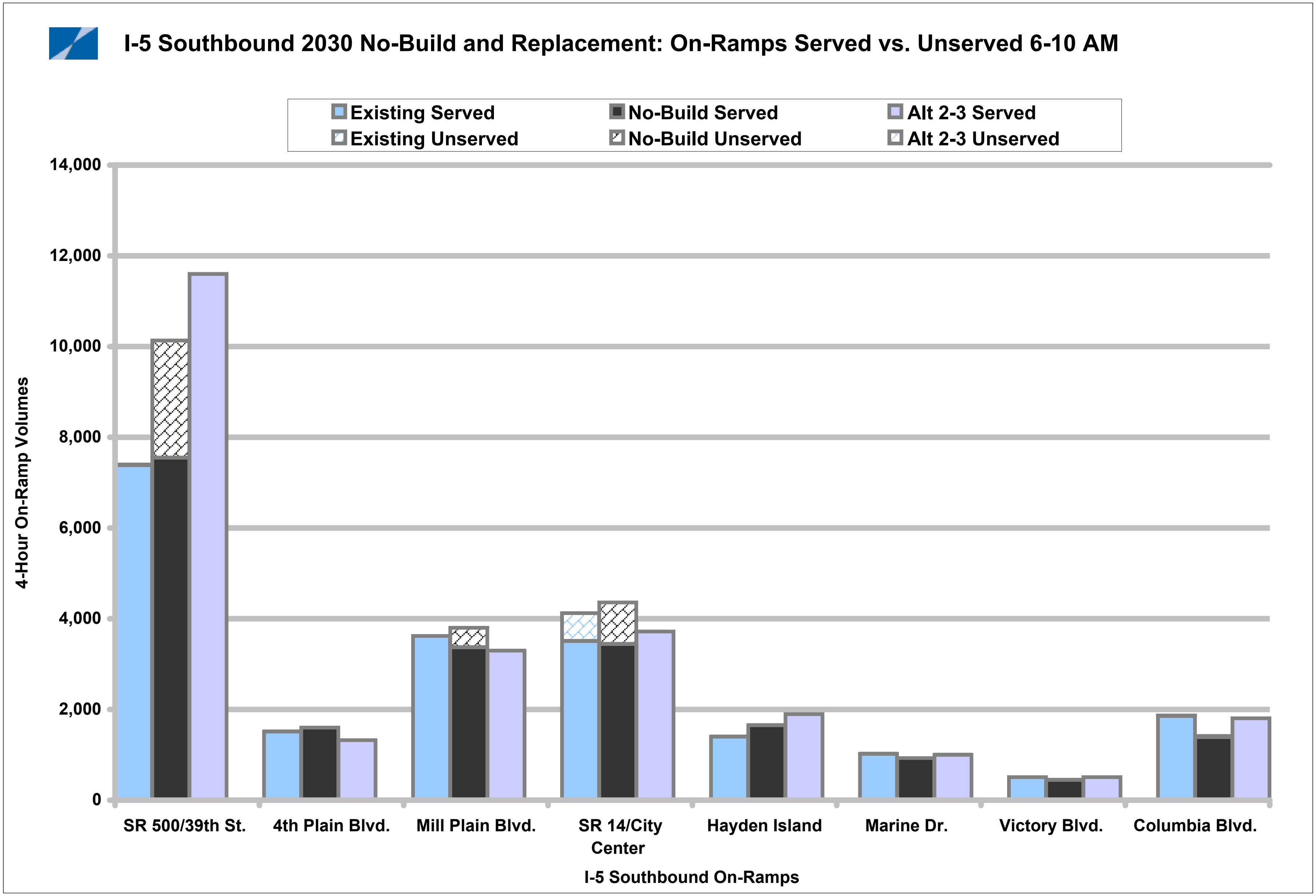

I-5 Southbound 2030 No-Build and Replacement: On-Ramps Served vs. Unserved 6-10 AM
Existing Served
Existing Unserved
No-Build Served
No-Build Unserved
Alt 2-3 Served
Alt 2-3 Unserved
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
4-Hour On-Ramp Volumes
SR 500/39th St.
4th Plain Blvd.
Mill Plain Blvd.
SR 14/City Center
Hayden Island
Marine Dr.
Victory Blvd.
Columbia Blvd.
I-5 Southbound On-Ramps

Exhibit 7-20

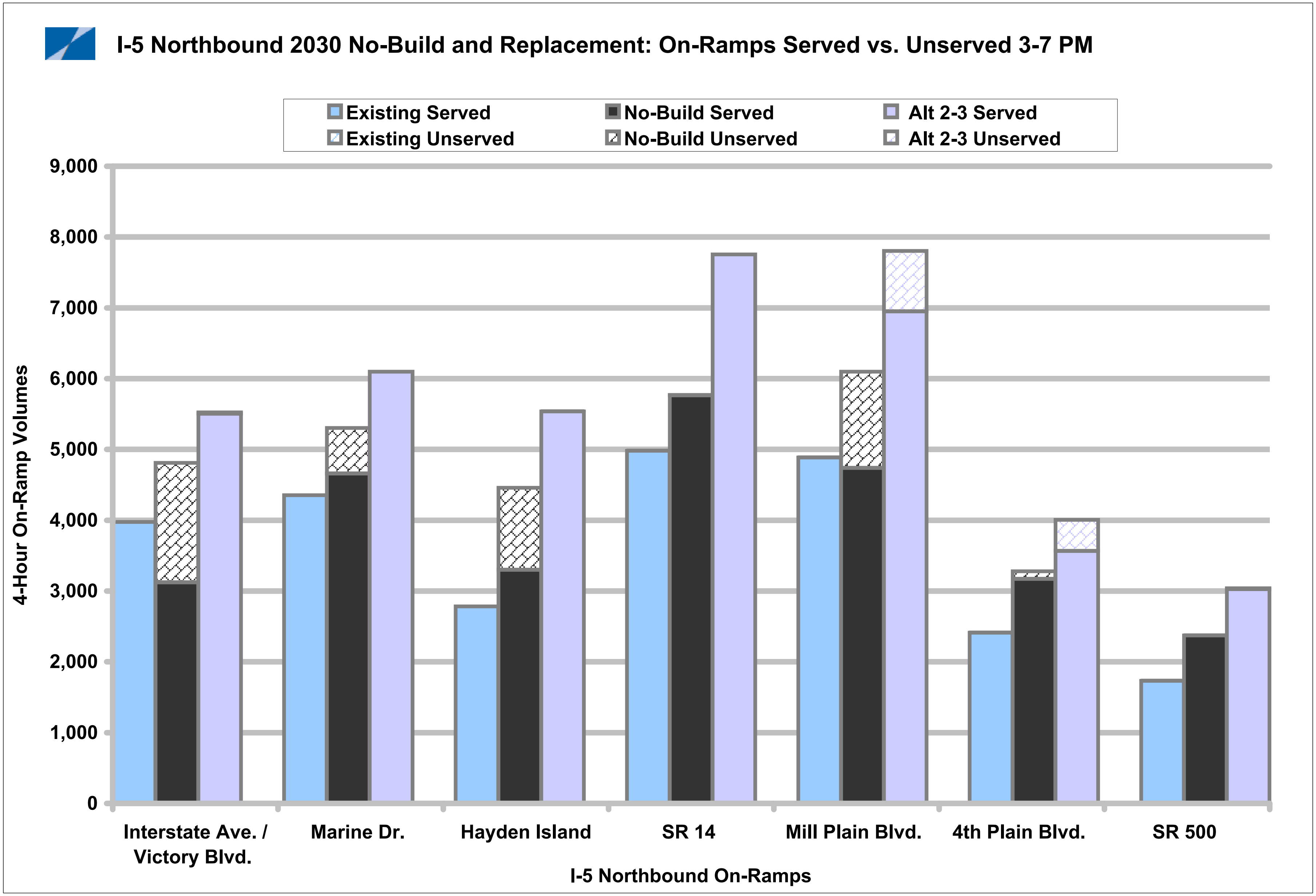
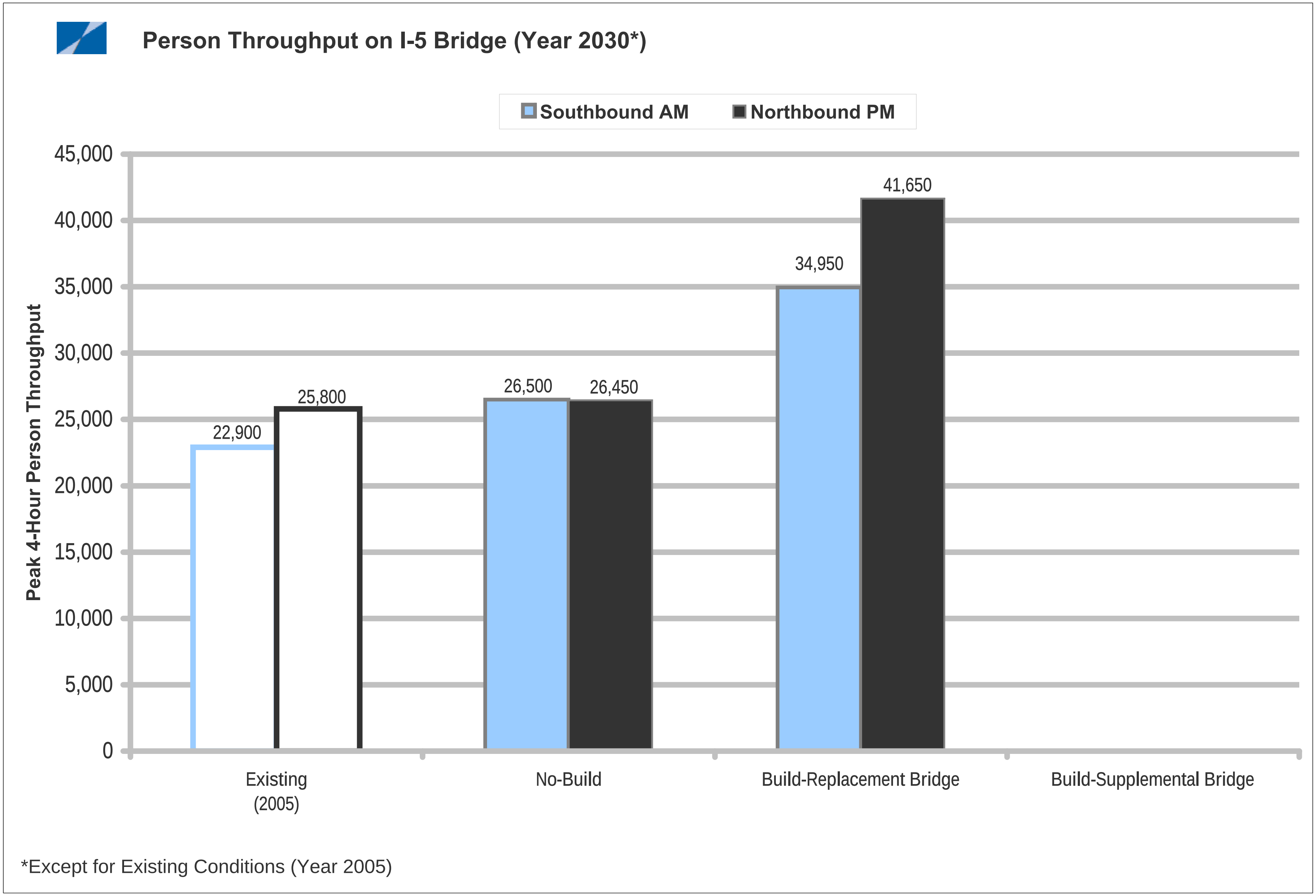

I-5 Northbound 2030 No-Build and Replacement: On-Ramps Served vs. Unserved 3-7 PM
Existing Served
Existing Unserved
No-Build Served
No-Build Unserved
Alt 2-3 Served
Alt 2-3 Unserved
4-Hour On-Ramp Volumes
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Interstate Ave. / Victory Blvd.
Marine Dr.
Hayden Island
SR 14
Mill Plain Blvd.
4th Plain Blvd.
SR 500
I-5 Northbound On-Ramps

Exhibit 7-21



Person Throughput on I-5 Bridge (Year 2030*)
Southbound AM
Northbound PM
Peak 4-Hour Person Throughput
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
22,900
25,800
26,500
26,450
34,950
41,650
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 7-22

Vancouver North-South Screenlines - AM Peak Hour Volumes			
Screenline	**No-Build**	**Replacement Bridge**	**Difference**
West of Franklin St			
Westbound Total	2,950	3,350	14%
Eastbound Total	2,200	2,350	7%
West of I-5			
Westbound Total	5,000	5,700	14%
Eastbound Total	3,800	4,150	9%
East of I-5			
Westbound Total	3,950	3,600	-9%
Eastbound Total	3,400	3,200	-6%

Vancouver East-West Screenlines - AM Peak Hour Volumes			
Screenline	**No-Build**	**Replacement Bridge**	**Difference**
North of Evergreen Blvd			
Southbound Total	1,800	1,900	6%
Northbound Total	1,350	1,250	-7%
North of 15th St			
Southbound Total	2,650	2,150	-19%
Northbound Total	650	750	15%
North of 4th Plain Blvd			
Southbound Total	2,750	1,900	-31%
Northbound Total	450	550	22%
North of 39th St			
Southbound Total	1,550	1,050	-32%
Northbound Total	350	750	114%

Exhibit 7-23

Vancouver North-South Screenlines - PM Peak Hour Volumes			
Screenline	**No-Build**	**Replacement Bridge**	**Difference**
West of Franklin St			
Westbound Total	2,600	3,000	15%
Eastbound Total	3,600	3,750	4%
West of I-5			
Westbound Total	4,450	4,900	10%
Eastbound Total	6,550	7,050	8%
East of I-5			
Westbound Total	3,550	3,850	8%
Eastbound Total	6,350	5,000	-21%

Vancouver East-West Screenlines - PM Peak Hour Volumes			
Screenline	**No-Build**	**Replacement Bridge**	**Difference**
North of Evergreen Blvd			
Southbound Total	1,350	1,400	4%
Northbound Total	2,300	2,100	-9%
North of 15th St			
Southbound Total	1,250	1,100	-12%
Northbound Total	1,700	1,450	-15%
North of 4th Plain Blvd			
Southbound Total	800	800	0%
Northbound Total	1,600	1,150	-28%
North of 39th St			
Southbound Total	650	1,000	54%
Northbound Total	1,200	1,000	-17%

Exhibit 7-24

Portland North-South Screenlines - AM Peak Hour Volumes			
Screenline	No-Build	Replacement Bridge	Difference
West of Denver Ave			
Westbound Total	4,600	4,550	-1%
Eastbound Total	3,550	3,550	0%
West of Vancouver Ave			
Westbound Total	3,800	3,700	-3%
Eastbound Total	3,100	3,450	11%
East of MLK Jr Blvd			
Westbound Total	4,550	4,500	-1%
Eastbound Total	3,100	3,300	6%

Portland East-West Screenlines - AM Peak Hour Volumes			
Screenline	No-Build	Replacement Bridge	Difference
Columbia Slough			
Southbound Total	1,800	1,700	-6%
Northbound Total	1,550	1,400	-10%
North of Portland Blvd			
Southbound Total	2,200	2,200	0%
Northbound Total	1,400	1,450	4%
South of Alberta St			
Southbound Total	3,800	3,750	-1%
Northbound Total	2,500	2,050	-18%

Exhibit 7-25

Portland North-South Screenlines - PM Peak Hour Volumes			
Screenline	**No-Build**	**Replacement Bridge**	**Difference**
West of Denver Ave			
Westbound Total	3,550	3,600	1%
Eastbound Total	5,550	5,350	-4%
West of Vancouver Ave			
Westbound Total	3,550	3,600	1%
Eastbound Total	3,800	3,600	-5%
East of MLK Jr Blvd			
Westbound Total	3,800	3,700	-3%
Eastbound Total	4,750	4,600	-3%

Portland East-West Screenlines - PM Peak Hour Volumes			
Screenline	**No-Build**	**Replacement Bridge**	**Difference**
Columbia Slough			
Southbound Total	1,850	1,750	-5%
Northbound Total	2,050	2,150	5%
North of Portland Blvd			
Southbound Total	2,400	2,200	-8%
Northbound Total	2,900	3,050	5%
South of Alberta St			
Southbound Total	3,350	2,850	-15%
Northbound Total	4,750	4,650	-2%

Exhibit 7-26

Applicable Local Street Intersection Performance Criteria for Build Alternatives

Vancouver Intersection Performance Criteria			
No-Build	**Build Alternatives**	**Determination**	**Mitigation?**
LOS E or better ≤ 80 seconds[1]	LOS E or better ≤ 80 seconds	No project impact	No
LOS E or better ≤ 80 seconds	LOS F > 80 seconds	Significant project-related impact	**Yes**
LOS F > 80 and ≤ 100 seconds	LOS E or better ≤ 80 seconds	Project-related benefit	No
LOS F > 80 and ≤ 100 seconds[2]	LOS F > 80 and ≤ 100 seconds	No project impact if delay within established range is lower under build alternative	No
LOS F > 80 and ≤ 100 seconds[2]	LOS F > 80 and ≤ 100 seconds	Significant project-related impact if delay within established range is at least 10 seconds higher	**Yes**
LOS F > 100 seconds[3]	LOS F < 100 seconds	Project-related benefit	No
LOS F > 100 seconds	LOS F > 100 seconds	No project impact	No

Portland Intersection Performance Criteria			
No-Build	**Build Alternatives**	**Determination**	**Mitigation?**
LOS D or better ≤ 55 seconds	LOS D or better ≤ 55 seconds	No project impact	No
LOS D or better ≤ 55 seconds	LOS E or worse > 55 seconds	Significant project-related impact	**Yes**
LOS E ≤ 80 seconds	LOS E ≤ 80 seconds	Significant project-related impact if delay within established range is at least 10 seconds higher under build alternative	**Yes**
LOS F > 80 seconds	LOS E or better ≤ 80 seconds	Project-related benefit	No
LOS F > 80 seconds[2]	LOS F > 80 seconds	No project impact	No
V/C ≤ 0.85[4] or ≤ 0.99[5]	V/C > 0.85[4] or > 0.99[5]	Significant project-related impact	**Yes**
V/C ≤ 0.85[4] or ≤ 0.99[5]	V/C ≤ 0.85[4] or ≤ 0.99[5]	No project impact	No

(1) Refers to average delay per vehicle entering the intersection.

(2) LOS F gradations not established within this range.

(3) Assumed level of delay at which point motorists would change route, travel mode, or time of day for trip.

(4) A V/C ratio of 0.85 is used for ramp terminals in all scenarios.

(5) A V/C ratio of 0.99 is used for ODOT intersections that are not ramp terminals in all scenarios.

Exhibit 7-27

BRT Vancouver Alignment Park-and-Ride Trip Generation								
	Trip	Parking	AM Peak Hour Trip Generation			PM Peak Hour Trip Generation		
Park-and-Ride Lot	**Type**	**Spaces**	**Arrivals**	**Departures**	**Total**	**Arrivals**	**Departures**	**Total**
Kiggins Bowl	Park-and-Ride	150	85	0	**85**	0	75	**75**
	Kiss-and-Ride	0	0	0	**0**	0	0	**0**
	Total	150	85	0	**85**	0	75	**75**
Lincoln	Park-and-Ride	1,800	790	0	**790**	0	630	**630**
	Kiss-and-Ride	0	200	200	**400**	270	270	**540**
	Total	1,800	990	200	**1,190**	270	900	**1,170**
Clark College	Park-and-Ride	460	255	0	**255**	0	230	**230**
	Kiss-and-Ride	0	0	0	**0**	0	0	**0**
	Total	460	255	0	**255**	0	230	**230**
Total	**Park-and-Ride**	**2,410**	**1,130**	**0**	**1,130**	**0**	**935**	**935**
	Kiss-and-Ride	**0**	**200**	**200**	**400**	**270**	**270**	**540**
	Total	**2,410**	**1,330**	**200**	**1,530**	**270**	**1,205**	**1,475**

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Exhibit 7-28

Vancouver Intersection Performance Results

AM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 2 - BRT Vancouver Alignment)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Eastbound Left	5.9	A	0.01	LOS E	Y	-	-	Southbound Left/Right	14.8	B	0.48	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Eastbound Left	5.3	A	0.06	LOS E	Y	-	-	Southbound Thru/Right	8.5	A	0.56	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Eastbound Left/Right	5.2	A	0.05	LOS E	Y	-	-	***Overall Intersection***	29.6	C	0.78	LOS E	Y	100	150 (WBL)
																205	225 (WBT)
																150	250 (WBR)
																100	150 (SBL)
*	SR 14 and Main Street									***Overall Intersection***	11.4	B	0.59	LOS E	Y	100	150 (SBL)
*	3rd/4th St. @ Esther St.	Westbound Left/Right	4.2	A	0.12	LOS E	Y	-	-	Westbound Left/Right	9.1	A	0.44	LOS E	Y	-	-
02	4th St. @ Columbia St.	Northbound Thru/Right	0.4	A	0.11	LOS E	Y	-	-								
03	4th St. @ Washington St.	Eastbound Right	2.8	A	0.04	LOS E	Y	-	-								
04	5th St. @ Columbia St.	Southbound Left	53.8	F	0.16	LOS E	N	90	100 (SBL)	Westbound Left/Right	> 100	F	0.61	LOS E	N	200	200 (WBLR)
								210	225 (SBT)								
05	5th St. @ Washington St.	***Overall Intersection***	49.2	D	0.44	LOS E	Y	185	200 (EBR to I-5)	Southbound Right	42.2	D	0.06	LOS E	Y	-	-
								210	225 (SBL)								
								210	225 (SBT)								
*	5th St. @ Main St.									***Overall Intersection***	7.3	A	0.66	LOS E	Y	175	175 (SBLTR)
06	6th St. @ Columbia St.	***Overall Intersection***	26.5	C	0.47	LOS E	Y	185	225 (WBL)	***Overall Intersection***	15.2	B	0.91	LOS E	Y	75	125 (NBL)
																205	225 (NBTR)
07	6th St. @ Washington St.	***Overall Intersection***	61.6	E	0.49	LOS E	Y	220	225 (WBLT)	***Overall Intersection***	17.3	B	0.78	LOS E	Y	210	225 (EBLTR)
								490	500 (SBT)							195	200 (NBTR)
08	6th St. @ Main St.	Westbound Left/Thru/Right	27.9	D	0.87	LOS E	Y	230	250 (WBLT)	Eastbound Left/Thru/Right	29.5	D	1.20	LOS E	Y	205	225 (EBLTR)
09	6th St. @ Broadway	Southbound Right	32.1	D	0.44	LOS E	Y	-	-								
10	6th St. @ C St.	Northbound Left/Thru	79.0	F	-	LOS E	N	850	850 (NBLT)								
11	8th St. @ Esther St.	Southbound Left/Thru/Right	8.7	A	0.31	LOS E	Y	-	-	Northbound Left/Thru/Right	7.5	A	0.40	LOS E	Y	-	-
12	8th St. @ Columbia St.	***Overall Intersection***	15.4	B	0.98	LOS E	Y	195	200 (WBLTR)	***Overall Intersection***	14.2	B	0.96	LOS E	Y	-	-
13	8th St. @ Washington St.	***Overall Intersection***	25.4	C	0.59	LOS E	Y	100	125 (WBL)	***Overall Intersection***	9.1	A	0.71	LOS E	Y	-	-
								205	225 (SBLT)								
14	8th St. @ Main St.	***Overall Intersection***	12.6	B	0.71	LOS E	Y	-	-	***Overall Intersection***	12.1	B	0.58	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left/Thru/Right	10.7	B	-	LOS E	Y	-	-	Southbound Left/Thru/Right	8.6	A	1.16	LOS E	Y	-	-
16	8th St. @ C St.	***Overall Intersection***	16.5	B	0.58	LOS E	Y	-	-	***Overall Intersection***	13.8	B	0.53	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	4.4	A	0.08	LOS E	Y	-	-	Westbound Left/Thru/Right	6.3	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Westbound Left/Thru/Right	7.8	A	0.19	LOS E	Y	-	-	Westbound Left/Thru/Right	17.3	C	0.12	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Left	67.4	F	0.06	LOS E	N	-	-	***Overall Intersection***	5.2	A	0.40	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	5.9	A	0.07	LOS E	Y	-	-	Eastbound Left/Thru/Right	6.8	A	0.20	LOS E	Y	-	-
21	9th St. @ Broadway	Eastbound Left/Right	4.8	A	0.05	LOS E	Y	-	-	Eastbound Left/Right	3.6	A	0.06	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Northbound Left/Thru/Right	7.8	A	0.18	LOS E	Y	-	-	Northbound Left/Thru/Right	12.5	B	0.43	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	***Overall Intersection***	15.3	B	0.73	LOS E	Y	205	225 (WBTR)	***Overall Intersection***	18.6	B	0.92	LOS E	Y	225	225 (WBTR)
																100	150 (NBL)
																220	225 (NBTR)
																205	225 (SBTR)
24	Evergreen Blvd. @ Washington St.	***Overall Intersection***	22.9	C	0.61	LOS E	Y	75	100 (WBL)	***Overall Intersection***	9.2	A	0.57	LOS E	Y	-	-
								210	225 (SBTR)								
25	Evergreen Blvd. @ Main St.	***Overall Intersection***	17.0	B	0.77	LOS E	Y	220	225 (WBLTR)	***Overall Intersection***	13.6	B	0.80	LOS E	Y	210	225 (SBLTR)
26	Evergreen Blvd. @ Broadway	***Overall Intersection***	15.8	B	0.78	LOS E	Y	75	125 (WBL)	***Overall Intersection***	12.9	B	0.81	LOS E	Y	210	225 (SBLTR)
								210	225 (WBTR)								
27	Evergreen Blvd. @ C St.	***Overall Intersection***	15.7	B	0.68	LOS E	Y	-	-	***Overall Intersection***	13.3	B	0.84	LOS E	Y	-	-
28	11th St. @ Esther St.	Southbound Left/Thru/Right	4.7	A	0.06	LOS E	Y	-	-	Northbound Left/Thru/Right	5.0	A	0.17	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	12.1	B	0.42	LOS E	Y	-	-	Westbound Left/Thru/Right	13.3	B	0.34	LOS E	Y	-	-
30	11th St. @ Washington St.	Westbound Left/Thru	26.2	C	0.38	LOS E	Y	-	-	***Overall Intersection***	8.2	A	0.38	LOS E	Y	-	-
31	11th St. @ Main St.	Westbound Left/Thru/Right	14.1	B	0.23	LOS E	Y	-	-	Westbound Left/Thru/Right	8.9	A	0.38	LOS E	Y	-	-
32	11th St. @ Broadway	Westbound Left/Thru/Right	8.6	A	0.20	LOS E	Y	-	-	Eastbound Left/Thru/Right	12.3	B	0.33	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	6.4	A	0.26	LOS E	Y	-	-	Eastbound Left/Thru/Right	5.6	A	0.20	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	***Overall Intersection***	18.9	B	0.82	LOS E	Y	75	150 (SBL)	***Overall Intersection***	> 100	F	1.20	LOS E	N	810	825 (EBLTR)
								210	225 (SBT)							150	225 (NBR)
																75	150 (SBL)
																210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	***Overall Intersection***	7.8	A	0.49	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.47	LOS E	N	220	225 (EBLTR)
																205	225 (SBT)
36	Mill Plain Blvd. @ Main St.	***Overall Intersection***	13.1	B	1.10	LOS E	Y	70	150 (SBL)	***Overall Intersection***	70.7	E	1.14	LOS E	Y	205	225 (EBLTR)
								210	225 (SBT)							70	150 (SBL)
																210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	***Overall Intersection***	10.3	B	0.90	LOS E	Y	70	75 (SBL)	***Overall Intersection***	73.9	E	1.05	LOS E	Y	210	225 (EBTR)
								200	200 (SBT)							70	150 (SBL)
																200	200 (SBT)
38	Mill Plain Blvd. @ C St.	***Overall Intersection***	6.5	A	0.43	LOS E	Y	-	-	***Overall Intersection***	75.1	E	0.63	LOS E	Y	200	200 (EBLTR)
																195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	15.3	B	0.78	LOS E	Y	275	350 (WBL)	Southbound Right	> 100	F	0.00	LOS E	N	255	1175 (SBR)
																350	375 (EBR)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps									***Overall Intersection***	> 100	F	0.65	LOS E	N	775	950 (EBL)
																265	1425 (NBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	36.3	D	0.88	LOS E	Y	75	125 (WBR)	Northbound Right	> 100	F	0.00	LOS E	N	430	675 (NBR)
								590	600 (NBLT)								
								325	500 (NBR)								
41	15th St. @ Columbia St.	***Overall Intersection***	24.9	C	0.82	LOS E	Y	-	-	***Overall Intersection***	63.5	E	1.20	LOS E	Y	225	225 (WBLTR)
																700	700 (SBTR)
42	15th St. @ Washington St.	***Overall Intersection***	11.6	B	0.58	LOS E	Y	-	-	***Overall Intersection***	23.7	C	0.71	LOS E	Y	205	300 (WBL)
																205	225 (WBT)
43	15th St. @ Main St.	***Overall Intersection***	23.4	C	1.10	LOS E	Y	195	200 (WBLT)	***Overall Intersection***	65.2	E	1.14	LOS E	Y	190	200 (WBLTR)
																760	775 (SBTR)
44	15th St. @ Broadway	***Overall Intersection***	20.5	C	0.90	LOS E	Y	205	225 (WBLT)	***Overall Intersection***	86.2	F	1.05	LOS E	N	200	200 (WBLTR)
																775	875 (SBT)
45	15th St. @ C St.	***Overall Intersection***	13.5	B	0.59	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.75	LOS E	N	995	1000 (WBLTR)
46	McLoughlin Blvd. @ Columbia St.	***Overall Intersection***	14.6	B	0.82	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.80	LOS E	N	1365	1375 (SBLTR)
47	McLoughlin Blvd. @ Main St.	***Overall Intersection***	21.9	C	0.91	LOS E	Y	-	-	***Overall Intersection***	> 100	F	1.06	LOS E	N	215	225 (WBLTR)
																1355	1375 (SBLTR)
48	McLoughlin Blvd. @ Broadway	***Overall Intersection***	22.5	C	0.69	LOS E	Y	75	125 (WBL)	***Overall Intersection***	55.2	E	0.73	LOS E	Y	215	225 (EBLTR)
								105	125 (WBR)							75	125 (WBL)
49	McLoughlin Blvd. @ Fort Vancouver Way	***Overall Intersection***	12.3	B	0.50	LOS D	Y	-	-	***Overall Intersection***	13.0	B	0.48	LOS D	Y	-	-
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	17.7	C	0.07	LOS E	Y	-	-	Westbound Left/Thru/Right	29.2	D	0.10	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	8.9	A	0.09	LOS E	Y	-	-	Eastbound Left/Right	> 100	F	0.09	LOS E	N	425	425 (SBTR)
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	33.3	C	0.83	LOS D	Y	150	175 (WBL)	***Overall Intersection***	41.1	D	0.72	LOS D	Y	150	200 (WBL)
								75	100 (SBL)								
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	43.9	D	0.87	LOS D	Y	170	225 (WBL)	***Overall Intersection***	94.4	F	0.88	LOS D	N	645	775 (WBL)
								195	200 (WBT)							195	200 (WBTR)
								75	125 (SBL)							75	100 (NBR)
								470	475 (SBTR)							75	125 (SBL)
																475	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	0.80	LOS D	N	195	200 (EBLT)	***Overall Intersection***	> 100	F	0.57	LOS D	Y**	490	500 (WBTR)
								125	150 (WBL)							190	200 (SBLTR)
								495	500 (WBT)								
								440	450 (SBLTR)								
55	4th Plain Blvd. @ F St.	***Overall Intersection***	21.3	C	0.58	LOS D	Y	150	150 (EBT)	***Overall Intersection***	27.1	C	0.68	LOS D	Y	150	150 (EBT)
																550	550 (WBTR)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	23.4	C	0.69	LOS D	Y	200	275 (EBL)	***Overall Intersection***	49.4	D	0.73	LOS D	Y	200	250 (EBL)
																1045	1050 (WBT)
																1045	1050 (WBR)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	19.5	B	0.61	LOS D	Y	75	125 (WBR)	***Overall Intersection***	14.4	B	0.47	LOS D	Y	75	150 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	7.0	A	0.01	LOS E	Y	-	-	Southbound Right	44.2	E	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	19.8	B	0.51	LOS D	Y	-	-	***Overall Intersection***	14.0	B	0.49	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.18	LOS E	N	215	275 (EBL)	Eastbound Left/Thru/Right	74.1	F	0.09	LOS E	Y*	-	-
																230	250 (SBTR)
61	28th St. @ Broadway	Westbound Left	23.6	C	0.32	LOS E	Y	-	-								
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	1000	1000 (SBTR)	***Overall Intersection***	33.3	C	0.59	LOS D	Y	725	725 (SBTR)
63	33rd St. @ Main St.	***Overall Intersection***	51.0	D	0.83	LOS D	Y	50	75 (EBL)	***Overall Intersection***	76.9	E	0.75	LOS D	N	50	75 (EBL)
								50	100 (WBL)							50	75 (WBL)
								75	125 (NBL)							75	100 (SBL)
								75	125 (SBL)							770	775 (SBTR)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.06	LOS D	N	75	125 (EBL)	***Overall Intersection***	68.4	E	0.91	LOS D	Y**	275	425 (EBL)
								1310	1325 (EBTR)							1305	1325 (EBTR)
								75	150 (WBL)							75	125 (WBL)
								215	225 (WBTR)							215	225 (WBTR)
								75	125 (NBL)							75	125 (NBL)
								125	200 (SBL)								
								360	375 (SBT)								
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.18	LOS E	N	305	325 (NBLR)	Southbound Left/Thru/Right	> 100	F	0.02	LOS E	Y**	-	-
								50	75 (WBL)							435	450 (WBTR)
								430	450 (WBTR)								
								325	400 (SBLR)								
66	39th St. @ H St.	***Overall Intersection***	39.7	D	0.74	LOS D	Y	430	450 (EBTR)	***Overall Intersection***	57.6	E	0.84	LOS E	Y	435	450 (EBTR)
								135	150 (WBTR)							140	150 (WBTR)
																310	325 (SBLTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.67	LOS D	N	135	150 (EBT)	***Overall Intersection***	42.1	D	0.80	LOS D	Y	55	100 (EBR)
								55	125 (EBR)							275	350 (WBL)
								715	725 (WBT)							730	750 (WBT)
								1660	1700 (NBL)								
								125	275 (NBR)								
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.88	LOS D	N	1170	1175 (WBTR)	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1335	1350 (WBT)
								790	800 (NBLT)							790	800 (NBL)
								75	100 (NBR)								
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	> 100	F	0.66	LOS D	N	150	225 (SBL)	***Overall Intersection***	9.3	A	0.50	LOS D	Y	100	125 (NBL)
								1170	1175 (SBT)							100	150 (SBL)
*	P&R North @ Main St.									***Overall Intersection***	11.0	B	0.59	LOS D	Y	-	-
70	45th St. @ Main St.	***Overall Intersection***	41.1	D	0.74	LOS D	Y	260	275 (SBT)	***Overall Intersection***	10.1	B	0.61	LOS D	Y	105	125 (SBTR)
*	Kiggins P&R @ Main St.									Southbound Thru	6.3	A	0.44	LOS E	Y	-	-
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	> 100	F	0.80	LOS D	N	2105	2125 (SB - F/I-5)	***Overall Intersection***	26.8	C	0.72	LOS D	Y	1570	950 (SBLTR)
								1570	1575 (SB - F/Main)								
72	Ross St. @ Main St.	***Overall Intersection***	> 100	F	0.53	LOS D	N	60	100 (WBL)	***Overall Intersection***	12.2	B	0.65	LOS D	Y	60	100 (WBL)
								225	275 (SBL)								
								1290	1600 (SBT)								
73	Ross St. @ North Rd.	Northbound Left/Thru	> 100	F	0.57	LOS E	N	-	-	Northbound Left/Thru	8.6	A	0.54	LOS E	Y	-	-

Delay / LOS affected by freeway congestion
Intersection queuing spills back into upstream intersection
Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.
* Intersection not modeled in existing conditions scenario
Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y** Intersection operations are no worse than No-Build, and no mitigation is required.

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Exhibit 7-29

Vancouver Intersection Performance Results

PM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 2 - BRT Vancouver Alignment)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Eastbound Left	6.3	A	0.08	LOS E	Y	-	-	Southbound Left/Right	14.0	B	0.60	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Eastbound Left	7.0	A	0.10	LOS E	Y	-	-	Southbound Left/Right	10.1	B	0.70	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Eastbound Left/Right	7.4	A	0.17	LOS E	Y	-	-	*Overall Intersection*	39.7	D	0.60	LOS E	Y	100	125 (WBL)
																100	150 (SBL)
																430	450 (SBTR)
																150	175 (WBR)
*	SR 14 and Main Street									*Overall Intersection*	39.3	D	0.85	LOS E	Y	100	150 (SBL)
*	3rd/4th St. @ Esther St.	Southbound Left/Thru	2.9	A	0.01	LOS E	Y	-	-	Southbound Left/Thru	1.6	A	0.03	LOS E	Y	-	-
02	4th St. @ Columbia St.	Northbound Thru/Right	0.9	A	0.25	LOS E	Y	-	-								
03	4th St. @ Washington St.	Eastbound Right	2.6	A	0.02	LOS E	Y	-	-								
04	5th St. @ Columbia St.	Southbound Left	15.7	C	0.43	LOS E	Y	90	150 (SBL)	Westbound Left/Right	> 100	F	0.69	LOS E	N	200	275 (WBLR)
																205	225 (SBT)
05	5th St. @ Washington St.	*Overall Intersection*	18.3	B	0.54	LOS E	Y	180	225 (EBR to SR-14)	Southbound Right	73.5	F	0.07	LOS E	N	194	225 (SBR)
								210	225 (SBT)								
*	5th St. @ Main St.									*Overall Intersection*	13.9	B	0.63	LOS E	Y	175	175 (SBLT)
06	6th St. @ Columbia St.	*Overall Intersection*	25.1	C	0.75	LOS E	Y	75	100 (SBL)	*Overall Intersection*	64.5	E	0.82	LOS E	Y	210	250 (WBL)
																205	225 (NBTR)
																75	100 (SBL)
07	6th St. @ Washington St.	*Overall Intersection*	30.5	C	0.59	LOS E	Y	220	225 (WBLT)	*Overall Intersection*	24.5	C	0.49	LOS E	Y	-	-
08	6th St. @ Main St.	Westbound Left/Thru/Right	11.4	B	0.48	LOS E	Y	-	-	Southbound Left/Thru/Right	21.2	C	0.67	LOS E	Y	207	225 (EBLTR)
09	6th St. @ Broadway	Southbound Right	5.6	A	0.27	LOS E	Y	-	-								
10	6th St. @ C St.	Northbound Left/Thru	4.6	A	0.74	LOS E	Y	-	-								
11	8th St. @ Esther St.	Northbound Left/Thru/Right	> 100	F	0.64	LOS E	N	-	-	Eastbound Left/Thru/Right	11.8	B	0.01	LOS E	Y	-	-
12	8th St. @ Columbia St.	*Overall Intersection*	51.4	D	1.22	LOS E	Y	500	500 (EBLTR)	*Overall Intersection*	51.1	D	1.00	LOS E	Y	75	125 (EBL)
								215	225 (SBLTR)							220	225 (WBLTR)
																150	175 (NBL)
																495	500 (NBTR)
																500	500 (EBTR)
																75	125 (SBL)
																210	225 (SBTR)
13	8th St. @ Washington St.	*Overall Intersection*	19.0	B	0.60	LOS E	Y	100	125 (WBL)	*Overall Intersection*	17.0	B	0.80	LOS E	Y	220	300 (EBLTR)
14	8th St. @ Main St.	*Overall Intersection*	18.9	B	0.66	LOS E	Y	-	-	*Overall Intersection*	25.1	C	0.89	LOS E	Y	210	225 (EBLTR)
																205	225 (SBLTR)
15	8th St. @ Broadway	Southbound Left/Thru/Right	12.1	B	0.54	LOS E	Y	-	-	Southbound Left/Thru/Right	25.4	D	1.27	LOS E	Y	-	-
16	8th St. @ C St.	*Overall Intersection*	20.6	C	0.48	LOS E	Y	-	-	*Overall Intersection*	18.2	B	0.87	LOS E	Y	215	225 (EBLR)
17	9th St. @ Esther St.	Eastbound Left/Thru/Right	97.0	F	0.03	LOS E	N	-	-	Northbound Left/Thru/Right	3.4	A	0.01	LOS E	Y	-	-
18	9th St. @ Columbia St.	Eastbound Left/Thru/Right	82.7	F	0.24	LOS E	N	-	-	Northbound Left/Thru/Right	11.7	B	0.01	LOS E	Y	210	225 (NBLTR)
																220	225 (SBLTR)
19	9th St. @ Washington St.	Westbound Thru	15.4	C	0.11	LOS E	Y	-	-	*Overall Intersection*	11.4	B	0.38	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	8.9	A	0.06	LOS E	Y	-	-	Eastbound Left/Thru/Right	30.9	D	0.58	LOS E	Y	-	-
21	9th St. @ Broadway	Northbound Left/Thru	9.3	A	0.25	LOS E	Y	-	-	Northbound Left/Thru	4.6	A	0.02	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Southbound Left/Thru/Right	9.5	A	0.18	LOS E	Y	-	-	Eastbound Left/Thru/Right	47.0	E	0.01	LOS E	Y	535	550 (EBLTR)
23	Evergreen Blvd. @ Columbia St.	*Overall Intersection*	21.1	C	0.73	LOS E	Y	100	125 (EBL)	*Overall Intersection*	56.5	E	0.85	LOS E	Y	100	150 (EBL)
																510	525 (EBTR)
																220	225 (NBTR)
																100	125 (SBL)
																205	225 (SBTR)
24	Evergreen Blvd. @ Washington St.	*Overall Intersection*	13.5	B	0.65	LOS E	Y	75	100 (WBL)	*Overall Intersection*	12.1	B	0.78	LOS E	Y	225	225 (EBLTR)
25	Evergreen Blvd. @ Main St.	*Overall Intersection*	17.8	B	0.67	LOS E	Y	215	225 (NBLTR)	*Overall Intersection*	32.2	C	0.78	LOS E	Y	210	275 (EBLTR)
																220	225 (WBLTR)
																215	225 (NBLTR)
																210	225 (SBLTR)
26	Evergreen Blvd. @ Broadway	*Overall Intersection*	20.3	C	0.64	LOS E	Y	220	225 (NBLTR)	*Overall Intersection*	17.0	B	0.73	LOS E	Y	75	125 (WBL)
																220	225 (NBLTR)
27	Evergreen Blvd. @ C St.	*Overall Intersection*	34.7	C	0.75	LOS E	Y	75	125 (EBL)	*Overall Intersection*	57.6	E	1.12	LOS E	Y	210	225 (SBLTR)
28	11th St. @ Esther St.	Northbound Left/Thru/Right	6.0	A	0.15	LOS E	Y	-	-	Northbound Left/Thru/Right	8.5	A	0.12	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	28.9	D	0.54	LOS E	Y	-	-	Eastbound Left/Thru/Right	26.3	D	1.03	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	40.8	E	0.24	LOS E	Y	-	-	*Overall Intersection*	11.3	B	0.40	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Left/Thru/Right	81.7	F	0.20	LOS E	N	-	-	Eastbound Left/Thru/Right	28.4	D	1.06	LOS E	Y	-	-
32	11th St. @ Broadway	Westbound Left/Thru/Right	> 100	F	0.43	LOS E	N	215	225 (WBLTR)	Eastbound Left/Thru/Right	10.5	B	0.49	LOS E	Y	-	-
								210	225 (NBLTR)								
33	11th St. @ C St.	Westbound Right	> 100	F	0.32	LOS E	N	205	225 (WBTR)	Southbound Left/Thru/Right	48.3	E	0.00	LOS E	Y	-	-
								215	225 (NBT)								
34	Mill Plain Blvd. @ Columbia St.	*Overall Intersection*	> 100	F	0.78	LOS E	N	810	825 (EBLTR)	*Overall Intersection*	> 100	F	1.18	LOS E	Y**	810	825 (EBLTR)
								150	250 (NBR)							150	200 (NBR)
								75	125 (SBL)							75	100 (SBL)
								210	225 (SBT)							210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	*Overall Intersection*	68.7	E	0.59	LOS E	Y	215	225 (EBTR)	*Overall Intersection*	23.1	C	0.61	LOS E	Y	235	250 (EBLTR)
								210	225 (SBT)							95	100 (NBTR)
36	Mill Plain Blvd. @ Main St.	*Overall Intersection*	> 100	F	1.22	LOS E	N	210	225 (EBT)	*Overall Intersection*	91.5	F	1.23	LOS E	Y*	205	225 (EBLTR)
								765	775 (NBTR)							370	375 (NBTR)
								70	100 (SBL)							70	150 (SBL)
																210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	*Overall Intersection*	85.8	F	0.85	LOS E	N	210	225 (EBT)	*Overall Intersection*	44.6	D	0.93	LOS E	Y	210	225 (EBLTR)
								770	775 (NBTR)							375	375 (NBLT)
								70	125 (SBL)							70	150 (SBL)
																200	200 (SBT)
38	Mill Plain Blvd. @ C St.	*Overall Intersection*	81.0	F	0.84	LOS E	N	205	225 (EBT)	*Overall Intersection*	> 100	F	1.18	LOS E	N	200	200 (EBLTR)
								765	775 (NBTR)							370	375 (NBTR)
																195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	*Overall Intersection*	94.0	F	0.92	LOS E	N	795	800 (EBT)	Southbound Right	> 100	F	0.00	LOS E	N	-	-
								350	525 (EBR)							825	825 (EBT)
								275	400 (WBL)								
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps									*Overall Intersection*	> 100	F	1.00	LOS E	N	125	950 (EBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	*Overall Intersection*	35.3	D	0.97	LOS E	Y	450	450 (WBT)	Westbound Right	30.8	D	0.54	LOS E	Y	200	275 (WBR)
								75	150 (WBR)								
								325	375 (NBR)								
41	15th St. @ Columbia St.	*Overall Intersection*	12.4	B	0.78	LOS E	Y	210	225 (NBT)	*Overall Intersection*	11.0	B	1.18	LOS E	Y	240	250 (WBLTR)
42	15th St. @ Washington St.	*Overall Intersection*	20.6	C	0.43	LOS E	Y	210	250 (WBL)	*Overall Intersection*	14.9	B	0.74	LOS E	Y	205	300 (WBL)
																205	225 (WBT)
43	15th St. @ Main St.	*Overall Intersection*	14.9	B	1.22	LOS E	Y	195	200 (WBT)	*Overall Intersection*	14.4	B	1.23	LOS E	Y	190	200 (WBLTR)
																70	125 (NBL)
44	15th St. @ Broadway	*Overall Intersection*	18.8	B	0.85	LOS E	Y	205	225 (WBT)	*Overall Intersection*	21.8	C	0.93	LOS E	Y	200	200 (WBLTR)
								70	150 (NBL)							70	100 (NBL)
								25	75 (SBR)								
45	15th St. @ C St.	*Overall Intersection*	31.7	C	0.55	LOS E	Y	195	200 (NBLT)	*Overall Intersection*	> 100	F	0.80	LOS E	N	875	875 (WBLTR)
																490	500 (SBTR)
46	McLoughlin Blvd. @ Columbia St.	*Overall Intersection*	59.1	E	0.73	LOS E	Y	-	-	*Overall Intersection*	14.5	B	0.69	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	*Overall Intersection*	93.8	F	0.86	LOS E	N	500	500 (EBLTR)	*Overall Intersection*	20.1	C	0.83	LOS E	Y	-	-
								755	775 (NBLTR)								
48	McLoughlin Blvd. @ Broadway	*Overall Intersection*	> 100	F	0.55	LOS E	N	75	125 (EBL)	*Overall Intersection*	12.7	B	0.48	LOS E	Y	105	150 (WBR)
								220	225 (EBTR)								
								105	175 (WBR)								
49	McLoughlin Blvd. @ Fort Vancouver Way	*Overall Intersection*	14.3	B	0.50	LOS D	Y	-	-	*Overall Intersection*	18.6	B	0.51	LOS D	Y	150	175 (SBL)
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	6.9	A	0.02	LOS E	Y	-	-	Northbound Left/Thru/Right	2.2	A	0.39	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	> 100	F	0.13	LOS E	N	-	-	Northbound Left/Thru	5.6	A	0.02	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	*Overall Intersection*	> 100	F	0.74	LOS D	N	760	775 (EBTR)	*Overall Intersection*	32.9	C	0.75	LOS D	Y	150	175 (WBL)
53	4th Plain Blvd. @ Main St.	*Overall Intersection*	76.4	E	0.84	LOS D	N	250	325 (EBL)	*Overall Intersection*	39.1	D	0.82	LOS D	Y	250	300 (EBL)
								495	500 (EBTR)							495	500 (EBTR)
								170	225 (WBL)							195	225 (WBL)
								195	200 (WBT)							195	200 (WBTR)
								75	100 (NBL)							75	125 (NBL)
								425	425 (NBT)							425	425 (NBT)
								75	150 (NBR)							75	150 (NBR)
								75	125 (SBL)							75	125 (SBL)
								470	475 (SBTR)								
54	4th Plain Blvd. @ Broadway	*Overall Intersection*	> 100	F	1.05	LOS D	N	195	200 (EBTR)	*Overall Intersection*	19.3	B	0.76	LOS D	Y	125	200 (NBL)
								125	175 (WBL)								
								495	550 (WBT)								
								1800	1800 (NBLTR)								
55	4th Plain Blvd. @ F St.	*Overall Intersection*	11.0	B	0.57	LOS D	Y	150	150 (EBT)	*Overall Intersection*	13.2	B	0.61	LOS D	Y	75	100 (EBL)
																150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	*Overall Intersection*	36.6	D	0.92	LOS D	Y	200	275 (EBL)	*Overall Intersection*	70.1	E	0.92	LOS D	N	200	275 (EBL)
								555	575 (EBT)							554	575 (EBT)
								850	850 (WBT)							990	1000 (WBT)
																990	1300 (WBR)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	*Overall Intersection*	> 100	F	0.88	LOS D	N	275	350 (EBL)	*Overall Intersection*	58.2	E	0.74	LOS D	Y*	620	625 (WBT)
								850	850 (EBT)							150	175 (NBR)
								840	850 (WBT)							250	350 (EBR)
								75	150 (WBR)							75	125 (WBL)
								3225	3200 (NBLT)								
								600	900 (NBR)								
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	50.2	F	0.01	LOS E	N	-	-	Westbound Thru/Right	79.0	F	0.28	LOS E	N	730	750 (WBTR)
59	4th Plain Blvd. @ St. Johns Blvd.	*Overall Intersection*	69.5	E	0.66	LOS D	N	170	225 (EBL)	*Overall Intersection*	86.3	F	0.62	LOS D	N	170	250 (EBL)
								805	825 (EBT)							150	175 (WBL)
								150	175 (NBL)								
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.05	LOS E	N	-	-	Northbound Thru/Right	3.0	A	0.21	LOS E	Y	-	-
								215	225 (SBTR)								
61	28th St. @ Broadway	Northbound Thru/Right	52.8	F	0.37	LOS E	N	-	-								
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	150	150 (WBLTR)	*Overall Intersection*	33.4	C	0.54	LOS D	Y	160	175 (WBLTR)
								430	450 (EBLTR)							230	275 (NBTR)
								215	225 (NBTR)								
								100	100 (SBTR)								
								210	300 (NWR)								
63	33rd St. @ Main St.	*Overall Intersection*	> 100	F	0.66	LOS D	N	50	100 (EBL)	*Overall Intersection*	> 100	F	0.79	LOS D	Y**	50	100 (EBL)
								770	775 (EBTR)							50	100 (WBL)
								50	100 (WBL)							210	225 (NBTR)
								600	600 (WBTR)							75	100 (SBL)
								1000	1000 (NBT)								
								75	100 (SBL)								

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Exhibit 7-29 - continued

Vancouver Intersection Performance Results

PM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 2 - BRT Vancouver Alignment)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.10	LOS D	**N**	75	150 (EBL)	***Overall Intersection***	> 100	F	1.03	LOS D	Y**	275	425 (EBL)
								1270	1275 (EBTR)							1310	1425 (EBTR)
								75	125 (WBL)							75	100 (WBL)
								215	225 (WBTR)							215	225 (WBTR)
								75	125 (NBL)							225	325 (SBL)
								1570	1575 (NBTR)							360	375 (SBT)
								125	175 (SBL)								
								360	375 (SBT)								
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.61	LOS E	**N**	305	325 (NBLR)	Northbound Left/Thru/Right	> 100	F	0.20	LOS E	Y**	290	300 (NBLTR)
								215	225 (EBTR)							215	225 (EBTR)
								50	75 (WBL)							430	450 (WBTR)
								430	450 (WBTR)								
66	39th St. @ H St.	***Overall Intersection***	> 100	F	0.85	LOS D	**N**	430	450 (EBTR)	***Overall Intersection***	57.7	E	0.91	LOS D	Y*	435	450 (EBTR)
								135	150 (WBTR)							140	150 (WBTR)
								310	325 (SBLTR)								
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	48.0	D	0.86	LOS D	Y	135	150 (EBT)	***Overall Intersection***	67.7	E	0.80	LOS D	**N**	55	100 (EBR)
								55	125 (EBR)							730	750 (WBT)
								710	725 (WBT)								
								1660	1175 (NBR)								
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.95	LOS D	**N**	300	350 (EBL)	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1120	1125 (WBT)
								710	725 (EBT)							790	825 (NBL)
								1170	1175 (WBTR)							75	150 (NBR)
								790	800 (NBLT)								
								75	125 (NBR)								
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	80.4	F	0.59	LOS D	**N**	1170	1175 (SBT)	***Overall Intersection***	34.1	C	0.55	LOS D	Y	495	500 (SBTR)
																100	125 (NBL)
*	P&R North @ Main St.									***Overall Intersection***	40.7	D	0.50	LOS D	Y	571	575 (SBT)
70	45th St. @ Main St.	***Overall Intersection***	17.6	B	0.55	LOS D	Y	-	-	***Overall Intersection***	15.4	B	0.61	LOS D	Y	105	125 (SBTR)
*	Kiggins P&R @ Main St.									Westbound Left/Right	> 100	F	0.20	LOS E	**N**	-	-
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	29.7	C	0.67	LOS D	Y	1135	375 (SB - F/I-5)	***Overall Intersection***	69.9	E	0.68	LOS D	**N**	-	-
								1550	425 (SB - F/Main)								
72	Ross St. @ Main St.	***Overall Intersection***	16.0	B	0.70	LOS D	Y	60	75 (WBL)	***Overall Intersection***	> 100	F	0.82	LOS D	**N**	60	100 (WBL)
								60	75 (WBR)							60	100 (WBR)
73	Ross St. @ North Rd.	Southbound Thru/Right	70.1	F	0.38	LOS E	**N**	-	-	Southbound Thru/Right	> 100	F	0.35	LOS E	**N**	935	950 (SBTR)
																1175	1175 (NBLT)

Delay / LOS affected by freeway congestion
Intersection queuing spills back into upstream intersection
Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.
* Intersection not modeled in existing conditions scenario
Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 7-30

LRT Vancouver Alignment Park-and-Ride Trip Generation								
	Trip	Parking	AM Peak Hour Trip Generation			PM Peak Hour Trip Generation		
Park-and-Ride Lot	**Type**	**Spaces**	**Arrivals**	**Departures**	**Total**	**Arrivals**	**Departures**	**Total**
Kiggins Bowl	Park-and-Ride	150	85	0	**85**	0	75	**75**
	Kiss-and-Ride	0	0	0	**0**	0	0	**0**
	Total	150	85	0	**85**	0	75	**75**
Lincoln	Park-and-Ride	1,800	790	0	**790**	0	630	**630**
	Kiss-and-Ride	0	200	200	**400**	270	270	**540**
	Total	1,800	990	200	**1,190**	270	900	**1,170**
Clark College	Park-and-Ride	460	255	0	**255**	0	230	**230**
	Kiss-and-Ride	0	0	0	**0**	0	0	**0**
	Total	460	255	0	**255**	0	230	**230**
Total	**Park-and-Ride**	**2,410**	**1,130**	**0**	**1,130**	**0**	**935**	**935**
	Kiss-and-Ride	**0**	**200**	**200**	**400**	**270**	**270**	**540**
	Total	**2,410**	**1,330**	**200**	**1,530**	**270**	**1,205**	**1,475**

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Exhibit 7-31

Vancouver Intersection Performance Results

AM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 3 - LRT Vancouver Alignment)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Eastbound Left	5.9	A	0.01	LOS E	Y	-	-	Southbound Left/Right	6.5	A	0.48	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Eastbound Left	5.3	A	0.06	LOS E	Y	-	-	Southbound Thru/Right	7.0	A	0.56	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Eastbound Left/Right	5.2	A	0.05	LOS E	Y	-	-	***Overall Intersection***	14.7	B	0.78	LOS E	Y	100	150 (SBL)
																100	150 (WBL)
																205	225 (WBT)
																150	200 (WBR)
*	SR 14 and Main Street									***Overall Intersection***	17.4	B	0.59	LOS E	Y	100	150 (SBL)
*	3rd/4th St. @ Esther St.	Westbound Left/Right	4.2	A	0.12	LOS E	Y	-	-	Westbound Left/Right	7.4	A	0.44	LOS E	Y	-	-
02	4th St. @ Columbia St.	Northbound Thru/Right	0.4	A	0.11	LOS E	Y	-	-								
03	4th St. @ Washington St.	Eastbound Right	2.8	A	0.04	LOS E	Y	-	-								
04	5th St. @ Columbia St.	Southbound Left	53.8	F	0.16	LOS E	N	90	100 (SBL)	Northbound Thru	10.5	B	0.61	LOS E	Y	90	100 (SBL)
								210	225 (SBT)								
05	5th St. @ Washington St.	***Overall Intersection***	49.2	D	0.44	LOS E	Y	185	200 (EBR to I-5)	Southbound Right	16.6	B	0.06	LOS E	Y	-	-
								210	225 (SBL)								
								210	225 (SBT)								
*	5th St. @ Main St.									***Overall Intersection***	8.1	A	0.66	LOS E	Y	-	-
06	6th St. @ Columbia St.	***Overall Intersection***	26.5	C	0.47	LOS E	Y	185	225 (WBL)	***Overall Intersection***	13.4	B	0.91	LOS E	Y	75	125 (NBL)
																205	225 (NBTR)
07	6th St. @ Washington St.	***Overall Intersection***	61.6	E	0.49	LOS E	Y	220	225 (WBLT)	***Overall Intersection***	12.5	B	0.78	LOS E	Y	-	-
								490	500 (SBT)								
08	6th St. @ Main St.	Westbound Left/Thru/Right	27.9	D	0.87	LOS E	Y	230	250 (WBLT)	Eastbound Left/Thru/Right	23.3	C	1.20	LOS E	Y	205	225 (EBLTR)
09	6th St. @ Broadway	Southbound Right	32.1	D	0.44	LOS E	Y	-	-								
10	6th St. @ C St.	Northbound Left/Thru	79.0	F	-	LOS E	N	850	850 (NBLT)								
11	8th St. @ Esther St.	Southbound Left/Thru/Right	8.7	A	0.31	LOS E	Y	-	-	Northbound Left/Thru/Right	6.9	A	0.40	LOS E	Y	-	-
12	8th St. @ Columbia St.	***Overall Intersection***	15.4	B	0.98	LOS E	Y	195	200 (WBLTR)	***Overall Intersection***	13.8	B	0.96	LOS E	Y	-	-
13	8th St. @ Washington St.	***Overall Intersection***	25.4	C	0.59	LOS E	Y	100	125 (WBL)	***Overall Intersection***	8.8	A	0.63	LOS E	Y	-	-
								205	225 (SBLT)								
14	8th St. @ Main St.	***Overall Intersection***	12.6	B	0.71	LOS E	Y	-	-	***Overall Intersection***	13.9	B	0.58	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left/Thru/Right	10.7	B	-	LOS E	Y	-	-	Southbound Left/Thru/Right	9.9	A	1.16	LOS E	Y	-	-
16	8th St. @ C St.	***Overall Intersection***	16.5	B	0.58	LOS E	Y	-	-	***Overall Intersection***	11.6	B	0.53	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	4.4	A	0.08	LOS E	Y	-	-	Westbound Left/Thru/Right	6.2	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Westbound Left/Thru/Right	7.8	A	0.19	LOS E	Y	-	-	Southbound Left/Thru/Right	2.5	A	0.03	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Left	67.4	F	0.06	LOS E	N	-	-	***Overall Intersection***	3.9	A	0.35	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	5.9	A	0.07	LOS E	Y	-	-	Northbound Left/Thru/Right	1.9	A	0.03	LOS E	Y	-	-
21	9th St. @ Broadway	Eastbound Left/Right	4.8	A	0.05	LOS E	Y	-	-	Southbound Thru/Right	1.2	A	0.20	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Northbound Left/Thru/Right	7.8	A	0.18	LOS E	Y	-	-	Westbound Left/Thru/Right	2.9	A	0.06	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	***Overall Intersection***	15.3	B	0.73	LOS E	Y	205	225 (WBTR)	***Overall Intersection***	20.7	C	0.92	LOS E	Y	225	225 (WBTR)
																100	150 (NBL)
																205	275 (SBL)
24	Evergreen Blvd. @ Washington St.	***Overall Intersection***	22.9	C	0.61	LOS E	Y	75	100 (WBL)	***Overall Intersection***	14.6	B	0.57	LOS E	Y	210	225 (WBT)
								210	225 (SBTR)								
25	Evergreen Blvd. @ Main St.	***Overall Intersection***	17.0	B	0.77	LOS E	Y	220	225 (WBLTR)	***Overall Intersection***	13.3	B	0.80	LOS E	Y	220	225 (WBLTR)
26	Evergreen Blvd. @ Broadway	***Overall Intersection***	15.8	B	0.78	LOS E	Y	75	125 (WBL)	***Overall Intersection***	13.3	B	0.81	LOS E	Y	75	125 (WBL)
								210	225 (WBTR)							210	225 (WBTR)
27	Evergreen Blvd. @ C St.	***Overall Intersection***	15.7	B	0.68	LOS E	Y	-	-	***Overall Intersection***	12.6	B	0.84	LOS E	Y	-	-
28	11th St. @ Esther St.	Southbound Left/Thru/Right	4.7	A	0.06	LOS E	Y	-	-	Westbound Left/Thru/Right	4.8	A	0.01	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	12.1	B	0.42	LOS E	Y	-	-	Westbound Left/Thru/Right	11.8	B	0.34	LOS E	Y	-	-
30	11th St. @ Washington St.	Westbound Left/Thru	26.2	C	0.38	LOS E	Y	-	-	***Overall Intersection***	11.1	B	0.37	LOS E	Y	-	-
31	11th St. @ Main St.	Westbound Left/Thru/Right	14.1	B	0.23	LOS E	Y	-	-	Westbound Left/Thru/Right	8.2	A	0.38	LOS E	Y	-	-
32	11th St. @ Broadway	Westbound Left/Thru/Right	8.6	A	0.20	LOS E	Y	-	-	Southbound Left/Thru/Right	2.3	A	0.04	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	6.4	A	0.26	LOS E	Y	-	-	Eastbound Left/Thru/Right	5.3	A	0.20	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	***Overall Intersection***	18.9	B	0.82	LOS E	Y	75	150 (SBL)	***Overall Intersection***	> 100	F	1.25	LOS E	N	810	825 (EBLTR)
								210	225 (SBT)							75	150 (SBL)
																210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	***Overall Intersection***	7.8	A	0.49	LOS E	Y	-	-	***Overall Intersection***	86.6	F	0.47	LOS E	N	220	225 (EBLTR)
																205	225 (SBLT)
																210	225 (NBTR)
36	Mill Plain Blvd. @ Main St.	***Overall Intersection***	13.1	B	1.10	LOS E	Y	70	150 (SBL)	***Overall Intersection***	48.7	D	1.22	LOS E	Y	205	225 (EBLTR)
								210	225 (SBT)							70	150 (SBL)
																210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	***Overall Intersection***	10.3	B	0.90	LOS E	Y	70	75 (SBL)	***Overall Intersection***	23.7	C	1.03	LOS E	Y	210	225 (EBTR)
								200	200 (SBT)								
38	Mill Plain Blvd. @ C St.	***Overall Intersection***	6.5	A	0.43	LOS E	Y	-	-	***Overall Intersection***	80.5	F	0.63	LOS E	N	200	200 (EBLTR)
																195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	15.3	B	0.78	LOS E	Y	275	350 (WBL)	Southbound Right	> 100	F	0.00	LOS E	N	825	825 (EBT)
																350	375 (EBR)
																125	125 (WBT)
																255	1150 (SBR)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps									***Overall Intersection***	> 100	F	0.65	LOS E	N	155	225 (WBL)
																265	1350 (NBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	36.3	D	0.88	LOS E	Y	75	125 (WBR)	Northbound Left/Thru	> 100	F	0.00	LOS E	N	-	-
								590	600 (NBLT)							430	1350 (NBR)
								325	500 (NBR)								
41	15th St. @ Columbia St.	***Overall Intersection***	24.9	C	0.82	LOS E	Y	-	-	***Overall Intersection***	64.6	E	1.25	LOS E	Y	225	225 (WBLTR)
																700	700 (SBTR)
42	15th St. @ Washington St.	***Overall Intersection***	11.6	B	0.58	LOS E	Y	-	-	***Overall Intersection***	56.2	E	0.64	LOS E	Y	205	300 (WBL)
																205	225 (WBT)
43	15th St. @ Main St.	***Overall Intersection***	23.4	C	1.10	LOS E	Y	195	200 (WBLT)	***Overall Intersection***	> 100	F	1.22	LOS E	N	190	200 (WBLTR)
																225	225 (SBTR)
44	15th St. @ Broadway	***Overall Intersection***	20.5	C	0.90	LOS E	Y	205	225 (WBLT)	***Overall Intersection***	> 100	F	1.03	LOS E	N	200	200 (WBLTR)
45	15th St. @ C St.	***Overall Intersection***	13.5	B	0.59	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.75	LOS E	N	870	875 (WBLTR)
46	McLoughlin Blvd. @ Columbia St.	***Overall Intersection***	14.6	B	0.82	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.84	LOS E	N	510	525 (WBLTR)
																1365	1375 (SBLTR)
47	McLoughlin Blvd. @ Main St.	***Overall Intersection***	21.9	C	0.91	LOS E	Y	-	-	***Overall Intersection***	> 100	F	1.07	LOS E	N	225	225 (WBLTR)
																1350	1350 (SBLTR)
48	McLoughlin Blvd. @ Broadway	***Overall Intersection***	22.5	C	0.69	LOS E	Y	75	125 (WBL)	***Overall Intersection***	> 100	F	0.38	LOS E	N	1320	1325 (WBT)
								105	125 (WBR)								
49	McLoughlin Blvd. @ Fort Vancouver Way	***Overall Intersection***	12.3	B	0.50	LOS D	Y	-	-	***Overall Intersection***	69.8	E	0.48	LOS D	N	-	-
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	17.7	C	0.07	LOS E	Y	-	-	Southbound Left/Thru/Right	32.0	D	0.01	LOS E	Y	435	450 (SBLTR)
51	24th St. @ Main St.	Eastbound Left/Right	8.9	A	0.09	LOS E	Y	-	-	Southbound Thru/Right	49.7	E	0.61	LOS E	Y	425	425 (SBTR)
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	33.3	C	0.83	LOS D	Y	150	175 (WBL)	***Overall Intersection***	> 100	F	0.72	LOS D	N	150	200 (WBL)
								75	100 (SBL)							235	250 (SBTR)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	43.9	D	0.87	LOS D	Y	170	225 (WBL)	***Overall Intersection***	> 100	F	0.88	LOS D	N	195	275 (WBTR)
								195	200 (WBT)							425	425 (NBT)
								75	125 (SBL)							75	100 (SBL)
								470	475 (SBTR)							475	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	0.80	LOS D	N	195	200 (EBLT)	***Overall Intersection***	> 100	F	0.57	LOS D	Y**	450	450 (WBTR)
								125	150 (WBL)							190	200 (SBLTR)
								495	500 (WBT)								
								440	450 (SBLTR)								
55	4th Plain Blvd. @ F St.	***Overall Intersection***	21.3	C	0.58	LOS D	Y	150	150 (EBT)	***Overall Intersection***	93.2	F	0.68	LOS D	N	150	200 (EBL)
																550	550 (WBTR)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	23.4	C	0.69	LOS D	Y	200	275 (EBL)	***Overall Intersection***	> 100	F	0.73	LOS D	N	200	250 (EBL)
																1045	1050 (WBT)
																2155	2850 (SBL)
																2155	2850 (SBR)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	19.5	B	0.61	LOS D	Y	75	125 (WBR)	***Overall Intersection***	> 100	F	0.47	LOS D	N	620	625 (WBT)
																185	200 (NBL)
																75	150 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	7.0	A	0.01	LOS E	Y	-	-	Westbound Thru/Right	> 100	F	0.29	LOS E	N	730	750 (WBTR)
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	19.8	B	0.51	LOS D	Y	-	-	***Overall Intersection***	19.6	B	0.49	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.18	LOS E	N	215	275 (EBL)	Northbound Thru/Right	> 100	F	0.21	LOS E	Y**	475	475 (NBTR)
																230	250 (SBTR)
61	28th St. @ Broadway	Westbound Left	23.6	C	0.32	LOS E	Y	-	-								
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	1000	1000 (SBTR)	***Overall Intersection***	> 100	F	0.00	LOS D	Y**	230	250 (NBTR)
																715	725 (SBTR)
63	33rd St. @ Main St.	***Overall Intersection***	51.0	D	0.83	LOS D	Y	50	75 (EBL)	***Overall Intersection***	> 100	F	0.75	LOS D	N	50	100 (EBL)
								50	100 (WBL)							780	800 (EBTR)
								75	125 (NBL)							50	100 (WBL)
								75	125 (SBL)							610	625 (WBTR)
																210	225 (NBTR)
																75	100 (SBL)
																770	775 (SBTR)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.06	LOS D	N	75	125 (EBL)	***Overall Intersection***	> 100	F	0.85	LOS D	Y**	275	350 (EBL)
								1310	1325 (EBTR)							1305	1325 (EBTR)
								75	150 (WBL)							75	125 (WBL)
								215	225 (WBTR)							215	225 (WBTR)
								75	125 (NBL)							75	125 (NBL)
								125	200 (SBL)							625	625 (NBTR)
								360	375 (SBT)							350	350 (SBT)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.18	LOS E	N	305	325 (NBLR)	Westbound Thru/Right	> 100	F	0.59	LOS E	Y**	435	450 (WBTR)
								50	75 (WBL)								
								430	450 (WBTR)								
								325	400 (SBLR)								
66	39th St. @ H St.	***Overall Intersection***	39.7	D	0.74	LOS D	Y	430	450 (EBTR)	***Overall Intersection***	56.1	E	0.84	LOS E	Y**	435	450 (EBTR)
								135	150 (WBTR)							140	150 (WBTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.67	LOS D	N	135	150 (EBT)	***Overall Intersection***	67.1	E	0.80	LOS D	Y*	55	100 (EBR)
								55	125 (EBR)							730	750 (WBT)
								715	725 (WBT)								
								1660	1700 (NBL)								
								125	275 (NBR)								
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.88	LOS D	N	1170	1175 (WBTR)	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1175	1175 (WBT)
								790	800 (NBLT)							790	800 (NBL)
								75	100 (NBR)								
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	> 100	F	0.66	LOS D	N	150	225 (SBL)	***Overall Intersection***	26.1	C	0.50	LOS D	Y	100	150 (SBL)
								1170	1175 (SBT)								
*	P&R North @ Main St.									***Overall Intersection***	23.2	C	0.59	LOS D	Y	-	-
70	45th St. @ Main St.	***Overall Intersection***	41.1	D	0.74	LOS D	Y	260	275 (SBT)	***Overall Intersection***	13.7	B	0.61	LOS D	Y	105	125 (SBTR)
*	Kiggins P&R @ Main St.									Southbound Thru	10.6	B	0.44	LOS E	Y	430	350 (SBT)
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	> 100	F	0.80	LOS D	N	2105	2125 (SB - F/I-5)	***Overall Intersection***	41.0	D	0.72	LOS D	Y	205	225 (SBLTR)
								1570	1575 (SB - F/Main)								
72	Ross St. @ Main St.	***Overall Intersection***	> 100	F	0.53	LOS D	N	60	100 (WBL)	***Overall Intersection***	19.0	B	0.00	LOS D	Y	60	100 (WBL)
								225	275 (SBL)								
								1290	1600 (SBT)								
73	Ross St. @ North Rd.	Northbound Left/Thru	> 100	F	0.57	LOS E	N	-	-	Northbound Left/Thru	11.1	B	0.54	LOS E	Y	-	-

(yellow)	Delay / LOS affected by freeway congestion
(blue)	Intersection queuing spills back into upstream intersection
Note 1	The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2	The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.
*	Intersection not modeled in existing conditions scenario
Y*	Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y**	Intersection operations are no worse than No-Build, and no mitigation is required.

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Exhibit 7-32

Vancouver Intersection Performance Results

PM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 3 - LRT Vancouver Alignment)							
#	**Intersection**	**Approach/Movement**	**Delay (Seconds)**	**LOS**	**ICU / V/C[1]**	**Standard[2]**	**Meets Standard**	**Storage Length**	**95% Queue (ft)**	**Approach/Movement**	**Delay (Seconds)**	**LOS**	**ICU / V/C[1]**	**Standard[2]**	**Meets Standard**	**Storage Length**	**95% Queue (ft)**
*	Esther St. @ Columbia Way	Eastbound Left	6.3	A	0.08	LOS E	Y	-	-	Westbound Left/Thru/Right	14.2	B	0.07	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Eastbound Left	7.0	A	0.10	LOS E	Y	-	-	Southbound Left/Right	14.2	B	0.70	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Eastbound Left/Right	7.4	A	0.17	LOS E	Y	-	-	***Overall Intersection***	43.5	D	0.60	LOS E	Y	100	125 (WBL)
																146	150 (SBL)
																430	450 (SBTR)
																159	175 (WBR)
*	SR 14 and Main Street									***Overall Intersection***	62.2	E	0.85	LOS E	Y	100	150 (SBL)
																300	300 (EBTR)
																565	575 (SBT)
*	3rd/4th St. @ Esther St.	Southbound Left/Thru	2.9	A	0.01	LOS E	Y	-	-	Southbound Left/Thru	21.5	C	0.03	LOS E	Y	-	-
02	4th St. @ Columbia St.	Northbound Thru/Right	0.9	A	0.25	LOS E	Y	-	-								
03	4th St. @ Washington St.	Eastbound Right	2.6	A	0.02	LOS E	Y	-	-								
04	5th St. @ Columbia St.	Southbound Left	15.7	C	0.43	LOS E	Y	90	150 (SBL)	Northbound Thru	30.0	D	0.27	LOS E	Y	205	225 (SBT)
05	5th St. @ Washington St.	***Overall Intersection***	18.3	B	0.54	LOS E	Y	180	225 (EBR to SR-14)	Southbound Right	1.6	A	0.07	LOS E	Y	-	-
								210	225 (SBT)								
*	5th St. @ Main St.									***Overall Intersection***	29.8	C	0.63	LOS E	Y	210	225 (WBLTR)
																175	175 (SBLT)
06	6th St. @ Columbia St.	***Overall Intersection***	25.1	C	0.75	LOS E	Y	75	100 (SBL)	***Overall Intersection***	53.9	D	0.82	LOS E	Y	210	275 (WBL)
																205	225 (NBTR)
07	6th St. @ Washington St.	***Overall Intersection***	30.5	C	0.59	LOS E	Y	220	225 (WBLT)	***Overall Intersection***	22.7	C	0.49	LOS E	Y	-	-
08	6th St. @ Main St.	Westbound Left/Thru/Right	11.4	B	0.48	LOS E	Y	-	-	Eastbound Left/Thru/Right	20.5	C	0.67	LOS E	Y	207	225 (EBLTR)
09	6th St. @ Broadway	Southbound Right	5.6	A	0.27	LOS E	Y	-	-								
10	6th St. @ C St.	Northbound Left/Thru	4.6	A	0.74	LOS E	Y	-	-								
11	8th St. @ Esther St.	Northbound Left/Thru/Right	> 100	F	0.64	LOS E	N	-	-	Eastbound Left/Thru/Right	65.8	F	0.01	LOS E	Y*	535	550 (EBLTR)
12	8th St. @ Columbia St.	***Overall Intersection***	51.4	D	1.22	LOS E	Y	500	500 (EBLTR)	***Overall Intersection***	74.7	E	1.00	LOS E	Y	75	150 (EBL)
								215	225 (SBLTR)							220	225 (WBLTR)
																171	175 (NBL)
																495	500 (NBTR)
																500	500 (EBTR)
																120	125 (SBL)
																210	225 (SBTR)
13	8th St. @ Washington St.	***Overall Intersection***	19.0	B	0.60	LOS E	Y	100	125 (WBL)	***Overall Intersection***	32.0	C	0.80	LOS E	Y	220	300 (EBLTR)
																210	225 (WBTR)
																203	225 (SBTR)
14	8th St. @ Main St.	***Overall Intersection***	18.9	B	0.66	LOS E	Y	-	-	***Overall Intersection***	32.3	C	0.89	LOS E	Y	210	225 (EBLTR)
																220	225 (WBLTR)
																205	225 (SBLTR)
15	8th St. @ Broadway	Southbound Left/Thru/Right	12.1	B	0.54	LOS E	Y	-	-	Southbound Left/Thru/Right	26.8	D	1.27	LOS E	Y	-	-
16	8th St. @ C St.	***Overall Intersection***	20.6	C	0.48	LOS E	Y	-	-	***Overall Intersection***	19.5	B	0.87	LOS E	Y	217	225 (EBLR)
17	9th St. @ Esther St.	Eastbound Left/Thru/Right	97.0	F	0.03	LOS E	N	-	-	Northbound Left/Thru/Right	19.1	C	0.01	LOS E	Y	-	-
18	9th St. @ Columbia St.	Eastbound Left/Thru/Right	82.7	F	0.24	LOS E	N	-	-	Northbound Left/Thru/Right	17.9	C	0.01	LOS E	Y	210	225 (NBLTR)
19	9th St. @ Washington St.	Westbound Thru	15.4	C	0.11	LOS E	Y	-	-	***Overall Intersection***	10.6	B	0.38	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	8.9	A	0.06	LOS E	Y	-	-	Eastbound Left/Thru/Right	20.0	C	0.58	LOS E	Y	-	-
21	9th St. @ Broadway	Northbound Left/Thru	9.3	A	0.25	LOS E	Y	-	-	Eastbound Left/Right	7.9	A	0.20	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Southbound Left/Thru/Right	9.5	A	0.18	LOS E	Y	-	-	Eastbound Left/Thru/Right	> 100	F	0.01	LOS E	N	535	550 (EBLTR)
																215	225 (NBLTR)
23	Evergreen Blvd. @ Columbia St.	***Overall Intersection***	21.1	C	0.73	LOS E	Y	100	125 (EBL)	***Overall Intersection***	65.9	E	0.85	LOS E	Y	100	150 (EBL)
																510	525 (EBTR)
																133	150 (WBL)
																220	225 (NBTR)
24	Evergreen Blvd. @ Washington St.	***Overall Intersection***	13.5	B	0.65	LOS E	Y	75	100 (WBL)	***Overall Intersection***	17.3	B	0.78	LOS E	Y	225	225 (EBLTR)
25	Evergreen Blvd. @ Main St.	***Overall Intersection***	17.8	B	0.67	LOS E	Y	215	225 (NBLTR)	***Overall Intersection***	30.7	C	0.78	LOS E	Y	210	275 (EBLTR)
																215	225 (NBLTR)
																210	225 (SBLTR)
26	Evergreen Blvd. @ Broadway	***Overall Intersection***	20.3	C	0.64	LOS E	Y	220	225 (NBLTR)	***Overall Intersection***	15.3	B	0.73	LOS E	Y	75	125 (WBL)
																219	225 (NBLTR)
27	Evergreen Blvd. @ C St.	***Overall Intersection***	34.7	C	0.75	LOS E	Y	75	125 (EBL)	***Overall Intersection***	30.9	C	1.12	LOS E	Y	210	225 (SBLTR)
28	11th St. @ Esther St.	Northbound Left/Thru/Right	6.0	A	0.15	LOS E	Y	-	-	Northbound Left/Thru/Right	10.1	B	0.12	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	28.9	D	0.54	LOS E	Y	-	-	Eastbound Left/Thru/Right	26.9	D	0.62	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	40.8	E	0.24	LOS E	Y	-	-	***Overall Intersection***	14.8	B	0.43	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Left/Thru/Right	81.7	F	0.20	LOS E	N	-	-	Eastbound Left/Thru/Right	38.0	E	1.23	LOS E	Y	-	-
32	11th St. @ Broadway	Westbound Left/Thru/Right	> 100	F	0.43	LOS E	N	215	225 (WBLTR)	Southbound Left/Thru/Right	24.2	C	0.12	LOS E	Y	-	-
								210	225 (NBLTR)								
33	11th St. @ C St.	Westbound Right	> 100	F	0.32	LOS E	N	205	225 (WBTR)	Eastbound Left/Thru/Right	53.1	F	0.63	LOS E	Y*	220	225 (EBLTR)
								215	225 (NBT)								
34	Mill Plain Blvd. @ Columbia St.	***Overall Intersection***	> 100	F	0.78	LOS E	N	810	825 (EBLTR)	***Overall Intersection***	> 100	F	1.18	LOS E	Y**	810	825 (EBLTR)
								150	250 (NBR)							150	225 (NBR)
								75	125 (SBL)							75	150 (SBL)
								210	225 (SBT)							210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	***Overall Intersection***	68.7	E	0.59	LOS E	Y	215	225 (EBTR)	***Overall Intersection***	68.4	E	0.61	LOS E	Y	235	250 (EBLTR)
								210	225 (SBT)							210	225 (NBTR)
36	Mill Plain Blvd. @ Main St.	***Overall Intersection***	> 100	F	1.22	LOS E	N	210	225 (EBT)	***Overall Intersection***	73.5	E	1.23	LOS E	Y	205	225 (EBLTR)
								765	775 (NBTR)							765	775 (NBTR)
								70	100 (SBL)							70	150 (SBL)
																210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	***Overall Intersection***	85.8	F	0.85	LOS E	N	210	225 (EBT)	***Overall Intersection***	45.0	D	0.93	LOS E	Y	210	225 (EBLTR)
								770	775 (NBTR)							770	775 (NBTR)
								70	125 (SBL)							70	125 (SBL)
38	Mill Plain Blvd. @ C St.	***Overall Intersection***	81.0	F	0.84	LOS E	N	205	225 (EBT)	***Overall Intersection***	> 100	F	1.18	LOS E	N	200	200 (EBLTR)
								765	775 (NBTR)							765	775 (NBTR)
																195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	94.0	F	0.92	LOS E	N	795	800 (EBT)	Southbound Right	> 100	F	-	LOS E	N	950	950 (SBR)
								350	525 (EBR)								
								275	400 (WBL)								
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps									***Overall Intersection***	> 100	F	1.00	LOS E	N	775	850 (EBL)
																950	950 (EBT)
																1115	1125 (NBL)
																940	950 (SBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	35.3	D	0.97	LOS E	Y	450	450 (WBT)	Northbound Right	> 100	F	-	LOS E	N	420	500 (NBR)
								75	150 (WBR)								
								325	375 (NBR)								
41	15th St. @ Columbia St.	***Overall Intersection***	12.4	B	0.78	LOS E	Y	210	225 (NBT)	***Overall Intersection***	53.6	D	1.18	LOS E	Y	225	225 (WBLTR)
																75	100 (NBL)
																210	225 (NBT)
42	15th St. @ Washington St.	***Overall Intersection***	20.6	C	0.43	LOS E	Y	210	250 (WBL)	***Overall Intersection***	32.5	C	0.60	LOS E	Y	205	225 (WBL)
																205	225 (WBT)
43	15th St. @ Main St.	***Overall Intersection***	14.9	B	1.22	LOS E	Y	195	200 (WBT)	***Overall Intersection***	37.3	D	1.23	LOS E	Y	190	200 (WBLTR)
																70	125 (NBL)
																225	225 (SBTR)
44	15th St. @ Broadway	***Overall Intersection***	18.8	B	0.85	LOS E	Y	205	225 (WBT)	***Overall Intersection***	30.0	C	0.93	LOS E	Y	200	200 (WBLTR)
								70	150 (NBL)							70	150 (NBL)
								25	75 (SBR)							200	225 (NBT)
45	15th St. @ C St.	***Overall Intersection***	31.7	C	0.55	LOS E	Y	195	200 (NBLT)	***Overall Intersection***	> 100	F	0.80	LOS E	N	875	875 (WBLTR)
																490	500 (SBTR)
46	McLoughlin Blvd. @ Columbia St.	***Overall Intersection***	59.1	E	0.73	LOS E	Y	-	-	***Overall Intersection***	16.1	B	0.69	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	***Overall Intersection***	93.8	F	0.86	LOS E	N	500	500 (EBLTR)	***Overall Intersection***	20.9	C	0.83	LOS E	Y	-	-
								755	775 (NBLTR)								
48	McLoughlin Blvd. @ Broadway	***Overall Intersection***	> 100	F	0.55	LOS E	N	75	125 (EBL)	***Overall Intersection***	5.7	A	0.36	LOS E	Y	-	-
								220	225 (EBTR)								
								105	175 (WBR)								
49	McLoughlin Blvd. @ Fort Vancouver Way	***Overall Intersection***	14.3	B	0.50	LOS D	Y	-	-	***Overall Intersection***	28.8	C	0.51	LOS D	Y	150	175 (SBL)

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Exhibit 7-32 - continued

Vancouver Intersection Performance Results

PM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 3 - LRT Vancouver Alignment)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	6.9	A	0.02	LOS E	Y	-	-	Westbound Left/Thru/Right	4.4	A	0.09	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	> 100	F	0.13	LOS E	N	-	-	Eastbound Left/Right	32.9	D	0.15	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	> 100	F	0.74	LOS D	N	760	775 (EBTR)	***Overall Intersection***	76.2	E	0.75	LOS D	Y*	150	175 (EBL)
																760	775 (EBTR)
																150	200 (WBL)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	76.4	E	0.84	LOS D	N	250	325 (EBL)	***Overall Intersection***	72.4	E	0.82	LOS D	Y*	250	300 (EBL)
								495	500 (EBTR)							495	500 (EBTR)
								170	225 (WBL)							195	200 (WBL)
								195	200 (WBT)							195	200 (WBTR)
								75	100 (NBL)							75	125 (NBL)
								425	425 (NBT)							425	425 (NBT)
								75	150 (NBR)							75	125 (NBR)
								75	125 (SBL)							75	125 (SBL)
								470	475 (SBTR)							475	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	1.05	LOS D	N	195	200 (EBTR)	***Overall Intersection***	25.0	C	0.70	LOS D	Y	195	200 (EBLTR)
								125	175 (WBL)							125	175 (NBL)
								495	550 (WBT)							765	575 (NBTR)
								1800	1800 (NBLTR)								
55	4th Plain Blvd. @ F St.	***Overall Intersection***	11.0	B	0.57	LOS D	Y	150	150 (EBT)	***Overall Intersection***	7.9	A	0.61	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	36.6	D	0.92	LOS D	Y	200	275 (EBL)	***Overall Intersection***	47.7	D	0.92	LOS D	Y	200	275 (EBL)
								555	575 (EBT)							1045	1050 (WBT)
								850	850 (WBT)							1045	1050 (WBR)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.88	LOS D	N	275	350 (EBL)	***Overall Intersection***	38.4	D	0.74	LOS D	Y	620	625 (WBT)
								850	850 (EBT)							250	350 (EBR)
								840	850 (WBT)							75	125 (WBL)
								75	150 (WBR)								
								3225	3200 (NBLT)								
								600	900 (NBR)								
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	50.2	F	0.01	LOS E	N	-	-	Eastbound Left	> 100	F	0.01	LOS E	N	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	69.5	E	0.66	LOS D	N	170	225 (EBL)	***Overall Intersection***	61.9	E	0.62	LOS D	Y*	170	250 (EBL)
								805	825 (EBT)							1420	1425 (EBT)
								150	175 (NBL)							150	200 (NBL)
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.05	LOS E	N	-	-	Eastbound Left/Thru/Right	> 100	F	0.03	LOS E	Y**	-	-
								215	225 (SBTR)							475	475 (NBTR)
																230	250 (SBTR)
61	28th St. @ Broadway	Northbound Thru/Right	52.8	F	0.37	LOS E	N	-	-								
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	150	150 (WBLTR)	***Overall Intersection***	> 100	F	0.51	LOS D	Y**	160	175 (WBLTR)
								430	450 (EBLTR)							230	250 (NBTR)
								215	225 (NBTR)							725	725 (SBTR)
								100	100 (SBTR)								
								210	300 (NWR)								
63	33rd St. @ Main St.	***Overall Intersection***	> 100	F	0.66	LOS D	N	50	100 (EBL)	***Overall Intersection***	> 100	F	0.69	LOS D	Y**	50	100 (EBL)
								770	775 (EBTR)							780	800 (EBTR)
								50	100 (WBL)							50	100 (WBL)
								600	600 (WBTR)							935	950 (NBTR)
								1000	1000 (NBT)							75	125 (SBL)
								75	100 (SBL)								
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.10	LOS D	N	75	150 (EBL)	***Overall Intersection***	> 100	F	1.03	LOS D	Y**	275	400 (EBL)
								1270	1275 (EBTR)							1305	1325 (EBTR)
								75	125 (WBL)							75	125 (WBL)
								215	225 (WBTR)							215	225 (WBTR)
								75	125 (NBL)							275	325 (NBL)
								1570	1575 (NBTR)							1395	1400 (NBTR)
								125	175 (SBL)							225	250 (SBL)
								360	375 (SBT)							350	350 (SBT)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.61	LOS E	N	305	325 (NBLR)	Northbound Left/Thru/Right	> 100	F	0.20	LOS E	Y**	290	300 (NBLTR)
								215	225 (EBTR)							215	225 (EBTR)
								50	75 (WBL)							435	450 (WBTR)
								430	450 (WBTR)								
66	39th St. @ H St.	***Overall Intersection***	> 100	F	0.85	LOS D	N	430	450 (EBTR)	***Overall Intersection***	61.9	E	0.95	LOS D	Y*	435	450 (EBTR)
								135	150 (WBTR)							140	150 (WBTR)
								310	325 (SBLTR)								
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	48.0	D	0.86	LOS D	Y	135	150 (EBT)	***Overall Intersection***	49.6	D	0.80	LOS D	Y	55	100 (EBR)
								55	125 (EBR)							730	750 (WBT)
								710	725 (WBT)								
								1660	1175 (NBR)								
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.95	LOS D	N	300	350 (EBL)	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1175	1175 (WBT)
								710	725 (EBT)							790	800 (NBL)
								1170	1175 (WBTR)							75	150 (NBR)
								790	800 (NBLT)								
								75	125 (NBR)								
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	80.4	F	0.59	LOS D	N	1170	1175 (SBT)	***Overall Intersection***	56.6	E	0.55	LOS D	Y*	100	150 (NBL)
																100	150 (SBL)
																495	500 (SBTR)
*	P&R North @ Main St.									***Overall Intersection***	47.7	D	0.50	LOS D	Y	570	575 (WBT)
70	45th St. @ Main St.	***Overall Intersection***	17.6	B	0.55	LOS D	Y	-	-	***Overall Intersection***	20.3	C	0.61	LOS D	Y	105	125 (SBTR)
*	Kiggins P&R @ Main St.									Westbound Left/Right	> 100	F	0.21	LOS E	N	130	150 (WBLR)
																430	450 (SBT)
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	29.7	C	0.67	LOS D	Y	1135	375 (SB - F/I-5)	***Overall Intersection***	29.5	C	0.68	LOS D	Y	430	400 (NBL)
								1550	425 (SB - F/Main)							2105	225 (SB - F/I-5)
																1550	325 (SB - F/Main)
72	Ross St. @ Main St.	***Overall Intersection***	16.0	B	0.70	LOS D	Y	60	75 (WBL)	***Overall Intersection***	17.7	B	0.82	LOS D	N	60	75 (WBL)
								60	75 (WBR)							60	75 (WBR)
																200	200 (NBR)
73	Ross St. @ North Rd.	Southbound Thru/Right	70.1	F	0.38	LOS E	N	-	-	Southbound Thru/Right	> 100	F	0.98	LOS E	Y	935	950 (SBTR)
																1175	1175 (NBLT)

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.

* Intersection not modeled in existing conditions scenario

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 7-33

LRT I-5 Full Length Alignment Park-and-Ride Trip Generation								
	Trip	Parking	AM Peak Hour Trip Generation			PM Peak Hour Trip Generation		
Park-and-Ride Lot	**Type**	**Spaces**	**Arrivals**	**Departures**	**Total**	**Arrivals**	**Departures**	**Total**
Kiggins Bowl	Park-and-Ride	1,400	615	0	**615**	0	560	**560**
	Kiss-and-Ride	0	155	155	**310**	140	140	**280**
	Total	1,400	770	155	**925**	140	700	**840**
Lincoln	Park-and-Ride	0	0	0	**0**	0	0	**0**
	Kiss-and-Ride	0	0	0	**0**	0	0	**0**
	Total	0	0	0	**0**	0	0	**0**
Clark College	Park-and-Ride	1,100	485	0	**485**	0	385	**385**
	Kiss-and-Ride	0	120	120	**240**	165	165	**330**
	Total	1,100	605	120	**725**	165	550	**715**
Total	**Park-and-Ride**	**2,500**	**1,100**	**0**	**1,100**	**0**	**945**	**945**
	Kiss-and-Ride	**0**	**275**	**275**	**550**	**305**	**305**	**610**
	Total	**2,500**	**1,375**	**275**	**1,650**	**305**	**1,250**	**1,555**

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Exhibit 7-34

Vancouver Intersection Performance Results

AM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 3 - LRT I-5 Full Length)							
#	**Intersection**	**Approach/Movement**	**Delay (Seconds)**	**LOS**	**ICU / V/C[1]**	**Standard[2]**	**Meets Standard**	**Storage Length**	**95% Queue (ft)**	**Approach/Movement**	**Delay (Seconds)**	**LOS**	**ICU / V/C[1]**	**Standard[2]**	**Meets Standard**	**Storage Length**	**95% Queue (ft)**
*	Esther St. @ Columbia Way	Eastbound Left	5.9	A	0.01	LOS E	Y	-	-	Southbound Left/Right	6.5	A	0.48	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Eastbound Left	5.3	A	0.06	LOS E	Y	-	-	Southbound Thru/Right	7.0	A	0.56	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Eastbound Left/Right	5.2	A	0.05	LOS E	Y	-	-	***Overall Intersection***	14.7	B	0.78	LOS E	Y	100	150 (SBL)
																100	150 (WBL)
																205	225 (WBT)
																150	200 (WBR)
*	SR 14 and Main Street									***Overall Intersection***	17.4	B	0.59	LOS E	Y	100	150 (SBL)
*	3rd/4th St. @ Esther St.	Westbound Left/Right	4.2	A	0.12	LOS E	Y	-	-	Westbound Left/Right	7.4	A	0.44	LOS E	Y	-	-
02	4th St. @ Columbia St.	Northbound Thru/Right	0.4	A	0.11	LOS E	Y	-	-								
03	4th St. @ Washington St.	Eastbound Right	2.8	A	0.04	LOS E	Y	-	-								
04	5th St. @ Columbia St.	Southbound Left	53.8	F	0.16	LOS E	N	90	100 (SBL)	Northbound Thru	10.5	B	0.61	LOS E	Y	90	100 (SBL)
								210	225 (SBT)								
05	5th St. @ Washington St.	***Overall Intersection***	49.2	D	0.44	LOS E	Y	185	200 (EBR to I-5)	Southbound Right	16.6	B	0.06	LOS E	Y	-	-
								210	225 (SBL)								
								210	225 (SBT)								
*	5th St. @ Main St.									***Overall Intersection***	8.1	A	0.66	LOS E	Y	-	-
06	6th St. @ Columbia St.	***Overall Intersection***	26.5	C	0.47	LOS E	Y	185	225 (WBL)	***Overall Intersection***	13.4	B	0.91	LOS E	Y	75	125 (NBL)
																205	225 (NBTR)
07	6th St. @ Washington St.	***Overall Intersection***	61.6	E	0.49	LOS E	Y	220	225 (WBLT)	***Overall Intersection***	12.5	B	0.78	LOS E	Y	-	-
								490	500 (SBT)								
08	6th St. @ Main St.	Westbound Left/Thru/Right	27.9	D	0.87	LOS E	Y	230	250 (WBLT)	Eastbound Left/Thru/Right	23.3	C	1.20	LOS E	Y	205	225 (EBLTR)
09	6th St. @ Broadway	Southbound Right	32.1	D	0.44	LOS E	Y	-	-								
10	6th St. @ C St.	Northbound Left/Thru	79.0	F	-	LOS E	N	850	850 (NBLT)								
11	8th St. @ Esther St.	Southbound Left/Thru/Right	8.7	A	0.31	LOS E	Y	-	-	Northbound Left/Thru/Right	6.9	A	0.40	LOS E	Y	-	-
12	8th St. @ Columbia St.	***Overall Intersection***	15.4	B	0.98	LOS E	Y	195	200 (WBLTR)	***Overall Intersection***	13.8	B	0.96	LOS E	Y	-	-
13	8th St. @ Washington St.	***Overall Intersection***	25.4	C	0.59	LOS E	Y	100	125 (WBL)	***Overall Intersection***	8.8	A	0.63	LOS E	Y	-	-
								205	225 (SBLT)								
14	8th St. @ Main St.	***Overall Intersection***	12.6	B	0.71	LOS E	Y	-	-	***Overall Intersection***	13.9	B	0.58	LOS E	Y	-	-
15	8th St. @ Broadway	Southbound Left/Thru/Right	10.7	B	-	LOS E	Y	-	-	Southbound Left/Thru/Right	9.9	A	1.16	LOS E	Y	-	-
16	8th St. @ C St.	***Overall Intersection***	16.5	B	0.58	LOS E	Y	-	-	***Overall Intersection***	11.6	B	0.53	LOS E	Y	-	-
17	9th St. @ Esther St.	Westbound Left/Thru/Right	4.4	A	0.08	LOS E	Y	-	-	Westbound Left/Thru/Right	6.2	A	0.08	LOS E	Y	-	-
18	9th St. @ Columbia St.	Westbound Left/Thru/Right	7.8	A	0.19	LOS E	Y	-	-	Southbound Left/Thru/Right	2.5	A	0.03	LOS E	Y	-	-
19	9th St. @ Washington St.	Westbound Left	67.4	F	0.06	LOS E	N	-	-	***Overall Intersection***	3.9	A	0.35	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	5.9	A	0.07	LOS E	Y	-	-	Northbound Left/Thru/Right	1.9	A	0.03	LOS E	Y	-	-
21	9th St. @ Broadway	Eastbound Left/Right	4.8	A	0.05	LOS E	Y	-	-	Southbound Thru/Right	1.2	A	0.20	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Northbound Left/Thru/Right	7.8	A	0.18	LOS E	Y	-	-	Westbound Left/Thru/Right	2.9	A	0.06	LOS E	Y	-	-
23	Evergreen Blvd. @ Columbia St.	***Overall Intersection***	15.3	B	0.73	LOS E	Y	205	225 (WBTR)	***Overall Intersection***	20.7	C	0.92	LOS E	Y	225	225 (WBTR)
																100	150 (NBL)
																205	275 (SBL)
24	Evergreen Blvd. @ Washington St.	***Overall Intersection***	22.9	C	0.61	LOS E	Y	75	100 (WBL)	***Overall Intersection***	14.6	B	0.57	LOS E	Y	210	225 (WBT)
								210	225 (SBTR)								
25	Evergreen Blvd. @ Main St.	***Overall Intersection***	17.0	B	0.77	LOS E	Y	220	225 (WBLTR)	***Overall Intersection***	13.3	B	0.80	LOS E	Y	220	225 (WBLTR)
26	Evergreen Blvd. @ Broadway	***Overall Intersection***	15.8	B	0.78	LOS E	Y	75	125 (WBL)	***Overall Intersection***	13.3	B	0.81	LOS E	Y	75	125 (WBL)
								210	225 (WBTR)							210	225 (WBTR)
27	Evergreen Blvd. @ C St.	***Overall Intersection***	15.7	B	0.68	LOS E	Y	-	-	***Overall Intersection***	12.6	B	0.84	LOS E	Y	-	-
28	11th St. @ Esther St.	Southbound Left/Thru/Right	4.7	A	0.06	LOS E	Y	-	-	Westbound Left/Thru/Right	4.8	A	0.01	LOS E	Y	-	-
29	11th St. @ Columbia St.	Westbound Left/Thru/Right	12.1	B	0.42	LOS E	Y	-	-	Westbound Left/Thru/Right	11.8	B	0.34	LOS E	Y	-	-
30	11th St. @ Washington St.	Westbound Left/Thru	26.2	C	0.38	LOS E	Y	-	-	***Overall Intersection***	11.1	B	0.37	LOS E	Y	-	-
31	11th St. @ Main St.	Westbound Left/Thru/Right	14.1	B	0.23	LOS E	Y	-	-	Westbound Left/Thru/Right	8.2	A	0.38	LOS E	Y	-	-
32	11th St. @ Broadway	Westbound Left/Thru/Right	8.6	A	0.20	LOS E	Y	-	-	Southbound Left/Thru/Right	2.3	A	0.04	LOS E	Y	-	-
33	11th St. @ C St.	Eastbound Left/Thru	6.4	A	0.26	LOS E	Y	-	-	Eastbound Left/Thru/Right	5.3	A	0.20	LOS E	Y	-	-
34	Mill Plain Blvd. @ Columbia St.	***Overall Intersection***	18.9	B	0.82	LOS E	Y	75	150 (SBL)	***Overall Intersection***	> 100	F	1.20	LOS E	N	810	825 (EBLTR)
								210	225 (SBT)							150	200 (NBR)
																75	150 (SBL)
																210	225 (SBT)
35	Mill Plain Blvd. @ Washington St.	***Overall Intersection***	7.8	A	0.49	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.88	LOS E	N	220	225 (EBLTR)
																205	225 (SBT)
																210	225 (NBTR)
36	Mill Plain Blvd. @ Main St.	***Overall Intersection***	13.1	B	1.10	LOS E	Y	70	150 (SBL)	***Overall Intersection***	81.3	F	1.08	LOS E	N	205	225 (EBLTR)
								210	225 (SBT)							70	150 (SBL)
																210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	***Overall Intersection***	10.3	B	0.90	LOS E	Y	70	75 (SBL)	***Overall Intersection***	67.3	E	1.07	LOS E	Y	210	225 (EBTR)
								200	200 (SBT)							70	150 (SBL)
																205	225 (SBT)
38	Mill Plain Blvd. @ C St.	***Overall Intersection***	6.5	A	0.43	LOS E	Y	-	-	***Overall Intersection***	91.6	F	0.63	LOS E	N	200	200 (EBLTR)
																195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	15.3	B	0.78	LOS E	Y	275	350 (WBL)	Southbound Right	> 100	F	0.00	LOS E	N	255	1175 (SBR)
																350	375 (EBR)
																125	125 (WBT)
																255	1175 (SBR)
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps									***Overall Intersection***	> 100	F	0.65	LOS E	N	775	800 (EBL)
																740	750 (WBT)
																265	1375 (NBL)
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	36.3	D	0.88	LOS E	Y	75	125 (WBR)	Northbound Left/Thru	> 100	F	0.00	LOS E	N	-	-
								590	600 (NBLT)								
								325	500 (NBR)								
41	15th St. @ Columbia St.	***Overall Intersection***	24.9	C	0.82	LOS E	Y	-	-	***Overall Intersection***	52.9	D	1.20	LOS E	Y	240	250 (WBLTR)
																700	700 (SBTR)
42	15th St. @ Washington St.	***Overall Intersection***	11.6	B	0.58	LOS E	Y	-	-	***Overall Intersection***	31.6	C	0.88	LOS E	Y	205	275 (WBL)
																205	225 (WBT)
43	15th St. @ Main St.	***Overall Intersection***	23.4	C	1.10	LOS E	Y	195	200 (WBLT)	***Overall Intersection***	52.8	D	1.08	LOS E	Y	190	200 (WBLTR)
																755	775 (SBTR)
44	15th St. @ Broadway	***Overall Intersection***	20.5	C	0.90	LOS E	Y	205	225 (WBLT)	***Overall Intersection***	86.5	F	1.07	LOS E	N	200	200 (WBLTR)
																775	775 (SBT)
45	15th St. @ C St.	***Overall Intersection***	13.5	B	0.59	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.74	LOS E	N	870	875 (WBLTR)
																490	500 (SBTR)
46	McLoughlin Blvd. @ Columbia St.	***Overall Intersection***	14.6	B	0.82	LOS E	Y	-	-	***Overall Intersection***	> 100	F	0.72	LOS E	N	510	525 (WBLTR)
																1365	1375 (SBLTR)
47	McLoughlin Blvd. @ Main St.	***Overall Intersection***	21.9	C	0.91	LOS E	Y	-	-	***Overall Intersection***	83.3	F	0.72	LOS E	N	100	125 (WBL)
																225	225 (WBTR)
																50	100 (SBR)
48	McLoughlin Blvd. @ Broadway	***Overall Intersection***	22.5	C	0.69	LOS E	Y	75	125 (WBL)	***Overall Intersection***	78.0	E	0.52	LOS E	Y	75	100 (EBL)
								105	125 (WBR)							100	125 (WBL)
																1095	1100 (WBTR)
*	McLoughlin Blvd. @ Clark College P&R									***Overall Intersection***	12.2	B	0.23	LOS D	Y	-	-
49	McLoughlin Blvd. @ Fort Vancouver Way	***Overall Intersection***	12.3	B	0.50	LOS D	Y	-	-	***Overall Intersection***	13.7	B	0.48	LOS D	Y	-	-
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	17.7	C	0.07	LOS E	Y	-	-	Westbound Left/Thru/Right	> 100	F	0.09	LOS E	N	435	450 (SBLTR)
51	24th St. @ Main St.	Eastbound Left/Right	8.9	A	0.09	LOS E	Y	-	-	Eastbound Left/Right	21.3	C	0.05	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	33.3	C	0.83	LOS D	Y	150	175 (WBL)	***Overall Intersection***	75.0	E	0.71	LOS D	N	150	200 (WBL)
								75	100 (SBL)							75	75 (SBL)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	43.9	D	0.87	LOS D	Y	170	225 (WBL)	***Overall Intersection***	60.8	E	0.80	LOS D	N	195	200 (WBTR)
								195	200 (WBT)							75	75 (NBR)
								75	125 (SBL)							75	125 (SBL)
								470	475 (SBTR)							475	475 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	0.80	LOS D	N	195	200 (EBLT)	***Overall Intersection***	91.3	F	0.97	LOS D	Y*	125	150 (WBL)
								125	150 (WBL)							495	500 (WBTR)
								495	500 (WBT)							440	450 (SBLTR)
								440	450 (SBLTR)								
55	4th Plain Blvd. @ F St.	***Overall Intersection***	21.3	C	0.58	LOS D	Y	150	150 (EBT)	***Overall Intersection***	14.7	B	0.67	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	23.4	C	0.69	LOS D	Y	200	275 (EBL)	***Overall Intersection***	96.2	F	0.85	LOS D	N	200	275 (EBL)
																545	550 (EBT)
																960	975 (WBT)
																960	975 (WBR)
																1550	1600 (SBL)
																400	550 (SBR)
*	I-5 NB On-/Off-Ramps @ Clark College P&R									***Overall Intersection***	14.4	B	0.40	LOS D	Y	50	75 (NBR)
																75	75 (SBR)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	19.5	B	0.61	LOS D	Y	75	125 (WBR)	***Overall Intersection***	18.2	B	0.63	LOS D	Y	150	175 (EBR)
																150	200 (WBL)
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	7.0	A	0.01	LOS E	Y	-	-	Eastbound Left	4.9	A	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	19.8	B	0.51	LOS D	Y	-	-	***Overall Intersection***	14.1	B	0.49	LOS D	Y	-	-
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.18	LOS E	N	215	275 (EBL)	Eastbound Left/Thru/Right	> 100	F	0.10	LOS E	Y**	325	325 (EBLTR)
																215	225 (SBTR)
61	28th St. @ Broadway	Westbound Left	23.6	C	0.32	LOS E	Y	-	-	Westbound Left	23.7	C	0.45	LOS E	Y	-	-
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	1000	1000 (SBTR)	Westbound Left/Thru/Right	> 100	F	-	LOS D	Y**	150	150 (WBLTR)
																1000	950 (SBTR)
63	33rd St. @ Main St.	***Overall Intersection***	51.0	D	0.83	LOS D	Y	50	75 (EBL)	***Overall Intersection***	37.6	D	0.66	LOS D	Y	50	50 (EBL)
								50	100 (WBL)							50	75 (WBL)
								75	125 (NBL)							75	75 (SBL)
								75	125 (SBL)								

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Exhibit 7-34 - continued

Vancouver Intersection Performance Results

AM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 3 - LRT I-5 Full Length)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.06	LOS D	N	75	125 (EBL)	***Overall Intersection***	> 100	F	1.00	LOS D	Y**	75	125 (EBL)
								1310	1325 (EBTR)							1305	1325 (EBTR)
								75	150 (WBL)							75	125 (WBL)
								215	225 (WBTR)							215	225 (WBTR)
								75	125 (NBL)							75	125 (NBL)
								125	200 (SBL)							125	175 (SBL)
								360	375 (SBT)							360	375 (SBTR)
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.18	LOS E	N	305	325 (NBLR)	Southbound Left/Thru/Right	> 100	F	0.02	LOS E	Y**	-	-
								50	75 (WBL)							435	450 (WBTR)
								430	450 (WBTR)								
								325	400 (SBLR)								
66	39th St. @ H St.	***Overall Intersection***	39.7	D	0.74	LOS D	Y	430	450 (EBTR)	***Overall Intersection***	54.5	D	0.84	LOS E	Y	435	450 (EBTR)
								135	150 (WBTR)							140	150 (WBTR)
																310	325 (SBLTR)
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.67	LOS D	N	135	150 (EBT)	Northbound Left	68.1	E	0.30	LOS D	Y*	55	100 (EBR)
								55	125 (EBR)							730	750 (WBT)
								715	725 (WBT)								
								1660	1700 (NBL)								
								125	275 (NBR)								
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.88	LOS D	N	1170	1175 (WBTR)	***Overall Intersection***	> 100	F	0.80	LOS D	Y**	1175	1175 (WBT)
								790	800 (NBLT)							790	800 (NBL)
								75	100 (NBR)								
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	> 100	F	0.66	LOS D	N	150	225 (SBL)	***Overall Intersection***	16.9	B	0.49	LOS D	Y	-	-
								1170	1175 (SBT)								
70	45th St. @ Main St.	***Overall Intersection***	41.1	D	0.74	LOS D	Y	260	275 (SBT)	***Overall Intersection***	18.3	B	0.72	LOS D	Y	125	175 (SBL)
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	> 100	F	0.80	LOS D	N	2105	2125 (SB - F/I-5)	***Overall Intersection***	> 100	F	0.87	LOS D	Y**	150	200 (EBR)
								1570	1575 (SB - F/Main)							1785	1500 (SB F/Main)
*	Kiggins Bowl P&R/Hazel Dell @ Main St.									***Overall Intersection***	6.0	A	0.40	LOS D	Y	-	-
72	Ross St. @ Main St.	***Overall Intersection***	> 100	F	0.53	LOS D	N	60	100 (WBL)	***Overall Intersection***	12.1	B	0.62	LOS D	Y	60	75 (WBL)
								225	275 (SBL)								
								1290	1600 (SBT)								
73	Ross St. @ North Rd.	Northbound Left/Thru	> 100	F	0.57	LOS E	N	-	-	Northbound Left/Thru	13.4	B	0.57	LOS E	Y	-	-

Delay / LOS affected by freeway congestion
Intersection queuing spills back into upstream intersection
Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.
Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.
* Intersection not modeled in existing conditions scenario
Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.
Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 7-35

Vancouver Intersection Performance Results

PM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 3 - LRT I-5 Full Length)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
*	Esther St. @ Columbia Way	Eastbound Left	6.3	A	0.08	LOS E	Y	-	-	Westbound Left/Thru/Right	14.2	B	0.07	LOS E	Y	-	-
*	Columbia St. @ Columbia Way	Eastbound Left	7.0	A	0.10	LOS E	Y	-	-	Southbound Left/Right	14.2	B	0.70	LOS E	Y	-	-
01	3rd/4th St. @ Columbia St	Eastbound Left/Right	7.4	A	0.17	LOS E	Y	-	-	***Overall Intersection***	43.5	D	0.60	LOS E	Y	100	125 (WBL)
																146	150 (SBL)
																430	450 (SBTR)
																159	175 (WBR)
*	SR 14 and Main Street									***Overall Intersection***	62.2	E	0.85	LOS E	Y	100	150 (SBL)
																300	300 (EBTR)
																565	575 (SBT)
*	3rd/4th St. @ Esther St.	Southbound Left/Thru	2.9	A	0.01	LOS E	Y	-	-	Southbound Left/Thru	21.5	C	0.03	LOS E	Y	-	-
02	4th St. @ Columbia St.	Northbound Thru/Right	0.9	A	0.25	LOS E	Y	-	-								
03	4th St. @ Washington St.	Eastbound Right	2.6	A	0.02	LOS E	Y	-	-								
04	5th St. @ Columbia St.	Southbound Left	15.7	C	0.43	LOS E	Y	90	150 (SBL)	Northbound Thru	30.0	D	0.27	LOS E	Y	205	225 (SBT)
05	5th St. @ Washington St.	***Overall Intersection***	18.3	B	0.54	LOS E	Y	180	225 (EBR to SR-14)	Southbound Right	1.6	A	0.07	LOS E	Y	-	-
								210	225 (SBT)								
*	5th St. @ Main St.									***Overall Intersection***	29.8	C	0.63	LOS E	Y	210	225 (WBLTR)
																175	175 (SBLT)
06	6th St. @ Columbia St.	***Overall Intersection***	25.1	C	0.75	LOS E	Y	75	100 (SBL)	***Overall Intersection***	53.9	D	0.82	LOS E	Y	210	275 (WBL)
																205	225 (NBTR)
07	6th St. @ Washington St.	***Overall Intersection***	30.5	C	0.59	LOS E	Y	220	225 (WBLT)	***Overall Intersection***	22.7	C	0.49	LOS E	Y	-	-
08	6th St. @ Main St.	Westbound Left/Thru/Right	11.4	B	0.48	LOS E	Y	-	-	Eastbound Left/Thru/Right	20.5	C	0.67	LOS E	Y	207	225 (EBLTR)
09	6th St. @ Broadway	Southbound Right	5.6	A	0.27	LOS E	Y	-	-								
10	6th St. @ C St.	Northbound Left/Thru	4.6	A	0.74	LOS E	Y	-	-								
11	8th St. @ Esther St.	Northbound Left/Thru/Right	> 100	F	0.64	LOS E	N	-	-	Eastbound Left/Thru/Right	65.8	F	0.01	LOS E	Y*	535	550 (EBLTR)
12	8th St. @ Columbia St.	***Overall Intersection***	51.4	D	1.22	LOS E	Y	500	500 (EBLTR)	***Overall Intersection***	74.7	E	1.00	LOS E	Y	75	150 (EBL)
								215	225 (SBLTR)							220	225 (WBLTR)
																171	175 (NBL)
																495	500 (NBTR)
																500	500 (EBTR)
																120	125 (SBL)
																210	225 (SBTR)
13	8th St. @ Washington St.	***Overall Intersection***	19.0	B	0.60	LOS E	Y	100	125 (WBL)	***Overall Intersection***	32.0	C	0.80	LOS E	Y	220	300 (EBLTR)
																210	225 (WBTR)
																203	225 (SBTR)
14	8th St. @ Main St.	***Overall Intersection***	18.9	B	0.66	LOS E	Y	-	-	***Overall Intersection***	32.3	C	0.89	LOS E	Y	210	225 (EBLTR)
																220	225 (WBLTR)
																205	225 (SBLTR)
15	8th St. @ Broadway	Southbound Left/Thru/Right	12.1	B	0.54	LOS E	Y	-	-	Southbound Left/Thru/Right	26.8	D	1.27	LOS E	Y	-	-
16	8th St. @ C St.	***Overall Intersection***	20.6	C	0.48	LOS E	Y	-	-	***Overall Intersection***	19.5	B	0.87	LOS E	Y	217	225 (EBLR)
17	9th St. @ Esther St.	Eastbound Left/Thru/Right	97.0	F	0.03	LOS E	N	-	-	Northbound Left/Thru/Right	19.1	C	0.01	LOS E	Y	-	-
18	9th St. @ Columbia St.	Eastbound Left/Thru/Right	82.7	F	0.24	LOS E	N	-	-	Northbound Left/Thru/Right	17.9	C	0.01	LOS E	Y	210	225 (NBLTR)
19	9th St. @ Washington St.	Westbound Thru	15.4	C	0.11	LOS E	Y	-	-	***Overall Intersection***	10.6	B	0.38	LOS E	Y	-	-
20	9th St. @ Main St.	Eastbound Left/Thru/Right	8.9	A	0.06	LOS E	Y	-	-	Eastbound Left/Thru/Right	20.0	C	0.58	LOS E	Y	-	-
21	9th St. @ Broadway	Northbound Left/Thru	9.3	A	0.25	LOS E	Y	-	-	Eastbound Left/Right	7.9	A	0.20	LOS E	Y	-	-
22	Evergreen Blvd. @ Esther St.	Southbound Left/Thru/Right	9.5	A	0.18	LOS E	Y	-	-	Eastbound Left/Thru/Right	> 100	F	0.01	LOS E	N	535	550 (EBLTR)
																215	225 (NBLTR)
23	Evergreen Blvd. @ Columbia St.	***Overall Intersection***	21.1	C	0.73	LOS E	Y	100	125 (EBL)	***Overall Intersection***	65.9	E	0.85	LOS E	Y	100	150 (EBL)
																510	525 (EBTR)
																133	150 (WBL)
																220	225 (NBTR)
24	Evergreen Blvd. @ Washington St.	***Overall Intersection***	13.5	B	0.65	LOS E	Y	75	100 (WBL)	***Overall Intersection***	17.3	B	0.78	LOS E	Y	225	225 (EBLTR)
25	Evergreen Blvd. @ Main St.	***Overall Intersection***	17.8	B	0.67	LOS E	Y	215	225 (NBLTR)	***Overall Intersection***	30.7	C	0.78	LOS E	Y	210	275 (EBLTR)
																215	225 (NBLTR)
																210	225 (SBLTR)
26	Evergreen Blvd. @ Broadway	***Overall Intersection***	20.3	C	0.64	LOS E	Y	220	225 (NBLTR)	***Overall Intersection***	15.3	B	0.73	LOS E	Y	75	125 (WBL)
																219	225 (NBLTR)
27	Evergreen Blvd. @ C St.	***Overall Intersection***	34.7	C	0.75	LOS E	Y	75	125 (EBL)	***Overall Intersection***	30.9	C	1.12	LOS E	Y	210	225 (SBLTR)
28	11th St. @ Esther St.	Northbound Left/Thru/Right	6.0	A	0.15	LOS E	Y	-	-	Northbound Left/Thru/Right	10.1	B	0.12	LOS E	Y	-	-
29	11th St. @ Columbia St.	Eastbound Left/Thru/Right	28.9	D	0.54	LOS E	Y	-	-	Eastbound Left/Thru/Right	26.9	D	0.62	LOS E	Y	-	-
30	11th St. @ Washington St.	Eastbound Thru/Right	40.8	E	0.24	LOS E	Y	-	-	***Overall Intersection***	14.8	B	0.43	LOS E	Y	-	-
31	11th St. @ Main St.	Eastbound Left/Thru/Right	81.7	F	0.20	LOS E	N	-	-	Eastbound Left/Thru/Right	38.0	E	1.23	LOS E	Y	-	-
32	11th St. @ Broadway	Westbound Left/Thru/Right	> 100	F	0.43	LOS E	N	215	225 (WBLTR)	Southbound Left/Thru/Right	24.2	C	0.12	LOS E	Y	-	-
								210	225 (NBLTR)								
33	11th St. @ C St.	Westbound Right	> 100	F	0.32	LOS E	N	205	225 (WBTR)	Eastbound Left/Thru/Right	53.1	F	0.63	LOS E	Y*	220	225 (EBLTR)
								215	225 (NBT)								
34	Mill Plain Blvd. @ Columbia St.	***Overall Intersection***	> 100	F	0.78	LOS E	N	810	825 (EBLTR)	***Overall Intersection***	> 100	F	1.18	LOS E	Y**	810	825 (EBLTR)
								150	250 (NBR)							191	200 (NBR)
								75	125 (SBL)							84	100 (SBL)
								210	225 (SBT)								
35	Mill Plain Blvd. @ Washington St.	***Overall Intersection***	68.7	E	0.59	LOS E	Y	215	225 (EBTR)	***Overall Intersection***	45.7	D	0.61	LOS E	Y	235	250 (EBLTR)
								210	225 (SBT)								
36	Mill Plain Blvd. @ Main St.	***Overall Intersection***	> 100	F	1.22	LOS E	N	210	225 (EBT)	***Overall Intersection***	63.5	E	1.23	LOS E	Y	205	225 (EBLTR)
								765	775 (NBTR)							765	775 (NBTR)
								70	100 (SBL)							134	150 (SBL)
																210	225 (SBT)
37	Mill Plain Blvd. @ Broadway	***Overall Intersection***	85.8	F	0.85	LOS E	N	210	225 (EBT)	***Overall Intersection***	26.1	C	0.92	LOS E	Y	210	225 (EBLTR)
								770	775 (NBTR)							89	100 (SBL)
								70	125 (SBL)								
38	Mill Plain Blvd. @ C St.	***Overall Intersection***	81.0	F	0.84	LOS E	N	205	225 (EBT)	***Overall Intersection***	95.3	F	1.12	LOS E	N	200	200 (EBLTR)
								765	775 (NBTR)							195	200 (SBLT)
39	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	94.0	F	0.92	LOS E	N	795	800 (EBT)	Eastbound Thru	14.9	B	1.01	LOS E	Y	-	-
								350	525 (EBR)								
								275	400 (WBL)								
*	Mill Plain Blvd. @ I-5 SB On-/Off-Ramps									***Overall Intersection***	52.5	D	1.00	LOS E	Y	-	-
40	Mill Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	35.3	D	0.97	LOS E	Y	450	450 (WBT)	Westbound Thru	40.9	E	0.23	LOS E	Y	-	-
								75	150 (WBR)								
								325	375 (NBR)								
41	15th St. @ Columbia St.	***Overall Intersection***	12.4	B	0.78	LOS E	Y	210	225 (NBT)	***Overall Intersection***	16.8	B	1.18	LOS E	Y	240	250 (WBLTR)
																88	100 (NBL)
42	15th St. @ Washington St.	***Overall Intersection***	20.6	C	0.43	LOS E	Y	210	250 (WBL)	***Overall Intersection***	20.2	C	0.58	LOS E	Y	205	300 (WBL)
																205	225 (WBT)
43	15th St. @ Main St.	***Overall Intersection***	14.9	B	1.22	LOS E	Y	195	200 (WBT)	***Overall Intersection***	20.7	C	1.23	LOS E	Y	190	200 (WBLTR)
																77	100 (NBL)
44	15th St. @ Broadway	***Overall Intersection***	18.8	B	0.85	LOS E	Y	205	225 (WBT)	***Overall Intersection***	21.8	C	0.92	LOS E	Y	200	200 (WBLTR)
								70	150 (NBL)							107	125 (NBL)
								25	75 (SBR)							30	50 (SBR)
45	15th St. @ C St.	***Overall Intersection***	31.7	C	0.55	LOS E	Y	195	200 (NBLT)	***Overall Intersection***	81.2	F	0.81	LOS E	N	875	875 (WBLTR)
																490	500 (SBTR)
46	McLoughlin Blvd. @ Columbia St.	***Overall Intersection***	59.1	E	0.73	LOS E	Y	-	-	***Overall Intersection***	17.1	B	0.62	LOS E	Y	-	-
47	McLoughlin Blvd. @ Main St.	***Overall Intersection***	93.8	F	0.86	LOS E	N	500	500 (EBLTR)	***Overall Intersection***	28.0	C	0.74	LOS E	Y	100	100 (EBLTR)
								755	775 (NBLTR)							50	50 (SBLTR)
48	McLoughlin Blvd. @ Broadway	***Overall Intersection***	> 100	F	0.55	LOS E	N	75	125 (EBL)	***Overall Intersection***	31.2	C	0.53	LOS E	Y	84	100 (EBL)
								220	225 (EBTR)							88	100 (WBL)
								105	175 (WBR)								
*	McLoughlin Blvd. @ Clark College P & R									***Overall Intersection***	7.6	A	0.36	LOS D	Y	-	-
49	McLoughlin Blvd. @ Fort Vancouver Way	***Overall Intersection***	14.3	B	0.50	LOS D	Y	-	-	***Overall Intersection***	20.9	C	0.55	LOS D	Y	150	175 (SBL)

Continued on next page

Exhibit 7-35 - continued

Vancouver Intersection Performance Results

PM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternative 3 - LRT I-5 Full Length)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
50	24th St. @ Columbia St.	Eastbound Left/Thru/Right	6.9	A	0.02	LOS E	Y	-	-	Northbound Left/Thru/Right	2.2	A	0.01	LOS E	Y	-	-
51	24th St. @ Main St.	Eastbound Left/Right	> 100	F	0.13	LOS E	N	-	-	Northbound Left/Thru	5.1	A	0.02	LOS E	Y	-	-
52	4th Plain Blvd. @ Columbia St.	***Overall Intersection***	> 100	F	0.74	LOS D	N	760	775 (EBTR)	***Overall Intersection***	92.7	F	0.70	LOS D	Y*	760	775 (EBTR)
53	4th Plain Blvd. @ Main St.	***Overall Intersection***	76.4	E	0.84	LOS D	N	250	325 (EBL)	***Overall Intersection***	56.2	E	0.78	LOS D	Y*	250	300 (EBL)
								495	500 (EBTR)							495	500 (EBTR)
								170	225 (WBL)							212	225 (WBL)
								195	200 (WBT)							195	200 (WBTR)
								75	100 (NBL)							102	125 (NBL)
								425	425 (NBT)							425	425 (NBT)
								75	150 (NBR)							130	150 (NBR)
								75	125 (SBL)							125	125 (SBL)
								470	475 (SBTR)							491	500 (SBTR)
54	4th Plain Blvd. @ Broadway	***Overall Intersection***	> 100	F	1.05	LOS D	N	195	200 (EBTR)	***Overall Intersection***	29.6	C	1.00	LOS D	Y	195	200 (EBLTR)
								125	175 (WBL)							176	200 (NBL)
								495	550 (WBT)								
								1800	1800 (NBLTR)								
55	4th Plain Blvd. @ F St.	***Overall Intersection***	11.0	B	0.57	LOS D	Y	150	150 (EBT)	***Overall Intersection***	9.2	A	0.61	LOS D	Y	150	150 (EBT)
56	4th Plain Blvd. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	36.6	D	0.92	LOS D	Y	200	275 (EBL)	***Overall Intersection***	53.8	D	0.93	LOS D	Y	200	275 (EBL)
								555	575 (EBT)							554	575 (EBT)
								850	850 (WBT)							990	1000 (WBT)
																1232	1250 (WBR)
*	I-5 NB On-/Off-Ramps @ Clark College P&R									***Overall Intersection***	49.9	D	0.47	LOS D	Y	355	375 (WBT)
																355	375 (WBR)
																430	450 (SBL)
																125	125 (SBR)
57	4th Plain Blvd. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.88	LOS D	N	275	350 (EBL)	***Overall Intersection***	37.5	D	0.79	LOS D	Y	670	675 (WBT)
								850	850 (EBT)							165	175 (NBR)
								840	850 (WBT)							223	225 (EBR)
								75	150 (WBR)							261	275 (WBL)
								3225	3200 (NBLT)								
								600	900 (NBR)								
58	4th Plain Blvd. @ Post Cemetery	Eastbound Left	50.2	F	0.01	LOS E	N	-	-	Eastbound Left	6.9	A	0.01	LOS E	Y	-	-
59	4th Plain Blvd. @ St. Johns Blvd.	***Overall Intersection***	69.5	E	0.66	LOS D	N	170	225 (EBL)	***Overall Intersection***	23.0	C	0.62	LOS D	Y	170	250 (EBL)
								805	825 (EBT)								
								150	175 (NBL)								
60	28th St. @ Main St.	Eastbound Left/Thru/Right	> 100	F	0.05	LOS E	N	-	-	Southbound Thru/Right	4.5	A	0.29	LOS E	Y	-	-
								215	225 (SBTR)								
61	28th St. @ Broadway	Northbound Thru/Right	52.8	F	0.37	LOS E	N	-	-	Northbound Thru/Right	1.7	A	0.11	LOS D	Y	-	-
62	29th St. @ Main St./Broadway	Westbound Left/Thru/Right	> 100	F	-	LOS E	N	150	150 (WBLTR)	***Overall Intersection***	4.4	A	0.00	LOS D	Y	-	-
								430	450 (EBLTR)								
								215	225 (NBTR)								
								100	100 (SBTR)								
								210	300 (NWR)								
63	33rd St. @ Main St.	***Overall Intersection***	> 100	F	0.66	LOS D	N	50	100 (EBL)	***Overall Intersection***	38.3	D	0.56	LOS D	Y	50	100 (EBL)
								770	775 (EBTR)							81	100 (WBL)
								50	100 (WBL)							96	100 (SBL)
								600	600 (WBTR)								
								1000	1000 (NBT)								
								75	100 (SBL)								
64	39th St. @ Main St.	***Overall Intersection***	> 100	F	1.10	LOS D	N	75	150 (EBL)	***Overall Intersection***	> 100	F	1.16	LOS D	Y**	75	125 (EBL)
								1270	1275 (EBTR)							1310	1325 (EBTR)
								75	125 (WBL)							111	125 (WBL)
								215	225 (WBTR)							215	225 (WBTR)
								75	125 (NBL)							114	125 (NBL)
								1570	1575 (NBTR)							151	175 (SBL)
								125	175 (SBL)							360	375 (SBT)
								360	375 (SBT)								
65	39th St. @ F St.	Northbound Left/Thru/Right	> 100	F	0.61	LOS E	N	305	325 (NBLR)	Northbound Left/Thru/Right	> 100	F	0.47	LOS E	Y**	60	75 (WBL)
								215	225 (EBTR)							430	450 (WBTR)
								50	75 (WBL)							305	325 (NBLTR)
								430	450 (WBTR)								
66	39th St. @ H St.	***Overall Intersection***	> 100	F	0.85	LOS D	N	430	450 (EBTR)	***Overall Intersection***	25.1	C	0.81	LOS D	Y	140	150 (WBTR)
								135	150 (WBTR)								
								310	325 (SBLTR)								
67	39th St. @ I-5 SB On-/Off-Ramps	***Overall Intersection***	48.0	D	0.86	LOS D	Y	135	150 (EBT)	***Overall Intersection***	54.0	D	0.00	LOS D	Y	55	100 (EBR)
								55	125 (EBR)							765	775 (WBT)
								710	725 (WBT)								
								1660	1175 (NBR)								
68	39th St. @ I-5 NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.95	LOS D	N	300	350 (EBL)	***Overall Intersection***	> 100	F	0.77	LOS D	Y**	1175	1175 (WBT)
								710	725 (EBT)							863	875 (NBL)
								1170	1175 (WBTR)							141	150 (NBR)
								790	800 (NBLT)								
								75	125 (NBR)								
69	WSDOT/40th St. @ Main St.	***Overall Intersection***	80.4	F	0.59	LOS D	N	1170	1175 (SBT)	***Overall Intersection***	62.5	E	0.41	LOS D	Y*	1200	1200 (SBTR)
70	45th St. @ Main St.	***Overall Intersection***	17.6	B	0.55	LOS D	Y	-	-	***Overall Intersection***	29.2	C	0.72	LOS D	Y	200	225 (EBL)
																125	125 (SBTR)
71	Hazel Dell @ Main St. (West)	***Overall Intersection***	29.7	C	0.67	LOS D	Y	1135	375 (SB - F/I-5)	***Overall Intersection***	42.9	D	0.81	LOS D	Y	315	375 (NBL)
								1550	425 (SB - F/Main)								
*	Kiggins Bowl P&R/Hazel Dell @ Main St.									***Overall Intersection***	6.2	A	0.57	LOS D	Y	80	100 (EBL)
72	Ross St. @ Main St.	***Overall Intersection***	16.0	B	0.70	LOS D	Y	60	75 (WBL)	***Overall Intersection***	16.7	B	0.79	LOS D	Y	60	100 (WBL)
								60	75 (WBR)							73	75 (WBR)
73	Ross St. @ North Rd.	Southbound Thru/Right	70.1	F	0.38	LOS E	N	-	-	Southbound Thru/Right	> 100	F	0.35	LOS E	N	935	950 (SBTR)
																1175	1175 (NBLT)

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 The 2003 Vancouver Concurrency Administration Manual designates an acceptable LOS standard of LOS E for downtown and LOS D for all other intersections.

* Intersection not modeled in existing conditions scenario

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 7-36

Portland Intersection Performance Results

AM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternatives 2 and 3)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	87.6	F	0.93	LOS D	N	125	250 (WBL)	***Overall Intersection***	65.0	E	0.92	LOS D	Y*	125	250 (WBL)
																125	150 (SBL)
02	Going and Interstate	***Overall Intersection***	52.9	D	0.88	LOS D	Y	125	275 (WBL)	***Overall Intersection***	64.9	E	0.88	LOS D	N	355	500 (EBL)
								125	150 (NBL)							125	300 (WBL)
								355	450 (EBL)							125	225 (NBL)
03	Alberta and Interstate	***Overall Intersection***	27.5	C	0.73	LOS D	Y	100	150 (SBL)	***Overall Intersection***	31.0	C	0.79	LOS D	Y	100	150 (SBL)
04	Alberta and SB I-5 Off-Ramp	***Overall Intersection***	46.3	D	0.78	0.85	Y	75	125 (WBL)	***Overall Intersection***	20.6	C	0.77	0.85	Y	75	125 (WBL)
								175	175 (WBT)							175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	***Overall Intersection***	53.9	D	0.43	0.85	Y	75	100 (EBL)	***Overall Intersection***	31.7	C	0.47	0.85	Y	75	100 (EBL)
06	Alberta and MLK Jr.	***Overall Intersection***	39.8	D	0.89	LOS D	Y	75	125 (WBR)	***Overall Intersection***	31.0	C	0.87	LOS D	Y	75	125 (WBR)
								100	150 (NBL)							100	150 (NBL)
								100	125 (SBL)							100	150 (SBL)
07	Portland and Interstate	***Overall Intersection***	20.6	C	0.62	LOS D	Y	100	125 (WBL)	***Overall Intersection***	22.6	C	0.65	LOS D	Y	100	150 (WBL)
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	18.8	B	0.53	0.85	Y	125	150 (SWR)	***Overall Intersection***	19.3	B	0.53	0.85	Y	190	225 (WBL)
																125	150 (SBR)
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	12.6	B	0.44	0.85	Y	-	-	***Overall Intersection***	13.5	B	0.47	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	14.7	B	0.70	LOS D	Y	100	150 (NBL)	***Overall Intersection***	14.3	B	0.71	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	***Overall Intersection***	> 100	F	0.90	0.99	Y	150	325 (WBL)	***Overall Intersection***	> 100	F	0.88	0.99	Y	150	200 (EBL)
								225	275 (NBL)							150	300 (WBL)
								150	275 (EBL)							555	850 (WBTR)
								1155	1175 (EBTR)							225	275 (NBL)
								555	1100 (WBTR)								
12	Lombard and I-5 SB On-Ramps	Westbound Thru	12.9	B	0.42	0.85	Y	-	-	Westbound Thru	5.8	A	0.42	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	16.8	C	0.57	0.85	Y	-	-	Northbound Right	8.1	A	0.63	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	> 100	F	0.88	0.99	Y	100	175 (EBL)	***Overall Intersection***	> 100	F	0.89	0.99	Y	100	175 (EBL)
								100	175 (WBL)							100	175 (WBL)
								100	200 (NBL)							100	200 (NBL)
								150	300 (SBL)							150	300 (SBL)
15	Interstate and Argyle	***Overall Intersection***	26.7	C	0.69	LOS D	Y	75	125 (EBR)	***Overall Intersection***	22.4	C	0.67	LOS D	Y	75	125 (EBR)
								50	125 (NBL)							50	125 (NBL)
								150	150 (NBT)							150	150 (NBT)
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	14.9	B	0.63	0.85	Y	150	200 (WBR)	***Overall Intersection***	15.4	B	0.67	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	37.2	D	0.89	0.99	Y	100	200 (NBL)	***Overall Intersection***	36.1	D	0.82	0.99	Y	100	200 (NBL)
								225	250 (SBL)							225	350 (SBL)
18	Victory and Expo Road	Westbound Left/Thru/Right	3.1	A	0.12	LOS E	Y	-	-	Westbound Left/Thru/Right	3.1	A	0.08	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Westbound Left/Thru	1.3	A	0.21	0.85	Y	-	-	Westbound Left/Thru	1.4	A	0.19	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	5.0	A	0.13	0.85	Y	-	-	***Overall Intersection***	5.2	A	0.11	0.85	Y	-	-
21	Union Ct and I-5 NB Off-Ramp	Eastbound Left	8.4	A	0.28	0.85	Y	-	-								
22	Union Ct/Marine Way and Vancouver Way	Northeast Left/Thru	8.4	A	0.55	LOS E	Y	-	-								
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	> 100	F	0.83	0.85	Y	200	2075 (NBL)	***Overall Intersection***	15.2	B	0.52	0.85	Y	-	-
								275	350 (EBL)								
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	11.2	B	0.35	0.85	Y	-	-								
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	9.5	A	0.32	LOS D	Y	-	-								
26	Hayden Island North Ramp Terminal - Center									***Overall Intersection***	10.2	B	0.25	0.85	Y	-	-
27	Hayden Island North Ramp Terminal - West									***Overall Intersection***	2.5	A	0.22	0.85	Y	-	-
28	Hayden Island North Ramp Terminal - East									Northbound Right	1.7	A	0.30	0.85	Y	-	-
29	Hayden Island Drive and N Jantzen Drive									***Overall Intersection***	8.4	A	0.26	LOS D	Y	-	-
30	Hayden Island Drive and Center Ave									***Overall Intersection***	8.4	A	0.34	LOS D	Y	-	-
31	Hayden Island Drive and Jantzen Beach Center									***Overall Intersection***	11.9	B	0.28	LOS D	Y	-	-
32	Tomahawk Island Drive and Jantzen Ave									***Overall Intersection***	11.7	B	0.32	LOS D	Y	-	-
33	Jantzen Beach Center and Jantzen Dr									***Overall Intersection***	6.3	A	0.30	LOS D	Y	-	-
34	Center Ave and Jantzen Ave									***Overall Intersection***	15.6	B	0.32	LOS D	Y	-	-
35	Center Ave and New Central Road									Southbound Left/Thru	6.5	A	0.21	LOS E	Y	-	-
36	Hayden Island South Ramp Terminal - Center									***Overall Intersection***	14.0	B	0.24	0.85	Y	-	-
37	Hayden Island South Ramp Terminal - East									***Overall Intersection***	5.1	A	0.15	0.85	Y	-	-
38	Hayden Island South Ramp Terminal - West									***Overall Intersection***	6.0	A	0.14	0.85	Y	-	-
39	Vancouver Way and MLK on- and off-ramps									***Overall Intersection***	7.9	A	0.44	0.85	Y	150	200 (SBR)
40	Marine Drive and Anchor Way									***Overall Intersection***	2.3	A	0.44	LOS D	Y	-	-
41	Union Court and Vancouver Way									Westbound Left	23.6	C	0.27	LOS E	Y	450	525 (WBL)
																75	125 (NBR)

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1)
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 7-37

Portland Intersection Performance Results

PM Peak Hour		2030 No-Build (Alternative 1)								2030 Replacement Bridge (Alternatives 2 and 3)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	93.6	F	0.99	LOS D	N	125	175 (EBL)	***Overall Intersection***	77.5	E	0.98	LOS D	Y*	125	200 (EBL)
								125	150 (NBL)							125	200 (WBL)
								125	200 (SBL)							125	175 (NBL)
								125	175 (WBL)							125	225 (SBL)
02	Going and Interstate	***Overall Intersection***	65.2	E	0.84	LOS D	N	125	225 (NBL)	***Overall Intersection***	66.0	E	0.83	LOS D	Y	125	175 (WBL)
								125	250 (WBL)							125	175 (NBL)
																300	450 (SBL)
																965	975 (SBTR)
03	Alberta and Interstate	***Overall Intersection***	38.8	D	0.94	LOS D	Y	125	225 (NBL)	***Overall Intersection***	37.3	D	0.90	LOS D	Y	125	200 (NBL)
								100	150 (SBL)							100	125 (SBL)
								965	1150 (NBTR)								
04	Alberta and SB I-5 Off-Ramp	***Overall Intersection***	19.5	B	0.52	0.85	Y	75	125 (WBL)	***Overall Intersection***	16.3	B	0.56	0.85	Y	75	125 (WBL)
								175	175 (WBT)							175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	***Overall Intersection***	17.3	B	0.74	0.85	Y	75	125 (EBL)	***Overall Intersection***	21.4	C	0.76	0.85	Y	75	125 (EBL)
								175	175 (EBT)							175	175 (EBT)
06	Alberta and MLK Jr.	***Overall Intersection***	71.9	E	0.91	LOS D	N	100	200 (NBL)	***Overall Intersection***	21.1	C	0.88	LOS D	Y	100	200 (NBL)
								100	200 (SBL)							100	175 (SBL)
07	Portland and Interstate	***Overall Intersection***	36.3	D	0.75	LOS D	Y	100	200 (WBL)	***Overall Intersection***	77.1	E	0.77	LOS D	N	100	150 (EBL)
								175	225 (NBL)							100	225 (WBL)
																175	325 (NBL)
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	17.2	B	0.52	0.85	Y	125	175 (SWR)	***Overall Intersection***	15.9	B	0.53	0.85	Y	125	150 (SWR)
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	9.3	A	0.40	0.85	Y	-	-	***Overall Intersection***	15.0	B	0.54	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	16.8	B	0.84	LOS D	Y	100	150 (NBL)	***Overall Intersection***	17.0	B	0.82	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	***Overall Intersection***	> 100	F	0.95	0.99	Y	100	200 (NBR)	***Overall Intersection***	> 100	F	0.98	0.99	Y	150	250 (EBL)
								250	275 (SBL)							1150	1150 (EBTR)
								150	250 (EBL)							150	275 (WBL)
								150	300 (WBL)							225	300 (NBL)
								225	300 (NBL)							100	200 (NBR)
								1150	1150 (EBTR)							250	350 (SBL)
12	Lombard and I-5 SB On-Ramps	Westbound Thru	7.6	A	0.56	0.85	Y	-	-	Eastbound Thru/Right	4.7	A	0.54	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	14.9	B	0.55	0.85	Y	-	-	***Overall Intersection***	4.7	A	0.53	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	> 100	F	0.99	0.99	Y	100	200 (EBL)	***Overall Intersection***	> 100	F	0.95	0.99	Y	100	200 (EBL)
								100	200 (WBL)							1730	1750 (EBTR)
								100	225 (NBL)							100	200 (WBL)
								150	250 (SBL)							100	200 (NBL)
								1320	1325 (SBTR)							150	300 (SBL)
								1730	1750 (EBTR)								
15	Interstate and Argyle	***Overall Intersection***	> 100	F	0.63	LOS D	N	1300	1300 (EBLT)	***Overall Intersection***	78.6	E	0.66	LOS D	Y*	75	150 (EBR)
								50	125 (NBL)							50	100 (NBL)
								125	125 (NBT)							125	125 (NBT)
								75	150 (EBR)								
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	11.7	B	0.57	0.85	Y	-	-	***Overall Intersection***	15.1	B	0.62	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	83.5	F	0.74	0.99	Y	350	450 (WBL)	***Overall Intersection***	47.5	D	0.85	0.99	Y	350	425 (WBL)
								100	225 (NBL)							100	225 (NBL)
								225	400 (SBL)							225	400 (SBL)
								150	450 (EBR)								
18	Victory and Expo Road	Southbound Left/Thru	76.6	F	0.45	LOS E	N	-	-	Southbound Left/Thru	8.0	A	0.44	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Eastbound Thru	27.7	D	0.28	0.85	Y	75	75 (EBT)	Eastbound Thru	0.2	A	0.31	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.31	0.85	Y	290	775 (EBL)	***Overall Intersection***	9.1	A	0.40	0.85	Y	-	-
								850	850 (WBT)								
								200	225 (WBR)								
21	Union Ct and I-5 NB Off-Ramp	Northbound Thru	> 100	F	0.20	0.85	Y	200	300 (EBL)								
								1195	1550 (EBR)								
22	Union Ct/Marine Way and Vancouver Way	Northeast Left/Thru	95.4	F	0.82	LOS E	N	75	200 (SBLTR)								
								370	2500 (NBTL)								
								370	2500 (NBTR)								
								55	100 (SWL)								
								55	150 (SWTR)								
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	> 100	F	0.82	0.85	Y	275	400 (EBL)	***Overall Intersection***	18.1	B	0.63	0.85	Y	-	-
								2130	2150 (EBT)								
								373	2925 (WBR)								
								200	1525 (NBLT)								
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	24.8	C	0.80	0.85	Y	115	225 (WBLT)								
								75	125 (WBR)								
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	69.8	E	0.67	LOS D	N	70	100 (WBLR)								
								150	200 (SBL)								
								820	825 (SBT)								
26	Hayden Island North Ramp Terminal - Center									***Overall Intersection***	15.6	B	0.39	0.85	Y	-	-
27	Hayden Island North Ramp Terminal - West									***Overall Intersection***	3.2	A	0.42	0.85	Y	-	-
28	Hayden Island North Ramp Terminal - East									Northbound Right	1.8	A	0.32	0.85	Y	-	-
29	Hayden Island Drive and N Jantzen Drive									***Overall Intersection***	15.1	B	0.40	LOS D	Y	-	-
30	Hayden Island Drive and Center Ave									***Overall Intersection***	11.6	B	0.45	LOS D	Y	-	-
31	Hayden Island Drive and Jantzen Beach Center									***Overall Intersection***	11.6	B	0.40	LOS D	Y	-	-
32	Tomahawk Island Drive and Jantzen Ave									***Overall Intersection***	19.1	B	0.56	LOS D	Y	-	-
33	Jantzen Beach Center and Jantzen Dr									***Overall Intersection***	10.3	B	0.50	LOS D	Y	-	-
34	Center Ave and Jantzen Ave									***Overall Intersection***	15.9	B	0.47	LOS D	Y	-	-
35	Center Ave and New Central Road									Southbound Left/Thru	10.7	B	0.67	LOS E	Y	-	-
36	Hayden Island South Ramp Terminal - Center									***Overall Intersection***	22.4	C	0.36	0.85	Y	-	-
37	Hayden Island South Ramp Terminal - East									***Overall Intersection***	9.4	A	0.32	0.85	Y	-	-
38	Hayden Island South Ramp Terminal - West									***Overall Intersection***	3.9	A	0.23	0.85	Y	-	-
39	Vancouver Way and MLK on- and off-ramps									***Overall Intersection***	8.3	A	0.35	0.85	Y	-	-
40	Marine Drive and Anchor Way									***Overall Intersection***	1.3	A	0.39	LOS D	Y	-	-
41	Union Court and Vancouver Way									Northbound Left	> 100	F	0.59	LOS E	N	-	-

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1).
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

8. Supplemental Crossing (Alternatives 4 and 5)

8.1 Description of Supplemental Alternatives

Alternatives 4 and 5 would involve the construction of a new bridge immediately downstream of the existing I-5 crossing. The new "supplemental" bridge would carry four lanes of southbound I-5 traffic and high-capacity transit. There would not be direct northbound access from Marine Drive to Hayden Island or direct southbound access from Hayden Island to Marine Drive. The existing I-5 bridges would be re-striped into four lanes with standard safety shoulders for northbound traffic, and wider bicycle and pedestrian lanes would be included on the existing bridges. The existing bridges would be retrofitted to a "no collapse" standard to resist a major earthquake.

Under Alternative 4, bus rapid transit would be the high-capacity transit mode. For Alternative 5, light rail would be the HCT mode.

8.2 I-5 and I-205 Performance

This section summarizes highway performance for Alternatives 4 and 5 (2030).

8.2.1 Daily Traffic Levels

The highway performance results described in this chapter assume that tolls would be collected at the I-5 crossing using an electronic toll collection system. For more information on toll collection or estimated daily traffic levels if no tolls were collected, or if tolls were collected at both the I-5 and I-205 crossings, see Chapter 9.

Under the supplemental crossing, by 2030 the average weekday traffic across the I-5 crossing is expected to be 165,000 vehicles, lower than the 184,000 daily vehicle trips expected under No-Build conditions due to vehicle-trip reductions from the provision of high-capacity transit and because of tolling. Interstate 205 traffic volumes would increase from 210,000 vehicles per day under No-Build conditions to 219,000 vehicles with the supplemental crossing. **Exhibit 8-1** summarizes average daily traffic (ADT) volumes on the I-5 bridge, the I-205 bridge, and the total river crossing.

8.2.2 Travel Demand – Vehicles

This section compares travel demand between the forecast No-Build and supplemental crossing conditions in the year 2030, using four-hour peak periods.

8.2.2.1 Vehicle Demands on I-5

As shown in **Exhibit 8-2**, the supplemental crossing would result in increased vehicle demand for southbound I-5 north of the Interstate Bridge during the morning peak.

Southbound I-5 in the Bridge Influence Area would show close to 10 percent decrease in demand compared to No-Build conditions, due to the provision of high-capacity transit, tolling, and downstream congestion forecast north of the I-405 split bottleneck. Traffic demand would decrease by 1,600 southbound vehicle trips (six percent) across the I-5 bridge during the morning peak.

Outside the Bridge Influence Area traffic is forecast to grow for northbound I-5 during the morning peak, but vehicle demand is forecast to decrease (17 to 37 percent) within the Bridge Influence Area for the supplemental crossing, as shown in **Exhibit 8-3**. Northbound traffic demand would decrease by 4,600 vehicle trips (27 percent) across the I-5 bridge during the morning peak.

Southbound I-5 peak travel demand along the entire length of the corridor is forecast to decrease during the afternoon/evening peak for the supplemental crossing, as shown in **Exhibit 8-4**. The forecast decreases are up to 10 percent north of the Bridge Influence Area, five to 25 percent in the Bridge Influence Area, and up to 15 percent south of the Bridge Influence Area. Traffic demand across the I-5 crossing during the afternoon/evening peak would decrease by 3,600 southbound vehicle trips (19 percent).

Northbound travel demand along the length of the I-5 corridor is forecast to increase during the afternoon/evening peak for the supplemental crossing, as shown in **Exhibit 8-5**, excluding the area south of the I-5 bridge, which shows decreases of less than five percent. Northbound traffic demand would decrease by 500 vehicle trips (two percent) across the I-5 crossing during the afternoon/evening peak

8.2.2.2 Vehicle Demand on I-205

As shown in **Exhibit 8-6**, the supplemental crossing would correlate to lower traffic volume growth along southbound I-205 during the morning peak. The provision of high-capacity transit and the inclusion of tolling would reduce overall southbound volumes for both I-205 and I-5 during the morning peak. Vehicle demand would be reduced by less than five percent compared to No-Build conditions on the I-205 corridor.

Exhibit 8-7 compares peak demand for northbound I-205 with the supplemental crossing and the No-Build Alternative. Weekday northbound I-205 morning peak travel demand is forecast to increase throughout the entire corridor between three and 25 percent with the supplemental crossing. The increased volume would divert from I-5 during the off-peak, as well as the relatively free-flowing conditions forecast for I-205 during the morning peak.

Southbound I-205 afternoon/evening peak travel demand shows minimal growth estimated throughout the I-205 corridor (see **Exhibit 8-8**). Similar to the northbound morning traffic demand, southbound I-205 volumes would increase during the afternoon/evening off-peak due to free-flowing conditions along southbound I-205.

Northbound I-205 travel demand along the entire length of the corridor is forecast to decrease during the afternoon/evening peak, as shown in **Exhibit 8-9**. Although the supplemental crossing would have tolling, the I-5 capacity improvements under the supplemental crossing, combined with the forecast congestion along I-205, would result in vehicle demand reduction along I-205. The northbound I-205 vehicle demand is forecast to decrease by seven percent or less compared to the No-Build Alternative.

8.2.3 Travel Demand – Truck Freight

Daily truck freight travel demand would be similar in No-Build and supplemental crossing alternatives because the movement of freight is substantially related to economic conditions in the region, and freight moved by trucks is not likely to shift travel modes due to congestion. However, truck demand by time of day would likely change because there would be fewer uncongested hours under the supplemental crossing compared to existing conditions, resulting in more trucks during the commuter peak and midday hours.

Predicted daily truck volumes were distributed to each hour of the day to develop an hourly truck volume forecast for the supplemental crossing. The hourly volumes are based on existing hourly truck volumes, predicted levels of congestion (see Section 8.2.3) and the number of congested hours. Congestion is defined in this report at travel speeds less than 30 mph.

The supplemental crossing would result in more trucks during midday operations compared to the No-Build Alternative. Reducing congestion and truck travel occurring throughout the day would mean more flexibility in truck scheduling and improved reliability of truck shipments. The lack of a direct ramp connection between Marine Drive and Hayden would affect truck travel patterns. Trucks traveling between the two locations would either have to seek alternate routes to I-5 or travel on I-5 then use the arterial street network to reach their destination. **Exhibit 8-10** summarizes truck volumes by time of day for the supplemental crossing, No-Build Alternative, and existing conditions.

Trucks prefer to travel during uncongested conditions, but truck travel will occur even during congested hours in order to meet shipping requirements. As the number of uncongested hours decreases, more trucks are forced to operate during congestion, resulting in increased cost to shippers. The supplemental crossing results in more trucks traveling during congested conditions than the replacement crossing.

8.2.3.1 Truck Operating Characteristics

The rate in growth for truck traffic is predicted to be higher than the rate of growth for general purpose traffic, which would result in a higher proportion of trucks in the overall traffic stream. A truck consumes approximately twice the highway capacity as a passenger car, so the proportion of highway capacity used by trucks will be greater than today. The supplemental crossing would improve southbound highway geometries such as uphill ramp grades, superelevation, and merge distances to current standards. Truck speeds at interchanges and at the merge points with mainline I-5 would be higher than for the existing or No-Build conditions, resulting in reduced congestion from slow-moving trucks.

8.2.3.2 Oversized Loads

The southbound supplemental crossing would be constructed to meet standard clearance heights for a federal interstate facility and ramps would be designed for the wider turns required by oversized loads.

8.2.4 Effects of Congestion

This section compares congestion between the forecast No-Build and supplemental crossing conditions in the year 2030.

8.2.4.1 Duration of Congestion on Southbound I-5

The supplemental crossing would reduce congestion on the Interstate Bridge from 7.25 hours under No-Build conditions to 3.75 hours. As shown **in Exhibit 8-11**, downstream congestion arising along I-5 just north of the I-405 split would continue.

The downstream bottleneck located north of the I-405 split would remain, with nearly 11.5 hours of congestion. Similarly, the effects of the southbound bottleneck located near the I-5 lane drop in the Rose Quarter would remain similar to 2030 No-Build conditions, with approximately 3.75 hours of congestion.

8.2.4.2 Duration of Congestion on Northbound I-5

As shown in **Exhibit 8-12**, northbound traffic would experience congestion on I-5 just south of the supplemental crossing. Since the supplemental crossing uses both existing bridges for I-5 traffic, travel lanes on I-5 must physically separate or diverge in advance of the two bridges and then reconnect north of the two bridges. This arrangement would require all northbound traffic accessing I-5 from Marine Drive and Hayden Island to use the existing eastern bridge. In addition, all northbound traffic on I-5 traveling from south of Marine Drive and destined for SR 14, City Center, Mill Plain Boulevard, and Fourth Plain Boulevard would also be required to use the eastern bridge.

Due to substantial traffic maneuvers in advance of the I-5 “diverge” point, as well as the high traffic demand for the eastern bridge and the extensive weaving that would result within the eastern travel lanes, congestion and queuing would result on the eastern bridge and on I-5 downstream of the divergence. Traffic congestion would result in these locations for about seven hours each weekday during the afternoon/evening, compared to eight hours under No-Build conditions.

As a side effect of the northbound congestion associated with the supplemental crossing, only 45 to 55 percent of the traffic demand attempting to access northbound I-5 from the Marine Drive and Hayden Island on-ramps during the afternoon/evening peak would be served, i.e., the highway’s traffic congestion would limit the number of vehicles that could enter the highway from these locations, resulting in ramp backups and local street congestion.

The other two bottlenecks located near the I-405/Rose Quarter weaving area and the Marquam Bridge would remain similar to No-Build conditions.

8.2.5 Travel Times

This section compares travel times between the forecast No-Build and supplemental crossing conditions in the year 2030, using two-hour peak periods.

8.2.5.1 Travel Time along I-5

The supplemental crossing would result in a two minute (10 percent) increase in southbound I-5 travel time from SR 500 to Columbia Boulevard (see **Exhibit 8-13**). Although the bottleneck north of the I-405 split would occur under both the supplemental crossing and No-Build alternatives during the morning peak, the Interstate Bridge bottleneck would moderate the flow southbound under the No-Build Alternative, allowing traffic in that segment to flow more freely.

Although the southbound morning peak travel time from SR 500 to Columbia Boulevard would be higher under the supplemental crossing, travel time from 179th Street to I-84 would be lower by five minutes (12 percent) compared to No-Build conditions. Although the elimination of the Interstate Bridge bottleneck would result in longer travel times within the Bridge Influence Area, the duration of congestion would be less under the supplemental crossing. In addition, substantially more traffic volume would be served.

As shown in **Exhibit 8-14**, northbound travel times during the afternoon/evening peak from Columbia Boulevard to SR 500 are forecast to improve by five to seven minutes (36 to 50 percent) depending upon which bridge span is used (west or east). Northbound travel times between I-84 to 179th Street are forecast to improve by 15 to 17 minutes (34 to 39 percent) depending upon which bridge span is used.

8.2.5.2 Travel Time along I-205

Southbound I-205 travel times during the morning peak would decrease by two minutes (six percent) from SR 500 to I-84 for the supplemental crossing (see **Exhibit 8-15**). This would occur due to demand from I-205 shifting to I-5.

Northbound I-205 travel times from I-84 to SR 500 would remain similar under both the supplemental crossing and No-Build alternatives during the afternoon/evening peak (see **Exhibit 8-16**).

8.2.6 Service Volumes

This section compares vehicle throughput between the forecast No-Build and supplemental crossing conditions in the year 2030, using four-hour peak periods.

8.2.6.1 Vehicle Throughput (Served Volume) on Southbound I-5

As shown in **Exhibit 8-17**, southbound vehicle throughput along I-5 near the Pioneer Street interchange would be similar under the supplemental crossing and No-Build Alternative (18,000 vehicles during the morning peak).

Southbound vehicle throughput near the SR 500 interchange during the morning peak would increase by almost 7,000 vehicles (30 percent) for the supplemental crossing.

Although the supplemental crossing would serve more traffic volume, it would not serve the entire forecast demand due to the downstream bottleneck located north of the I-405 split. However, the percentage served would be higher than the No-Build Alternative.

Similarly, southbound I-5 vehicle throughput on the Interstate Bridge during the morning peak would increase by 1,200 vehicles (five percent) with the supplemental crossing although vehicle demand would be the same as with No-Build. While the southbound Interstate Bridge bottleneck would be eliminated, recurrent traffic congestion from the downstream bottleneck located just north of the I-405 split would limit the traffic volume served across the I-5 bridge to about 95 percent of its demand.

Southbound vehicle throughput north of the I-405 split would serve 1,200 more vehicles under the supplemental crossing than the No-Build condition. Both alternatives are forecast to serve approximately 80 percent of their demand.

8.2.6.2 Vehicle Throughput (Served Volume) on Northbound I-5

During the afternoon/evening peak, northbound I-5 vehicle throughput north of I-405 would increase by over 4,000 vehicles (30 percent) for the supplemental crossing (see **Exhibit 8-18**). Although the vehicle demand would be similar to No-Build conditions, the supplemental crossing would improve the bottleneck at the Interstate Bridge, resulting in improved service volumes for northbound I-5.

During the afternoon/evening peak, northbound vehicle throughput across the I-5 bridge is forecast to increase by 1,100 vehicles (six percent) compared to No-Build conditions. The would result due to the slightly higher capacity of the new four-lane northbound system, although the separation between travel lanes in advance of, across, and downstream of the two existing bridges combined with the short on-ramp spacing between Marine Drive and Hayden Island would result in traffic congestion lasting throughout the day, see **Exhibit 8-12**.

Because of the northbound traffic congestion that would result across the eastern bridge, at and downstream of the highway “diverge” point, only 45 percent of Hayden Island’s on-ramp demand would be served during the afternoon/evening peak. Only 55 percent of the Marine Drive on-ramp demand would be able to access northbound I-5. This would result in backups along the ramps and on the adjacent local street system.

Northbound I-5 vehicle throughputs near SR 500 would increase substantially between the supplemental crossing and the No-Build Alternative. The volume served would increase by almost 10,000 vehicles, or 45 percent.

Northbound vehicle throughputs along I-5 near the Pioneer Street interchange would be similar under supplemental crossing conditions and No-Build conditions (18,000 vehicles during the afternoon/evening peak).

8.2.7 Served vs. Unserved Ramp Volumes

This section compares ramp volumes between the forecast No-Build and supplemental crossing conditions in the year 2030, using four-hour peak periods.

8.2.7.1 Served vs. Unserved Ramp Volumes on Southbound I-5

During the morning peak, the number of southbound on-ramps within the Bridge Influence Area that would have unserved volumes would decrease from three (SR 500/39th Street, Mill Plain Boulevard, and SR 14/City Center) under No-Build conditions to none, as shown in **Exhibit 8-19**. This decrease would be due to reduced congestion forecast for southbound I-5 during the morning peak under the supplemental crossing.

8.2.7.2 Served vs. Unserved Ramp Volumes on Northbound I-5

During the afternoon/evening peak, five northbound on-ramps in the Bridge Influence Area (Interstate Avenue/Victory Boulevard, Marine Drive, Hayden Island, Mill Plain Boulevard and Fourth Plain Boulevard) would have unserved volumes under both supplemental and No-Build alternatives, as shown in **Exhibit 8-20**.

Although the number of failing ramps would be the same, the number of unserved vehicles would increase substantially at some ramps and decrease slightly at others under the supplemental crossing. The volume of unserved vehicles at Interstate/Victory would decrease from 1,700 to 400 vehicles. At Marine Drive it would increase from 650 to 2,500 vehicles. At Hayden Island it would increase from 1,150 to 3,050 vehicles. At Mill Plain Boulevard it would decrease from 1,350 to 1,050 vehicles. At Fourth Plain Boulevard it would increase from 100 to 250 vehicles.

Under the supplemental crossing 2,500 vehicles, or 45 percent of total on-ramp volume, of northbound vehicles would be unserved at Marine Drive. At Hayden Island 3,000 vehicles or 55 percent of total on-ramp volume would be unserved. These vehicles would be unable to enter the I-5 mainline because of the splitting of the highway (south of Marine Drive) into two northbound two-lane bridge segments and the short Marine Drive and Hayden Island on-ramps.

8.2.8 Person Throughput

For the supplemental crossing, about 26,400 persons in southbound vehicles would cross during the morning four-hour peak, an increase of seven percent over No-Build conditions. Up to 8,450 persons would use transit during this period.

Due to the level of congestion at the I-5 bridge for the supplemental crossing, about 25,700 persons in northbound vehicles would cross during the afternoon/evening four-hour peak, an increase of five percent compared to No-Build conditions. Up to 7,350 persons using transit would cross during this period. **Exhibit 8-21** shows person throughput data.

8.2.9 Safety

The supplemental crossing would address some of I-5's existing non-standard geometric and safety design elements by including highway and interchange enhancements affecting southbound I-5. However, the supplemental crossing would not eliminate bridge lifts for northbound traffic, or non-standard ramp features such as short merging and diverging areas for northbound traffic immediately south of and north of the existing bridges. According to ODOT collision statistics, the highest collision rate during the last five years, considering all 300 miles of I-5 in the state or Oregon, occurs on northbound I-5 just south of the existing bridgehead at Hayden Island. The supplemental crossing would create a northbound mainline “diverge” point near Marine Drive, which is an atypical design and would result in turbulence and weaving for both passenger vehicles and trucks at and in advance of the highway’s split. In addition, the supplemental crossing would result in substantial congestion in the northbound direction at the bridgehead.

For the above reasons, the supplemental crossing would not provide the same level of safety benefits as the replacement crossing.

8.3 Local Streets

8.3.1 Travel Demand

This section compares demand on local streets between the forecast No-Build and supplemental crossing conditions in the year 2030, using one-hour peak periods.

8.3.1.1 Vancouver Screenlines – Morning Peak Hour

During the morning peak, eastbound and westbound traffic west of I-5 would increase between five and 15 percent over No-Build conditions as shown in **Exhibit 8-22**. Eastbound and westbound traffic east of I-5 would decrease between five and ten percent.

During the morning peak, southbound traffic in Vancouver would decrease between 20 and 30 percent along most major streets. The decrease in southbound arterial traffic would be caused by improvements to I-5 which would shift arterial traffic back to I-5.

Northbound traffic in Vancouver would increase between 15 and 115 percent along most major streets, except across Evergreen Boulevard, which shows a decrease of less than 10 percent. Volumes would be higher under No-Build conditions because westbound traffic on SR 14 would travel through downtown Vancouver to enter I-5 at the downtown Vancouver on-ramp located on Washington Street.

8.3.1.2 Vancouver Screenlines – Afternoon/Evening Peak Hour

During the afternoon/evening peak, eastbound and westbound traffic west of I-5 would increase between five and 15 percent over No-Build conditions as shown in **Exhibit 8-23**. East of I-5, westbound traffic would increase approximately 10 percent and eastbound traffic would decrease by approximately 20 percent compared to No-Build conditions.

During the afternoon/evening peak, southbound traffic in Vancouver would change slightly, less than ten percent, across three southern screenlines. At the screenline north of 39th Street, southbound traffic would increase by over 50 percent due to the modification to southbound highway access. With the supplemental crossing, the southbound off-ramp to 39th Street would be removed and replaced with the new southbound SR 500 off-ramp, which would cause traffic to shift from southbound I-5 to southbound Main Street to access the neighborhood, although the overall volume growth over No-Build conditions would be relatively small (less than 400 vehicles).

Northbound traffic in Vancouver would decrease between 10 and 30 percent over No-Build conditions, with the highest decrease in downtown Vancouver.

8.3.1.3 Portland Screenlines – Morning Peak Hour

During the morning peak, westbound traffic volume on both sides of the highway would change less than five percent compared to No-Build conditions as shown in **Exhibit 8-24**.

Eastbound traffic on both sides of I-5 would increase up to 15 percent over No-Build conditions, with the higher growth forecast for the eastside of I-5. Northbound and southbound traffic in Portland would increase or decrease less than 15 percent over No-Build conditions.

8.3.1.4 Portland Screenlines – Afternoon/Evening Peak Hour

During the afternoon/evening peak, eastbound and westbound traffic on both sides of the highway would change by less than five percent compared to No-Build conditions as shown in **Exhibit 8-25**. Northbound and southbound traffic in Portland would increase or decrease by less than 20 percent.

8.3.2 Intersection Service Levels

This section compares intersection service levels between the forecast No-Build and supplemental crossing conditions in the year 2030, using one-hour peak periods.

Exhibit 8-26 summarizes the applicable level-of-service and volume-to-capacity performance criteria used when comparing supplemental crossing conditions against No-Build conditions for the study intersections. The criteria recognize that under No-Build conditions some local intersections may operate unacceptably and that mitigation would not be required under the supplemental crossing options if the options caused no further degradation to these intersections.

In addition to intersection level-of-service and/or volume-to-capacity ratios, vehicular queuing impacts would be significant when under the supplemental crossing option a traffic lane’s storage distance is exceeded, but would not be exceeded under No-Build conditions. Similarly, significant queuing impacts would result if the resulting vehicle queue extends into upstream intersection, but would not under No-Build conditions.

8.3.2.1 Vancouver Service Levels – Morning and Afternoon/Evening Peak Hours

Alternatives 4 and 5 would have impacts similar to those of Alternatives 2 and 3 on local streets in Vancouver. All interchanges would have similar configurations, with a few minor differences near SR 14’s connections to downtown. By retaining the existing bridges, the connection at Main Street with SR 14 eastbound would not be possible under the supplemental crossing. The alignment of Columbia Way would be slightly different, but would not impact travel patterns in the downtown area.

One inbound connection from SR 14 would still be provided under the supplemental crossing. As a result, traffic operations during the morning peak would degrade near lower downtown as an additional 800 vehicles per hour would access Columbia Street. An additional 10 intersections in lower downtown Vancouver would experience level-of-service or queuing deficiencies compared to the replacement crossing. Refer to **Exhibits 7-28**, **7-31**, and **7-34** for a complete list of expected morning traffic operations.

The afternoon/evening peak travel patterns would change from removing the intersection at SR 14 and Main Street. Ten additional intersections in lower downtown Vancouver would experience level-of-service or vehicle queuing deficiencies compared to the replacement crossing. Under the supplemental crossing, all traffic heading eastbound on SR 14 would access the highway through the Columbia Street and SR 14 intersection. In addition, traffic going to or from Columbia Way to downtown through the Main Street connection would be required to use Columbia Way. During the afternoon/evening peak, this would shift an additional 600 southbound vehicles and 220 northbound vehicles to Columbia Way. This would double the number of vehicles making a southbound left at the intersection of Columbia Street at SR 14 (Refer to **Exhibits 7-29**, **7-32**, and **7-35** for a complete listing of afternoon/evening traffic operations).

8.3.2.2 Portland Service Levels – Morning and Afternoon/Evening Peak Hours

8.3.2.2.1 Hayden Island Interchange Area

With a supplemental crossing, the Hayden Island interchange would be completely reconstructed. The result would be a pair of new highway ramp terminals and a reconfigured street network. Thirteen potential new study intersections were analyzed.

As shown in **Exhibit 8-27**, during the morning peak, all of the proposed ODOT and PDOT study intersections would operate acceptably by the applicable standards. All of the study intersections would operate with acceptable vehicle queuing.

As shown in **Exhibit 8-28**, during the afternoon/evening peak, all six ODOT intersections and two of the PDOT intersections would operate acceptably as compared to the applicable ODOT standards for highway ramp terminals. Five of the proposed PDOT intersections would operate unacceptably. During the afternoon/evening peak, two ODOT and three PDOT intersections would operate with acceptable vehicle queuing. Four ODOT and four PDOT intersections would experience queuing extending past turn lane storage capacities or to upstream intersections.

8.3.2.2.1.1 Recommended Mitigation Measures

No reasonable mitigation measures are recommended because many of the impacts that would occur with Alternatives 4 and 5 could not be mitigated without changing the crossing's fundamental design. Many of the traffic impacts from the supplemental crossing occur at on- and off-ramps as traffic is funneled into the right-hand two lanes that are separated from the interior northbound lanes. Essentially, the only mitigation possible would be to add an additional auxiliary lane on the outside northbound bridge;

this is not reasonable because it would remove the safety shoulders that are necessary to improve safety conditions and address this project's purpose and need.

8.3.2.2.2 Marine Drive Interchange Area

With a supplemental crossing, the Marine Drive interchange would be reconstructed as a SPUI. There are three design options for the Marine Drive interchange; each configuration is available for both the replacement and supplemental river crossing. These options include a "standard" design option that would retain most of the existing Marine Drive alignment, a "southern realignment" that would realign Marine Drive south of the Expo Center property, and the "diagonal realignment" design option. The southern design would introduce a traffic signal at the new intersection of Marine Drive and Force Avenue; the other designs would largely retain the existing configuration. Each design option would add free-flow access (no stop signs or signals) for the most frequently used connections between I-5 and Marine Drive. A connection between Martin Luther King Jr. Boulevard and Vancouver Way would be built east of the interchange. Highway ramps at the interchange would be reconstructed, resulting in the removal of one leg of the Union Court and Vancouver Way intersection. The interchange area now consists of four new study intersections.

As shown in **Exhibit 8-27**, during the morning peak, all four of the proposed intersections would operate acceptably as compared to the applicable standards. Two ODOT and one proposed PDOT intersections would operate with acceptable vehicle queuing. One of the proposed PDOT intersections would experience queuing extending past turn lane storage capacities or to upstream intersections.

As shown in **Exhibit 8-28**, during the afternoon/evening peak, both ODOT intersections and one PDOT intersection would operate acceptably. One of the proposed PDOT intersections would operate unacceptably. One ODOT and one PDOT intersection would operate with acceptable vehicle queuing. One ODOT and one PDOT intersection would experience queuing extending past turn lane storage capacities or to upstream intersections.

8.3.2.2.2.1 Recommended Mitigation Measures

The following measures are recommended to mitigate unacceptable operations under the supplemental crossing:

Vancouver Way and Martin Luther King Jr. Boulevard on- and off-ramps:

- No reasonable mitigation recommended for reasons as stated above under Hayden Island Interchange.

Union Court and Vancouver Way:

- Extend storage lane another 50 feet, signalize intersection and optimize for critical movements.

8.3.2.2.3 Victory Boulevard Interchange Area

Under the supplemental crossing scenario, the Victory Boulevard interchange area would remain in the same configuration as the No-Build Alternative. The interchange area consists of four study intersections.

As shown in **Exhibit 8-27** and **Exhibit 8-28**, during the morning and afternoon/evening peak hours all four of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative.

As shown in **Exhibit 8-27** and **Exhibit 8-28**, during the morning and afternoon/evening peak hours, all of the proposed study intersections would operate with acceptable vehicle queuing when compared to the No-Build Alternative.

8.3.2.2.3.1 Recommended Mitigation Measures

As all intersections would operate acceptably, no traffic mitigation would be required.

8.3.2.2.4 Interstate Avenue Analysis Area

Under the supplemental crossing scenario, the Interstate Avenue analysis area would remain the same as the No-Build Alternative. The analysis area consists of four study intersections.

As shown in **Exhibit 8-27**, during the morning peak, three of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative. One of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under the supplemental crossing.

As shown in **Exhibit 8-28**, during the afternoon/evening peak, two of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative. Two of the study intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under the supplemental crossing.

As shown in **Exhibit 8-27**, during the morning peak, all of the study intersections would operate with acceptable vehicle queuing when compared to the No-Build Alternative.

As shown in **Exhibit 8-28**, during the afternoon/evening peak, two of the study intersections would operate with acceptable vehicle queuing when compared to the No-Build Alternative. Two of the study intersections would experience queuing extending past turn lane storage capacities or to upstream intersections, which would not result under the No-Build Alternative.

8.3.2.2.4.1 Recommended Mitigation Measures

The following measures are recommended to mitigate unacceptable operations under the supplemental crossing:

- Going Street and Interstate Avenue:

  - Optimize LRT pre-emption at intersection.
  - Install advanced signal controllers to manage LRT pre-emption.
  - Change westbound right into a through/right choice lane to allow traffic to continue westbound.
- Rosa Parks Way and Interstate Avenue:
  - Optimize LRT pre-emption at intersection.
  - Install advanced signal controllers to manage LRT pre-emption.
- Lombard Boulevard and Interstate Avenue:
  - Optimize LRT pre-emption at intersection.
  - Install advanced signal controllers to manage LRT pre-emption.

8.3.2.2.5 Martin Luther King Jr. Boulevard Analysis Area

Under the supplemental crossing scenario, the Martin Luther King Jr. Boulevard analysis area would remain the same as the No-Build Alternative. The analysis area consists of five study intersections.

As shown in **Exhibit 8-27** and **Exhibit 8-28**, during the morning and afternoon/evening peak hours all five of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative.

As shown in **Exhibit 8-27** and **Exhibit 8-28**, during the morning and afternoon/evening peak hours, all of the proposed study intersections would operate with acceptable vehicle queuing when compared to the No-Build Alternative.

8.3.2.2.5.1 Recommended Mitigation Measures

As all intersections would operate acceptably, no traffic mitigation would be required.

8.3.2.2.6 I-5 Ramp Terminals Analysis Area

With a supplemental crossing, the I-5 Ramp Terminals analysis area would remain in the same configuration as the No-Build Alternative. The interchange area consists of seven study intersections.

As shown in **Exhibit 8-27 and Exhibit 8-28**, during the morning and afternoon/evening peaks, all of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions as compared to the No-Build Alternative. As shown in **Exhibit 8-27 and Exhibit 8-28**, during the morning and afternoon/evening peaks, all of the study intersections would operate acceptably with improved, similar, or slightly degraded conditions.

8.3.2.2.6.1 Recommended Mitigation Measures

As all intersections would operate acceptably, no traffic mitigation would be required.

8.4 Pedestrian and Bicycle Circulation

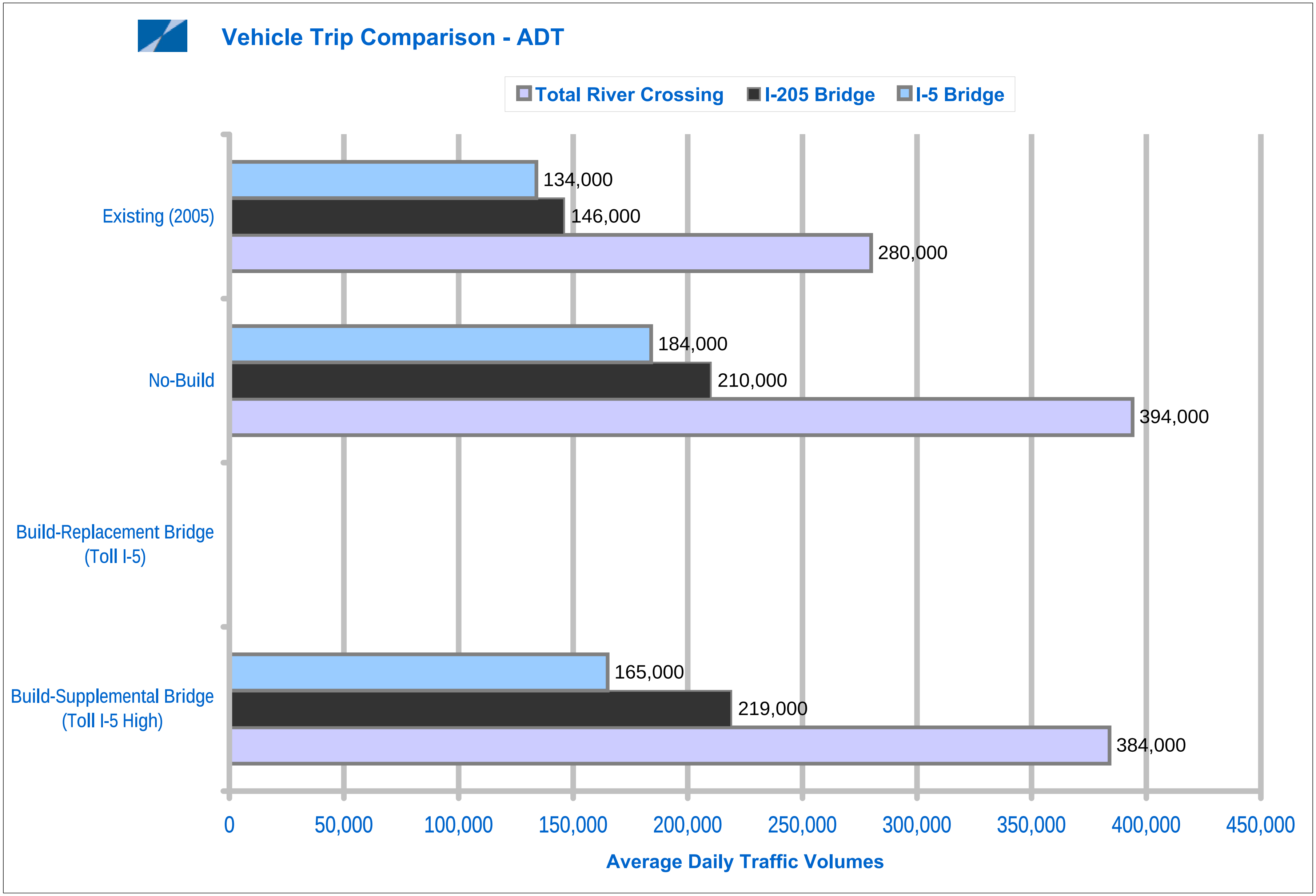
The supplemental crossing would substantially improve pedestrian and bicycle connectivity although it would continue to require users traveling across Hayden Island to navigate at-grade streets and intersections. The supplemental crossing was evaluated with a widened sidewalk on the existing eastern bridge in order to accommodate both pedestrians and bicyclists in a safe manner. Ramps would connect this widened pathway with Columbia Way in Vancouver and with Tomahawk Island Drive on Hayden Island. An above-grade multi-use pathway on the western bridge would connect Tomahawk Island Drive and Marine Drive. Pedestrians and bicyclists using both pathways would need to travel along Tomahawk Island Drive, under I-5, and through at-grade intersections.

Today, pedestrians and bicyclists cross North Portland Harbor on a multi-use pathway on the east side of the harbor bridge. The proposed crossing for the supplemental bridge option would remove access at this location and require users to travel out of direction to access the new pathway along the high-capacity transit guideway. Once on Hayden Island, the new pathway would require additional time for users to access the proposed pathway on the east side of the east bridge over the Columbia River. Connections to the bridge would require that pedestrians and bicyclists leave the high-capacity transit guideway pathway and drop down to Hayden Island, then travel on sidewalks before they could access the southern end of the new cantilevered pathway on the existing northbound Interstate Bridge. Like the replacement crossing, a potential mitigation measure to alleviate some of the circuitous routing would be to construct a pedestrian pathway on the east side of the harbor bridge. A longer-range measure that could be considered to help avoid these issues would be a new cantilevered pathway on the west side of the existing southbound Interstate Bridge.

For the supplemental crossing alternatives, connections consisting of ramps, stairs, or elevators would connect with existing and planned sidewalks and pathways in Vancouver, Hayden Island, and near Marine Drive. The connections would be coordinated with ongoing planning in those areas.

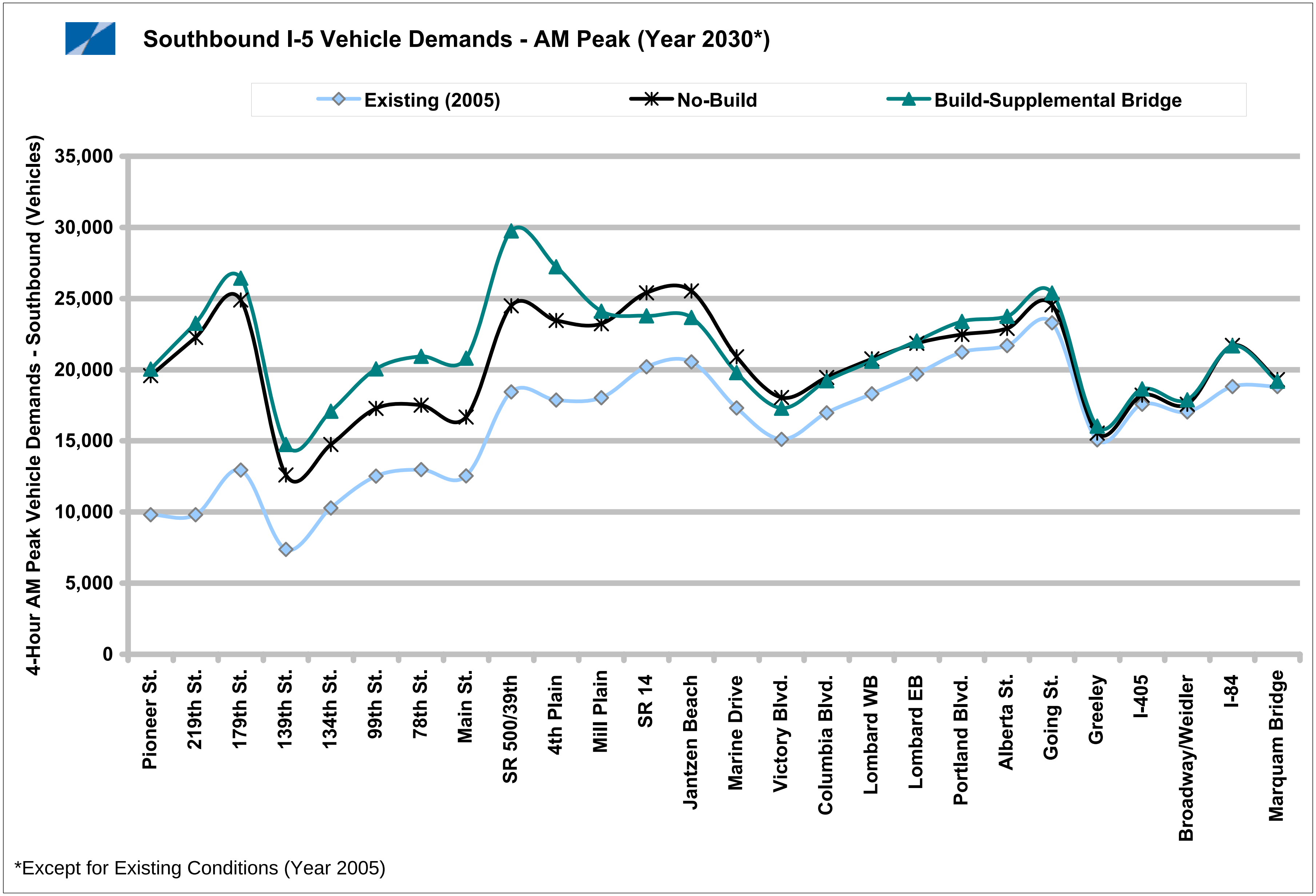
Further design of highway interchange components will be required to determine the long-term pedestrian and bicycle effects of potential designs.

Exhibit 8-1



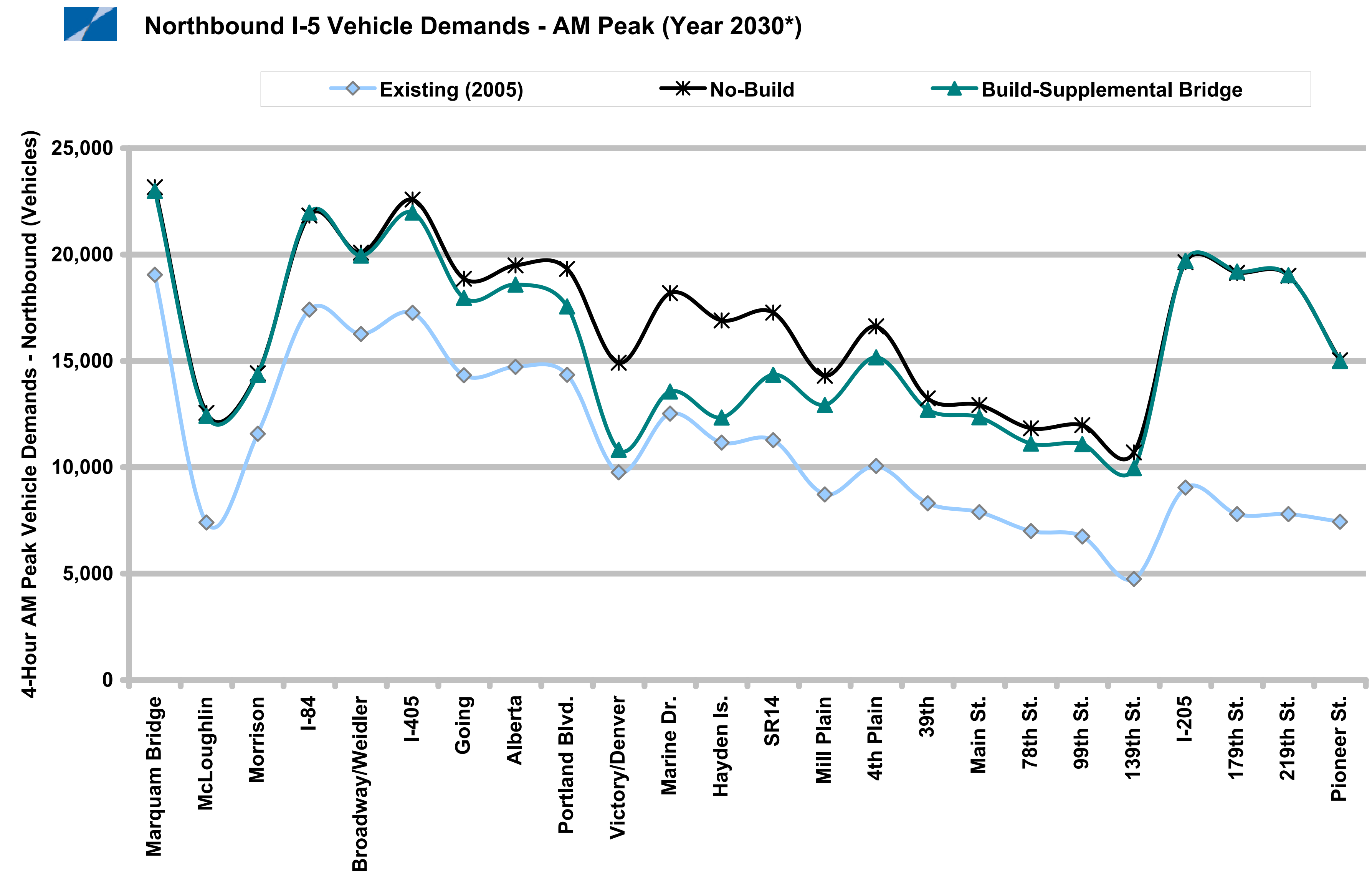
Vehicle Trip Comparison - ADT
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
No-Build
Build-Replacement Bridge (Toll I-5)
Build-Supplemental Bridge (Toll I-5 High)
134,000
146,000
280,000
184,000
210,000
394,000
165,000
219,000
384,000
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
Average Daily Traffic Volumes

Exhibit 8-2



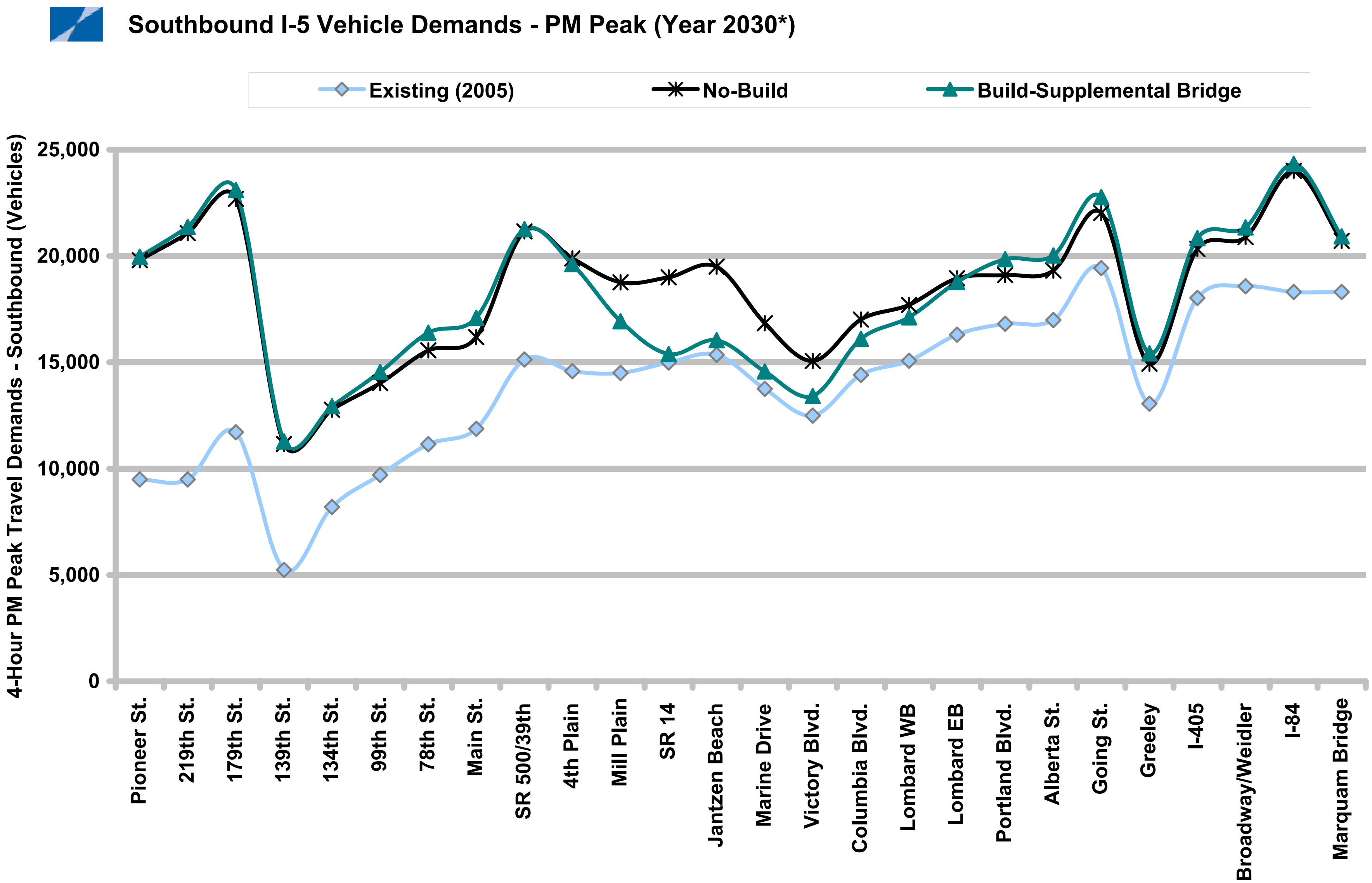
Southbound I-5 Vehicle Demands - AM Peak (Year 2030*)
Existing (2005)
No-Build
Build-Supplemental Bridge
4-Hour AM Peak Vehicle Demands - Southbound (Vehicles)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Pioneer St.
219th St.
179th St.
139th St.
134th St.
99th St.
78th St.
Main St.
SR 500/39th
4th Plain
Mill Plain
SR 14
Jantzen Beach
Marine Drive
Victory Blvd.
Columbia Blvd.
Lombard WB
Lombard EB
Portland Blvd.
Alberta St.
Going St.
Greeley
I-405
Broadway/Weidler
I-84
Marquam Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 8-3



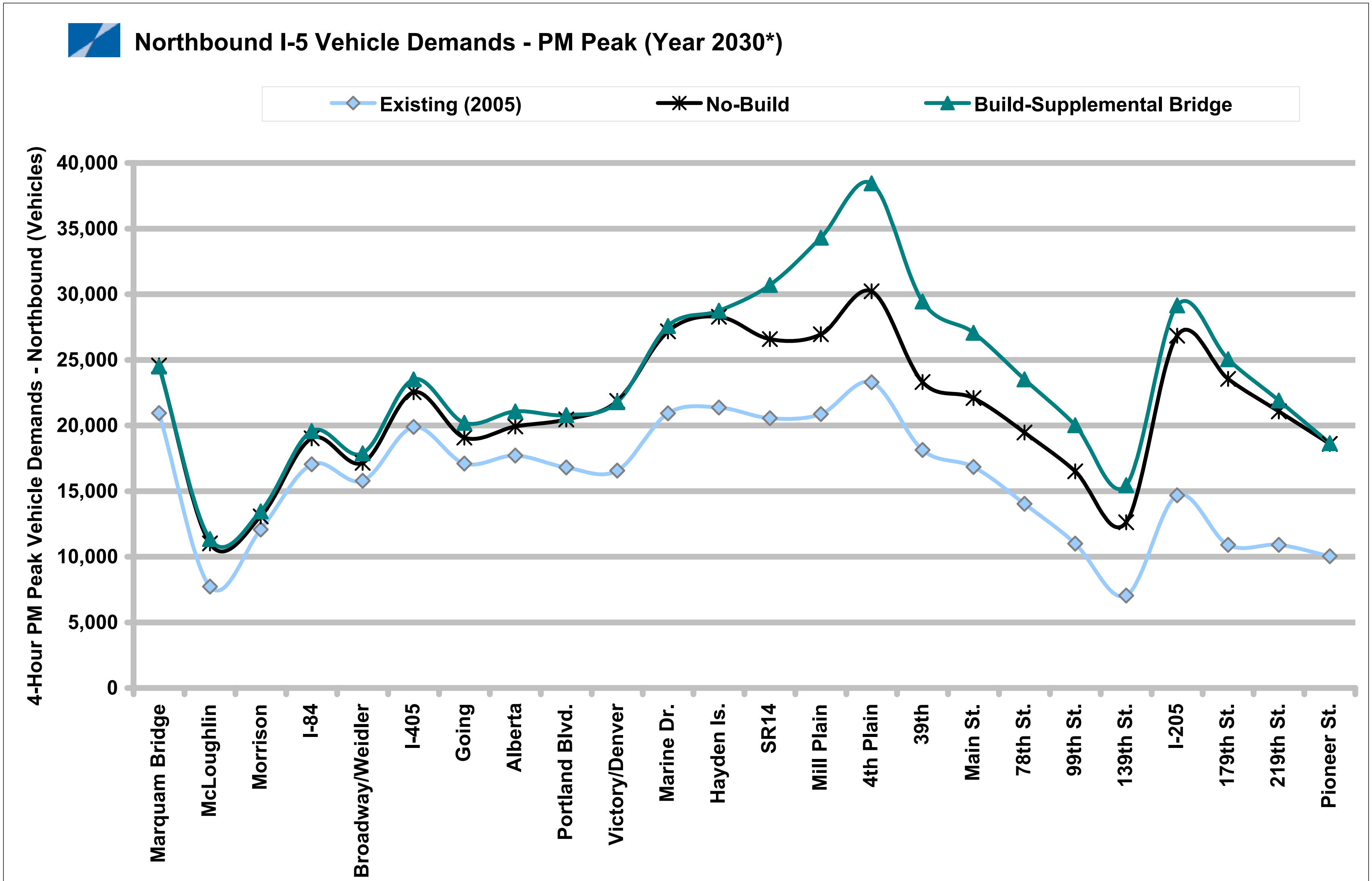
*Except for Existing Conditions (Year 2005)

Exhibit 8-4



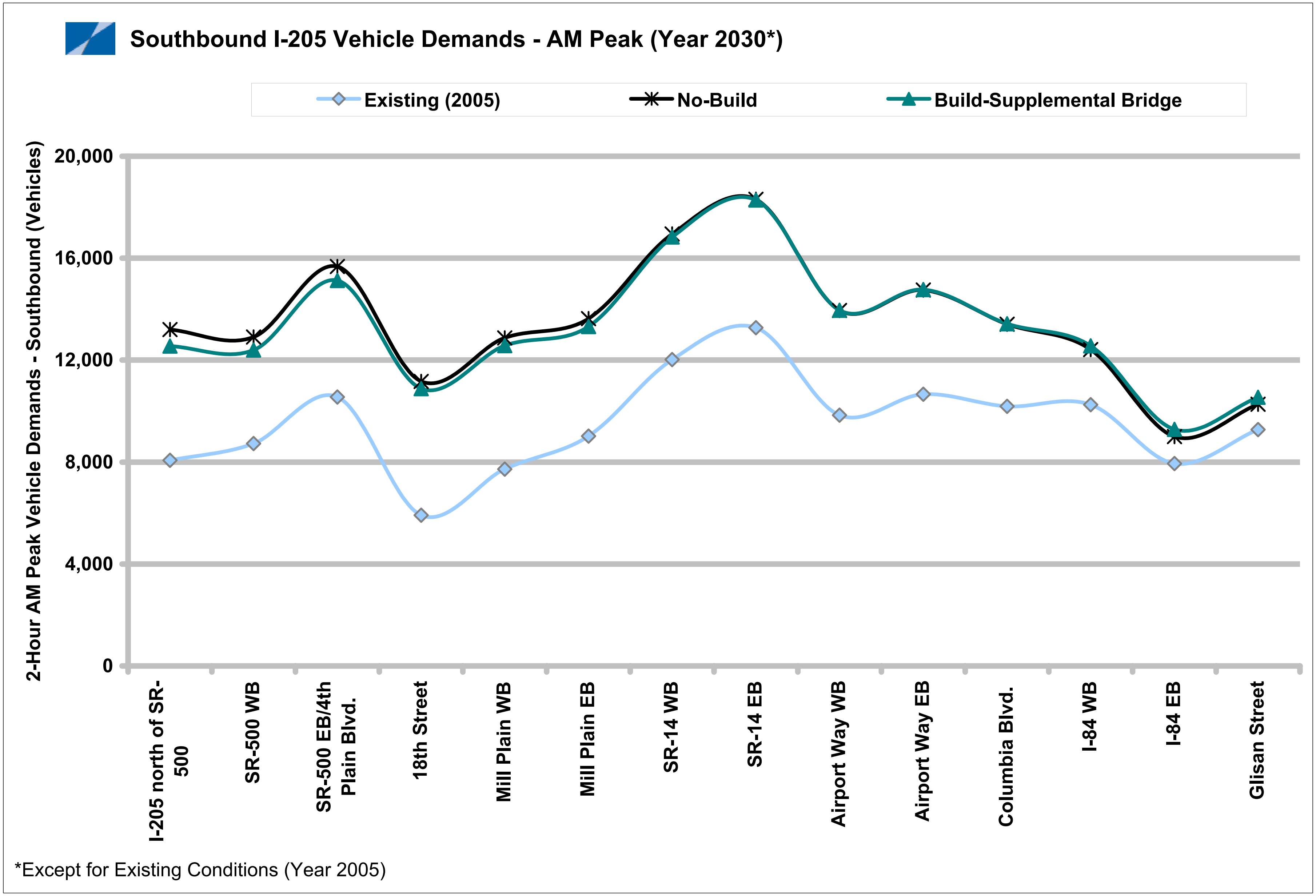
*Except for Existing Conditions (Year 2005)

Exhibit 8-5



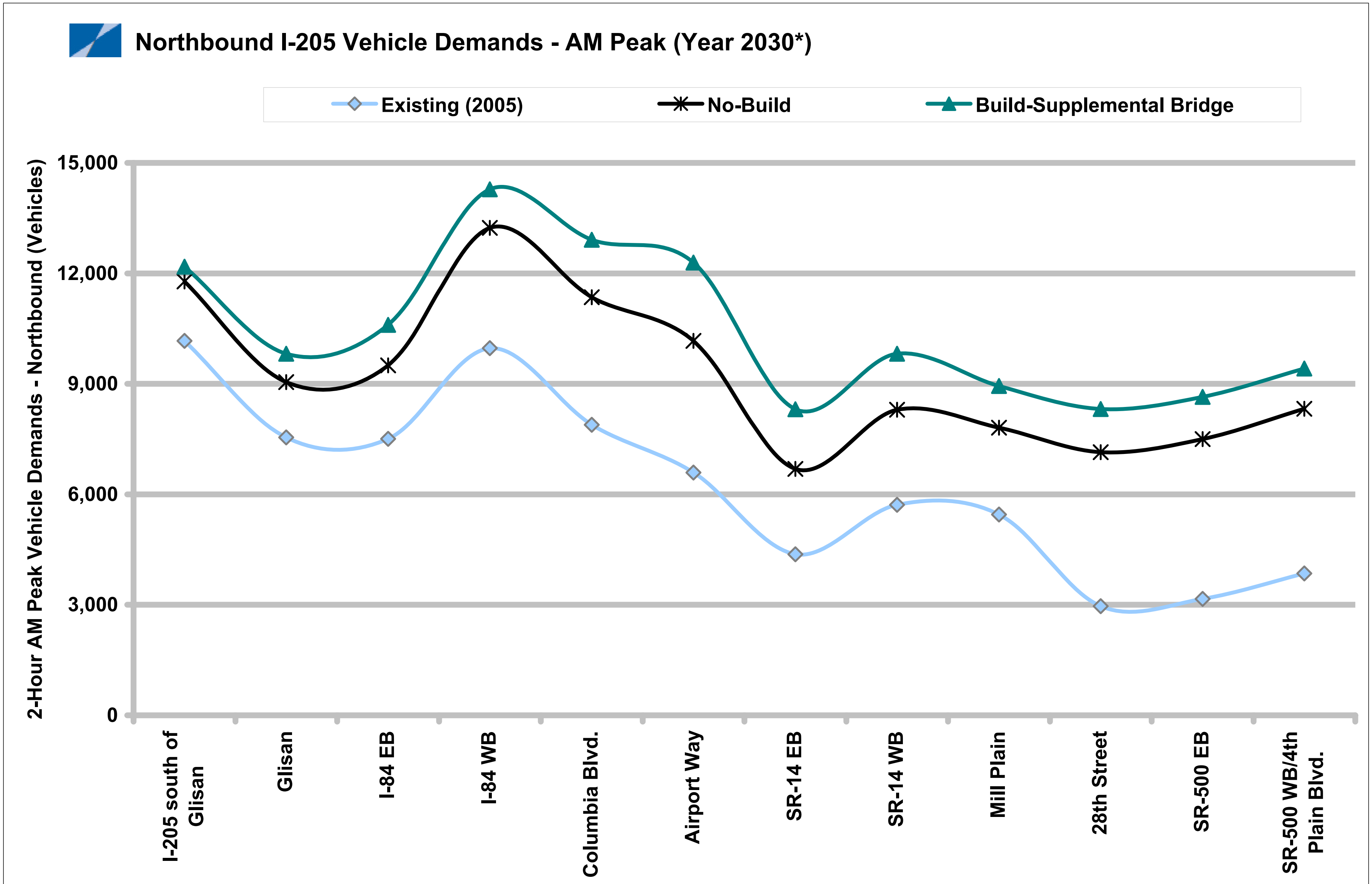
*Except for Existing Conditions (Year 2005)

Exhibit 8-6



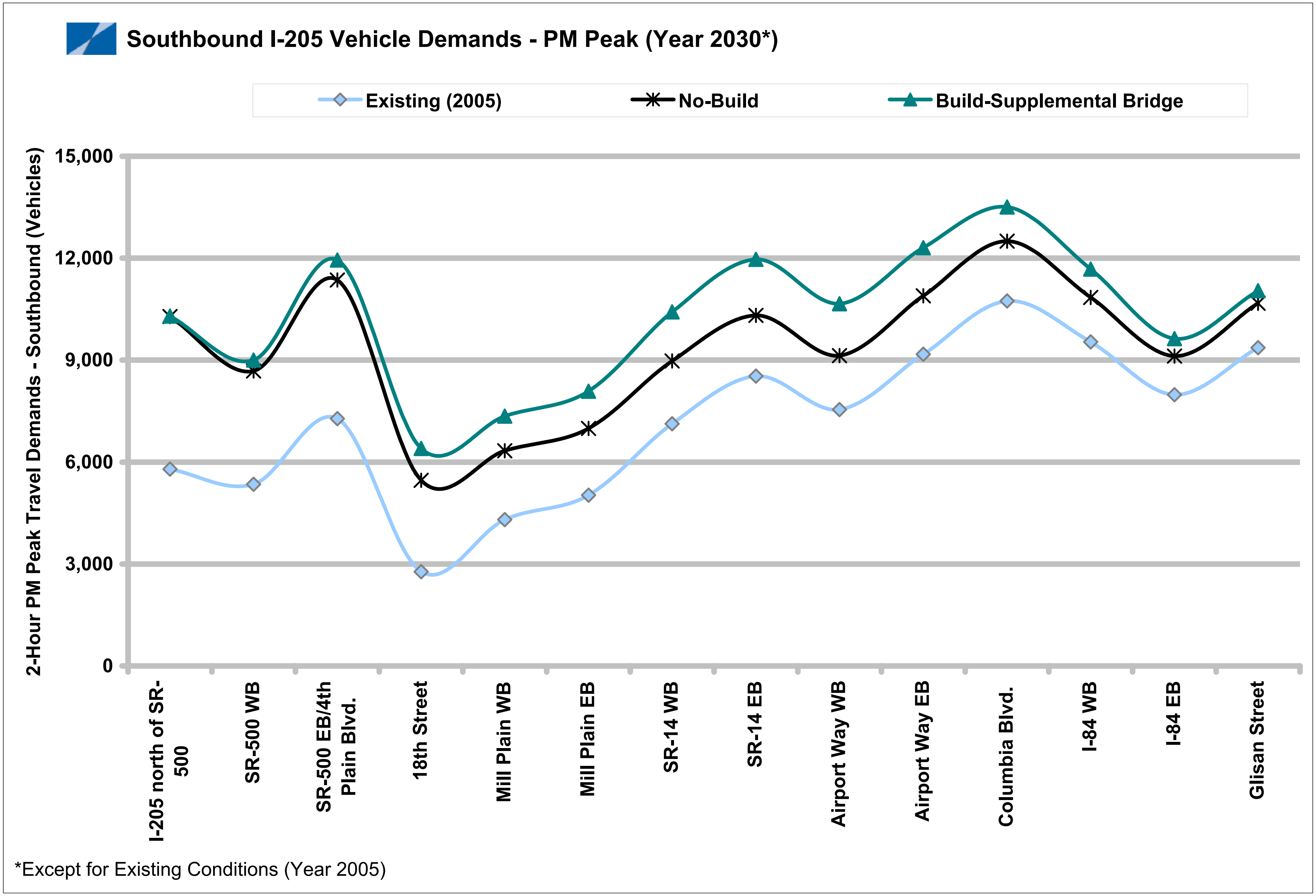
Southbound I-205 Vehicle Demands - AM Peak (Year 2030*)
Existing (2005)
No-Build
Build-Supplemental Bridge
2-Hour AM Peak Vehicle Demands - Southbound (Vehicles)
20,000
16,000
12,000
8,000
4,000
0
I-205 north of SR-500
SR-500 WB
SR-500 EB/4th Plain Blvd.
18th Street
Mill Plain WB
Mill Plain EB
SR-14 WB
SR-14 EB
Airport Way WB
Airport Way EB
Columbia Blvd.
I-84 WB
I-84 EB
Glisan Street
*Except for Existing Conditions (Year 2005)

Exhibit 8-7



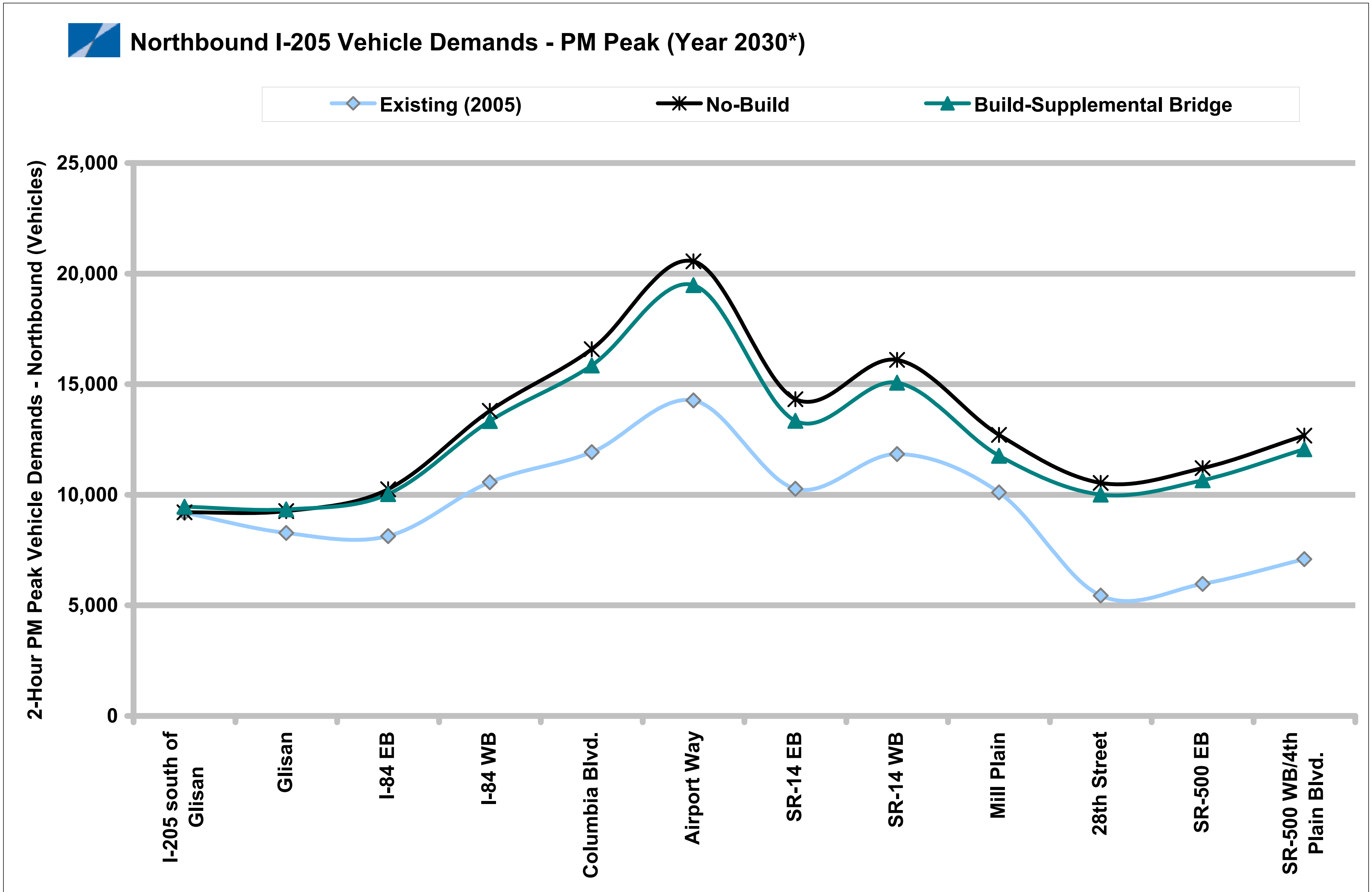
*Except for Existing Conditions (Year 2005)

Exhibit 8-8



Southbound I-205 Vehicle Demands - PM Peak (Year 2030*)
Existing (2005)
No-Build
Build-Supplemental Bridge
2-Hour PM Peak Travel Demands - Southbound (Vehicles)
15,000
12,000
9,000
6,000
3,000
0
I-205 north of SR-500
SR-500 WB
SR-500 EB/4th Plain Blvd.
18th Street
Mill Plain WB
Mill Plain EB
SR-14 WB
SR-14 EB
Airport Way WB
Airport Way EB
Columbia Blvd.
I-84 WB
I-84 EB
Glisan Street
*Except for Existing Conditions (Year 2005)

Exhibit 8-9



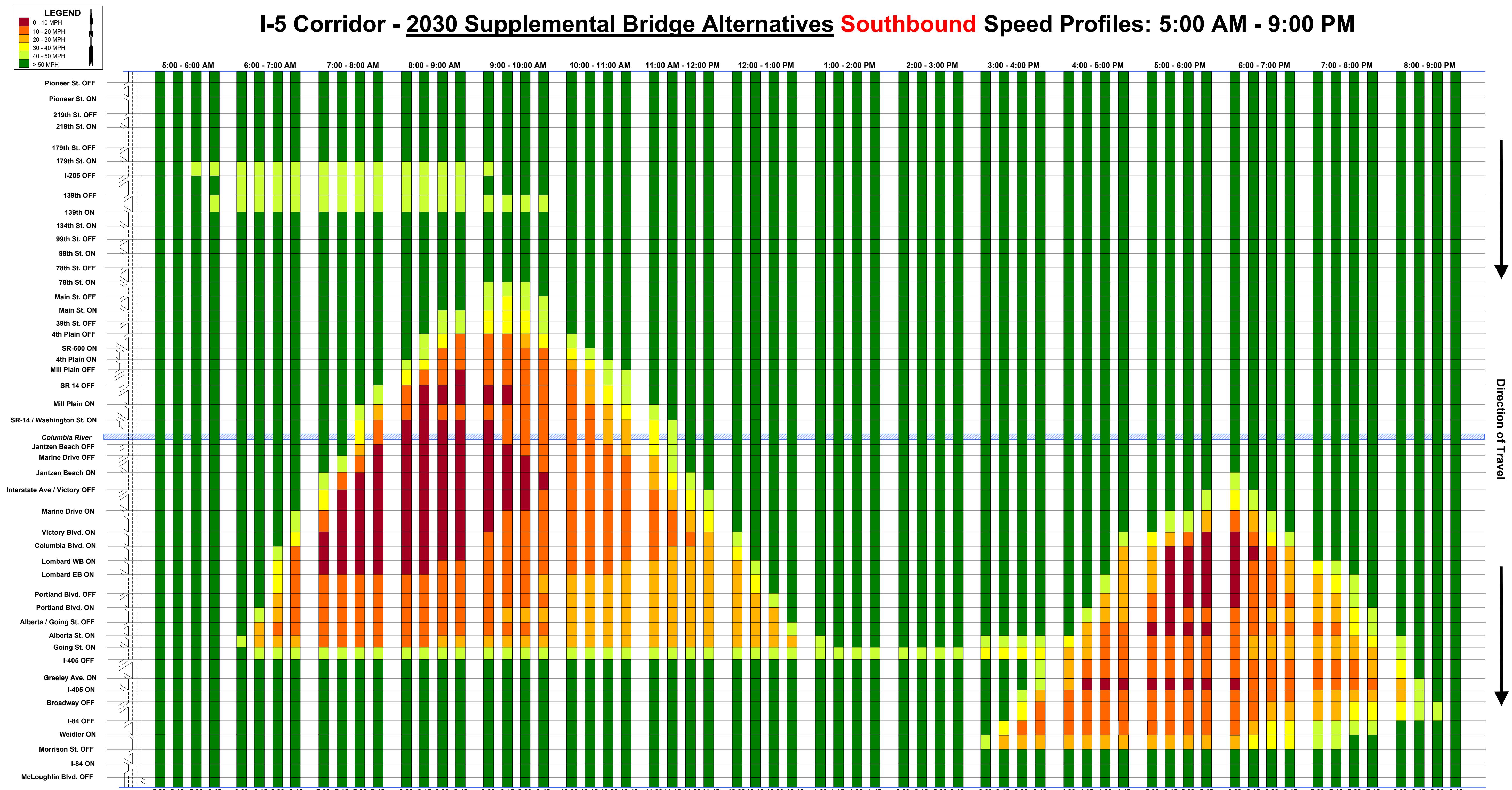
*Except for Existing Conditions (Year 2005)

Exhibit 8-10

Peak Period 2030 Truck Volume - Bridge Alternatives				
	No-Build		Supplemental Bridge	
Hours	**Southbound**	**Northbound**	**Southbound**	**Northbound**
AM Peak Period 6 AM - 10 AM	1,140	2,195	1,150	2,245
Midday Peak Period 10 AM - 3 PM	3,525	2,900	3,700	2,915
PM Peak Period 3 PM - 7 PM	2,350	1,635	2,105	1,650
Night 7 PM - 6 AM	2,790	2,870	2,850	2,790
Daily Total	**9,805**	**9,600**	**9,805**	**9,600**
Number hours of congestion[1]	7.25	7.75	3.25	7.50
Number trucks traveling in congestion	2,220	3,075	980	3,305

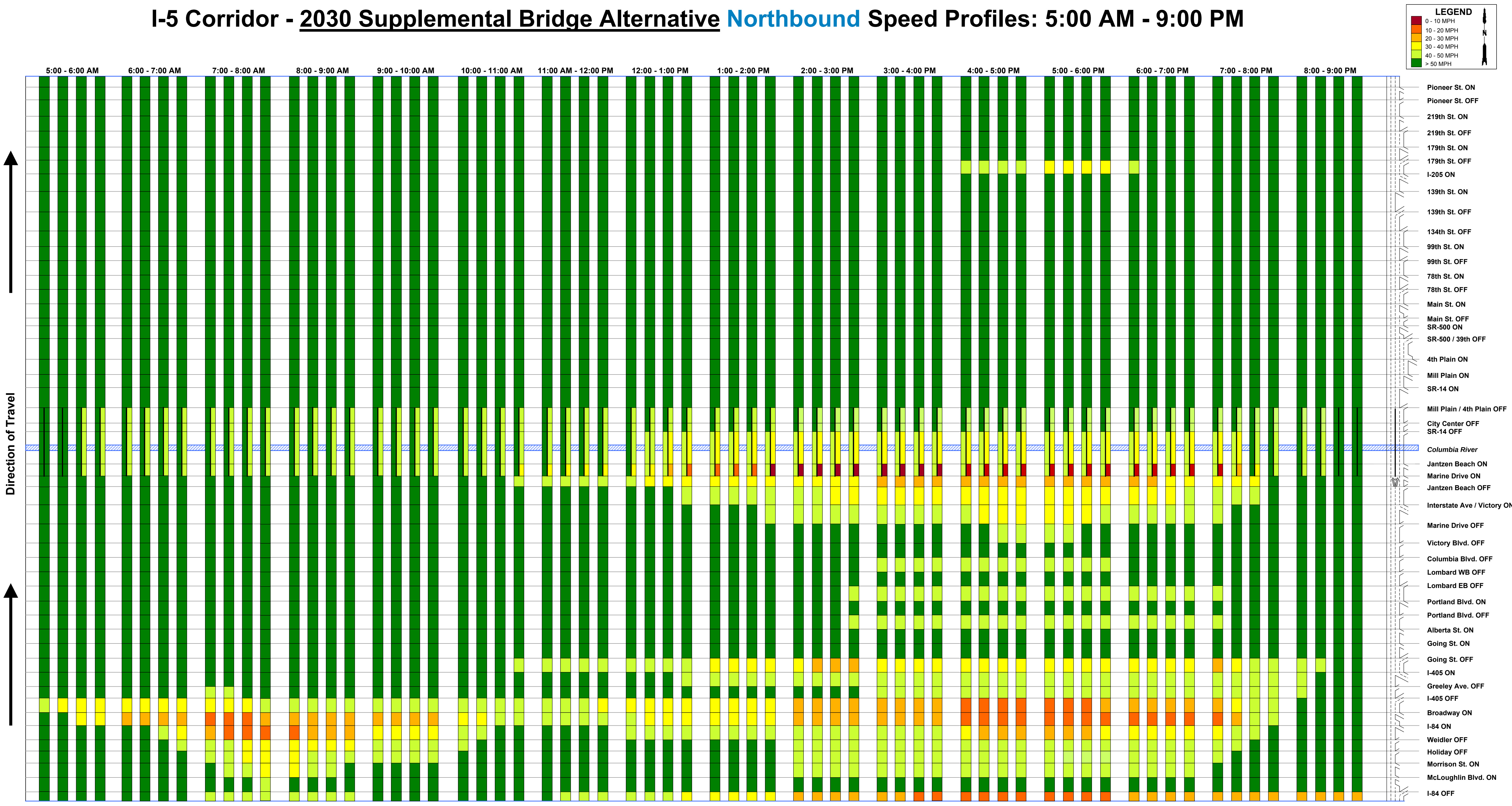
Source: Portland/Vancouver International and Domestic Trade Capacity Analysis, 2006 and CRC Project, September 2007

Exhibit 8-11



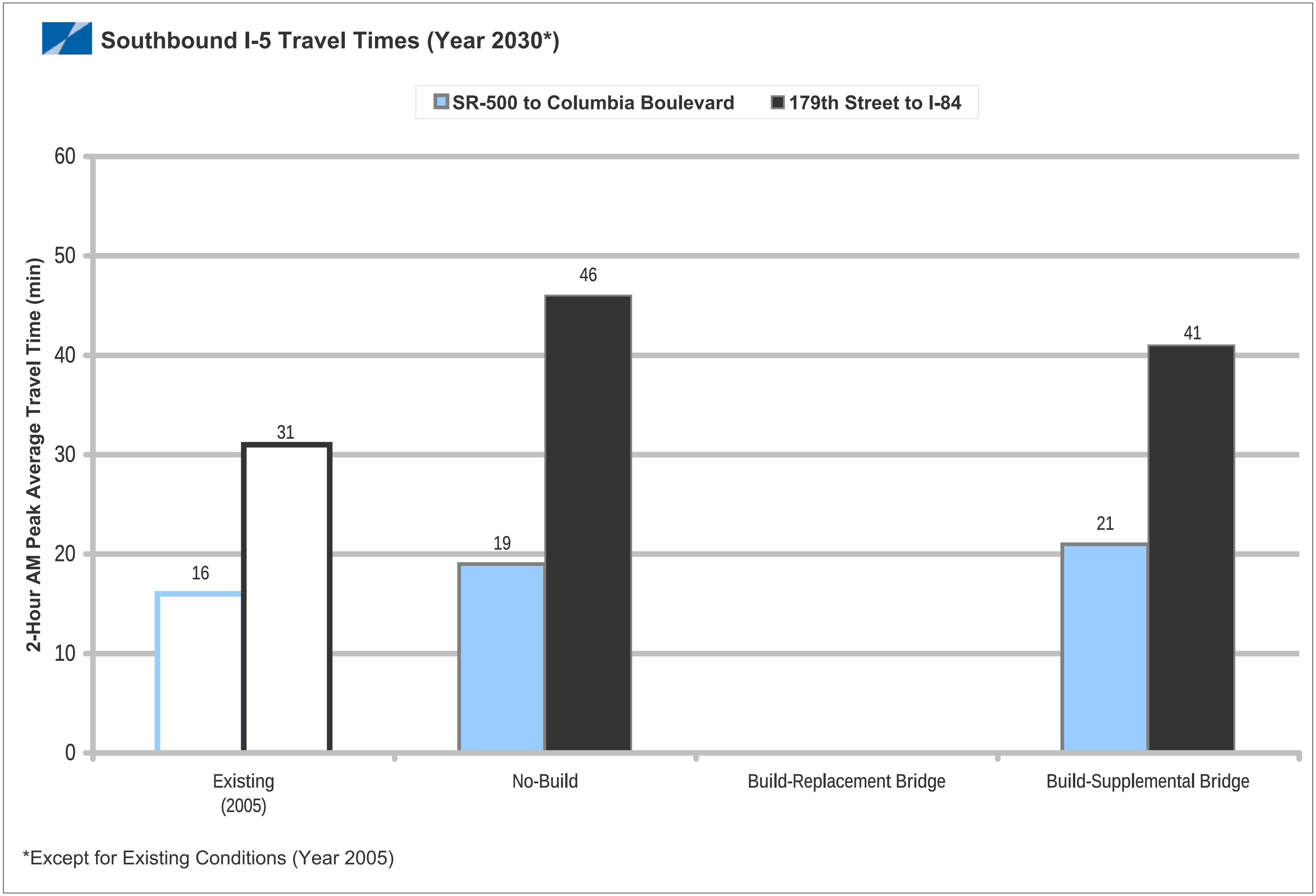
DRAFT as of 10-29-07

Exhibit 8-12



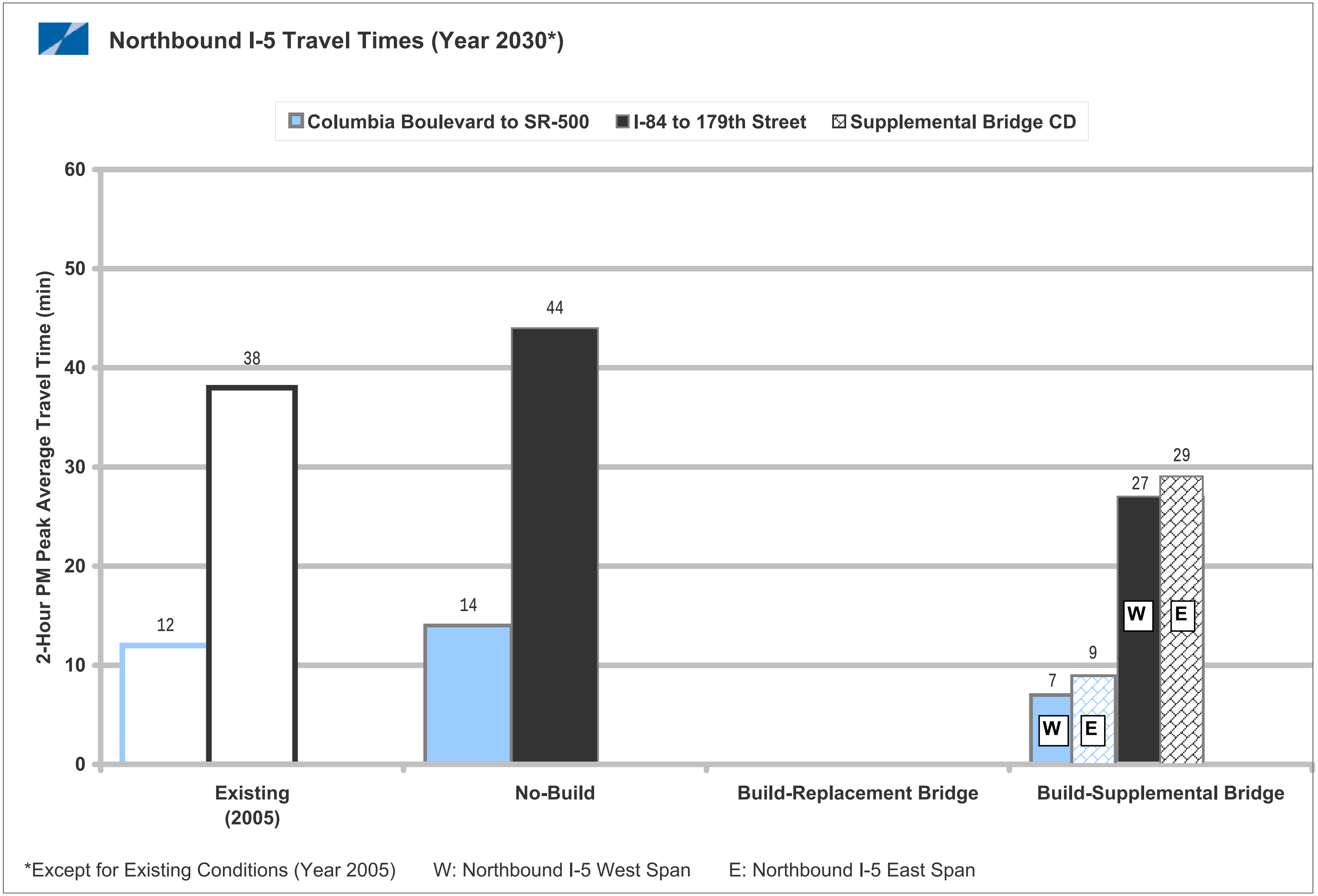
DRAFT as of 10-29-07

Exhibit 8-13



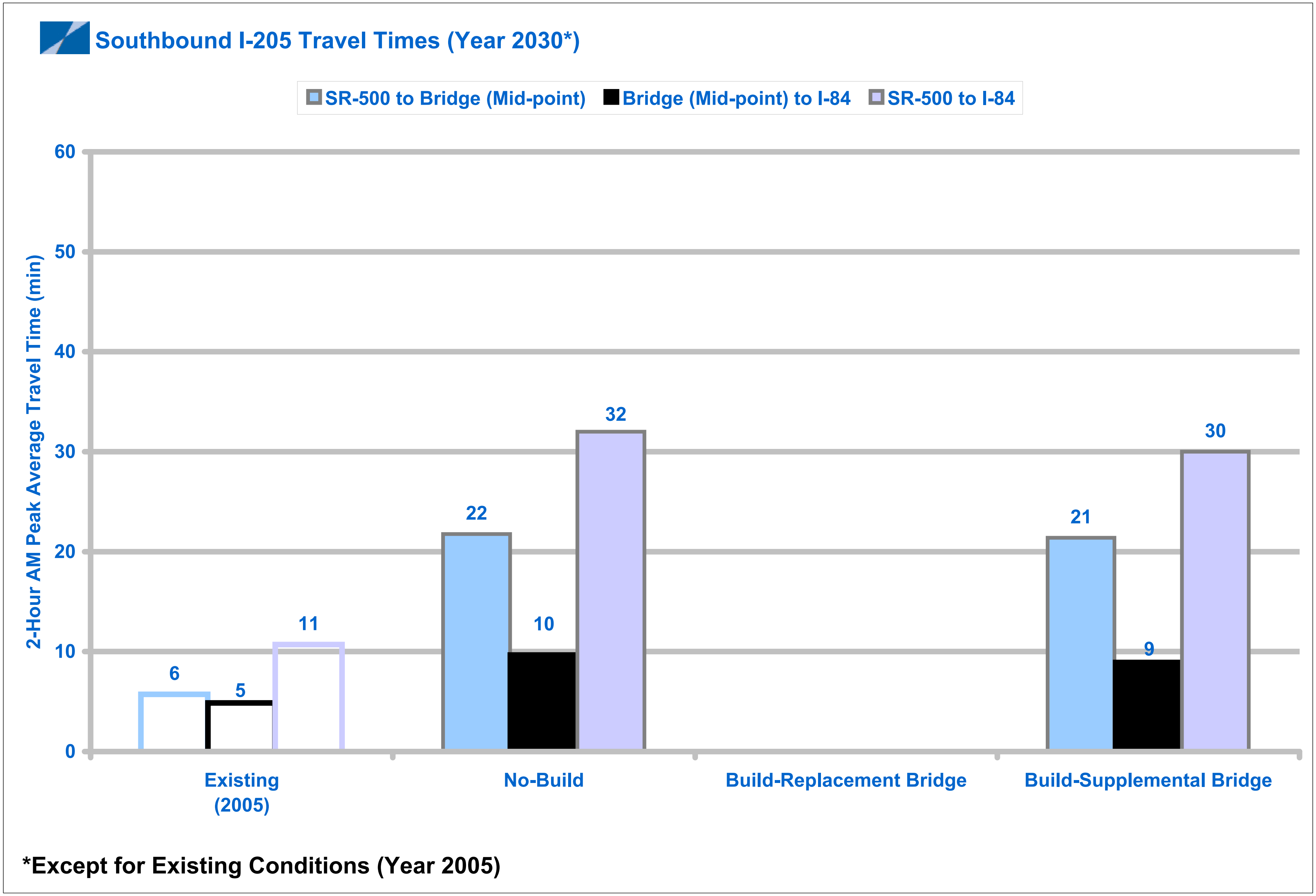
Southbound I-5 Travel Times (Year 2030*)
SR-500 to Columbia Boulevard
179th Street to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
16
31
19
46
21
41
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 8-14



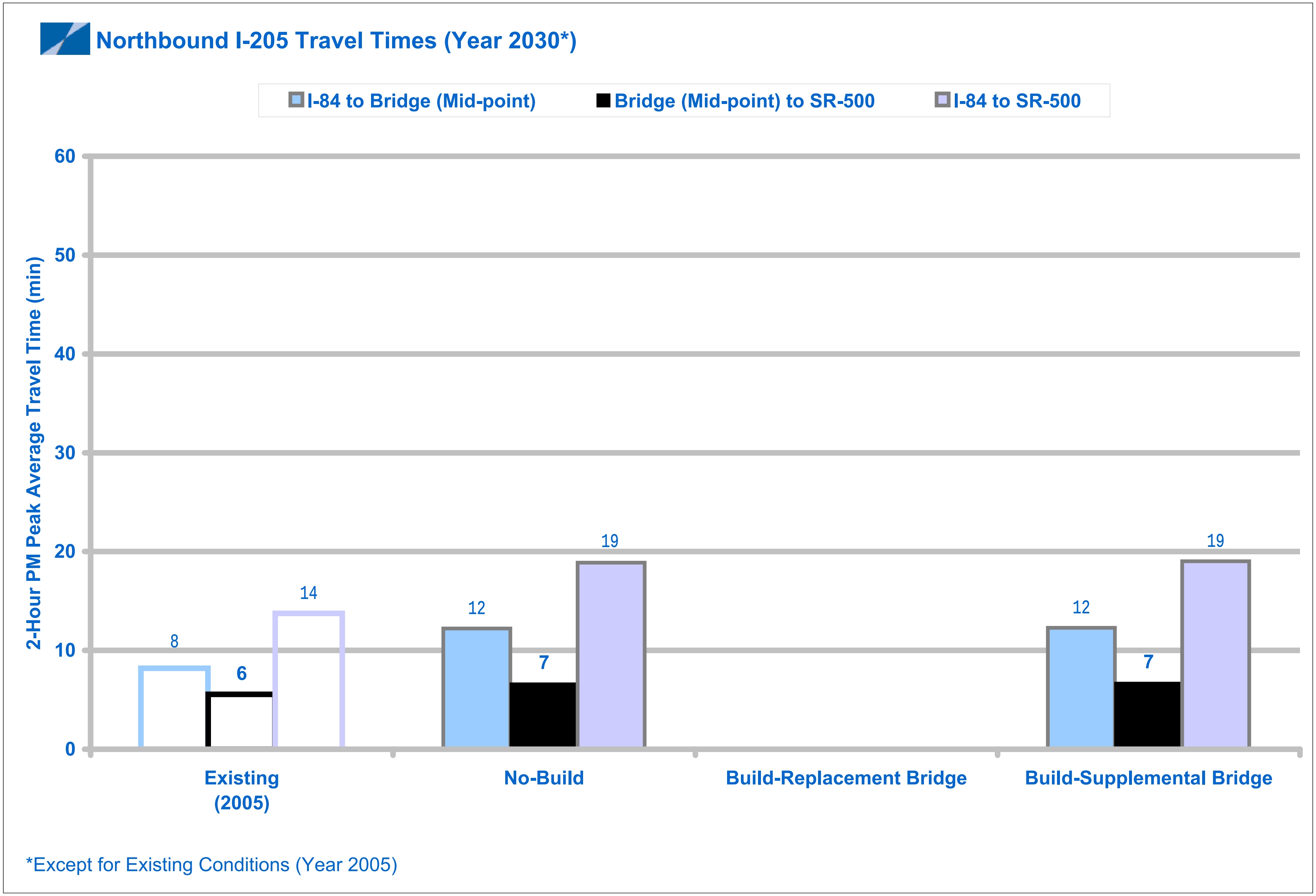
Northbound I-5 Travel Times (Year 2030*)
Columbia Boulevard to SR-500
I-84 to 179th Street
Supplemental Bridge CD
2-Hour PM Peak Average Travel Time (min)
60
50
40
30
20
10
0
12
38
14
44
7
9
27
29
W
E
W
E
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)
W: Northbound I-5 West Span
E: Northbound I-5 East Span

Exhibit 8-15



Southbound I-205 Travel Times (Year 2030*)
SR-500 to Bridge (Mid-point)
Bridge (Mid-point) to I-84
SR-500 to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
6
5
11
22
10
32
21
9
30
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 8-16



Northbound I-205 Travel Times (Year 2030*)
I-84 to Bridge (Mid-point)
Bridge (Mid-point) to SR-500
I-84 to SR-500
2-Hour PM Peak Average Travel Time (min)
60
50
40
30
20
10
0
8
6
14
12
7
19
12
7
19
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit 8-17

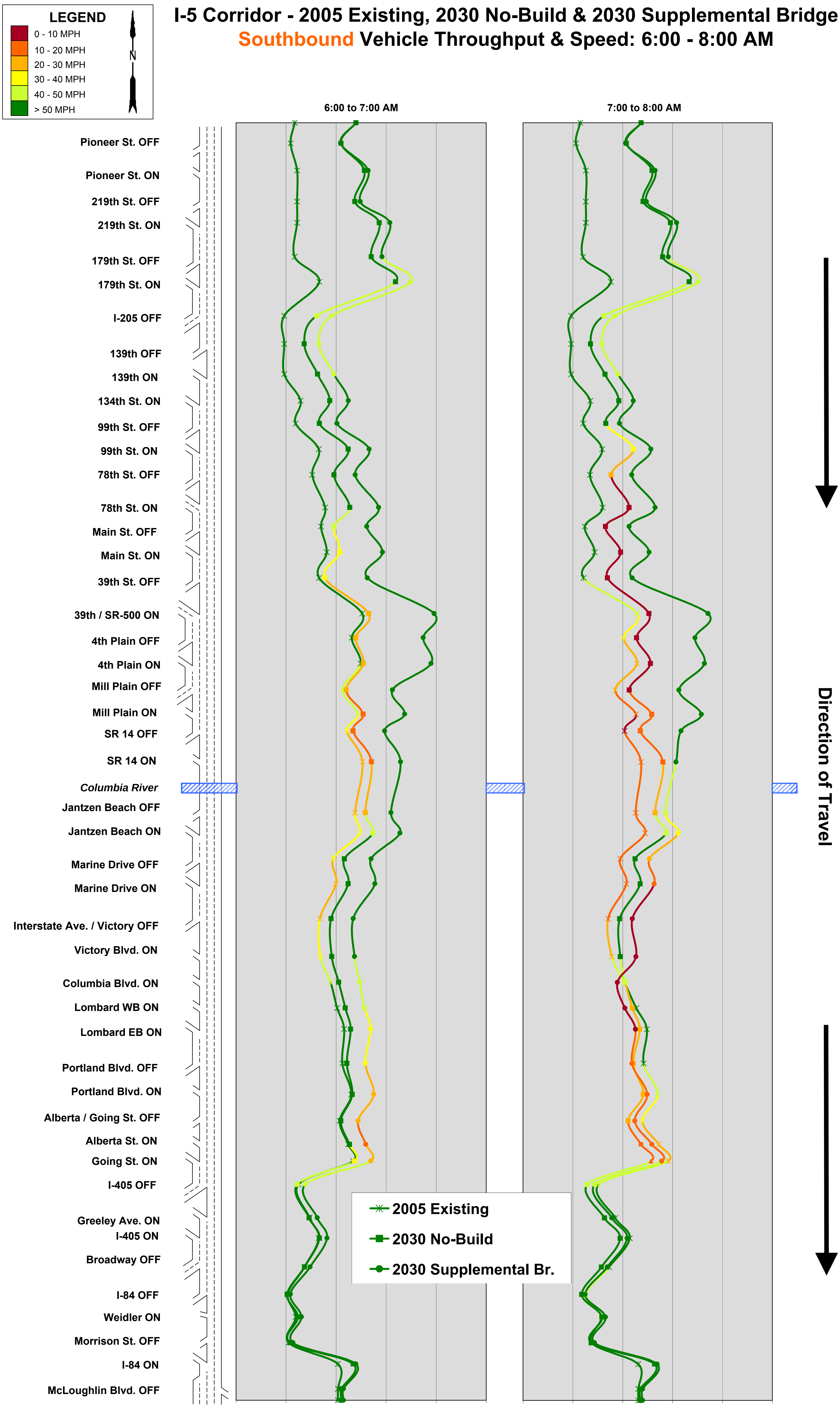


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Exhibit 8-17 - continued

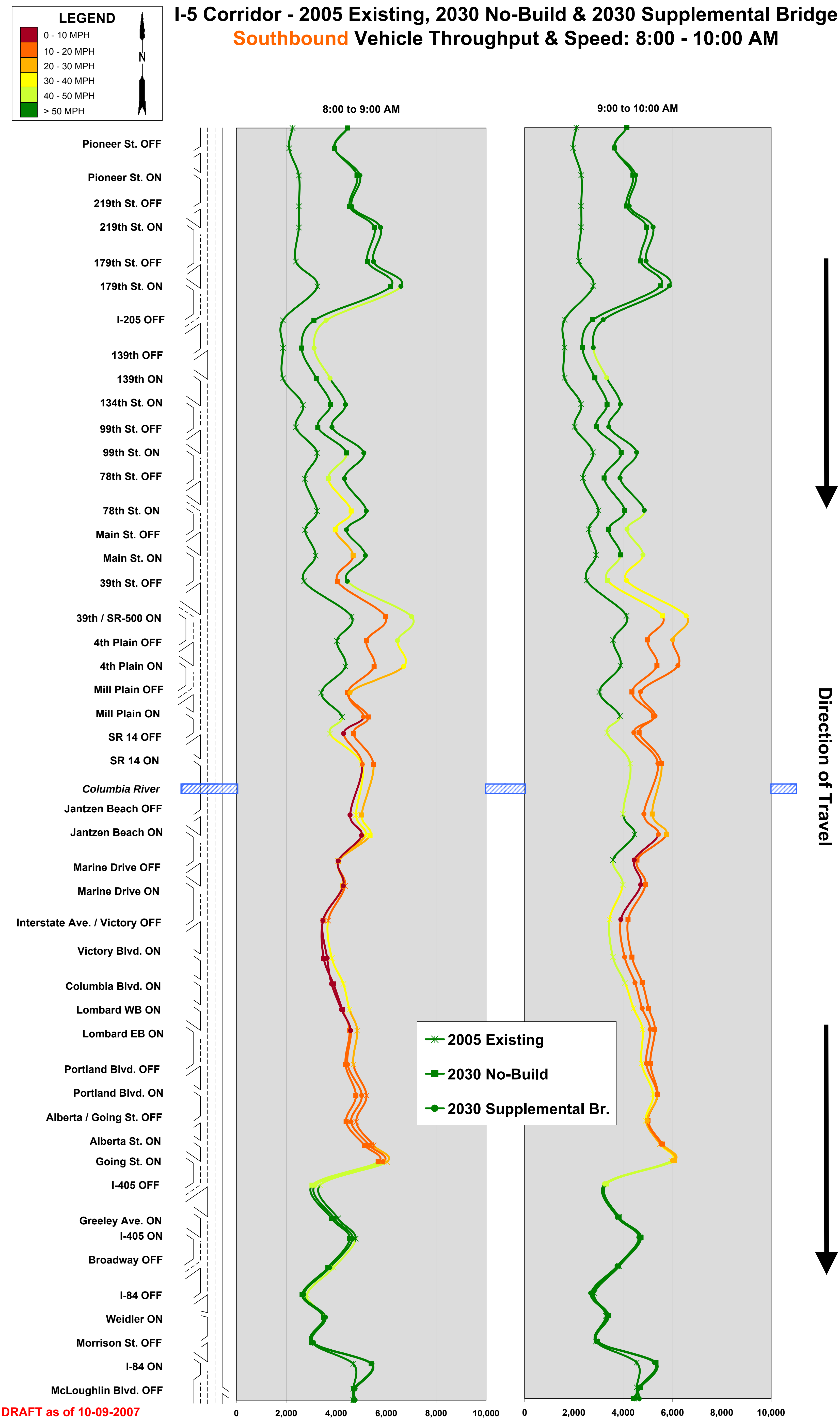

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Exhibit 8-18

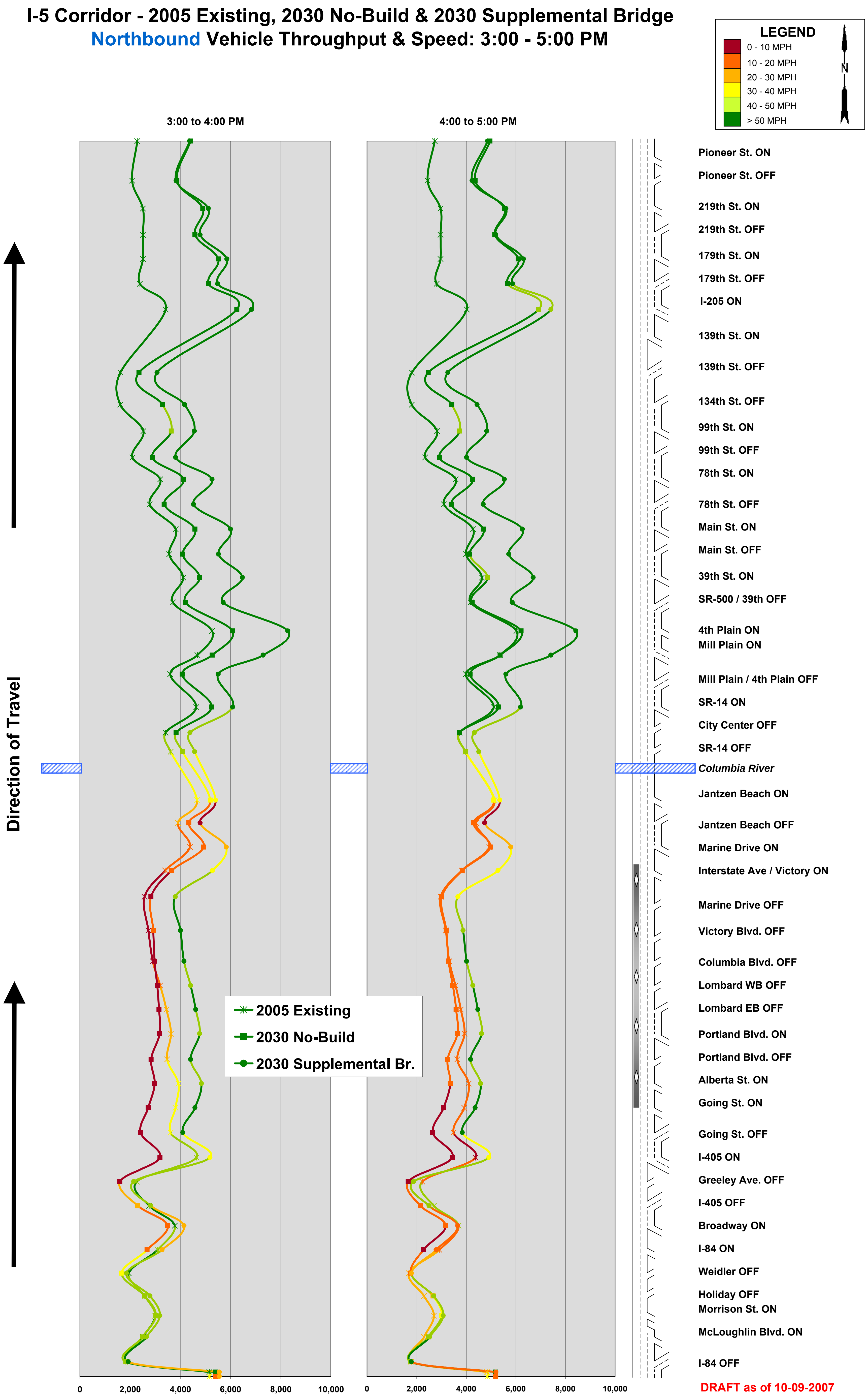

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Exhibit 8-18 - continued

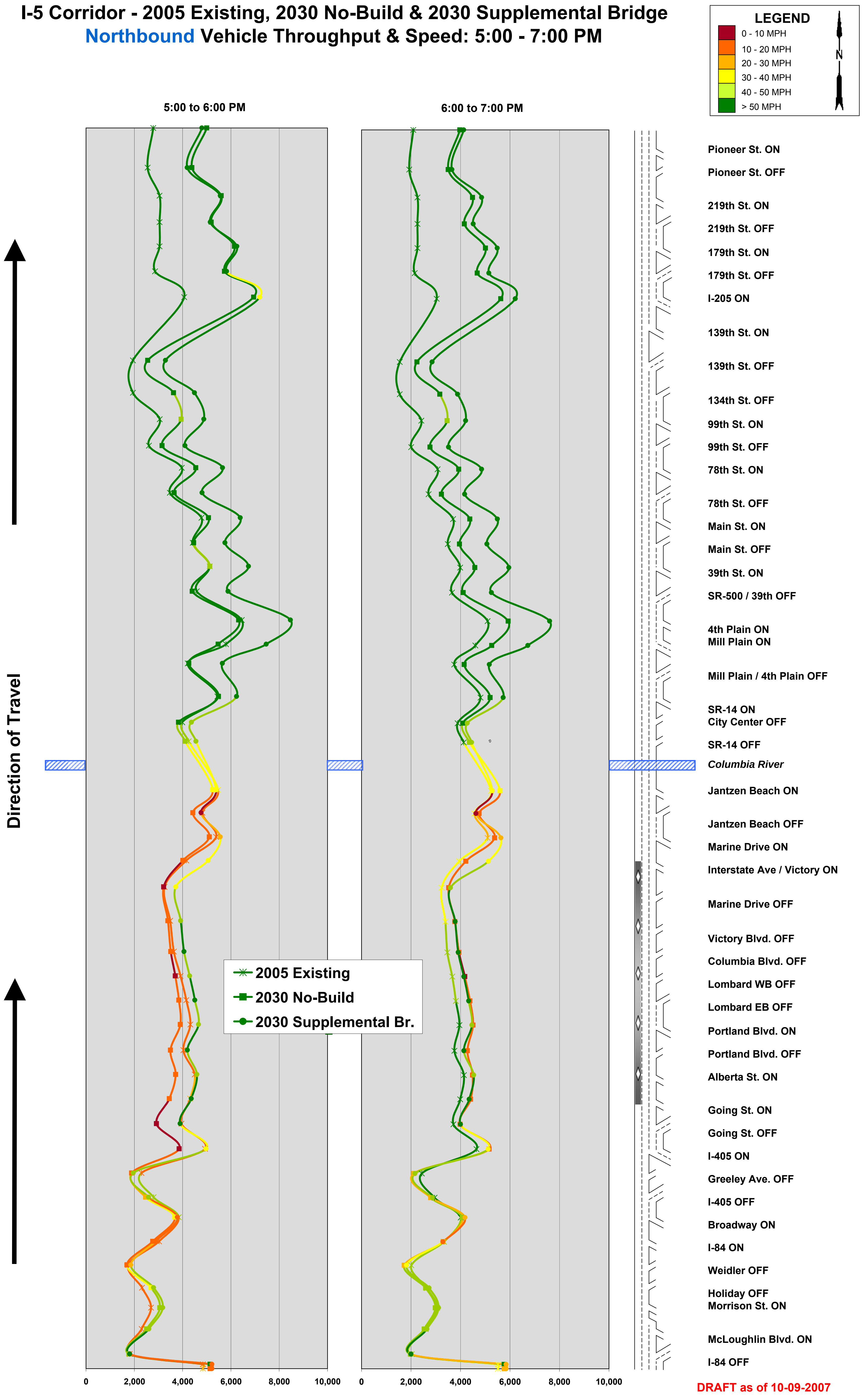
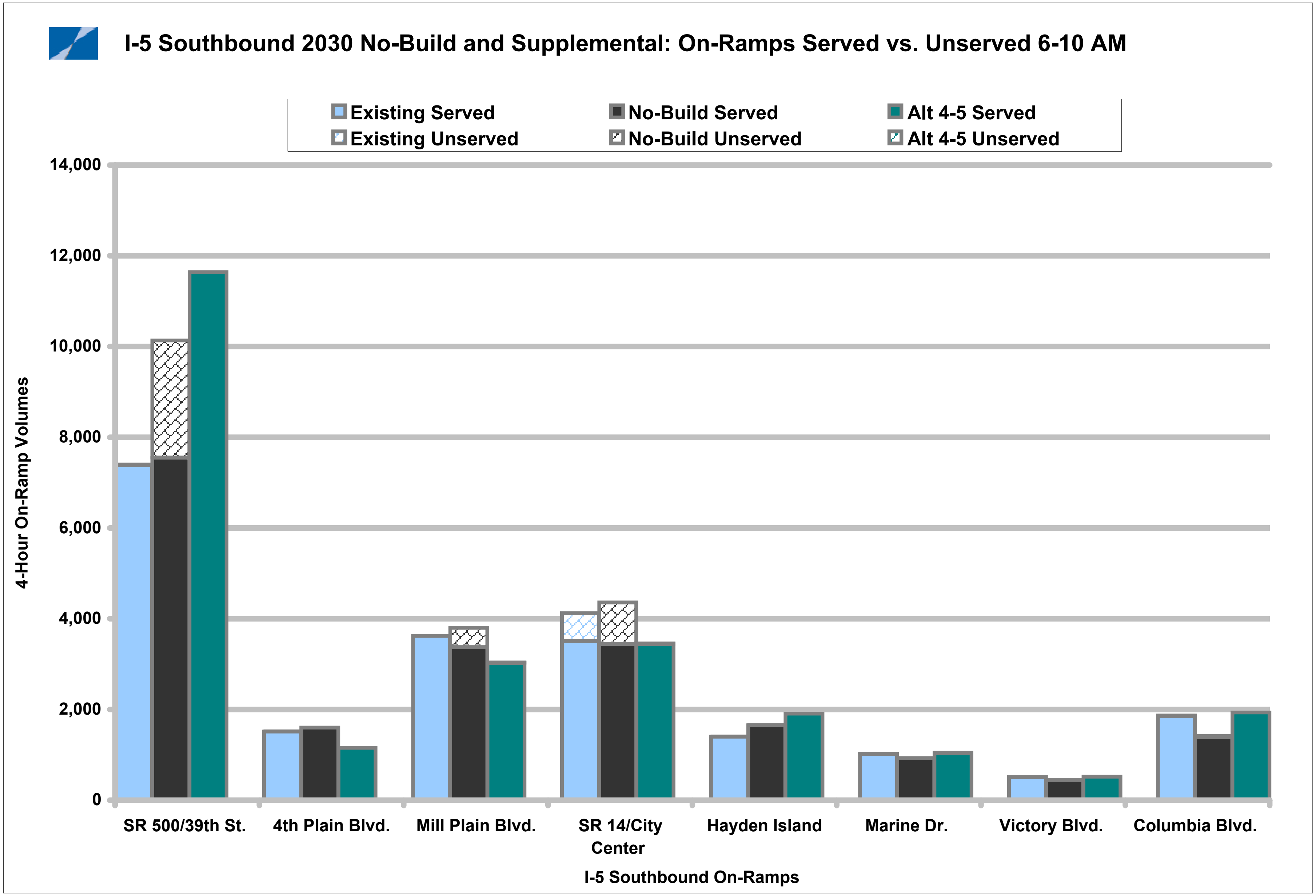
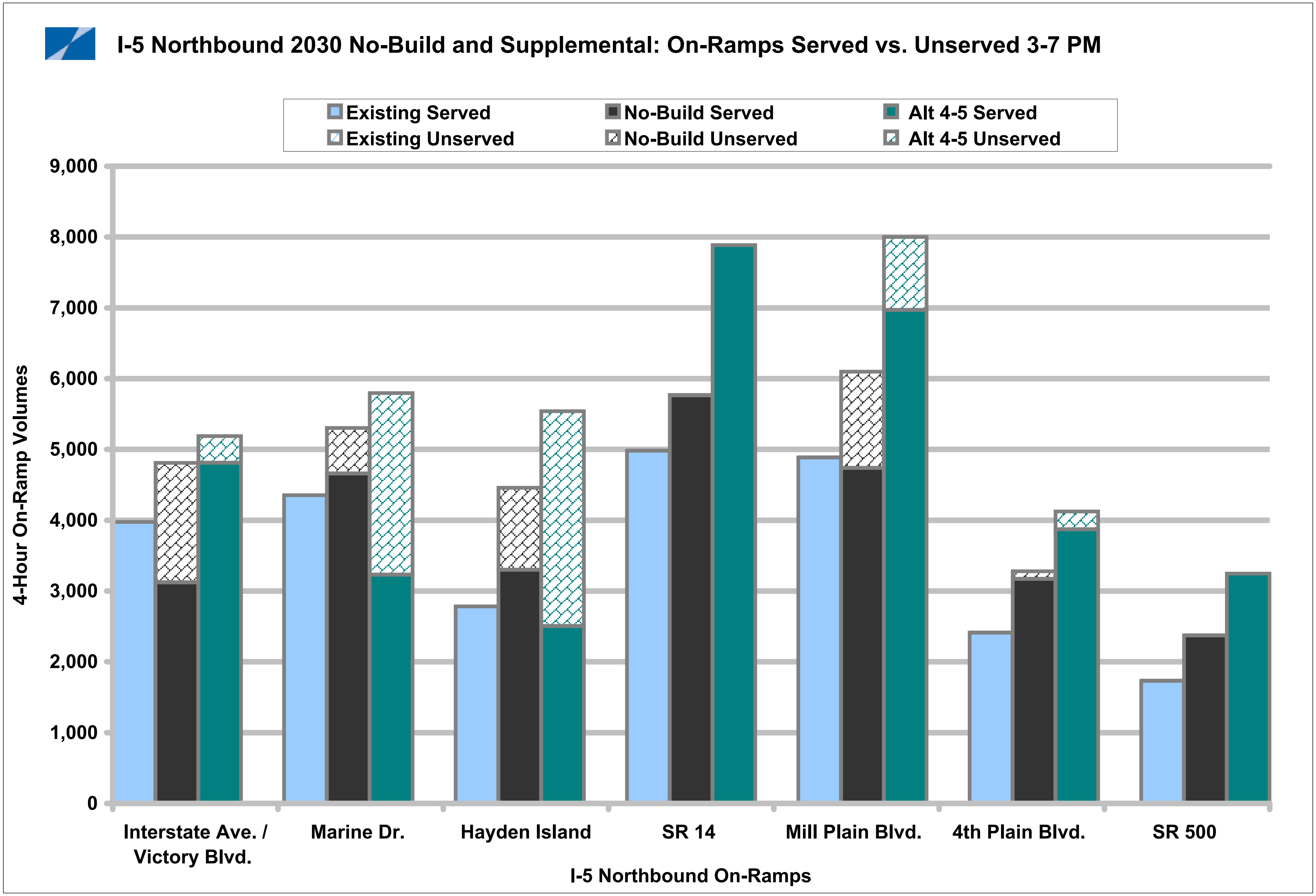


Exhibit 8-19



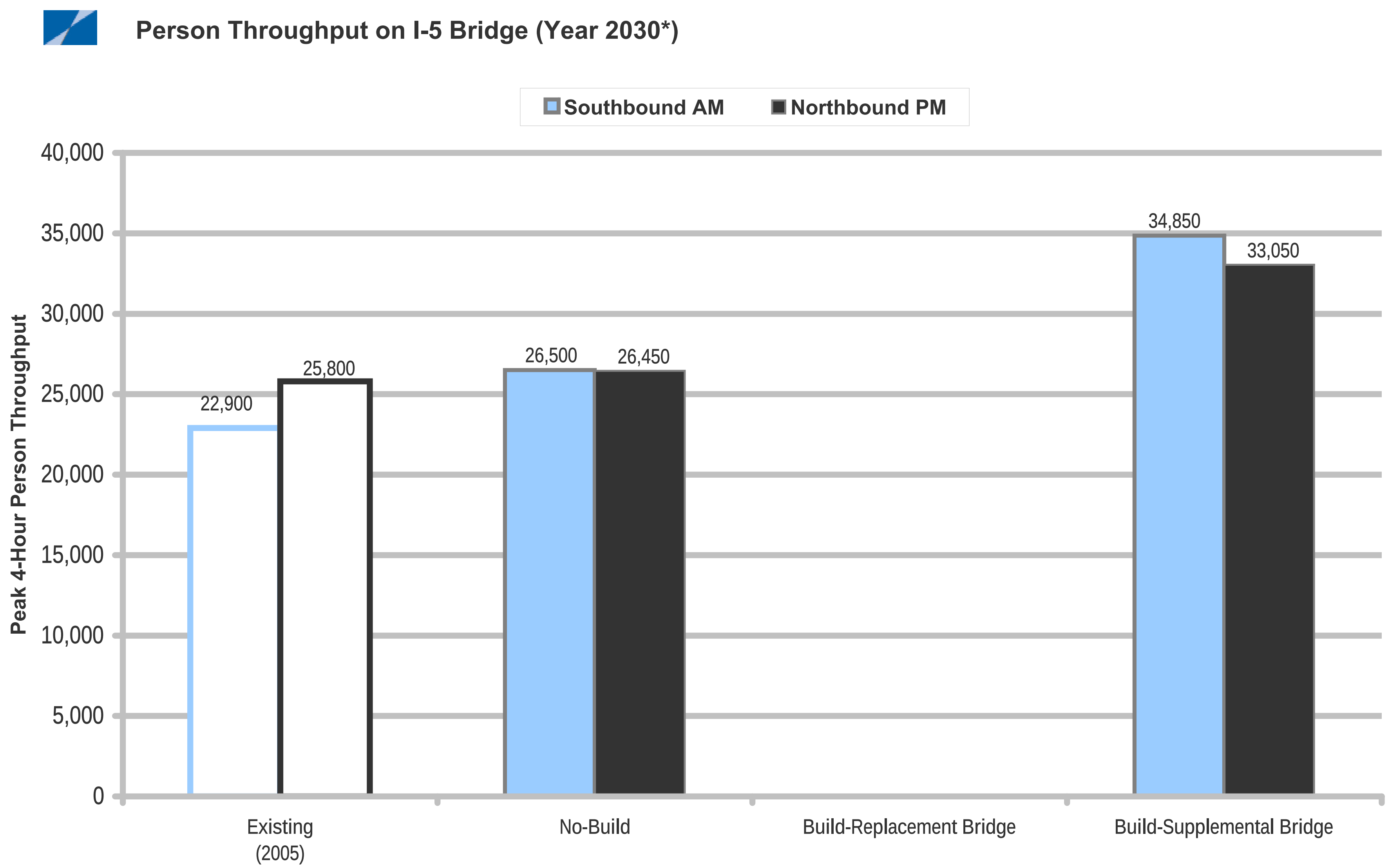
I-5 Southbound 2030 No-Build and Supplemental: On-Ramps Served vs. Unserved 6-10 AM
Existing Served
Existing Unserved
No-Build Served
No-Build Unserved
Alt 4-5 Served
Alt 4-5 Unserved
4-Hour On-Ramp Volumes
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
SR 500/39th St.
4th Plain Blvd.
Mill Plain Blvd.
SR 14/City Center
Hayden Island
Marine Dr.
Victory Blvd.
Columbia Blvd.
I-5 Southbound On-Ramps

Exhibit 8-20



I-5 Northbound 2030 No-Build and Supplemental: On-Ramps Served vs. Unserved 3-7 PM
Existing Served
Existing Unserved
No-Build Served
No-Build Unserved
Alt 4-5 Served
Alt 4-5 Unserved
4-Hour On-Ramp Volumes
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Interstate Ave. / Victory Blvd.
Marine Dr.
Hayden Island
SR 14
Mill Plain Blvd.
4th Plain Blvd.
SR 500
I-5 Northbound On-Ramps

Exhibit 8-21



*Except for Existing Conditions (Year 2005)

Exhibit 8-22

Vancouver North-South Screenlines - AM Peak Hour Volumes			
Screenline	**No-Build**	**Supplemental Bridge**	**Difference**
West of Franklin St			
Westbound Total	2,950	3,350	14%
Eastbound Total	2,200	2,350	7%
West of I-5			
Westbound Total	5,000	5,700	14%
Eastbound Total	3,800	4,150	9%
East of I-5			
Westbound Total	3,950	3,600	-9%
Eastbound Total	3,400	3,200	-6%

Vancouver East-West Screenlines - AM Peak Hour Volumes			
Screenline	**No-Build**	**Supplemental Bridge**	**Difference**
North of Evergreen Blvd			
Southbound Total	1,800	1,900	6%
Northbound Total	1,350	1,250	-7%
North of 15th St			
Southbound Total	2,650	2,150	-19%
Northbound Total	650	750	15%
North of 4th Plain Blvd			
Southbound Total	2,750	1,900	-31%
Northbound Total	450	550	22%
North of 39th St			
Southbound Total	1,550	1,050	-32%
Northbound Total	350	750	114%

Exhibit 8-23

Vancouver North-South Screenlines - PM Peak Hour Volumes			
Screenline	**No-Build**	**Supplemental Bridge**	**Difference**
West of Franklin St			
Westbound Total	2,600	3,000	15%
Eastbound Total	3,600	3,750	4%
West of I-5			
Westbound Total	4,450	4,900	10%
Eastbound Total	6,550	7,050	8%
East of I-5			
Westbound Total	3,550	3,850	8%
Eastbound Total	6,350	5,000	-21%

Vancouver East-West Screenlines - PM Peak Hour Volumes			
Screenline	**No-Build**	**Supplemental Bridge**	**Difference**
North of Evergreen Blvd			
Southbound Total	1,350	1,400	4%
Northbound Total	2,300	2,100	-9%
North of 15th St			
Southbound Total	1,250	1,100	-12%
Northbound Total	1,700	1,450	-15%
North of 4th Plain Blvd			
Southbound Total	800	800	0%
Northbound Total	1,600	1,150	-28%
North of 39th St			
Southbound Total	650	1,000	54%
Northbound Total	1,200	1,000	-17%

Exhibit 8-24

Portland North-South Screenlines - AM Peak Hour Volumes			
Screenline	**No-Build**	**Supplemental Bridge**	**Difference**
West of Denver Ave			
Westbound Total	4,600	4,450	-3%
Eastbound Total	3,550	3,550	0%
West of Vancouver Ave			
Westbound Total	3,800	3,900	3%
Eastbound Total	3,100	3,600	16%
East of MLK Jr Blvd			
Westbound Total	4,550	4,650	2%
Eastbound Total	3,100	3,550	15%

Portland East-West Screenlines - AM Peak Hour Volumes			
Screenline	**No-Build**	**Supplemental Bridge**	**Difference**
Columbia Slough			
Southbound Total	1,800	1,700	-6%
Northbound Total	1,550	1,400	-10%
North of Portland Blvd			
Southbound Total	2,200	2,200	0%
Northbound Total	1,400	1,400	0%
South of Alberta St			
Southbound Total	3,800	3,850	1%
Northbound Total	2,500	2,200	-12%

Exhibit 8-25

Portland North-South Screenlines - PM Peak Hour Volumes			
Screenline	**No-Build**	**Supplemental Bridge**	**Difference**
West of Denver Ave			
Westbound Total	3,550	3,500	-1%
Eastbound Total	5,550	5,600	1%
West of Vancouver Ave			
Westbound Total	3,550	3,500	-1%
Eastbound Total	3,800	3,800	0%
East of MLK Jr Blvd			
Westbound Total	3,800	3,700	-3%
Eastbound Total	4,750	4,750	0%

Portland East-West Screenlines - PM Peak Hour Volumes			
Screenline	**No-Build**	**Supplemental Bridge**	**Difference**
Columbia Slough			
Southbound Total	1,850	1,650	-11%
Northbound Total	2,050	2,200	7%
North of Portland Blvd			
Southbound Total	2,400	2,150	-10%
Northbound Total	2,900	2,900	0%
South of Alberta St			
Southbound Total	3,350	2,700	-19%
Northbound Total	4,750	4,600	-3%

Exhibit 8-26

Applicable Local Street Intersection Performance Criteria for Build Alternatives

Vancouver Intersection Performance Criteria

No-Build	Build Alternatives	Determination	Mitigation?
LOS E or better ≤ 80 seconds(1)	LOS E or better ≤ 80 seconds	No project impact	No
LOS E or better ≤ 80 seconds	LOS F > 80 seconds	Significant project-related impact	**Yes**
LOS F > 80 and ≤ 100 seconds	LOS E or better ≤ 80 seconds	Project-related benefit	No
LOS F > 80 and ≤ 100 seconds(2)	LOS F > 80 and ≤ 100 seconds	No project impact if delay within established range is lower under build alternative	No
LOS F > 80 and ≤ 100 seconds(2)	LOS F > 80 and ≤ 100 seconds	Significant project-related impact if delay within established range is at least 10 seconds higher	**Yes**
LOS F > 100 seconds(3)	LOS F < 100 seconds	Project-related benefit	No
LOS F > 100 seconds	LOS F > 100 seconds	No project impact	No

Portland Intersection Performance Criteria

No-Build	Build Alternatives	Determination	Mitigation?
LOS D or better ≤ 55 seconds	LOS D or better ≤ 55 seconds	No project impact	No
LOS D or better ≤ 55 seconds	LOS E or worse > 55 seconds	Significant project-related impact	**Yes**
LOS E ≤ 80 seconds	LOS E ≤ 80 seconds	Significant project-related impact if delay within established range is at least 10 seconds higher under build alternative	**Yes**
LOS F > 80 seconds	LOS E or better ≤ 80 seconds	Project-related benefit	No
LOS F > 80 seconds(2)	LOS F > 80 seconds	No project impact	No
V/C ≤ 0.85(4) or ≤ 0.99(5)	V/C > 0.85(4) or > 0.99(5)	Significant project-related impact	**Yes**
V/C ≤ 0.85(4) or ≤ 0.99(5)	V/C ≤ 0.85(4) or ≤ 0.99(5)	No project impact	No

(1) Refers to average delay per vehicle entering the intersection.

(2) LOS F gradations not established within this range.

(3) Assumed level of delay at which point motorists would change route, travel mode, or time of day for trip.

(4) A V/C ratio of 0.85 is used for ramp terminals in all scenarios.

(5) A V/C ratio of 0.99 is used for ODOT intersections that are not ramp terminals in all scenarios.

Exhibit 8-27

Portland Intersection Performance Results

AM Peak Hour		2030 No-Build (Alternative 1)								2030 Supplemental Bridge (Alternatives 4 and 5)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	87.6	F	0.93	LOS D	N	125	250 (WBL)	***Overall Intersection***	63.2	E	0.91	LOS D	Y*	125	250 (WBL)
																125	150 (SBL)
02	Going and Interstate	***Overall Intersection***	52.9	D	0.88	LOS D	Y	125	275 (WBL)	***Overall Intersection***	62.1	E	0.86	LOS D	N	355	500 (EBL)
								125	150 (NBL)							125	300 (WBL)
								355	450 (EBL)							125	200 (NBL)
03	Alberta and Interstate	***Overall Intersection***	27.5	C	0.73	LOS D	Y	100	150 (SBL)	***Overall Intersection***	31.0	C	0.74	LOS D	Y	100	175 (SBL)
04	Alberta and SB I-5 Off-Ramp	***Overall Intersection***	46.3	D	0.78	0.85	Y	75	125 (WBL)	***Overall Intersection***	27.6	C	0.80	0.85	Y	75	125 (WBL)
								175	175 (WBT)							175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	***Overall Intersection***	53.9	D	0.43	0.85	Y	75	100 (EBL)	***Overall Intersection***	51.1	D	0.55	0.85	Y	75	125 (EBL)
06	Alberta and MLK Jr.	***Overall Intersection***	39.8	D	0.89	LOS D	Y	75	125 (WBR)	***Overall Intersection***	64.2	E	0.89	LOS D	N	75	150 (WBR)
								100	150 (NBL)							100	150 (NBL)
								100	125 (SBL)							100	150 (SBL)
07	Portland and Interstate	***Overall Intersection***	20.6	C	0.62	LOS D	Y	100	125 (WBL)	***Overall Intersection***	21.3	C	0.63	LOS D	Y	100	125 (WBL)
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	18.8	B	0.53	0.85	Y	125	150 (SWR)	***Overall Intersection***	19.0	B	0.55	0.85	Y	190	225 (WBL)
																125	150 (SBR)
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	12.6	B	0.44	0.85	Y	-	-	***Overall Intersection***	13.2	B	0.44	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	14.7	B	0.70	LOS D	Y	100	150 (NBL)	***Overall Intersection***	13.2	B	0.69	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	***Overall Intersection***	> 100	F	0.90	0.99	Y	150	325 (WBL)	***Overall Intersection***	> 100	F	0.80	0.99	Y	150	200 (EBL)
								225	275 (NBL)							150	300 (WBL)
								150	275 (EBL)							555	825 (WBTR)
								1155	1175 (EBTR)							225	275 (NBL)
								555	1100 (WBTR)								
12	Lombard and I-5 SB On-Ramps	Westbound Thru	12.9	B	0.42	0.85	Y	-	-	Westbound Thru	78.8	F	0.42	0.85	Y	450	775 (WBT)
13	Lombard and I-5 NB Off-Ramps	Northbound Right	16.8	C	0.57	0.85	Y	-	-	Northbound Right	> 100	F	0.63	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	> 100	F	0.88	0.99	Y	100	175 (EBL)	***Overall Intersection***	> 100	F	0.92	0.99	Y	100	175 (EBL)
								100	175 (WBL)							100	200 (WBL)
								100	200 (NBL)							100	200 (NBL)
								150	300 (SBL)							150	300 (SBL)
15	Interstate and Argyle	***Overall Intersection***	26.7	C	0.69	LOS D	Y	75	125 (EBR)	***Overall Intersection***	24.4	C	0.67	LOS D	Y	75	150 (EBR)
								50	125 (NBL)							50	100 (NBL)
								150	150 (NBT)								
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	14.9	B	0.63	0.85	Y	150	200 (WBR)	***Overall Intersection***	17.6	B	0.72	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	37.2	D	0.89	0.99	Y	100	200 (NBL)	***Overall Intersection***	47.6	D	0.85	0.99	Y	100	225 (NBL)
								225	250 (SBL)							225	325 (SBL)
18	Victory and Expo Road	Westbound Left/Thru/Right	3.1	A	0.12	LOS E	Y	-	-	Westbound Left/Thru/Right	2.8	A	0.09	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Westbound Left/Thru	1.3	A	0.21	0.85	Y	-	-	Westbound Left/Thru	1.5	A	0.18	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	5.0	A	0.13	0.85	Y	-	-	***Overall Intersection***	5.6	A	0.12	0.85	Y	-	-
21	Union Ct and I-5 NB Off-Ramp	Eastbound Left	8.4	A	0.28	0.85	Y	-	-								
22	Union Ct/Marine Way and Vancouver Way	Northeast Left/Thru	8.4	A	0.55	LOS E	Y	-	-								
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	> 100	F	0.83	0.85	Y	200	2075 (NBL)	***Overall Intersection***	14.4	B	0.51	0.85	Y	-	-
								275	350 (EBL)								
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	11.2	B	0.35	0.85	Y	-	-								
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	9.5	A	0.32	LOS D	Y	-	-								
26	Hayden Island North Ramp Terminal - Center									***Overall Intersection***	10.3	B	0.25	0.85	Y	-	-
27	Hayden Island North Ramp Terminal - West									***Overall Intersection***	2.4	A	0.22	0.85	Y	-	-
28	Hayden Island North Ramp Terminal - East									Northbound Right	1.7	A	0.30	0.85	Y	-	-
29	Hayden Island Drive and N Jantzen Drive									***Overall Intersection***	8.8	A	0.26	LOS D	Y	-	-
30	Hayden Island Drive and Center Ave									***Overall Intersection***	8.3	A	0.34	LOS D	Y	-	-
31	Hayden Island Drive and Jantzen Beach Center									***Overall Intersection***	11.9	B	0.28	LOS D	Y	-	-
32	Tomahawk Island Drive and Jantzen Ave									***Overall Intersection***	11.7	B	0.32	LOS D	Y	-	-
33	Jantzen Beach Center and Jantzen Dr									***Overall Intersection***	6.3	A	0.30	LOS D	Y	-	-
34	Center Ave and Jantzen Ave									***Overall Intersection***	14.9	B	0.32	LOS D	Y	-	-
35	Center Ave and New Central Road									Southbound Left/Thru	6.5	A	0.21	LOS E	Y	-	-
36	Hayden Island South Ramp Terminal - Center									***Overall Intersection***	14.0	B	0.24	0.85	Y	-	-
37	Hayden Island South Ramp Terminal - East									***Overall Intersection***	4.6	A	0.15	0.85	Y	-	-
38	Hayden Island South Ramp Terminal - West									***Overall Intersection***	5.7	A	0.14	0.85	Y	-	-
39	Vancouver Way and MLK on- and off-ramps									***Overall Intersection***	8.9	A	0.43	0.85	Y	150	200 (SBR)
40	Marine Drive and Anchor Way									***Overall Intersection***	2.2	A	0.43	LOS D	Y	-	-
41	Union Court and Vancouver Way									Westbound Left	24.1	C	0.67	LOS E	Y	75	125 (NBR)

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1)
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

Exhibit 8-28

Portland Intersection Performance Results

PM Peak Hour		2030 No-Build (Alternative 1)								2030 Supplemental Bridge (Alternatives 4 and 5)							
#	Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]	Standard[2]	Meets Standard	Storage Length	95% Queue (ft)
01	Fremont and MLK Jr.	***Overall Intersection***	93.6	F	0.99	LOS D	N	125	175 (EBL)	***Overall Intersection***	> 100	F	0.98	LOS D	Y*	125	150 (EBL)
								125	150 (NBL)							125	200 (WBL)
								125	200 (SBL)							125	175 (NBL)
								125	175 (WBL)							125	200 (SBL)
02	Going and Interstate	***Overall Intersection***	65.2	E	0.84	LOS D	N	125	225 (NBL)	***Overall Intersection***	58.0	E	0.84	LOS D	Y*	355	425 (EBL)
								125	250 (WBL)							125	225 (WBL)
																125	175 (NBL)
																300	475 (SBL)
03	Alberta and Interstate	***Overall Intersection***	38.8	D	0.94	LOS D	Y	125	225 (NBL)	***Overall Intersection***	35.3	D	0.92	LOS D	Y	125	175 (NBL)
								100	150 (SBL)							100	125 (SBL)
								965	1150 (NBTR)								
04	Alberta and SB I-5 Off-Ramp	***Overall Intersection***	19.5	B	0.52	0.85	Y	75	125 (WBL)	***Overall Intersection***	16.0	B	0.53	0.85	Y	75	125 (WBL)
								175	175 (WBT)							175	175 (WBT)
05	Alberta and NB I-5 Off-Ramp	***Overall Intersection***	17.3	B	0.74	0.85	Y	75	125 (EBL)	***Overall Intersection***	15.8	B	0.70	0.85	Y	75	125 (EBL)
								175	175 (EBT)							175	175 (EBT)
06	Alberta and MLK Jr.	***Overall Intersection***	71.9	E	0.91	LOS D	N	100	200 (NBL)	***Overall Intersection***	53.6	D	0.86	LOS D	Y	100	175 (NBL)
								100	200 (SBL)							100	150 (SBL)
07	Portland and Interstate	***Overall Intersection***	36.3	D	0.75	LOS D	Y	100	200 (WBL)	***Overall Intersection***	57.1	E	0.76	LOS D	N	100	125 (EBL)
								175	225 (NBL)							100	200 (WBL)
																175	300 (NBL)
08	Portland and I-5 SB On-/Off Ramps	***Overall Intersection***	17.2	B	0.52	0.85	Y	125	175 (SWR)	***Overall Intersection***	15.1	B	0.52	0.85	Y	-	-
09	Portland and I-5 NB On-/Off Ramps	***Overall Intersection***	9.3	A	0.40	0.85	Y	-	-	***Overall Intersection***	16.1	B	0.51	0.85	Y	-	-
10	Portland and MLK Jr.	***Overall Intersection***	16.8	B	0.84	LOS D	Y	100	150 (NBL)	***Overall Intersection***	19.4	B	0.83	LOS D	Y	100	150 (NBL)
11	Lombard and Interstate	***Overall Intersection***	> 100	F	0.95	0.99	Y	100	200 (NBR)	***Overall Intersection***	> 100	F	1.07	0.99	N	150	250 (EBL)
								250	275 (SBL)							1150	1150 (EBTR)
								150	250 (EBL)							150	200 (WBL)
								150	300 (WBL)							225	300 (NBL)
								225	300 (NBL)							100	200 (NBR)
								1150	1150 (EBTR)							250	350 (SBL)
12	Lombard and I-5 SB On-Ramps	Westbound Thru	7.6	A	0.56	0.85	Y	-	-	Eastbound Thru/Right	5.0	A	0.55	0.85	Y	-	-
13	Lombard and I-5 NB Off-Ramps	Northbound Right	14.9	B	0.55	0.85	Y	-	-	***Overall Intersection***	4.8	A	0.55	0.85	Y	-	-
14	Lombard and MLK Jr.	***Overall Intersection***	> 100	F	0.99	0.99	Y	100	200 (EBL)	***Overall Intersection***	> 100	F	0.97	0.99	Y	100	175 (EBL)
								100	200 (WBL)							1730	1750 (EBTR)
								100	225 (NBL)							100	200 (WBL)
								150	250 (SBL)							100	200 (NBL)
								1320	1325 (SBTR)							150	300 (SBL)
								1730	1750 (EBTR)								
15	Interstate and Argyle	***Overall Intersection***	> 100	F	0.63	LOS D	N	1300	1300 (EBLT)	***Overall Intersection***	> 100	F	0.71	LOS D	Y**	1300	1300 (EBLT)
								50	125 (NBL)							75	150 (EBR)
								125	125 (NBT)							50	100 (NBL)
								75	150 (EBR)							125	125 (NBT)
16	Columbia Blvd and I-5 Ramps	***Overall Intersection***	11.7	B	0.57	0.85	Y	-	-	***Overall Intersection***	15.1	B	0.62	0.85	Y	150	200 (WBR)
17	Columbia Blvd and MLK Jr.	***Overall Intersection***	83.5	F	0.74	0.99	Y	350	450 (WBL)	***Overall Intersection***	39.9	D	0.84	0.99	Y	100	225 (NBL)
								100	225 (NBL)							225	350 (SBL)
								225	400 (SBL)								
								150	450 (EBR)								
18	Victory and Expo Road	Southbound Left/Thru	76.6	F	0.45	LOS E	N	-	-	Southbound Left/Thru	8.4	A	0.47	LOS E	Y	-	-
19	Victory Blvd and I-5 SB On-Ramp	Eastbound Thru	27.7	D	0.28	0.85	Y	75	75 (EBT)	Westbound Left/Thru	2.6	A	0.29	0.85	Y	-	-
20	Victory Blvd and NB On-/Off-Ramps	***Overall Intersection***	> 100	F	0.31	0.85	Y	290	775 (EBL)	***Overall Intersection***	10.4	B	0.35	0.85	Y	-	-
								850	850 (WBT)								
								200	225 (WBR)								
21	Union Ct and I-5 NB Off-Ramp	Northbound Thru	> 100	F	0.20	0.85	Y	200	300 (EBL)								
								1195	1550 (EBR)								
22	Union Ct/Marine Way and Vancouver Way	Northeast Left/Thru	95.4	F	0.82	LOS E	N	75	200 (SBLTR)								
								370	2500 (NBTL)								
								370	2500 (NBTR)								
								55	100 (SWL)								
								55	150 (SWTR)								
23	Marine Dr and I-5 On-/Off-Ramps	***Overall Intersection***	> 100	F	0.82	0.85	Y	275	400 (EBL)	***Overall Intersection***	10.3	B	0.60	0.85	Y	-	-
								2130	2150 (EBT)								
								373	2925 (WBR)								
								200	1525 (NBLT)								
24	Center Ave and I-5 SB On-/Off Ramps	***Overall Intersection***	24.8	C	0.80	0.85	Y	115	225 (WBLT)								
								75	125 (WBR)								
25	Hayden Island Dr and Hayden Island Dr South	***Overall Intersection***	69.8	E	0.67	LOS D	N	70	100 (WBLR)								
								150	200 (SBL)								
								820	825 (SBT)								
26	Hayden Island North Ramp Terminal - Center									***Overall Intersection***	46.9	D	0.40	0.85	Y	1725	2250 (NBL)
27	Hayden Island North Ramp Terminal - West									***Overall Intersection***	21.6	C	0.41	0.85	Y	-	-
28	Hayden Island North Ramp Terminal - East									Westbound Thru	20.8	C	0.30	0.85	Y	-	-
29	Hayden Island Drive and N Jantzen Drive									***Overall Intersection***	13.2	B	0.40	LOS D	Y	-	-
30	Hayden Island Drive and Center Ave									***Overall Intersection***	> 100	F	0.44	LOS D	N	550	550 (EBT)
																250	300 (EBR)
31	Hayden Island Drive and Jantzen Beach Center									***Overall Intersection***	> 100	F	0.40	LOS D	N	650	875 (NBR)
32	Tomahawk Island Drive and Jantzen Ave									***Overall Intersection***	31.7	C	0.56	LOS D	Y	-	-
33	Jantzen Beach Center and Jantzen Dr									***Overall Intersection***	> 100	F	0.51	LOS D	N	-	-
34	Center Ave and Jantzen Ave									***Overall Intersection***	> 100	F	0.47	LOS D	N	150	175 (EBL)
																630	650 (EBT)
																710	725 (SBL)
35	Center Ave and New Central Road									Southbound Left/Thru	> 100	F	0.67	LOS E	N	575	575 (SBLT)
36	Hayden Island South Ramp Terminal - Center									***Overall Intersection***	> 100	F	0.39	0.85	Y	200	250 (EBL)
37	Hayden Island South Ramp Terminal - East									***Overall Intersection***	76.9	E	0.32	0.85	Y	250	350 (WBR)
38	Hayden Island South Ramp Terminal - West									***Overall Intersection***	> 100	F	0.23	0.85	Y	385	400 (EBT)
39	Vancouver Way and MLK on- and off-ramps									***Overall Intersection***	> 100	F	0.32	0.85	Y	1200	1200 (SBLT)
																150	325 (SBR)
40	Marine Drive and Anchor Way									***Overall Intersection***	29.4	C	0.37	LOS D	Y	-	-
41	Union Court and Vancouver Way									Westbound Left	> 100	F	0.44	LOS E	N	75	125 (EBR)
																450	625 (WBL)
																574	575 (WBT)

Delay / LOS affected by freeway congestion

Intersection queuing spills back into upstream intersection

Note 1 The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.

Note 2 - The ODOT V/C standard of 0.85 is used for ramp terminals in the Existing, No-Build and Build scenarios as stated in the Oregon Highway Plan (Action 1F1).
- The ODOT V/C standard of 0.99 is used for intersections along Lombard Street and MLK Jr. Boulevard for the Existing, No-Build and Build scenarios as stated in the OHP (Table 7, 2004 update).
- PDOT's standard for signalized intersections is LOS D, and LOS E for unsignalized intersections. Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y* Intersection does not meet standard in the Build scenario, but meets the "do no worse" criteria as compared to the No-Build.

Y** Intersection operations are no worse than No-Build, and no mitigation is required.

9. Tolling Effects on Traffic

9.1 Description of Tolling Scenarios

As a part of the build alternatives, all motor vehicle users on I-5 crossing the Columbia River would pay a toll. Open Road Tolling (ORT) technology would be used. ORT allows the collection of tolls without the use of lane dividing barriers or toll-booths. With ORT, users are able to drive through at highway speeds without having to slow down at barriers or to physically pay a toll. Full use of ORT eliminates the need for toll plazas.

Tolls would be tracked using transponders affixed to vehicles. Motorists would establish a pre-paid account for their transponder. For vehicles without a transponder, license plate images would be scanned and users would be mailed a bill. Due to the added operational cost associated with license plate scanning and bill collection, vehicles without transponders would pay a higher toll rate than vehicles with transponders.

Exhibit 9-1 summarizes the tolling rate structure for the replacement crossing. For the supplemental crossing, which includes enhanced transit and transportation demand incentives, the peak toll for passenger vehicles would be 50 cents higher than shown in **Exhibit 9-1** (i.e., from 6 – 10 a.m. and 3 – 7 p.m., vehicles with transponders would be charged $2.50 and vehicles without transponders would be charged $3.00). For all build alternatives, medium trucks would be charged twice the rate of passenger vehicles, and heavy trucks would pay four times the passenger car rate.

Tolls would be administered for each direction of travel along I-5. For example, a vehicle with a transponder traveling southbound across the bridge at 8 a.m. and northbound across the bridge at 5 p.m. would pay a total of four dollars in tolls. The toll rates shown in **Exhibit 9-1** are based on 2006 dollars and have been assumed to increase at 2.5 percent per year, an assumed long-term inflation rate.

Traffic volumes crossing the Columbia River along I-5 and I-205 were estimated for each alternative. Sensitivity tests were conducted for some alternatives assuming a no-toll condition and a scenario where both the I-5 and I-205 Columbia River bridges were tolled.

9.2 I-5 and I-205 Performance

Based upon the assumptions described above, year 2030 average daily traffic demands were estimated for the I-5 and I-205 river crossings for several scenarios:

- No-Build conditions (Alternative 1).
- Replacement crossing without tolls.
- Replacement crossing with a toll on I-5 (Alternatives 2 and 3).
- Replacement crossing with tolls on I-5 and I-205.

- Supplemental crossing with a higher toll on I-5 (Alternatives 4 and 5).

In addition, traffic projections were estimated for Alternatives 2 and 3 for a 2015 interim year.

Exhibit 9-2 compares replacement crossing traffic projections for various tolling scenarios.

Compared to No-Build conditions (Alternative 1), provision of a non-tolled replacement crossing (including I-5 and high-capacity transit improvements, i.e., Alternatives 2 or 3 but without tolling), would increase I-5 vehicle traffic demand by 26,000 vehicles per day and decrease I-205 traffic by 10,000 vehicles per day, resulting in a net increase of 16,000 vehicles per day crossing the Columbia River via I-5 and I-205.

By tolling a replacement crossing (Alternatives 2 and 3), compared to a non-tolled replacement crossing condition, overall river crossings would decrease 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.

With a replacement crossing and tolls on both I-5 and I-205, river crossings would decrease by 44,000 vehicles per day compared to a non-tolled replacement crossing condition overall, with I-5 volumes decreasing by 14,000 vehicles and I-205 volumes decreasing by 30,000 vehicles.

If the replacement crossing were constructed by year 2015 and tolls were implemented on I-5, daily traffic volumes across the Columbia River would be about 55,000 vehicles per day higher than existing conditions, with 35 percent of this increase on the I-5 crossing and 65 percent of the increase using the I-205 crossing.

Exhibit 9-3 compares the effect of tolling for the supplemental crossing (Alternatives 4 and 5) with tolling the replacement crossing (Alternatives 2 and 3). Due to the supplemental crossing's assumed higher toll, lower available highway capacity, and provision of an enhanced transit system, daily I-5 vehicle crossings would be 13,000 vehicles per day lower compared to the replacement crossing, while I-205's crossings would increase by 6,000 vehicles per day. Overall, there would be 7,000 fewer vehicle crossings of the Columbia River via I-5 and I-205.

Exhibit 9-1

Toll Rate Structure For Replacement Bridge							
		Passenger Cars		Trucks with Transponders		Trucks without Transponders	
Start	End	with Transponder	No Transponder	Medium Truck	Heavy Truck	Medium Truck	Heavy Truck
Midnight	5:00 AM	$1.00	$2.00	$2.00	$4.00	$3.00	$5.00
5:00 AM	6:00 AM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
6:00 AM	10:00 AM	$2.00	$3.00	$4.00	$8.00	$5.00	$9.00
10:00 AM	3:00 PM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
3:00 PM	7:00 PM	$2.00	$3.00	$4.00	$8.00	$5.00	$9.00
7:00 PM	8:00 PM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
8:00 PM	Midnight	$1.00	$2.00	$2.00	$4.00	$3.00	$5.00

Notes: For Supplemental Bridge alternatives, the passenger car tolls would be increased by $0.50 between 6 - 10 a.m. and between 3 - 7 p.m. All proposed tolls are in 2006 dollars.

Exhibit 9-2

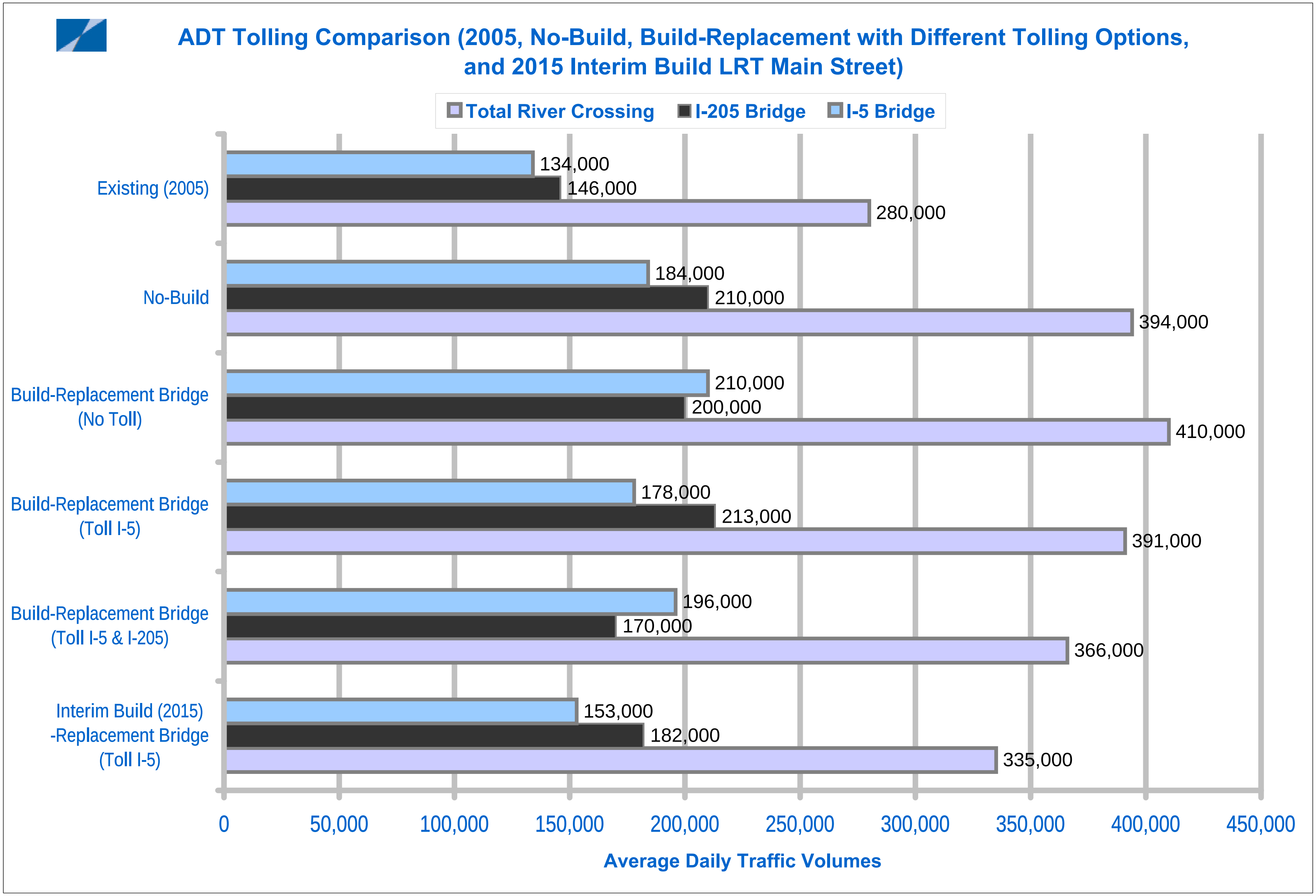
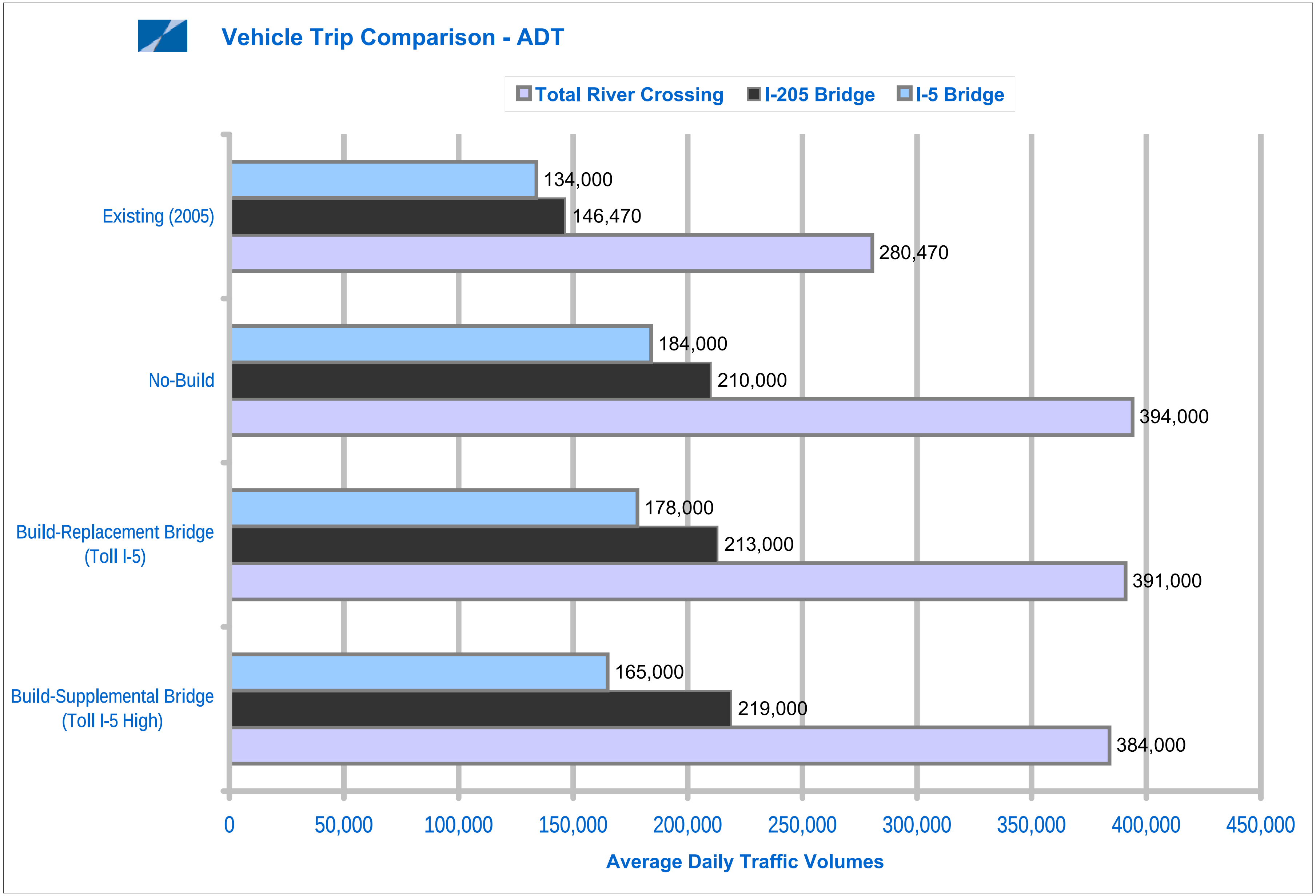

ADT Tolling Comparison (2005, No-Build, Build-Replacement with Different Tolling Options, and 2015 Interim Build LRT Main Street)
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
134,000
146,000
280,000
No-Build
184,000
210,000
394,000
Build-Replacement Bridge (No Toll)
210,000
200,000
410,000
Build-Replacement Bridge (Toll I-5)
178,000
213,000
391,000
Build-Replacement Bridge (Toll I-5 & I-205)
196,000
170,000
366,000
Interim Build (2015) -Replacement Bridge (Toll I-5)
153,000
182,000
335,000
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
Average Daily Traffic Volumes

Exhibit 9-3



Vehicle Trip Comparison - ADT
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
134,000
146,470
280,470
No-Build
184,000
210,000
394,000
Build-Replacement Bridge (Toll I-5)
178,000
213,000
391,000
Build-Supplemental Bridge (Toll I-5 High)
165,000
219,000
384,000
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
Average Daily Traffic Volumes

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