

INTERSTATE 5 COLUMBIA RIVER CROSSING

Public Services Technical Report



May 2008

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

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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Public Services Technical Report:

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TABLE OF CONTENTS

1. SUMMARY.....	1-1
1.1 Introduction.....	1-1
1.2 Description of the Alternatives.....	1-1
1.2.1 System-Level Choices.....	1-2
1.2.2 Segment-Level Choices.....	1-2
1.2.3 Full Alternatives.....	1-4
1.3 Long-Term Effects.....	1-5
1.3.1 Regional Effects.....	1-6
1.3.2 Segment-Level Effects.....	1-6
1.4 Temporary Effects.....	1-7
1.5 Mitigation.....	1-7
2. METHODS.....	2-1
2.1 Introduction.....	2-1
2.2 Study Area.....	2-1
2.2.1 Primary API.....	2-1
2.2.2 Secondary API.....	2-1
2.3 Effects Guidelines.....	2-3
2.3.1 Fire and Emergency Medical Services and Law Enforcement.....	2-3
2.3.2 School Transportation.....	2-3
2.3.3 Cemeteries.....	2-4
2.3.4 Postal Service and Solid Waste.....	2-4
2.4 Data Collection Methods.....	2-4
2.5 Analysis Methods.....	2-5
3. COORDINATION.....	3-1
4. AFFECTED ENVIRONMENT.....	4-1
4.1 Introduction.....	4-1
4.2 Regional Conditions.....	4-1
4.2.1 Fire and Life Safety.....	4-1
4.2.2 Law Enforcement.....	4-3
4.2.3 Medical Centers.....	4-5
4.2.4 Public Schools.....	4-5
4.2.5 Solid Waste Management.....	4-6
4.2.6 U.S. Postal Service.....	4-6
4.2.7 Cemeteries.....	4-7
4.3 Segment A Delta Park to Mill Plain District.....	4-7
4.3.1 Delta Park to South Downtown (Transit Segment A1).....	4-7
4.3.2 South Downtown to Mill Plain (Transit Segment A2).....	4-10
4.4 Segment B Mill Plain District to North Vancouver.....	4-13
4.4.1 Fire and Life Safety.....	4-13
4.4.2 Law Enforcement.....	4-14
4.4.3 Medical Centers.....	4-14
4.4.4 Public Schools and Other Facilities.....	4-14
4.4.5 Cemeteries.....	4-15

5. LONG-TERM EFFECTS	5-1
5.1 How is this section organized?	5-1
5.2 Impacts from Full Alternatives.....	5-1
5.2.1 No-Build Alternative (Alternative 1).....	5-1
5.2.2 Replacement Crossing with BRT (Alternative 2).....	5-3
5.2.3 Replacement Crossing with LRT (Alternative 3)	5-4
5.2.4 Supplemental Crossing with BRT (Alternative 4)	5-5
5.2.5 Supplemental Crossing with LRT (Alternative 5)	5-6
5.3 Impacts from Segment-Level Options.....	5-6
5.3.1 Segment A: Delta Park to Mill Plain District - Highway Alternatives.....	5-7
5.3.2 Segment B: Mill Plain District to North Vancouver - Highway Alternatives	5-23
5.3.3 Segment A1: Delta Park to South Vancouver - Transit Alternatives	5-33
5.3.4 Segment A2: South Vancouver to Mill Plain District - Transit Alternatives.....	5-34
5.3.5 Segment B: Mill Plain District to North Vancouver - Transit Alternatives	5-34
5.4 Impacts from Other Project Elements	5-45
5.4.1 Minimum Operable Segment	5-45
5.4.2 Transit Maintenance Base Options.....	5-46
5.5 Impacts from System-Level Choices	5-46
5.5.1 River Crossing Type and Capacity: How does the supplemental crossing compare to the replacement crossing?	5-46
5.5.2 Transit Mode: How does BRT compare to LRT?	5-46
5.5.3 Balance of Transit vs. Highway Investment: Increased Transit System Operations with Aggressive TDM/TSM Measures, and Efficient Transit System Operations with Standard TDM/TSM Measures	5-47
5.5.4 Major Transit Alignment: How do the Vancouver alignments compare to the I-5 alignments?	5-47
5.5.5 Tolling: How do the tolling options compare (no toll, standard or higher toll on I-5, toll on both I-5 and I-205)?	5-47
6. TEMPORARY EFFECTS.....	6-1
6.1 Introduction.....	6-1
6.2 Regional and System-Wide Impacts.....	6-1
6.3 Segment A: Delta Park to Mill Plain District	6-1
6.3.1 Impacts Common to All Alternatives	6-1
6.3.2 Impacts Unique to Transit Alternatives and Options	6-1
6.3.3 Impacts Unique to Highway Alternatives and Options	6-2
6.4 Segment B: Mill Plain District to North Vancouver	6-2
6.4.1 Impacts Common to All Alternatives	6-2
6.4.2 Impacts Unique to Transit Alternative and Options	6-2
6.4.3 Impacts Unique to Highway Alternatives and Options	6-2
7. MITIGATION FOR LONG-TERM EFFECTS.....	7-1
8. MITIGATION FOR TEMPORARY EFFECTS	8-1
8.1 Mitigation Common to All Build Alternatives	8-1
9. PERMITS AND APPROVALS	9-1
10. REFERENCES.....	10-1

List of Exhibits

Exhibit 1-1. Full Alternatives	1-4
Exhibit 1-2. Number of Intersections Degraded to Unacceptable in the Build Scenarios	1-6
Exhibit 2-1. Project Corridor	2-2
Exhibit 4-1. Public Services Within or Serving the Primary API	4-2
Exhibit 4-2. Fire and Life Safety Locations in Transit Segment A1	4-7
Exhibit 4-3. Public Services, Segments A.1 and A.2.....	4-8
Exhibit 4-4. Law Enforcement Location in Transit Segment A1	4-9
Exhibit 4-5. Schools Serving the Primary API in Transit Segment A1.....	4-10
Exhibit 4-6. Public Services, Segments A.2 and B.....	4-11
Exhibit 4-7. Fire and Life Safety for Primary API in Transit Segment A2	4-12
Exhibit 4-8. Law Enforcement for Primary API in Transit Segment A2	4-12
Exhibit 4-9. Vancouver Schools and Facilities Serving the Primary API	4-13
Exhibit 4-10. Fire and Life Safety in Segment B	4-13
Exhibit 4-11. Medical Centers in Segment B.....	4-14
Exhibit 4-12. Vancouver School District Public Schools and Facilities Segment B	4-14
Exhibit 5-1. Segment A: Delta Park to Mill Plain District	5-7
Exhibit 5-2. Project Area and Alternatives.....	5-8
Exhibit 5-3. Right-of-Way Impacts Vancouver Police Administration Building	5-9
Exhibit 5-4. Right-of-Way Impacts ODOT Permit Station.....	5-11
Exhibit 5-5. Right-of-Way Impacts Clark PUD Building.....	5-13
Exhibit 5-6. Right-of-way Impacts at FHWA Western Federal Lands Building	5-21
Exhibit 5-7. Segment B: Mill Plain District to North Vancouver	5-23
Exhibit 5-8. Public Service Direct Impacts Segment B - Replacement.....	5-24
Exhibit 5-9. Public Service Direct Impacts Segment B - Supplemental.....	5-27
Exhibit 5-10. Right-of-Way Impacts to Discovery Middle School/Kiggins Bowl	5-29
Exhibit 5-11. Right-of-Way Impacts to the Clark County Center for Community Health.....	5-31
Exhibit 5-12. Segment A1: Delta Park to South Vancouver LRT and BRT Options	5-33
Exhibit 5-13. Segment B: Mill Plain District to North Vancouver BRT and LRT Options	5-34
Exhibit 5-14. Right-of-Way Impacts SW Washington Memorial Health Center	5-35
Exhibit 5-15. Right-of-Way Impacts Vancouver School of Arts and Academics.....	5-37
Exhibit 5-16. Right-of-Way Impacts Clark College	5-39
Exhibit 5-18. Public Service Direct Impacts Segment B – Vancouver Transit.....	5-43
Exhibit 5-19. Public Service Direct Impacts Segment B – Vancouver Transit.....	5-44
Exhibit 5-20. Clark College and Mill Plain MOS impacts to Public Services	5-45
Exhibit 5-21. Public Service Direct Impacts Highway River Crossing Type	5-46

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ACRONYMS

Acronym	Description
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
API	Area of Potential Impact
BMP	Best Management Practice
BRT	Bus Rapid Transit
CCFM	Clark County Fire Marshall
CFR	Code of Federal Regulations
COVFD	City of Vancouver Fire Department
CRC	Columbia River Crossing
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
Ft	feet/foot
FTA	Federal Transit Administration
HCT	High-Capacity Transit
LOS	Level-of-Service
LRT	Light Rail Transit
Mi	mile
Min	minute
MOS	Minimum Operable Segment
Mph	Miles per hour
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
ORT	Open Road Tolling
OSP	Oregon State Police
PF&R	Portland Fire and Rescue
RTC	Regional Transportation Commission
SR	State Route
TAZ	Transportation Analysis Zone
TDM	Transportation Demand Management
TSM	Transportation System Management
USPS	U.S. Postal Service
VPD	Vancouver Police Department
VSD	Vancouver School District
WSDOT	Washington State Department of Transportation
WSP	Washington State Patrol

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1. Summary

1.1 Introduction

This report evaluates potential impacts to public services that would result from the proposed Interstate 5 (I-5) Columbia River Crossing (CRC) project alternatives. The two overall questions guiding the effects analysis are:

- Will long-term use and operation of the alternatives affect existing or planned facilities or provision of services provided by public services?
- Will construction activities of the alternatives affect the facilities or provision of services provided by public services?

The analysis is based on conceptual designs of a range of alternatives. This report identifies the likely impacts from those alternatives and potential measures to reduce the impacts, including possible options for avoiding, minimizing or mitigating impacts. Following the analysis and findings described in this report, and following additional agency and public coordination and input, the project sponsors will select a preferred alternative. The project team will further design and evaluate that alternative, refining the impact analysis and further developing mitigation measures.

1.2 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.

1.2.1 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 bridge structures across the Columbia River and replace them with three new parallel structures – 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 span downstream of the existing I-5 bridge. The new supplemental bridge would carry southbound I-5 traffic and HCT, while the existing I-5 bridge 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.

1.2.2 Segment-Level Choices

1.2.2.1 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 variations 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 general transit alignment 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.

HCT would touch down in downtown Vancouver at Sixth Street and Washington Street with a replacement river crossing. 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.

1.2.2.2 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 be located downstream of the existing I-5 bridge. 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.

1.2.3 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 1-1 summarizes how the options discussed above have been packaged into representative full alternatives.

Exhibit 1-1. 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 bridge with three new bridge structures downstream of the existing bridge. These new bridge structures would carry Interstate traffic, 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 Station in Portland, where riders could transfer to the MAX Yellow Line.

Alternative 3: This is similar to Alternative 2 except that 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 bridge, 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 bridge structures for northbound Interstate traffic, bicycles, and pedestrians. A new crossing would carry southbound Interstate traffic and BRT. The existing I-5 bridges would be re-striped to provide two lanes on each structure 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.

1.3 Long-Term Effects

In terms of traffic, the replacement alternatives would increase river crossing capacity to 75,000 trips a day during peak commute periods, versus 55,000 trips a day for the No-Build Alternative. This additional capacity would reduce the duration of congestion from 15 hours a day in 2030 from the No-Build Alternative to between 5.5 hours a day with the replacement crossing.

The supplemental crossing would increase river crossing capacity to 66,000 trips a day during peak commute periods, versus 55,000 trips a day for the No-Build Alternative. This additional capacity would reduce the duration of congestion from 15 hours a day in 2030 from the No-Build Alternative to 11 hours a day with the supplemental crossing.

An important element of the Vancouver transit alignment is its effects on traffic on northern Vancouver streets. The Vancouver alignment would reduce automobile capacity on Main Street, a key north-south arterial, causing more congestion in this area.

As shown in Exhibit 1-2 below, the I-5 alignment would have less effect on northern Vancouver streets because it is primarily within the I-5 right-of-way and does not reduce capacity of most streets. The additional highway and transit capacity of the build scenarios would substantially improve local street service during the afternoon peak period.

Exhibit 1-2. Number of Intersections Degraded to Unacceptable in the Build Scenarios

	Vancouver Intersections Failing to Meet Service Standards			
	Existing	2030 No Build	Vancouver Alignment	I-5 Alignment
During AM peak period	2	14	20	15
During PM peak period	1	30	9	4

Vancouver and I-5 alignments are using LRT. BRT would differ slightly.

1.3.1 Regional Effects

There are no regional effects on public service providers because no population inducing effect is expected from the project. See the Land Use Technical Report for further information.

1.3.2 Segment-Level Effects

Three to four public services could be directly displaced as a result of the river crossing and transit alternative. These could include the ODOT permit center on Hayden Island, the Clark PUD information building in Vancouver, just east of the I-5 bridge, the WSDOT maintenance facility and possibly the FHWA Western Federal Lands building. All sites except the WSDOT maintenance facility are predicted by right-of-way analysis to remain buildable. At other public service locations, including Discovery Middle School, the City of Vancouver Police Administration office, and the Clark College recreation fields, areas of property with no improvements would be permanently impacted by right-of-way acquisition.

Long-term traffic operation was analyzed in the Traffic Technical Report. Traffic congestion and the number of intersections predicted to fail operation standards affect the ability of the mobile portion of public services to continue to meet their service goals and maintain response times. Predicted traffic effects indicate that the mobile portion of the

public services considered in this report are likely to be most affected during the morning peak travel time under any build or no-build scenario. Any of the build scenarios greatly improve intersection function during the afternoon peak hour with the LRT I-5 option performing the best. Mobile public services are likely to be most affected by the intersection failures on Fourth Plain and Mill Plain Boulevards.

1.4 Temporary Effects

The build alternatives may include the temporary effects listed below. Mitigation measures for these effects are discussed in Section 9 of this report.

- Construction easements acquisitions for construction staging areas. These temporary acquisitions would be returned to the landowner after construction is complete. The locations of staging areas are yet to be confirmed based on final engineering designs.
- Noise impacts due to construction
- Vibration from construction
- Effects to air quality due to construction equipment
- Traffic spillover during construction
- Traffic detours and delays during construction

Construction of transit alternatives in downtown Vancouver may cause delays for mobile public services traveling either through downtown to another destination, or traveling within downtown to reach an emergency location near areas under construction.

In addition, construction at Discovery Middle School/Kiggins Bowl, the Vancouver Academy of Arts and Academics, and Fire Station 86 would cause temporary noise, vibration, and traffic delays. These effects would be temporary and no specific mitigation is proposed.

1.5 Mitigation

No significant effects to public services were identified in this analysis. However, some mitigation approaches are recommended. These generally include coordination with property owners to mitigate for right-of-way impacts including replacement of vegetation or parking areas where feasible.

Many of the intersections that do not meet standards are intersections (or corridors) for which the project team, in cooperation with sponsoring agencies, will develop mitigation strategies. The data presented here show the preliminary findings before mitigation techniques have been employed. Mitigation strategies will include road widening and the acquisition of new right-of-way only to mitigate cases of extreme delay, and only when no other mitigations will produce acceptable conditions. Unacceptable intersection operations accompanying the supplemental options would be more difficult to mitigate than those with the replacement options because the delays are generally far worse. Certain mitigations would improve an intersection that is just below standards, such as

many intersections under the replacement scenario, but these same mitigations would be ineffective for intersections with extreme delay.

For all temporary construction activities, detailed coordination about construction locations and phasing will be provided to the appropriate parties at law enforcement and fire, emergency responder services, and school transportation services. Especially for the emergency responders, this coordination needs to include any temporary access restrictions to highway on-ramps and exits, and critical emergency access routes.

During construction, fire engines should be able to enter and exit Fire Station 86 at 37th and Main Streets either through construction design or through operating procedures.

2. Methods

2.1 Introduction

The analysis was developed to comply with the National Environmental Policy Act (NEPA), applicable state environmental policy legislation, and local and state policies, standards and regulations.

Public services include law enforcement, fire and emergency medical services (including hospitals), solid waste collection and disposal, federal post office service, public school transportation, and cemeteries. Public transit, which is also a public service, is discussed in the Transportation Technical Report.

2.2 Study Area

This evaluation uses two study areas for environmental effects: the primary and secondary areas of potential impact (APIs). The primary API addresses direct impacts, and is similar across technical disciplines. Secondary APIs, the analysis units for indirect impacts, may vary by discipline. Project APIs are shown in Exhibit 2-1 and are described below.

2.2.1 Primary API

The primary API is the area most likely to experience direct impacts from construction and operation of proposed project alternatives. Most physical project changes would occur in this area, though mitigation could still occur outside of it.

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

2.2.2 Secondary API

The secondary API represents the area where indirect impacts (e.g., traffic and development changes) may occur from the proposed project alternatives. The study team relied primarily on secondary data to evaluate indirect project impacts.

The secondary API, over 15 miles long, runs from a point approximately one mile north of the I-5/I-205 interchange south to the I-5/I-84 interchange. It also extends one mile on both the east and west sides of the I-5 right-of-way. Traffic projections helped determine the geographic extent of potential indirect impacts.

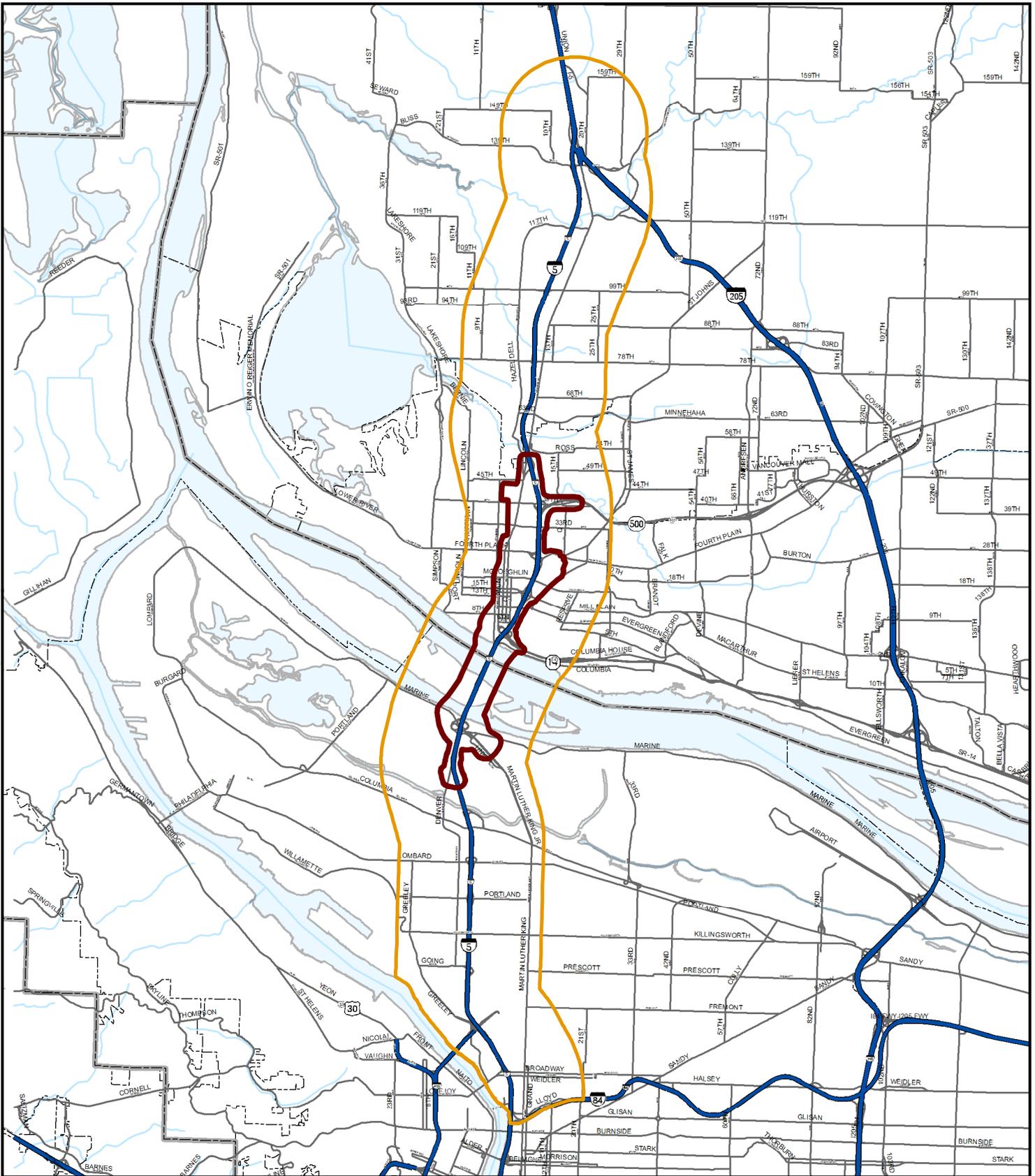
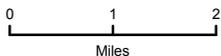


Exhibit 2-1: Project Corridor



- Primary API
- Secondary API



2.3 Effects Guidelines

The project team evaluated the degree to which proposed alternatives would affect the provision of public services. The evaluation considered both long-term and short-term (temporary) impacts. Because there are no regulatory guidelines to frame this impacts assessment, it was based on public service provider industry standards, or adopted strategic plans and goals.

The two overall questions guiding the effects analysis are:

- Will the long-term use and operation of the proposed I-5 CRC improvements affect existing or planned future facilities or provision of services provided by public services?
- Will the construction activities of the proposed I-5 CRC improvements affect facilities or provision of services provided by public services?

This evaluation considered the following specific questions for each public service:

2.3.1 Fire and Emergency Medical Services and Law Enforcement

- After the completion of the proposed I-5 CRC improvements, will fire and emergency medical response and law enforcement teams be able to reach accident or crime scenes as quickly as they would if no new crossing were built?
- Will detours or increased traffic during the construction of the proposed I-5 CRC improvements prevent the use of critical access routes such that service is detrimentally delayed?
- Will induced growth, as determined by the Land Use Technical Report, exceed growth planned for by these services? And, if so, will the induced growth require additional services?

2.3.2 School Transportation

- After the completion of the proposed I-5 CRC improvements, will school districts be able to collect and deliver students using the same major routes they would use without a new crossing? If a school location is affected, (i.e., sidewalks leading to a school are changed, or an intersection used by students is altered to remove the pedestrian crossing), would more or fewer students need to be bused to school?
- Will detours or increased traffic during construction of the proposed I-5 CRC improvements prevent the use of major routes such that service is detrimentally delayed, or additional students must be temporarily bused to school? For example, if roadways previously used by students walking to school would be made unsuitable for pedestrians during construction, then those students would need to be bused by the school district.
- Will induced growth, as determined by the Land Use Technical Report, exceed growth planned for by school services? And, if so, will the induced growth require additional services?

2.3.3 Cemeteries

- Will any cemeteries or direct access to cemeteries be displaced by the construction of the proposed I-5 CRC improvements?

2.3.4 Postal Service and Solid Waste

- After the completion of the proposed I-5 CRC improvements, will the transportation or facilities associated with the United States Postal Service (USPS) or municipal solid waste service be detrimentally affected? Will any facilities need to relocate, or will bulk transportation routes need to be shifted to new routes?
- Will detours or increased traffic during the construction of the proposed I-5 CRC improvements prevent the use of or access to USPS distribution centers or solid waste disposal or transfer facilities?

2.4 Data Collection Methods

Data for each public service (within the primary API) were gathered and analyzed. Where the facilities or key routes exist only within the secondary API, data were collected within the secondary API.

To answer the questions posed in this analysis, the project team collected information from:

- Existing facility and operations reports
- Available maps for route information
- Interviews with representatives from public services

Coordination with public service agencies was primarily by telephone and electronic communication.

When needed, the team made site visits to public services facilities to confirm or refine collected information. To help ensure collaboration and consistency between analyses, in addition to direct data collection coordination occurred with other environmental impact statement (EIS) technical reports, including Neighborhoods, Land Use, Transportation, and Acquisitions. Information gathered from each of these reports is as follows:

- Neighborhoods: School and other public facility impacts
- Land Use: Population, development forecasts, and induced growth
- Transportation: Intersection level-of-service (LOS), travel time changes, traffic delay, and access changes
- Acquisitions: Details of any facility displacements
- Noise and Vibration: Details about increased noise at schools and other sensitive outdoor public service locations.

Existing reports and maps provided the basic understanding of how public services function within the primary and secondary APIs. Interviews with public services representatives provided the additional knowledge necessary to answer the key questions posed above. Project staff evaluated land identified for potential future use as public service facility sites within the primary API to determine if any direct impacts to these sites would occur. To the extent that this type of information is produced and updated by public services, it was used for this analysis.

See the Neighborhoods Technical Report for information on how the public would access fixed locations of these public services, for example, whether a facility would be separated from the neighborhood or parts of the neighborhood it currently serves.

2.5 Analysis Methods

Potential cumulative effects from this project are evaluated in the Cumulative Effects Technical Report. Please refer to this report for an evaluation of possible cumulative effects.

Alternatives were evaluated to determine long-term effects on the movement and efficiency of public services by reviewing:

- Displacement of facilities or planned future facility sites;
- Traffic movement restrictions (e.g., closed roads, turning restrictions, one-way designations, or new median barriers); and
- Levels of traffic congestion, intersection performance ratings, and potential interference with movement of emergency service vehicles.

Staff evaluated LOS and delay time for approximately 80 intersections in the project area, and relied on the results of traffic modeling analysis for each alternative.

Emergency service vehicles use vehicle recognition signal priority technology at various intersections throughout the Portland-Vancouver metropolitan area and can pass through intersections against the signal if all other vehicles can move aside. The use of signal priority technology and emergency service right-of-way affects passage through intersections. Thus, although LOS and delay time analysis is useful in predicting overall impacts to services it is less accurate in predicting specific effects on emergency transportation. In some instances, an intersection may be physically constrained by project actions, such that other vehicles cannot move out of the way during an emergency. Thus, in addition to reviewing LOS and delay times at the approximately 80 intersections analyzed for the project, this analysis also reviewed intersections with potential to be significantly affected by congestion due to physical constraints or delays resulting from the alternatives. Staff also evaluated beneficial effects associated with project alternatives, including improved access, reduced delays and improved safety.

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3. Coordination

Early coordination with public services occurred to obtain information on the affected environment. See the references list for records of personal communications. For impact analysis, coordination occurred with the authors of the Historic, Archaeological, Neighborhoods, and Acquisitions Technical Reports and the Section 4(f) Evaluation.

Coordination occurred with the public services as indicated in the references section. Representatives of public services were asked questions similar to those below:

- How do you handle construction detours and changes in access routes?
- Given the level of detail available for the alternative transit and roadway options, what features may be problematic for the mobile portion of your service?
- Which, if any, intersections or road segments could cause detrimental delay to the mobile portion of your service?
- Are there reasonable alternate routes for mobile services? What kinds of effects would using these have?

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4. Affected Environment

4.1 Introduction

This section on regional conditions provides an overview of the public services on a regional basis. Exhibit 4-1 shows the specific locations of services that are either within the primary API or that serve population within the primary API, which are discussed by project segment.

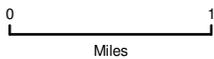
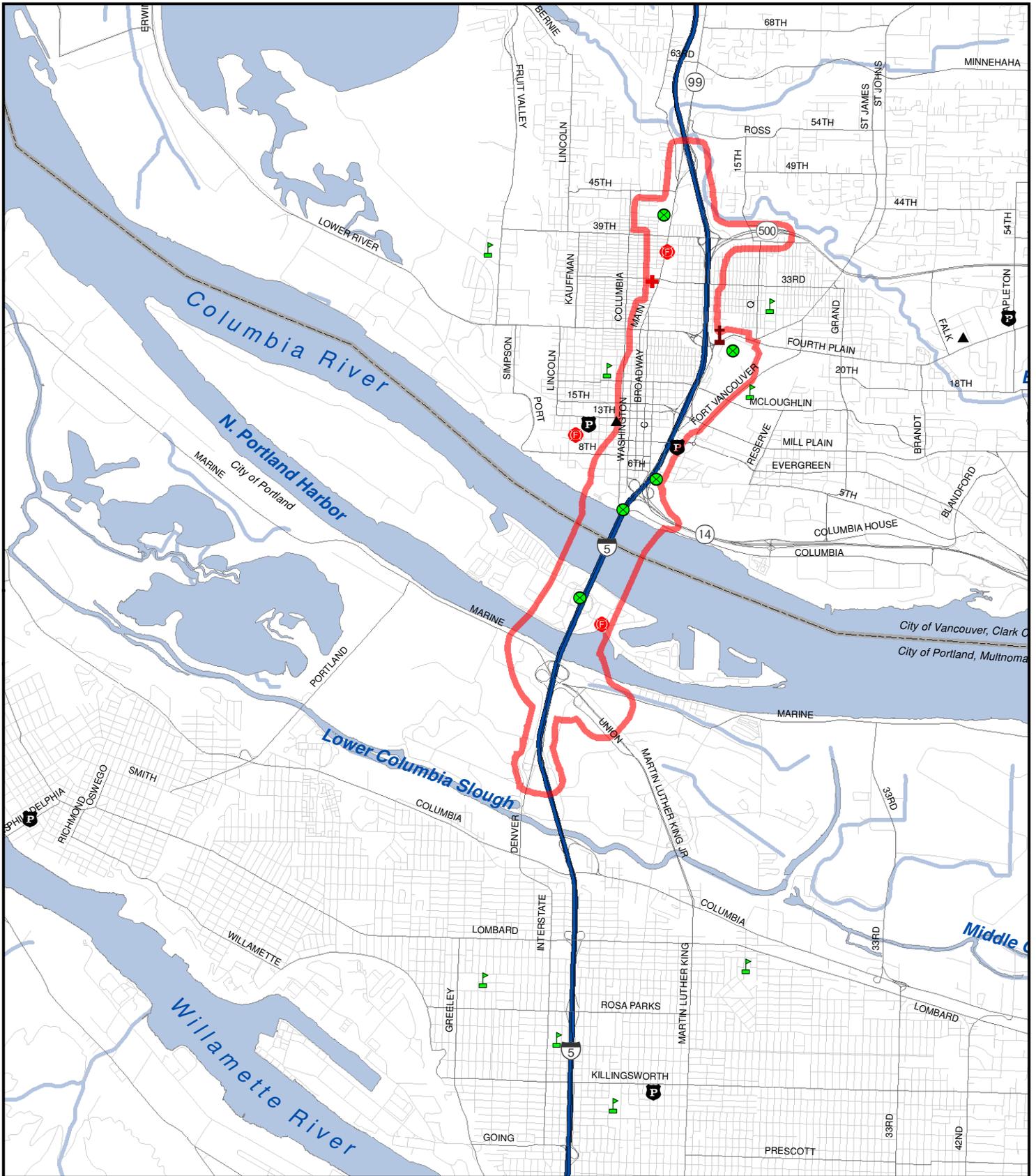
4.2 Regional Conditions

4.2.1 Fire and Life Safety

4.2.1.1 City of Vancouver

The City of Vancouver Fire Department (COV FD) provides fire suppression and emergency medical services for the city of Vancouver, which incorporates approximately 43 square miles and a population of 143,560 (US Census Bureau 2000b). The agency maintains intergovernmental agreements with adjacent jurisdictions (e.g., City of Portland) for emergency backup responses. Critical north-south emergency alternate access routes within or near Vancouver's portion of the secondary API include Main Street/SR 99 to the west of I-5, and Fort Vancouver Way and P Street to the east of I-5 (Walker 2005). Fire and rescue emergency responses for 2004 included 3,529 fire and 16,625 emergency medical services (COV FD 2005). The average response time for fire-related emergencies for 2004 was 6 minutes and 46 seconds. The average response time for emergency medical services was 4 minutes and 39 seconds (Walker 2005).

The Clark County Fire Marshal's Office (CCFM) provides fire suppression and emergency medical services for all unincorporated portions of Clark County, Washington. It also provides contracted fire and emergency medical services to each of the cities within the county, with the exceptions of Vancouver and Camas. Contracted cities include Battle Ground, La Center, Ridgefield, Washougal, a portion of Woodland, and Yacolt. Including these cities, the CCFM serves 574 square miles and 221,261 individuals. Intergovernmental agreements for emergency backup responses are maintained between the county and all adjacent jurisdictions (e.g., City of Vancouver) (Dunaway 2005). Critical north-south emergency alternate access routes within or near the county's portion of the API are located within Fire District No. 6 and include NW Hazel Dell Avenue to the west of I-5 and I-205 and State Route (SR) 99 to the east of I-5 (Cline 2005). The district's emergency responses for 2004 included 712 fire-related and 4,172 emergency medical services or other (Edwards 2005). Ninety-two percent of all fire and medical emergency response times for 2004 were within 6 minutes (Cline 2005).



-  School
-  Police Station
-  Post Office
-  Cemetery
-  Medical Center
-  Public Service
-  Fire Station
-  Primary API

Exhibit 4-1: Public Services
Public Services Within or Serving the Primary API



4.2.1.2 City of Portland

Portland Fire & Rescue (PF&R) provides fire suppression and emergency medical services within the city of Portland, which incorporates approximately 149.5 square miles and a population of 533,492, as of 2004 (U.S. Census Bureau, date unknown). PF&R maintains intergovernmental agreements with all adjacent jurisdictions, such as the City of Vancouver, for backup emergency responses. Critical north-south emergency alternate access routes in proximity to the secondary API include N Interstate Avenue to the west of I-5 and NE Vancouver Avenue, NE Williams Avenue and NE Martin Luther King, Jr. Boulevard to the east of I-5. Fire and rescue emergency responses for fiscal year 2003 – 2004 included 2,528 fire, 38,929 emergency medical services, and 19,215 other responses. Ninety percent of all fire and medical emergency response times for 2004 were within 7.55 minutes (Bunster 2005).

4.2.2 Law Enforcement

4.2.2.1 City of Vancouver

The Vancouver Police Department (VPD) West Precinct (the precinct) provides law enforcement services for that portion of the city of Vancouver located west of NE Andresen Road (COV 2005). The number of residents within this area is approximately 55,000 (Wallace 2005). The VPD maintains intergovernmental agreements with the City of Portland, Clark County and Washington State for emergency backup responses. The critical north-south emergency alternate access routes within, or in proximity to, the Washington portion of the APIs include Main Street/SR 99 to the west of I-5, and Fort Vancouver Way and P Avenue to the east of I-5. SR 500 provides east-west connectivity to/from I-205, which provides alternate north-south access through the city (Harris 2005).

4.2.2.2 Washington State

The Washington State Patrol (WSP) provides law enforcement services along all state and interstate rights-of-way within Washington. The Vancouver Detachment of the WSP's District 5 (the district) serves I-5 within the Washington portions of the APIs. The agency's Vancouver Detachment is responsible for patrolling 124 miles of state highway in Clark County and provides law enforcement services to a population of 337,110 (WSP 2004). According to agency sources (Linn 2005), the WSP does have intergovernmental agreements for emergency backup responses with abutting city and county jurisdictions within the state of Washington; however, it does not maintain similar contracts with Oregon law enforcement agencies. When necessary during police activity, the agency does use the I-5 bridge. The alternate access route most likely to serve as the agency's I-5 detour is SR 99. This route parallels I-5, running west of the highway south of NE Hazel Dell Avenue, and crossing east of the highway to the north, although near the river there is no alternate route. The average emergency response time for 2004 was approximately 10 minutes (Linn 2005). The District 5 2004 traffic statistics include 95,486 violation contacts and 48,756 issued citations statewide (WSP 2005a).

4.2.2.3 City of Portland North Precinct

The Portland Police Bureau's North Precinct (the precinct) is bounded primarily by the Columbia River to the north, the Willamette River to the south and west, and the I-5 corridor to the east; however, it also serves the area located directly opposite the North Portland peninsula, on the southwest side of the Willamette River (i.e., Linnton and Forest Park). The precinct incorporates approximately 27.9 square miles and serves a population of 48,203 (2000 estimate). Intergovernmental agreements with adjacent jurisdictions, such as the City of Vancouver, are maintained for emergency backup responses (Hendrix 2005). The critical north-south emergency alternate access routes within or near the precinct's portion of the API include N Interstate, N Denver, and N Greeley Avenues (Boeglin 2005). Person and property crime incident responses for 2004 were 358 and 2,927, respectively (COP PB 2005).

4.2.2.4 City of Portland Northeast Precinct

The Portland Police Bureau's Northeast Precinct (the precinct) is bounded by the Columbia River to the north, I-5 to the west, I-84 and NE Sandy Boulevard to the south, and I-205 to the east. The precinct incorporates approximately 20.7 square miles and serves a population of 87,448 (2000 estimate) (COP PB 2005). Intergovernmental agreements with adjacent jurisdictions (e.g., City of Vancouver) are maintained for emergency backup responses (Hendrix 2005). The critical north-south emergency alternate access routes within, or in proximity to, the precinct's portion of the API are NE Martin Luther King, Jr. Boulevard, N Williams Avenue and N Vancouver Avenue (Boeglin 2005). Person and property crime incident responses for 2004 were 891 and 8,029, respectively (COPPB 2005).

4.2.2.5 Oregon State Police

The Oregon State Police Bureau (OSP) provides law enforcement services along all of Oregon's state and interstate roadways, including the section of I-5 located within the Oregon portion of the primary and secondary APIs. The OSP serves all 3,641,056 Oregon residents, based on the 2004 US Census Population estimates, within a service area of 95,997 square miles (U.S. Census Bureau 2005). The agency monitors and patrols approximately 65,861 vehicle miles statewide (ODOT date unknown) and 170.05 vehicle miles in Multnomah County (ODOT 2005). The OSP maintains intergovernmental agreements with adjacent jurisdictions for emergency backup responses, including Clark County and the Washington State Patrol (WSP); however, no such contract currently exists between OSP and the City of Vancouver. Efforts to secure such an agreement are currently under way (Dokken 2005). The agency has no pre-determined critical north-south emergency alternate access route through the APIs though they have no alternative to the I-5 bridge to/from Hayden Island and across the Columbia River. According to an agency source (Drew 2005), "the [Oregon] State Police take whatever routes the Oregon Department of Transportation (ODOT) tells them to take." Based upon discussions with other law enforcement agencies serving the area, the alternate access routes most likely to serve as detours along the Portland portion of the secondary API include N Interstate, N Denver, and N Greeley Avenues to the west of I-5, and NE Martin Luther King, Jr. Boulevard, N Williams Avenue and N Vancouver Avenue to the east of I-5. The OSP

2004 person and property crime incident responses were 891 and 8,029, respectively. Reported offenses for 2003 include 41,115 person, 246,011 property and 165,085 behavioral offenses statewide (Bock 2003).

4.2.3 Medical Centers

Several hospitals provide hospital and emergency medical services to populations within the primary or secondary APIs. Portland facilities include Legacy Emanuel Hospital and Health Center and Kaiser Permanente, both west of I-5 and south of Columbia Boulevard. Vancouver facilities include Southwest Washington Medical Center in eastern Vancouver, Legacy Salmon Creek at the intersection of I-5 and I-205, Southwest Washington Memorial Hospital and Urgent Care Center on Main Street, and the Clark County Center for Community Health on the Vancouver Campus of the Portland Veterans Administration Hospital adjacent to I-5. Only the Clark County Center for Community Health and the Southwest Washington Memorial Hospital and Urgent Care Center are near areas that will potentially be directly impacted by the project.

4.2.4 Public Schools

4.2.4.1 Vancouver Public Schools and Other Colleges

In 2003 the Vancouver School District (VSD) enrollment totaled 22,279 students in its 21 elementary schools, seven middle schools, six high schools and special programs (VSD 2006). There are 17 VSD schools or other facilities within or directly adjacent to the secondary API. Six schools and three other facilities are within or serve the primary API.

The VSD transportation department is responsible for transporting 11,000 students on a daily basis, and has a fleet of 130 buses traveling 590 school bus routes (VSD 2006). The district covers an area of approximately 58 square miles.

Clark College, located north of Fort Vancouver, just east of I-5, is a private two-year junior college offering a wide range of courses from high school equivalency programs and continuing education to technical certificate programs for the workforce. Enrollment in fall of 2006 was 12,785 students (Clark College 2006).

4.2.4.1.1 State-funded Schools for the Deaf and Blind

The Washington State Schools for the Blind and the Deaf are located near the project area. The Washington State School for the Blind is at 2214 E 13th Street near Mill Plain Boulevard and E Reserve Street, serves as “a statewide demonstration and resource center and provide[s] direct and indirect services to students both on campus and in...children’s local communities” (Washington State School for the Blind 2008). The School for the Blind provides mobility classes with instruction on crossing streets, business area travel skills, and bus travel.

The Washington State School for the Deaf is at 611 Grand Boulevard, at Grand and Evergreen, and attempts to address the needs to deaf and hard of hearing students throughout the state “by providing instructional services, partnering with parents and

other agencies for systemic, integrated services to improve learning outcomes regardless of where the student attends school” (Washington State School for the Deaf 2008).

Though both schools are located outside of the primary API, they are addressed in this technical report because the communities that they serve require special consideration in the designing of transportation facilities.

4.2.4.2 Ridgefield School District

The small portion at the north end of the secondary API that is not served by Vancouver School District is served by Ridgefield School District (RSD). RSD includes South Ridge and Union Ridge Elementary Schools, View Ridge Middle School, and Ridgefield High School (RSD 2005).

4.2.4.3 City of Portland Schools

With a student enrollment of approximately 47,656, Portland Public Schools is the largest school district in Oregon. The district includes 59 elementary schools, 17 middle schools, 10 high schools, and a number of alternative schools and special programs. Four Portland schools serve areas within the primary API, Woodlawn Elementary, Chief Joseph Elementary, Ockley Green Middle School, and Jefferson High School.

4.2.5 Solid Waste Management

4.2.5.1 City of Vancouver and Clark County

Garbage collected in Vancouver and Clark County is transferred at one of two transfer stations, then shipped on the Columbia River from the Port of Vancouver to the Port of Morrow, where containers are unloaded and trucked to the Finley Butte Landfill in Boardman, Oregon (CCPW 2005).

4.2.5.2 City of Portland

Garbage is collected in the city of Portland by several private collection companies. Two public transfer facilities are operated by the Metro Regional Government (Metro). The Metro Central transfer station is located in northwest Portland, approximately one mile southeast of where the secondary API meets the Willamette River. The Metro South transfer station is located in Oregon City, approximately 15 miles south of the secondary API. Metro holds a 20-year contract with the Columbia Ridge Landfill in Arlington, Oregon to receive mixed waste from these two transfer facilities (Metro 2004; Metro 2005a). Many other privately owned landfill facilities throughout the state of Oregon accept waste from within the Metro region (Metro 2005b).

4.2.6 U.S. Postal Service

Four U.S. Post Office locations are located within the secondary API, and one is within downtown Vancouver in the primary API in Segment A2.

4.2.7 Cemeteries

There are several small cemeteries within the Portland portion of the secondary API, but none within the primary API.

The City of Vancouver owns and manages two public cemeteries within or adjacent to the secondary API. Old Hill Cemetery is at the corner of E Mill Plain Boulevard and N Grand Boulevard. Park Hill Cemetery is at 5915 E Mill Plain Boulevard.

Additional cemeteries in the secondary API include: Post Military Cemetery adjacent to I-5, north of the Fourth Plain; Clark County Poor Farm Cemetery in the vicinity of Hazel Dell and NE 19th Avenue; Goddard (Old Salmon Creek United Methodist) Cemetery; St. Johns Lutheran Cemetery (both near NE 112th Street and NE 10 Avenue); Manor - Wilson Bridge Cemetery; and Memory Memorial Cemetery (both near NE 72nd Avenue and NE 144th Street).

4.3 Segment A Delta Park to Mill Plain District

4.3.1 Delta Park to South Downtown (Transit Segment A1)

Exhibit 4-3 shows locations of public services within Transit Segment A1.

4.3.1.1 Fire and Life Safety

Three fire departments are either within or serve the primary API in Segment A1 as described in Exhibit 4-2. In a personal communication, Deputy Chief Tom Miletich noted that the Vancouver Fire Department plans to relocate both Station 82 in downtown Vancouver and Station 86 at East 37th and Main Streets. Plans are not finalized at this point, but the Department is looking at two different areas. For the Station 82, the area of interest is at 16th and Main Streets, with the intention of being more centrally located in downtown, having better east-west access, and still retaining good access to the Port of Vancouver. For Station 86, the area of interest is outside of the primary API at the intersection of 39th and Kaufmann (Miletich 2007).

Exhibit 4-2. Fire and Life Safety Locations in Transit Segment A1

Agency	Location	Critical Emergency Access Routes	Alternate Agency
Portland Fire & Rescue Station 17	848 N Tomahawk Dr., Hayden Island	N Interstate Ave., N Denver Ave., and NE MLK Blvd., N Tomahawk Island. I-5 is the only critical access route to/from Hayden Island.	All Adjacent Jurisdictions
Vancouver Fire Department Station 82	900 W Evergreen St., Vancouver	Main St./SR 99, Fort Vancouver Way and P Ave.	All Adjacent Jurisdictions
Vancouver Fire Department Station 86	400 E 37th St., Vancouver	Columbia Blvd., 39th St.	All Adjacent Jurisdictions

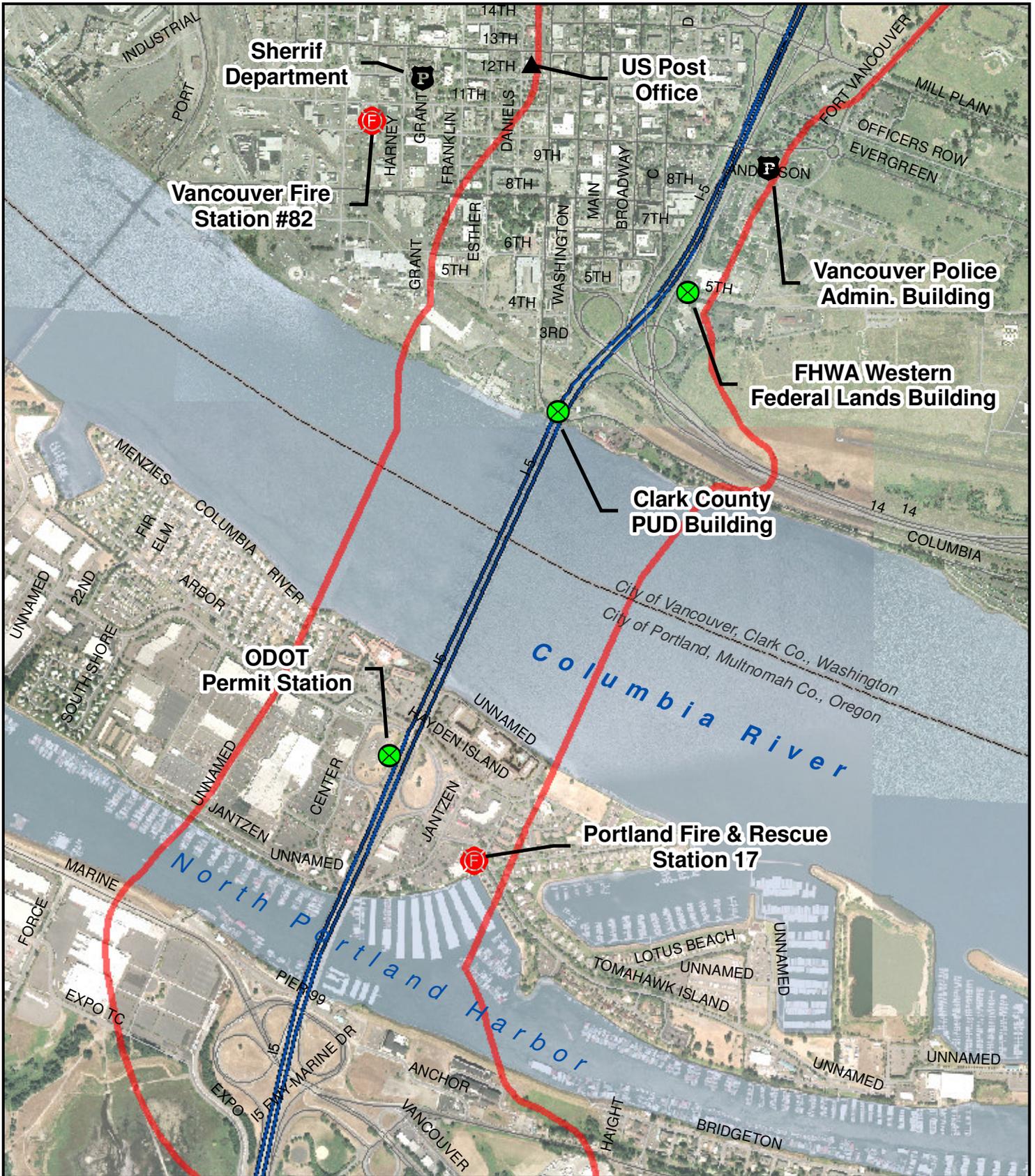


Exhibit 4-3: Public Services
Segments A.1 and A.2



4.3.1.2 Law Enforcement

Law enforcement services within the primary API are provided by the City of Portland Police Bureau's North and Northeast precincts, and by the City of Vancouver Police Administration and Traffic Office and the West Precinct. Exhibit 4-4 shows the locations of law enforcement facilities in Segment A. In a personal communication, Sergeant Wayne Reynolds noted that the Vancouver Police Department is planning to renovate the West Precinct. Vancouver Police also uses a portion of the WSDOT maintenance facility on Main Street for officer training operations. It is possible that the training operations will be relocated to the West Precinct with the remodel, but plans are unclear at this time. The Administration and Traffic Office parking lot adjacent to I-5 contains fuel pumps that serve all officers stationed at the administration office as well as impound vehicle storage and large operations vehicle storage (Reynolds 2007).

Exhibit 4-4. Law Enforcement Location in Transit Segment A1

Precinct	Location	Critical Emergency Access Routes	Backup Response Precincts
City of Portland Police Bureau			
North	7214 N Philadelphia St, Portland	N Interstate Ave., N Denver Ave. and N Greeley Ave. I-5 is the only critical access route to/from Hayden Island.	All Adjacent Jurisdictions
Northeast	449 NE Emerson St., Portland	NE MLK Blvd. I-5 is the only critical access route to/from Hayden Island.	All Adjacent Jurisdictions
City of Vancouver Police Department			
Police Administration and Traffic Office	605 E Evergreen St., Vancouver	None	Clark County and Washington State Police
West Precinct	2800 NE Stapleton Rd., Vancouver	Main St./SR 99, Fort Vancouver Way, P Ave., SR 500 to I-205	Clark County and Washington State Police

4.3.1.3 Medical Centers

There are no medical centers within the primary API in Segment A1.

4.3.1.4 Public Schools

4.3.1.4.1 City of Portland Schools

Portland Public Schools operates three public schools that serve the primary API, as identified in Exhibit 4-5. Only a very small portion of land within the primary API falls within the service boundaries of these schools.

4.3.1.4.2 City of Vancouver Schools

Vancouver's Hudson's Bay High School is located in Segment A1 and is the public high school for the entire primary API within Vancouver.

Exhibit 4-5. Schools Serving the Primary API in Transit Segment A1

School	Location	2006 Enrollment ^a
Portland		
Woodlawn Elementary (PK – 6th)	7200 NE 11th Ave.	450
Chief Joseph Elementary (PK – 5th)	2409 N Saratoga St.	359
Ockley Green Middle School (K-8th)	6031 N Montana Ave.	442
Jefferson High School	5210 N Kerby Ave.	661
Vancouver		
Hudson's Bay High School	1206 E. Reserve St.	N/A

^a Portland Public Schools (2004 and 2005).

4.3.1.5 Solid Waste Management

There are no transfer stations or solid waste disposal facilities within the primary API in Segment A1.

4.3.1.6 U.S. Postal Service

There are no U.S. Post Office locations within the primary API in Segment A1.

4.3.1.7 Cemeteries

There are no cemetery locations within the primary API in Segment A1.

4.3.1.8 Other Public Buildings

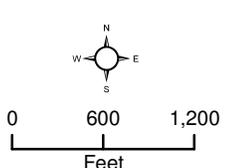
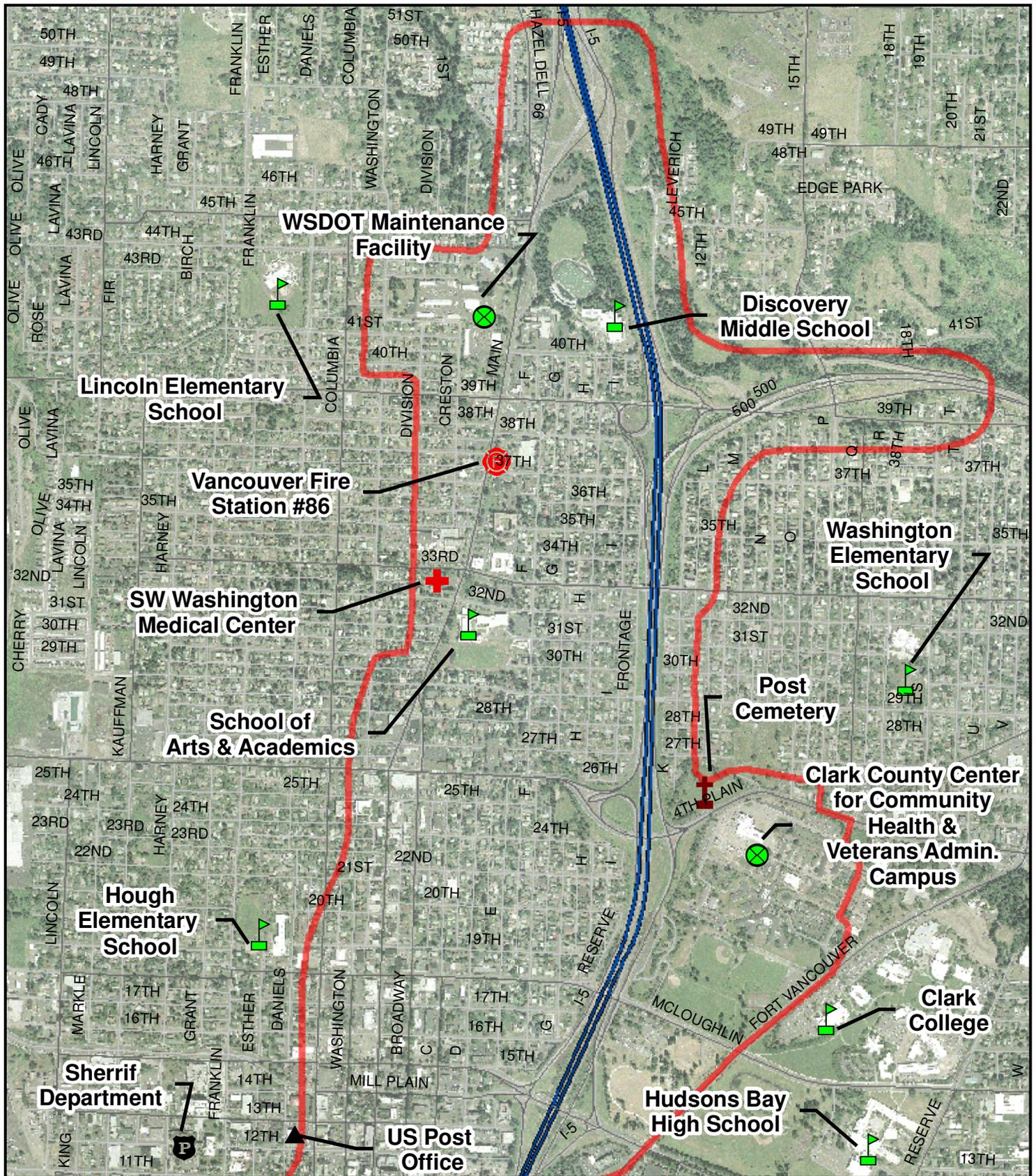
Although not originally considered in the definition of public services for the scope of this report, three resources observed in the study area did not readily fall into other categories and were added to this report. These include the ODOT Permit Station on Hayden Island to the west of and adjacent to I-5 and the Clark Public Utilities District storage and administration building immediately east of the existing I-5 bridge abutment in Vancouver, and the FHWA Western Federal Lands building (Exhibit 4-3).

4.3.2 South Downtown to Mill Plain (Transit Segment A2)

Public Services in Segment A2 and B are shown on Exhibit 4-6.

4.3.2.1 Fire and Life Safety

The City of Vancouver has two fire stations within or serving the primary API, and Clark County Fire provides back up service to the primary API (Exhibit 4-7). In a personal communication, Deputy Chief Tom Miletich noted that the Vancouver Fire Department plans to relocate both Station 82 in downtown Vancouver and Station 86 at East 37th and Main Streets. Plans are not finalized at this point, but the Department is looking at two different areas. For the Station 82, the area of interest is at 16th and Main Street with the intention of being more centrally located in downtown, having better east-west access, and still retaining good access to the Port of Vancouver. For Station 86, the area of interest is outside of the primary API at the intersection of 39th and Kaufmann (Miletich 2007).



- School
- Police Station
- Post Office
- Cemetery
- Medical Center
- Public Service
- Fire Station
- Primary API

Exhibit 4-6: Public Services
Segments A.2 and B



Exhibit 4-7. Fire and Life Safety for Primary API in Transit Segment A2

Agency	Location	Critical Emergency Access Routes	Alternate Agency
Vancouver Fire Department Station 82	900 W Evergreen	Main St./SR 99, Fort Vancouver Way and P Ave.	All Adjacent Jurisdictions
Vancouver Fire Department Station 86	400 E 37th St.	Columbia Blvd., 39th Street	All Adjacent Jurisdictions
Clark County Fire Marshal (District 6)	8800 NE Hazel Dell Ave.	I-205, SR 99 and NW Hazel Dell Ave.	All Adjacent Jurisdictions

4.3.2.2 Law Enforcement

The City of Vancouver's West Precinct, east of the secondary API, and the Police Administration and Traffic Office, adjacent to I-5 in Segment A2, provide law enforcement service for the entire area within the primary API (Exhibit 4-8). In a personal communication, Sergeant Wayne Reynolds noted that the Vancouver Police Department is planning to renovate the West Precinct. Vancouver Police also uses a portion of the WSDOT maintenance facility on Main Street for officer training operations. It is possible that training operations will be relocated to the West Precinct with the remodel, but plans are unclear at this time. The Administration and Traffic Office parking lot adjacent to I-5 contains fuel pumps that serve all officers stationed at the administration office as well as impound vehicle storage and large operations vehicle storage (Reynolds 2007).

Exhibit 4-8. Law Enforcement for Primary API in Transit Segment A2

Precinct	Location	Critical Emergency Access Routes	Backup Response Precincts
City of Vancouver Police Department			
Police Administration and Traffic Office	605 E Evergreen	None	Clark County and Washington State Police
West Precinct	2800 NE Stapleton Rd.	Main St./SR 99, Fort Vancouver Way, P Ave., SR 500 to I-205	Clark County and Washington State Police
Clark County Sheriff's Office			
Clark County	707 W 13th St.	NW Fruit Valley Rd., NE Hazel Dell Rd., NE St Johns Blvd., and NE Andresen Rd. (SR 500)	All Adjacent Jurisdictions

4.3.2.3 Medical Centers

There are no medical centers within the South Downtown to Mill Plain segment (Segment A2).

4.3.2.4 Schools

No schools are located in Segment A2; however several schools serve the population there. Exhibit 4-9 shows the City of Vancouver public schools whose service area includes this segment.

Exhibit 4-9. Vancouver Schools and Facilities Serving the Primary API

School	Location
Harney Elementary School	3212 E Evergreen Blvd.
Hough Elementary School	1900 Daniels St.
Discovery Middle School	800 E 40th St.
Hudson's Bay High School	1206 E Reserve St.
Washington State School for the Blind	2214 E 13 th St.
Washington State School for the Deaf	611 Grand Boulevard

4.3.2.5 Solid Waste Management

There are no solid waste facilities within the South Downtown to Mill Plain segment.

4.3.2.6 U.S. Postal Service

The Downtown Vancouver U.S. Post Office is located within the primary API at 1211 Daniels Street (U.S. Postal Service 2005).

4.3.2.7 Cemeteries

There are no cemeteries in Segment A2 of the primary API.

4.4 Segment B Mill Plain District to North Vancouver

Public Services in Segment A2 and B are shown on Exhibit 4-6.

4.4.1 Fire and Life Safety

One City of Vancouver fire station is within the primary API in Segment B, west of I-5 and south of 39th Avenue, as listed in Exhibit 4-10. In a personal communication, Deputy Chief Tom Miletich noted that the Vancouver Fire Department plans to relocate Station 86 at East 37th and Main Street. Plans are not finalized at this point. For Station 86, the area of interest is outside of the primary API at the intersection of 39th and Kaufmann (Miletich 2007).

Exhibit 4-10. Fire and Life Safety in Segment B

Agency	Location	Critical Emergency Access Routes	Alternate Agency
Vancouver Fire Department Station 86	400 E 37th St.	Main St./SR 99, Fort Vancouver Way and P Ave.	All Adjacent Jurisdictions

4.4.2 Law Enforcement

No law enforcement facilities are located in Segment B of the primary API. As described above, the entire area is served by the City of Vancouver West Precinct.

4.4.3 Medical Centers

Two medical centers in the primary API provide medical services in Segment B. The facilities include the Clark County Center of Community Health (Veterans Administration - Vancouver Campus) and the Southwest Washington Memorial Hospital and Urgent Care Center (Exhibit 4-11). In personal communications with representatives of City of Vancouver Fire and Police departments, fire and police services rarely, if ever, bring patients to this urgent care center (Reynolds 2007, Miletich 2007).

Exhibit 4-11. Medical Centers in Segment B

Hospital/Clinic	Location	Critical Care Services	Emergency Facility
Vancouver Hospitals			
SW Washington Memorial Health Center & Memorial Urgent Care	3400 Main St.	Urgent Care	No
Clark County Center for Community Health (on Veterans Administration—Vancouver Campus)	1601 E Fourth Plain Blvd.	None	No

4.4.4 Public Schools and Other Facilities

Several Vancouver public schools and facilities and one college are located in or serve the population in the primary API within Segment B, as shown in Exhibit 4-12.

Exhibit 4-12. Vancouver School District Public Schools and Facilities Segment B

School	Location	Location Within Vancouver API
Elementary Schools		
Lincoln	4200 Daniels St.	Vancouver
Washington	2908 S St.	Vancouver
Middle Schools		
Discovery	800 E 40th St.	Vancouver
Other Facilities		
Vancouver School of Arts and Academics (6-12)	3101 Main St.	Vancouver
Clark College	1800 E McLoughlin Blvd.	Vancouver
Kiggins Bowl Stadium (at Discovery)	40th & H Streets	Vancouver

4.4.5 Cemeteries

The Post Cemetery, a military facility adjacent to I-5, and St. James Acres cemetery in the vicinity of East 27th and L Streets are located within the primary API in Segment B.

4.4.5.1 Other Public Buildings

Although not originally considered in the definition of public services for the scope of this report, one resource observed in the study area did not readily fall into other categories and were added to this report. The Washington State Department of Transportation maintenance facility on 39th and Main Streets in Vancouver. WSDOT has had plans in place for many years to move this facility to another location. Independent of the CRC project, WSDOT has obtained funding to study two potential relocation sites for their facility, which they plan to complete by the end of 2008.

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5. Long-Term Effects

5.1 How is this section organized?

This chapter describes the long-term impacts that would be expected from the I-5 CRC alternatives and options. The chapter first describes impacts from the four full alternatives and No-Build. These are the five comprehensive alternatives that include specific highway, transit, bicycle, pedestrian and other elements. This discussion focuses on how these alternatives would affect corridor and regional impacts and performance. The discussion then focuses on impacts that would occur with various design options at the segment level, for example, comparing the impacts of each alignment option in each segment. Finally, it provides a more comparative and synthesized summary of the impacts associated with the system-level choices. This three-part approach provides a comprehensive description and comparison of (1) the combination of system-level and segment level choices expressed as five specific alternatives (2) discrete system-level choices, and (3) discrete segment-level choices.

It addresses both direct and indirect long-term impacts.

5.2 Impacts from Full Alternatives

This section describes the impacts from four full alternatives and the No-Build Alternative. These are combinations of highway, river crossing, transit and pedestrian/bicycle alternatives and options covering all of the CRC segments. They represent the range of system-level choices that most affect overall project performance, impacts and costs. The full alternatives are most useful for understanding the regional impacts, performance and total costs associated with the CRC project. Although other alignments and design options are also under study, these “full” alternatives provide a basis for the discussion.

5.2.1 No-Build Alternative (Alternative 1)

Under the No-Build Alternative there would be no direct physical impacts to public services. Long-term indirect effects for the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) generally include increased travel times and congested intersections. Over time these changes would result in increased response times for emergencies and increased travel times with less predictability for school transportation services.

By 2030, average weekday traffic across the I-5 bridges is forecast to reach 184,000 vehicles per day, an increase of 37 percent over current conditions. Daily traffic levels on the I-205 crossing would rise to 210,000 vehicles each day, an increase of 44 percent over current volumes.

By the year 2030 in the CRC project area, I-5's morning peak and afternoon/evening peak travel demand is expected to increase substantially and continue to be well in excess of the crossing's available capacity, resulting in substantially increased congestion and delay. The highest growth in traffic demand is projected to occur in northern Clark County (double by 2030) and the lowest growth in North Portland (less than five percent).

Increased vehicle demand and increased congestion on I-5 would negatively affect the ability of emergency services providers to meet their response time goals if they have to travel on I-5 and further, if that increased congestion on I-5 affects surface street congestion. The City of Portland fire station on Hayden Island would be most affected because fire trucks based at this facility have no alternative route available to travel south to emergencies in North Portland.

Standards for transportation corridors and intersections have been developed by the Cities of Portland and Vancouver, WSDOT and ODOT, and the nationally accepted Highway Capacity Manual. The CRC project team has used these standards to develop an intersection performance methodology that is comprehensive, fair to different agencies' needs, and capable of communicating a consistent message. In this technical report, "intersection standards" refer to the standards developed by the project team in cooperation with the agencies mentioned above.

Additionally the operational findings for local intersections are based on a comparative analysis of Build versus No-Build scenarios. Where the number of intersection (for example with the Replacement, LRT, Vancouver alignment) which do not meet standards are listed in the description of different Interchange Areas, the number of intersection which do not meet standards are being compared to the Build Scenario. The total number of intersections which will not meet standards may be higher.

In Portland, the existing conditions analysis (based on a year 2005 model) shows one intersection that fails to meet standards for the morning peak, and one that fails to meet standards in the afternoon peak. In Vancouver, one intersection does not meet standards in the morning peak, and two fail to do so in the afternoon peak.

By 2030, the No-Build Alternative would result in the following specific effects on local streets in the Vancouver subareas. The increased duration of southbound I-5 congestion in the morning is expected to raise the use of Main Street as a parallel alternate route for commuters destined to downtown Vancouver, as well as those bypassing I-5's congestion north of SR 14 and then entering the highway again at City Center.

Even with planned widening of Fourth Plain Boulevard to a five-lane roadway between I-5 and the western railroad bridge, 11 of 14 subarea intersections would not operate at acceptable performance standards during the afternoon/evening peak hour.

The Mill Plain Boulevard interchange would be congested for freight and commuter travel for several hours each day, including during the mid-day period between peak commute hours commonly targeted by regional freight movers.

Local street intersection operations would degrade system-wide. During the congested afternoon/evening peak, where all 73 local street intersections analyzed operate acceptably today, only 46 of these intersections would meet performance standards under 2030 No-Build conditions.

In 2030, the Portland local street system would be configured essentially as it is today. Two exceptions involve minor local street changes along Denver Avenue associated with I-5 widening through Delta Park and signalization of the I-5 southbound and northbound ramp terminals on Alberta Street.

Similar to current conditions, local street congestion would be most intense near the I-5 ramps and would remain influenced by the travel direction(s) and length of time that I-5 is congested each day. In short, when I-5 is congested (up to 15 hours daily), the nearby local street system is expected to be congested.

Travel to and from Hayden Island, provided exclusively by the I-5 interchange, would be constrained for several hours each day limiting the number of vehicles able to pass through this interchange. The Marine Drive interchange would be congested for several hours each day, including the mid-day period between peak commute hours commonly targeted by regional freight movers. Local street intersection operations would degrade system-wide, and affect all four Portland subareas. During the most congested afternoon/evening peak periods, where all 25 local street intersections operate acceptably under current conditions, only 18 would operate acceptably in 2030.

5.2.2 Replacement Crossing with BRT (Alternative 2)

The primary elements of this alternative are:

- Replacement bridges, 10 lanes
- Bus Rapid Transit (I-5 full-length)
- TSM/TDM Option 1

Under Alternative 3 (and Alternative 2) several public service locations would have right-of-way impacts. Impacts are minor unless otherwise indicated. The following locations are included, and further detail about these properties is provided in the segment-level options discussion in Section 5.3:

- City of Vancouver Police Administration and Traffic Office
- ODOT Permitting Station (displacement)
- Clark Public Utility District Building (displacement)
- Discovery Middle School
- Clark County Center for Community Health on Veterans Administration Campus
- ODOT Permitting Station
- Clark College – Recreation Fields
- WSDOT Maintenance Facility (potential displacement)

- FHWA Western Federal Lands building (potential building impact)

Compared to the No-Build Alternative, Alternative 2 would decrease travel time for southbound trips during the morning peak by five minutes over the 46 minute travel time for the 2030 No-Build Alternative, (12 percent) for trips along I-5 from 179th Street to I-84. Vehicles traveling northbound along I-5 from I-84 to 179th Street during the afternoon/ evening peak would experience a travel time decrease of 18 minutes over the 44 minute travel time for the 2030 No-Build Alternative (40 percent).

Increased vehicle demand and increased congestion on I-5 negatively affects.

Local street intersection operations would improve system-wide relative to the No-Build Alternative. For example, during the afternoon/evening peak under No-Build conditions, 46 of the 76 local study intersections would operate acceptably in Vancouver. Alternative 2 would improve local street operations, resulting in 67 of 76 intersections operating acceptably. Alternative 2 would reduce the duration of southbound congestion during the morning peak, which would also reduce congestion on most Vancouver local streets.

Traffic volumes along key east-west local streets between 39th Street and Mill Plain Boulevard would increase by five to 15 percent relative to No-Build conditions, while traffic volumes on key north-south local streets between Kaufman and P Streets would decrease by up to 30 percent.

Traffic traveling to or from downtown Vancouver on SR 14 would be able to use two access points—one along Columbia Street at Fourth Street and the other along Washington Street. The two access points would support better dispersion of traffic without overloading downtown intersections.

Portland's local street operations would improve system-wide relative to No-Build conditions. For example, during the afternoon/evening peak under No-Build conditions, 18 of 25 local street intersections would operate acceptably. Alternative 2 would add 12 new study intersections (primarily in the Hayden Island and Marine Drive interchange areas) and would result in a total of 35 of 37 intersections operating acceptably.

The increased capacity provided on I-5 under Alternative 2 would draw traffic from nearby parallel roadways back to I-5. Traffic volumes along key east-west local streets between Columbia Boulevard and Going Street would decrease by five percent relative to No-Build conditions, while traffic volumes on key north-south local streets between Greeley Avenue and Martin Luther King Jr. Boulevard would decline by up to 15 percent.

5.2.3 Replacement Crossing with LRT (Alternative 3)

The primary elements of this alternative are:

- Replacement bridges, 10 lanes
- Light Rail Transit (I-5 full-length alignment)
- TSM/TDM Option 1

Direct right-of-way impacts to public service locations and main-line traffic effects would be the same as those reported above for the replacement crossing with BRT.

5.2.4 Supplemental Crossing with BRT (Alternative 4)

The primary elements of this alternative are:

- Supplemental bridges, 8 lanes
- Bus Rapid Transit with Increased Transit Operations
- Full-length
- TSM/TDM Option 2

Several public service locations would have right-of-way impacts. These impacts are minor unless otherwise indicated. The following locations are included, and further detail about these properties is provided in the segment-level options discussion in Section 5.3:

- ODOT Permitting Station (displaced)
- Clark Public Utility District Building (displaced)
- Discovery Middle School
- Clark County Center for Community Health on Veterans Administration Campus
- Clark College – Recreation Fields
- WSDOT Maintenance Facility (potential displacement)

The lower capacity of a supplemental crossing—at 165,000 person-trips versus the 178,000 person-trips/day for a replacement crossing—would likely increase the duration of congestion at the I-5 crossing from 7.75 hours to no delay (with a margin of error of 2 hours), compared to the No-Build Alternative.

Since Alternative 4 would reduce the duration of southbound congestion during the morning peak, the duration of congestion on most local Vancouver streets would also decline. Increased capacity provided on I-5 would draw similar traffic levels from nearby roadways back to I-5. Traffic volumes along key east-west local streets between 39th Street and Mill Plain Boulevard would increase by five to 15 percent relative to No-Build conditions, while traffic volumes on key north-south local streets between Kaufman and P Streets would decrease by up to 30 percent.

For Alternative 4 only the Columbia Street intersection connection would be feasible for inbound SR 14 traffic to access downtown Vancouver. An additional 800 vehicle trips per hour would access Columbia Street during the morning peak, resulting in local street congestion and intersection failures in lower Vancouver. About 10 additional intersections in lower downtown Vancouver would experience level-of-service or vehicle queuing deficiencies.

The increased capacity provided on I-5 under Alternative 4 would draw traffic from nearby parallel roadways, in Portland, back to I-5. Traffic volumes along key east-west local streets between Columbia Boulevard and Going Street would decrease by five percent relative to

No-Build conditions, while traffic volumes on key north-south local streets between Greeley Avenue and Martin Luther King Jr. Boulevard would decline by up to 15 percent.

For Alternative 4, northbound traffic congestion near the crossing would decrease from eight hours under No-Build conditions to seven hours. Because of northbound traffic backups with Alternative 4, congestion would occur at I-5 interchange ramps (at Marine Drive and Hayden Island) and local streets in the vicinity of these interchanges.

Alternative 4 would improve local street intersection operations in the North Portland and Victory subareas, but would degrade intersection operations in the Marine Drive and Hayden Island areas. Alternative 4 would add 12 new study intersections, but during the afternoon/evening peak only 29 of 37 would operate acceptably compared to 18 of 25 local street intersections operating acceptably under No-Build conditions.

5.2.5 Supplemental Crossing with LRT (Alternative 5)

Under the supplemental crossing for both BRT and LRT intersection performance is nearly identical to that of the replacement crossing. See above findings for Alternative 4.

5.3 Impacts from Segment-Level Options

This section describes and compares the impacts associated with specific highway alignment and interchange options and specific transit alignments and options. They are organized by Segment, including:

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

For transit options, Segment A is divided into two sub-segments, each with a discrete set of transit choices:

- Sub-segment A1: Delta Park to South Vancouver
- Sub-segment A2: South Vancouver to Mill Plain District

Impacts from highway options are described separately from impacts from transit options. The purpose of this organization is to present the information according to the choices to be made. Where the traffic and transit choices would have a substantial effect on each other, this is considered.

During the planning and project selection process, the project designers attempted to avoid and minimize potential impacts by modifying alignments, shifting alignments or moving transit stations as possible. These shifts are conducted to minimize acquisition needs and to avoid undesirable building and access impacts. Right-of-way displacements, losses in parking, and changes in access identified in this report are based on preliminary design for the build alternatives. More detailed design for any of the alternatives will seek to reduce the amount of land that must be acquired for right-of-way.

5.3.1 Segment A: Delta Park to Mill Plain District - Highway Alternatives

Exhibit 5-1 summarizes differences among the alternatives in Segment A.

Exhibit 5-1. Segment A: Delta Park to Mill Plain District

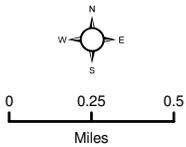
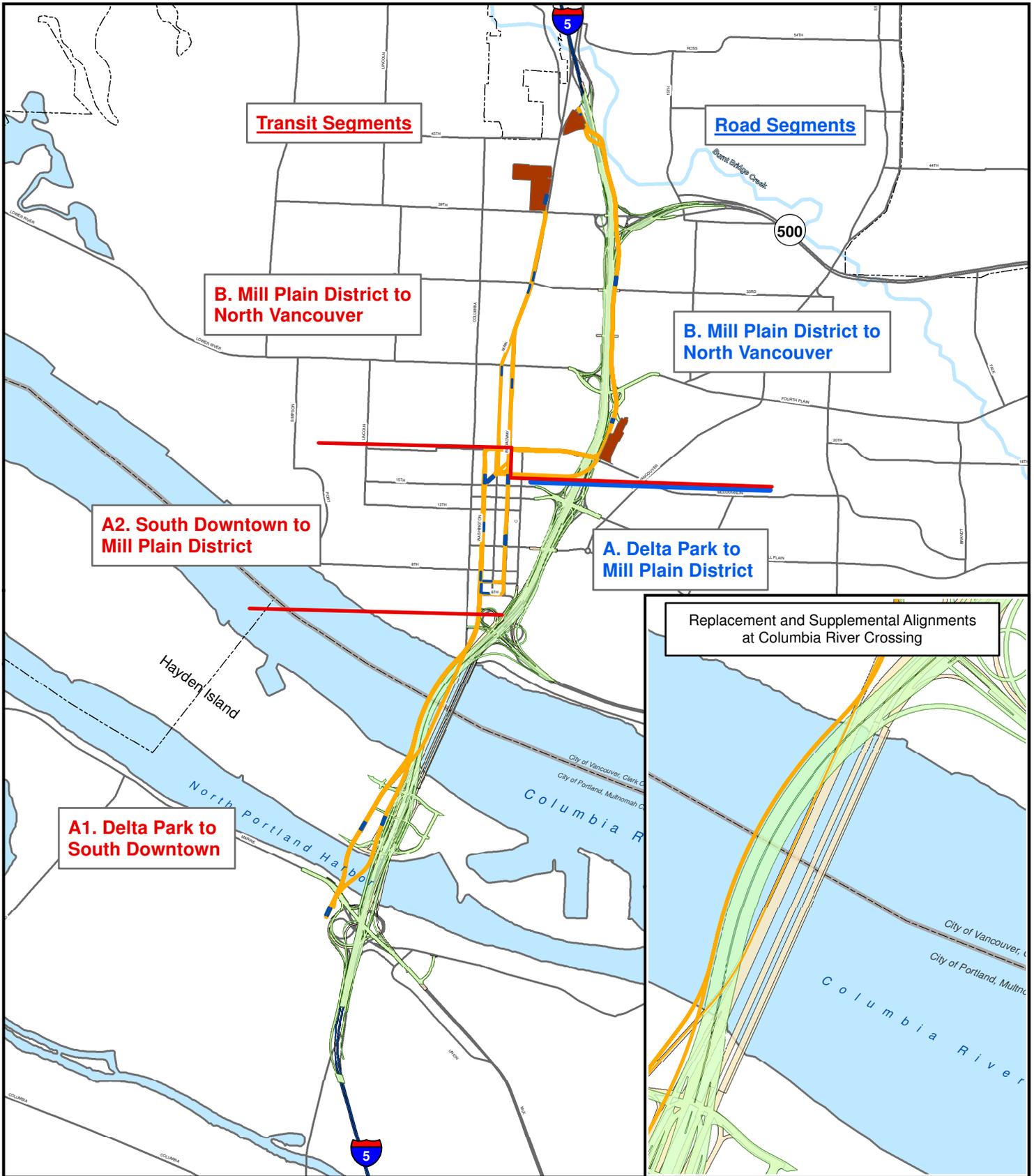
Crossing location	Replacement	Supplemental
City of Vancouver Police Administration and Traffic Office	Minor right-of-way acquisition. No building impact.	No Impact
ODOT Permitting Station	Partial right-of-way acquisition with displacement.	Partial right-of-way acquisition with displacement.
Clark Public Utility District Building	Partial right-of-way acquisition with displacement.	Partial right-of-way acquisition with displacement.
FHWA Western Federal Lands building	Partial right-of-way acquisition with possible building impact	Minor right-of-way acquisition. No building impact.

No differences in tolling impacts anticipated in Segment A.

5.3.1.1 Indirect Traffic Impacts

The Southern Realignment Marine Drive interchange design option could slow down large emergency response vehicles on the segment of Marine Drive west of I-5, which could increase emergency response times. Neither the Standard nor Diagonal Marine Drive interchange options would result in this impact.

Exhibit 5-2 shows the segment divisions for the primary and secondary APIs.



- Transit Segment Boundaries
- Roadway Segment Boundary
- Park and Ride
- Transit Stop
- Transit Alignment Options
- Replacement River Crossing
- Supplemental River Crossing

Exhibit 1-2: Project Area and Alternatives



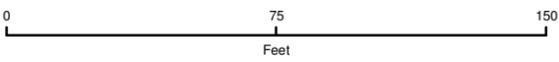


Exhibit 5-3: ROW impacts at Vancouver Police Headquarters/Administration



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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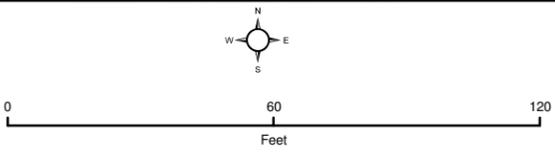
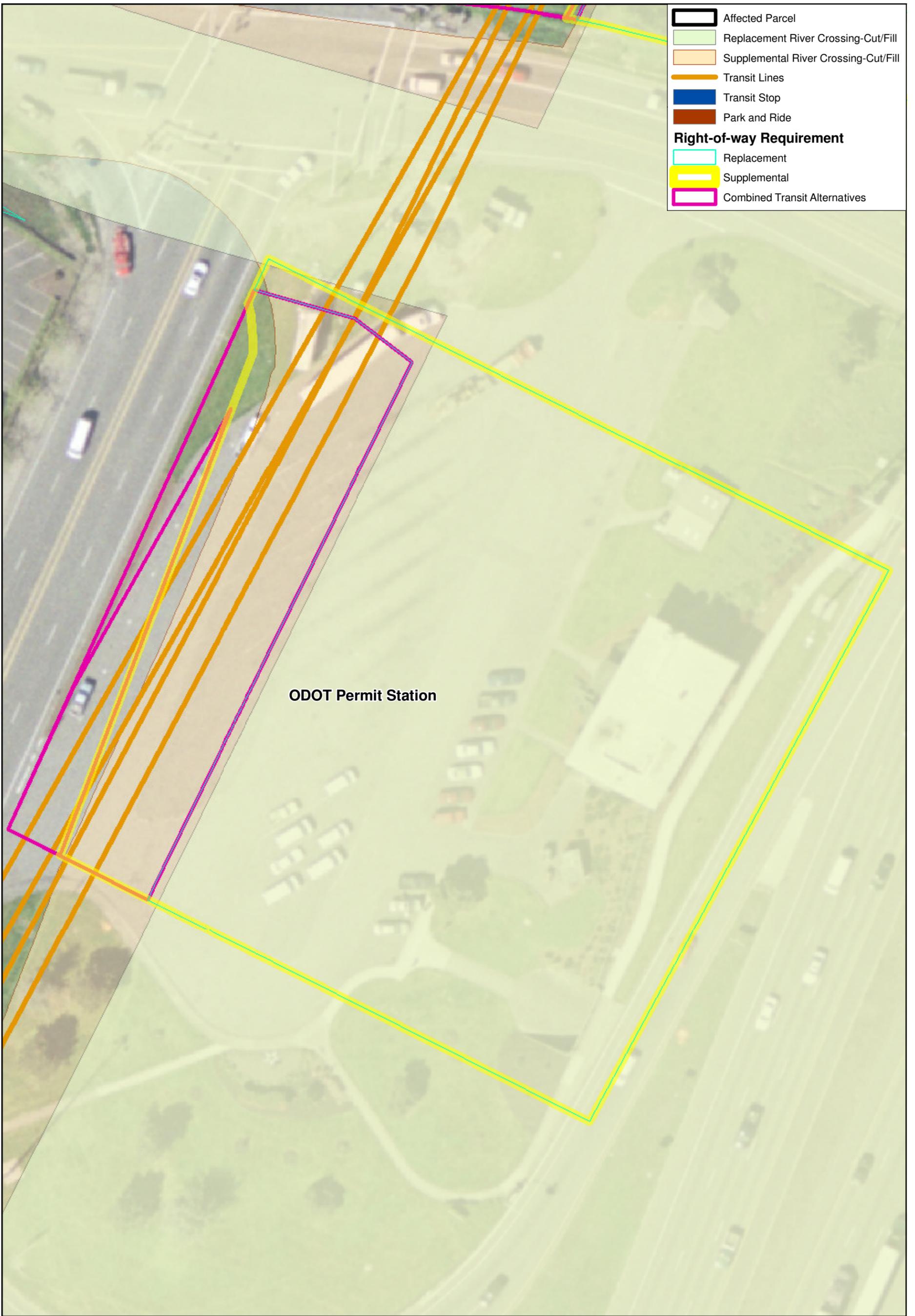
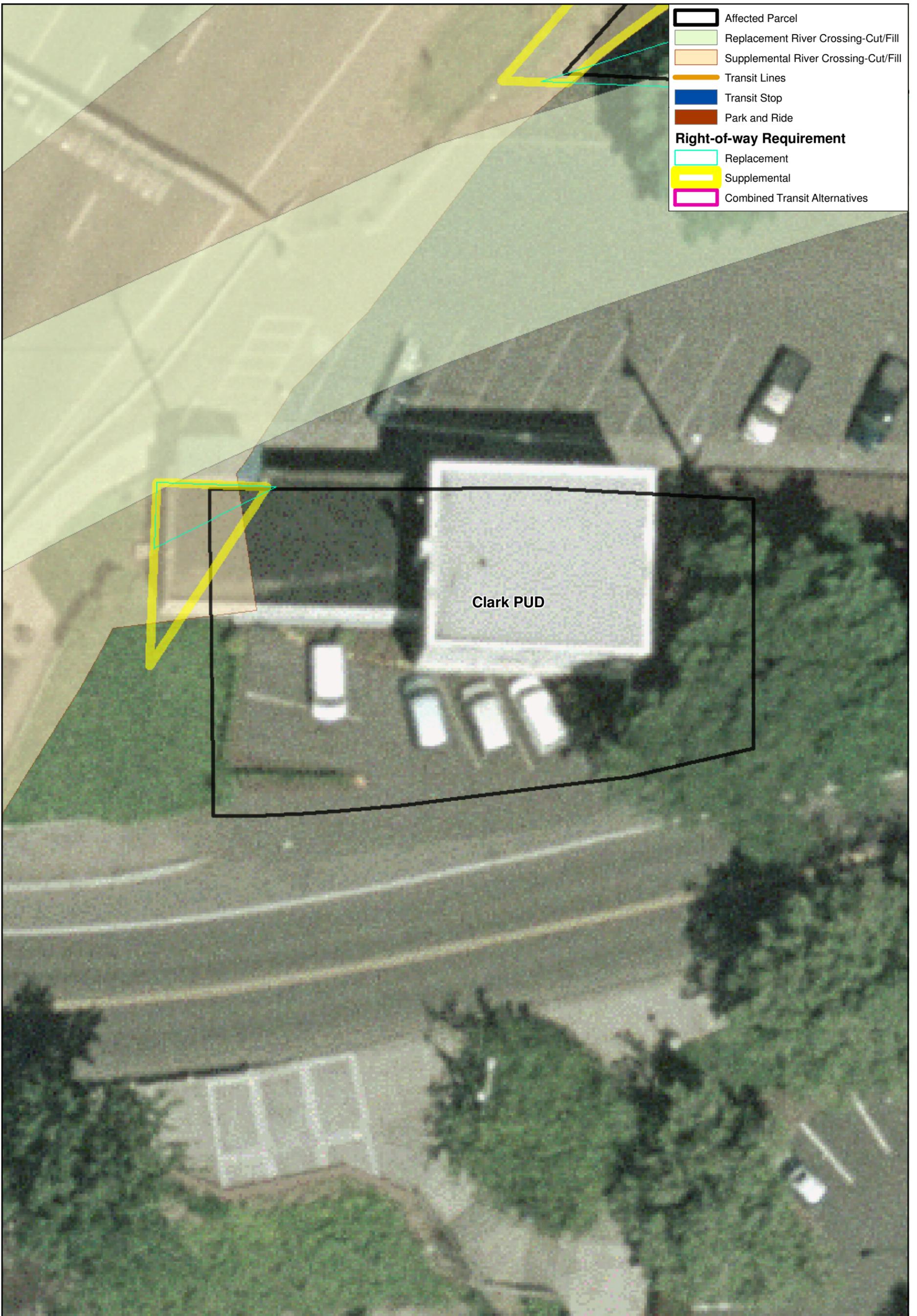


Exhibit 5-4: ROW impacts at ODOT Permit Station



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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- Affected Parcel
 - Replacement River Crossing-Cut/Fill
 - Supplemental River Crossing-Cut/Fill
 - Transit Lines
 - Transit Stop
 - Park and Ride
- Right-of-way Requirement**
- Replacement
 - Supplemental
 - Combined Transit Alternatives

Clark PUD

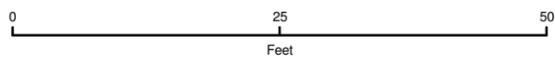


Exhibit 5-5: ROW impacts at Clark PUD Building



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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5.3.1.2 No-Build

Under the No-Build Alternative there would be no direct physical impacts to public services. Long-term indirect effects for the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) generally include increased travel times and congested intersections. Over time these changes would result in increased response times for emergencies and increased travel times with less predictability for school transportation services. Project wide No-Build 2030 traffic conditions are described in Section 5.2.1, No-Build Alternative. This section considers the indirect effects of the No-Build Alternative to public service mobile providers due to increased traffic congestion and changes in intersection level of service in Segment A.

Under the No-Build 2030 conditions traffic modeling predictions include three failing intersections during the morning peak hour near the SR 14/City Center interchange area including:

- Fifth Street at Columbia Street
- Sixth Street at C Street
- Ninth Street at Washington Street

In Segment A during the afternoon peak No-Build 2030 conditions, 11 intersections are predicted to fail near the SR 14/City Center and Mill Plain Boulevard interchange areas including:

- Esther Street at Eighth Street and Ninth Street
- Ninth Street at Columbia
- 11th Street at Main Street, Broadway, and C Street
- Mill Plain Boulevard at Columbia Street, Main Street, Broadway, C Street and the I-5 southbound on-/off-ramp

Indirect impacts to public services from the increased number of failing intersections in Vancouver include potential delay in response times for emergency and law enforcement services as well as school transportation services. Specifically the number of intersections failing along Mill Plain Boulevard presents an obstacle to emergency response, because this street serves as a major east-west connection across I-5.

Transportation modeling results for the build alternatives within Segment A are included in the transit segment discussions because the modeling results are affected by transit mode.

5.3.1.3 Replacement Crossing

In Segment A for highway alignments, there would be four direct physical impacts to public services locations under the replacement crossing. The property for the Vancouver Police Administration and Traffic Office, located immediately to the east of I-5 on E Evergreen Boulevard, would experience right-of-way acquisition along the border with I-5, but the impact is minimal, such that no building impact is predicted. Facilities near

the right-of-way acquisition area include vehicle fuel pumps, parking spaces for a variety of vehicles including a fenced impound vehicle area, and large vehicle storage. It appears from current right-of-way mapping that no parking spaces or facilities would be impacted and only landscaped areas would be acquired.

The Clark Public Utilities District building located on the east side of the bridge abutment would be impacted. The building functions as an information center that houses energy conservation staff and is not part of the utility distribution system. Under the replacement alignment the western portion of this building, nearest the bridge, would be impacted but the remainder of the property would be usable.

Under the replacement alignment, the ODOT Permit Station on Hayden Island would experience minor right-of-way acquisition with some building impact, but the site would remain usable.

The replacement crossing could impact a portion of the FHWA Western Federal Lands building on the Vancouver National Historic Reserve. The impacted portion of the FHWA Western Federal Lands building would be an annex that could potentially be removed without the displacement of the entire building. Design refinements of the replacement crossing may avoid this impact, although access through that area from Anderson Road would still be eliminated. See Exhibit 5-6 for this impact.

Long term, indirect impacts to the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) due to traffic impacts are discussed with the transit alternatives, below.

5.3.1.3.1 Hayden Island Area Indirect Impacts

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

During the year 2030 morning and afternoon peaks, all of the proposed intersections would operate acceptably.

Based on this information for the Hayden Island interchange area, it appears that the replacement bridge options would cause fewer local street congestion impacts and therefore would have fewer impacts to public services.

5.3.1.3.2 SR 14 Interchange Area Indirect Impacts

This section summarizes the differences found in the Traffic Technical Report for the SR 14 Interchange area within Segment A2. The analysis is broken down by crossing type and HCT type as provided by the traffic report.

Replacement (with LRT and Vancouver Alignments): The proposed interchange configuration would result in new intersections for eastbound SR 14 at Main Street and Fifth Street at Main Street. Fourth Street's intersections at Columbia and at Washington Streets would be eliminated. In addition, Sixth Street's intersections at Broadway and at

C Street would become unrestricted intersections without conflicting movements. The SR 14/City Center Interchange Area consists of 34 intersections, of which two would be new. During the year 2030 morning and afternoon peaks, all would operate acceptably as compared to the No-Build Alternative.

Replacement (with BRT and Vancouver Alignments): The proposed interchange configuration would result in new intersections for eastbound SR 14 at Main Street and Fifth Street at Main Street. Fourth Street's intersections at Columbia and at Washington Streets 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 intersections, of which two would be new.

During the year 2030 morning peak, 31 of the intersections would operate acceptably as compared to the No-Build Alternative. The two new intersections would operate acceptably. One of the intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations with the BRT Vancouver alignments.

During the afternoon peak, 30 of the intersections would operate acceptably as compared to the No-Build Alternative. The two new intersections would operate acceptably. Two intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under the BRT Vancouver alignments.

Replacement (with LRT and I-5 Alignment): The proposed interchange configuration would result in new intersections for eastbound SR 14 at Main Street and Fifth Street at 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 currently exist or would exist under No-Build conditions. During the 2030 morning and afternoon peaks, all of the intersections would operate acceptably as compared to the No-Build Alternative.

5.3.1.3.3 Mill Plain Interchange Area Indirect Impacts

Replacement (with LRT and Vancouver Alignment): The I-5 north and southbound on/off-ramps would be combined into one intersection. The Mill Plain Boulevard interchange area consists of 17 intersections, with three new intersections that do not currently exist or would exist under No-Build conditions.

During the year 2030 morning peak, four intersections would operate acceptably as compared to the No-Build Alternative. The three new intersections would operate unacceptably. Ten intersections would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under this alternative. Mill Plain Boulevard and 14th Street would be the most impacted. This could restrict east-west movements and delay public service response times.

During the year 2030 afternoon peak, 12 intersections would operate acceptably as compared to the No-Build Alternative. The three new intersections would operate unacceptably. Two intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under this alternative. Although the afternoon performance would be better than the morning, delays would still occur along Mill Plain.

Replacement (with BRT and Vancouver Alignment): I-5 north and southbound on-/off-ramps would be combined into one intersection. This interchange area consists of 17 intersections, with three would be new intersections that do not currently exist or would exist under No-Build conditions.

During the year 2030 morning peak, eight intersections would operate acceptably as compared to the No-Build Alternative. The three new intersections would operate unacceptably. Six intersections would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under this alternative.

During the year 2030 afternoon peak, 12 intersections would operate acceptably as compared to No-Build. Two of the three new intersections would operate unacceptably. Two intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under this alternative. With the BRT mode, the morning peak performance would be improved compared to the LRT.

Replacement (with LRT and I-5 Alignment): I-5 North and southbound on-/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. This interchange area consists of 18 intersections, with four new intersections that do not currently exist or would exist under No-Build conditions.

During the year 2030 morning peak, six intersections would operate acceptably as compared to the No-Build Alternative. Three would operate unacceptably. Eight of the intersections would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under this alternative. This morning peak performance would rank between the LRT and BRT Vancouver alignment options with regard to impact.

During the year 2030 afternoon peak, 12 intersections would operate acceptably as compared to the No-Build Alternative. The four new intersections would operate acceptably. Two intersections would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under this alternative. This afternoon peak performance would equal that of the BRT Vancouver alignment, thus, with respect to impact to public services ability to travel and maintain response times in Segment A2, the BRT Vancouver alternative would have the least adverse impact.

5.3.1.4 Supplemental Crossing

In Segment A for the supplemental crossing alternative, there would be two direct physical impacts to public services locations. Long-term, indirect impacts to the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) due to traffic impacts are discussed with the transit alternatives, below.

Under the supplemental crossing alternatives, the ODOT Permitting Station would experience some building impact, but the site would remain usable.

The Clark Public Utilities District building located on the east side of the bridge abutment would be impacted. The building functions as an information center that houses energy conservation staff and is not part of the utility distribution system. Under the supplemental alternatives the western portion of this building, nearest the bridge, would be impacted, but the remainder of the property will be usable.

5.3.1.4.1 Hayden Island Interchange Area Indirect Impacts

Under the supplemental alternatives, the Hayden Island interchange would be completely reconstructed. The result would be a pair of new highway ramps and a reconfigured street network. Fourteen potential new intersections were analyzed.

During the year 2030 morning peak, all of the proposed intersections would operate acceptably. During the year 2030 afternoon peak, six of the proposed ODOT intersections would operate acceptably and three proposed PDOT intersections would operate acceptably. Five of the proposed PDOT intersections would operate unacceptably.

5.3.1.4.2 SR 14 Interchange Area Indirect Impacts

This section summarizes the differences found in the Traffic Technical Report for the SR 14 Interchange area within Segment A2. The analysis is broken down by crossing type and HCT type as provided by the traffic report.

Supplemental (with LRT and I-5 Alignment): On the local streets in Vancouver the supplemental crossing would have impacts similar to those of the replacement crossing alternatives. All interchanges would have similar configurations with a few minor differences near SR 14's connections to downtown. By retaining the existing bridges, a connection at Main Street with SR 14 eastbound would not be possible. In addition, the alignment of Columbia Way would be slightly different, but would not impact travel patterns in the downtown area. All inbound connections from SR 14 would still be possible under the supplemental alternatives.

As a result, traffic operations during the morning peak would be similar to those of the replacement scenarios. Afternoon peak travel patterns would be expected to change from removing the intersection at SR 14 and Main Street. Under the supplemental alternatives, all eastbound SR 14 traffic would access the highway through the Columbia Street and SR 14 intersection. Traffic going to or from Columbia Way to downtown through the Main Street connection would use Columbia Way. During the afternoon peak, this would shift an additional 600 vehicles southbound and 220 vehicles northbound to Columbia Way. This would double the number of vehicles making a southbound left at the intersection of Columbia Street at SR 14.

Based on this information, the replacement options with LRT would be preferable because they create less local street congestion in Segment A1.

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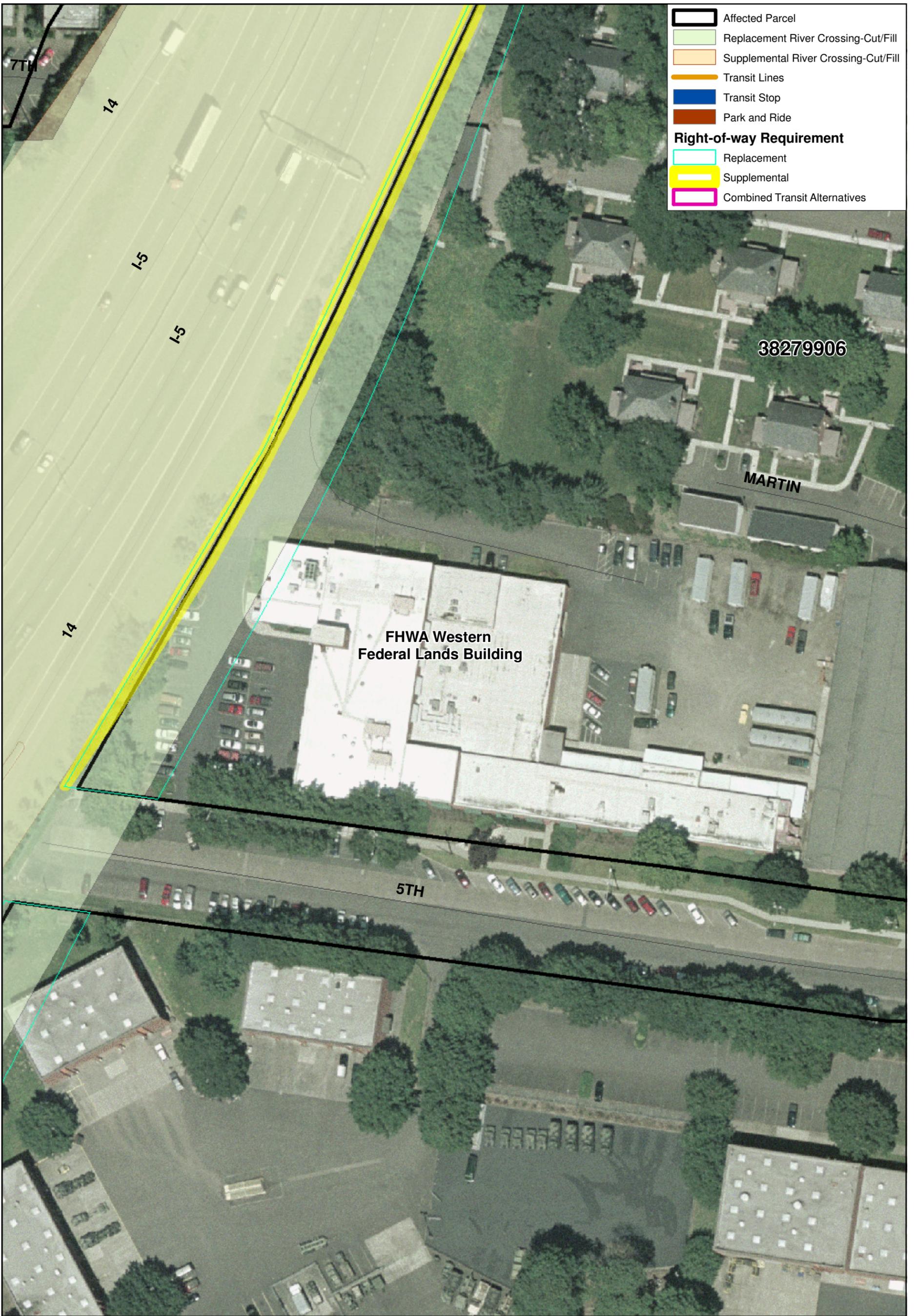


Exhibit 5-6: ROW impacts at FHWA Western Federal Lands Building*



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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5.3.2 Segment B: Mill Plain District to North Vancouver - Highway Alternatives

Exhibit 5-7 summarizes differences in effects among the highway alternatives in Segment B.

Exhibit 5-7. Segment B: Mill Plain District to North Vancouver

	Replacement	Supplemental
Discovery Middle School	Minor right-of-way Acquisition. No Building Impact	Minor right-of-way Acquisition, less than Replacement. No Building Impact
Clark County Center for Community Health - Veterans Administration Campus	Minor right-of-way Acquisition. No Building Impact	

No differences in tolling impacts anticipated in Segment B.

5.3.2.1 No-Build

Under the No-Build Alternative there would be no direct physical impacts to public services. Long-term indirect effects for the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) are generally considered to include increased travel times and congested intersections. Over time these changes would result in increased response times for emergencies, and increased travel times with less predictability for school transportation services. Project-wide No-Build 2030 traffic conditions are described in Section 5.2.1, No-Build Alternative. This section considers the indirect effects of the No-Build Alternative to public service mobile providers due to increased traffic congestion and changes in intersection level of service within Segment B.

Under the No-Build 2030 conditions traffic modeling predictions include three failing intersections during the morning peak hour near the Fourth Plain Boulevard interchange area, one of which is failing under existing conditions:

- Main Street at 28th Street (currently failing) and 29th Street
- Fourth Plain Boulevard at Broadway

During the afternoon peak hour No-Build 2030 conditions at the Fourth Plain Boulevard interchange, 11 intersections are predicted to fail, leaving only three in the interchange area meeting standards. Those continuing to meet standards would include:

- 24th Street at Columbia Street
- Fourth Plain Boulevard at F Street and I-5 southbound on-/off-ramps

The other interchange area within Segment B is at SR 500/Main Street/39th Street. There is one intersection in the study currently failing standards at 39th Street at I-5 southbound on-/off-ramps.

This intersection would continue to fail under the No-Build 2030 conditions. In addition, traffic modeling predictions indicate 11 other intersections would fail under No-Build conditions during the morning peak hour. Only three intersections out of the 15 included in the study would not fail. These include:

- 39th at H Street
- Main Street at 45th Street and Main Street Split

Existing conditions during the afternoon peak hour near this interchange include one failing intersection at 39th Street at F Street. Afternoon peak hour predictions for the intersections around the SR 500/Main Street/39th Street interchange area indicate that under No-Build 2030 conditions an additional five failing intersections. The six intersections that would fail are:

- 39th Street at F Street, Main Street, H Street, and I-5 northbound on-/off-ramps
- WSDOT/40th Street at Main Street
- Ross Street at North Road

Indirect impacts to public services from the increased number of failing intersections in Vancouver include potential delay in response times for emergency and law enforcement services as well as school transportation services. The number of intersections along 39th Street failing during the afternoon peak would present the largest impact on response times as this street is a major east-west connection.

Transportation modeling results for the build alternatives for Segment B are included in the Transit Segment discussions because the modeling results are affected by transit mode.

5.3.2.2 I-5 Current Alignment (with Replacement Bridge)

Two public service properties in Segment B would experience minor right-of-way impacts with the replacement alternatives (Exhibit 5-8). No other direct impacts would occur due to highway alignments in this segment.

Exhibit 5-8. Public Service Direct Impacts Segment B - Replacement

Public Service	Address	Impact
Discovery Middle School	800 E 40th St.	An area containing an internal circulation drive and 10 – 15 parking spaces in the southeast corner, along the eastern property border with I-5 would be acquired primarily for underground construction. No building impact would occur. No vehicle access would be lost parking would remain.
Clark County Center for Community Health-Veterans Administration Campus	1601 E Fourth Plain Blvd.	A portion of an internal circulation drive and 10 – 15 parking spaces would be acquired in the southwest corner of the property. No building impact would occur. No vehicle access would be lost and remaining parking would remain.

At Discovery Middle School, the planned right-of-way acquisition would require disturbance during construction to an internal circulation drive and 10-15 parking spaces. This is considered in the Temporary Effects section of this report. Work in this area may require permanent construction of a portion of a retaining wall for the highway along the edge of the property, but no permanent effects to parking or vehicle access would occur.

Long-term, indirect impacts to the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) due to traffic impacts are discussed with the transit alternatives, below.

5.3.2.2.1 Fourth Plain Boulevard Interchange Area

Replacement (with LRT and Vancouver Alignment): 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, of which all exist under No-Build conditions. During the morning peak, six intersections would operate acceptably as compared to the No-Build Alternative. Seven would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under this alternative.

During the afternoon peak, 12 intersections would operate acceptably as compared to the No-Build Alternative. One would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under this alternative.

Replacement (with BRT and Vancouver Alignment): The Fourth Plain Boulevard interchange configuration would change the northbound on-ramp from a standard diamond configuration to a loop ramp configuration under this alternative. The BRT 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 intersections, all of which exist under No-Build conditions. During morning and afternoon peaks, 10 intersections would operate acceptably as compared to the No-Build Alternative. Three would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under this alternative.

Replacement (with LRT and I-5 alignment): The proposed interchange configuration would add a direct connection to the I-5 northbound on-/off-ramp for the Clark College Park and Ride. This interchange area consists of 15 study intersections, of which one would be a new intersection that does not currently exist or would exist under No-Build conditions.

During the year 2030 morning peak, ten intersections would operate acceptably as compared to the No-Build Alternative. The one new intersection would operate acceptably. Four intersections would degrade from acceptable operations under the No-Build Alternative to unacceptable operations under this alternative. During the afternoon peak, all intersections would operate acceptably as compared to the No-Build Alternative.

5.3.2.2.2 SR 500/Main Street/39th Interchange Area

Replacement (with LRT and Vancouver Alignment): 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. This interchange area consists of 12 intersections, of which two would be new.

During the morning peak, all intersections would operate acceptably as compared to the No-Build Alternative. During the afternoon peak, nine of the intersections would operate acceptably as compared to the No-Build Alternative. One of the two new intersections would operate acceptably. One would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations.

Replacement (with BRT and Vancouver alignment): 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. This interchange area consists of 12 intersections, of which two would be new. During the morning peak, all of the intersections would operate acceptably as compared to the No-Build Alternative. During the afternoon peak, six intersections would operate acceptably. One of the two new intersections would operate acceptably. Four would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under this alternative.

Replacement (with LRT and I-5 alignment): The proposed transit alignment would result in one new intersection for the north entrance to the Kiggins Bowl Park. The southern entrance would be aligned with the intersection of 45th Street at Main Street. This interchange area consists of 11 intersections, of which one would be new.

During the morning peak, all of the study intersections would operate acceptably as compared to the No-Build Alternative. During the afternoon peak, ten intersections would operate acceptably as compared to the No-Build Alternative. One would degrade from acceptable or unacceptable operations under the No-Build Alternative to unacceptable operations under this alternative.

5.3.2.3 I-5 Current Alignment (with Supplemental Bridge)

The same two public service properties described above would experience minor right-of-way impacts with the supplemental alternatives (Exhibit 5-9). However, the level of impact to Discovery Middle School would be smaller. No other direct impacts would occur due to highway alignments in this segment.

Exhibit 5-9. Public Service Direct Impacts Segment B - Supplemental

Public Service	Address	Impact
Discovery Middle School	800 E 40th St.	Area with 10 – 15 parking spaces in the SE corner, along the eastern property border with I-5 would be acquired primarily for underground construction. The internal drive would not be directly impacted, and no building impact would occur. No vehicle access would be lost and parking would remain.
Clark County Center for Community Health-Veterans Administration Campus	1601 E Fourth Plain Blvd.	A portion of internal circulation drive and 10 – 15 parking spaces would be acquired in the SW corner of the property. No building impact. No vehicle access would be lost and parking would remain.

At Discovery Middle School, the planned right-of-way acquisition would require disturbance during construction to 10-15 parking spaces. This is considered in the Temporary Effects section of this report. Work in this area may require permanent construction of a portion of a retaining wall for the highway along the edge of the property, but no permanent effects to parking or vehicle access would occur.

Long-term, indirect impacts to the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) due to traffic impacts are discussed with the transit alternatives, below.

See Exhibits 5-10 and 5-11 for these impacts.

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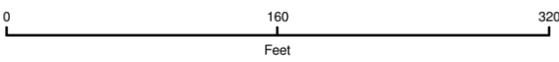


Exhibit 5-10: ROW impacts at Discovery Middle School



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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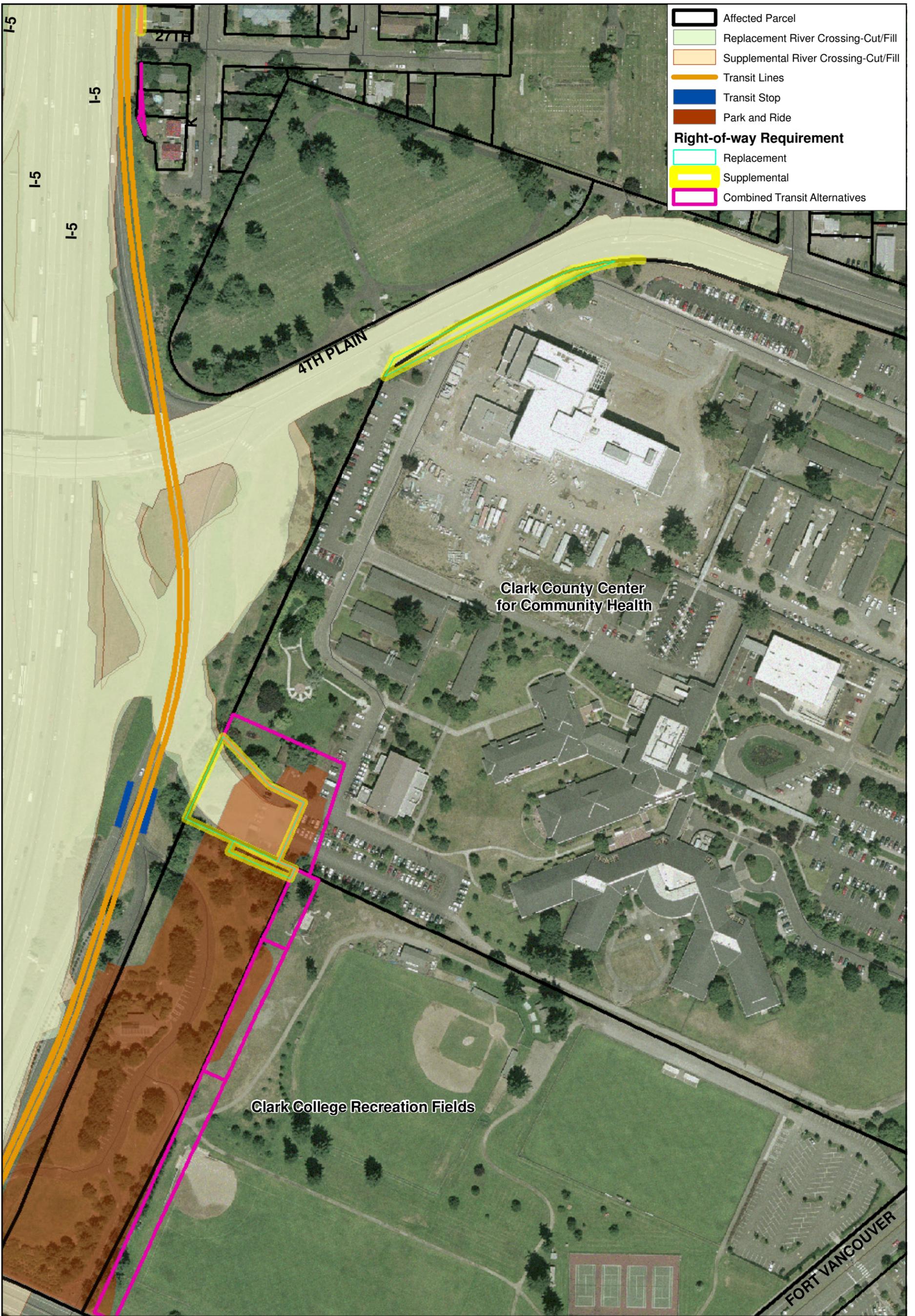


Exhibit 5-11: ROW impacts at Clark County Center for Community Health*



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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5.3.3 Segment A1: Delta Park to South Vancouver - Transit Alternatives

Exhibit 5-12 provides a summary of impacts in Segment A1 for transit alternatives.

Exhibit 5-12. Segment A1: Delta Park to South Vancouver LRT and BRT Options

Segment A1: Delta Park to South Vancouver LRT and BRT Options				
	Replacement		Supplemental	
	Adjacent	Offset	Adjacent	Offset
ODOT Permitting Station	Some right-of-way acquisition with building impacts. Site remains usable.	No Impact	Some right-of-way acquisition with building impacts. Site remains usable.	No Impact

5.3.3.1 No-Build

Under the No-Build Alternative there would be no direct physical impacts to public services. Long-term indirect effects for the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) are generally considered to include increased travel times and congested intersections. Over time these changes would result in increased response times for emergencies and increased travel times with less predictability for school transportation services. No-Build traffic conditions for Segment A, which includes A1, are described in Section 5.3.1.1.

5.3.3.2 Hayden Island I-5 Adjacent Alignment

Direct impacts from the high-capacity transit (HCT) alignment adjacent to I-5 would differ depending on which river crossing the transit alignment is paired with the replacement or supplemental crossings. For public services on Hayden Island, one property would be directly impacted.

Under the I-5 adjacent alignment with the replacement or supplemental crossings, the ODOT Permitting Station would have some right-of-way impact, but would continue to be a usable site. Between the different river crossing options for the adjacent transit alignments, the overall size of right-of-way impact is similar, but the location differs. The western edge of 5 – 10 truck parking spaces would be impacted under the replacement adjacent alignment, while the permit building would be impacted under the upstream adjacent alignment. For the supplemental adjacent alignment, the right-of-way impact would occur on the western edge of the property and would not impact parking spaces.

No direct impacts to other public services would occur with these alignments, and there would be no noise impacts that cannot be mitigated. The long-term indirect impacts to the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) were modeled for the supplemental and replacement crossings and did not differentiate between BRT, LRT, or adjacent or offset alignments.

5.3.3.3 Hayden Island I-5 Offset Alignment

The transit alignment offset from I-5 would avoid the ODOT permit center and would not result in any impacts to public services.

5.3.4 Segment A2: South Vancouver to Mill Plain District - Transit Alternatives

No direct physical impacts would occur to public service locations under any of the transit alternatives within Segment A2. However, both City of Vancouver Fire and Police services reported that Main Street/SR 99 is a critical access route for their mobile response services. This section discusses of impacts to local streets due to transit.

5.3.4.1 Indirect Impacts

There would be no direct impacts in Segment B. The Traffic Technical Report provides analysis for traffic impacts in the Mill Plain interchange area based on crossing alternative and HCT type. The Traffic Report did not differentiate between the different route options for HCT in this segment, so no differences are provided for the couplet on Broadway/Washington or the two-way Washington option. There are no noise or vibration impacts to outdoor school areas that cannot be mitigated.

5.3.4.2 No-Build

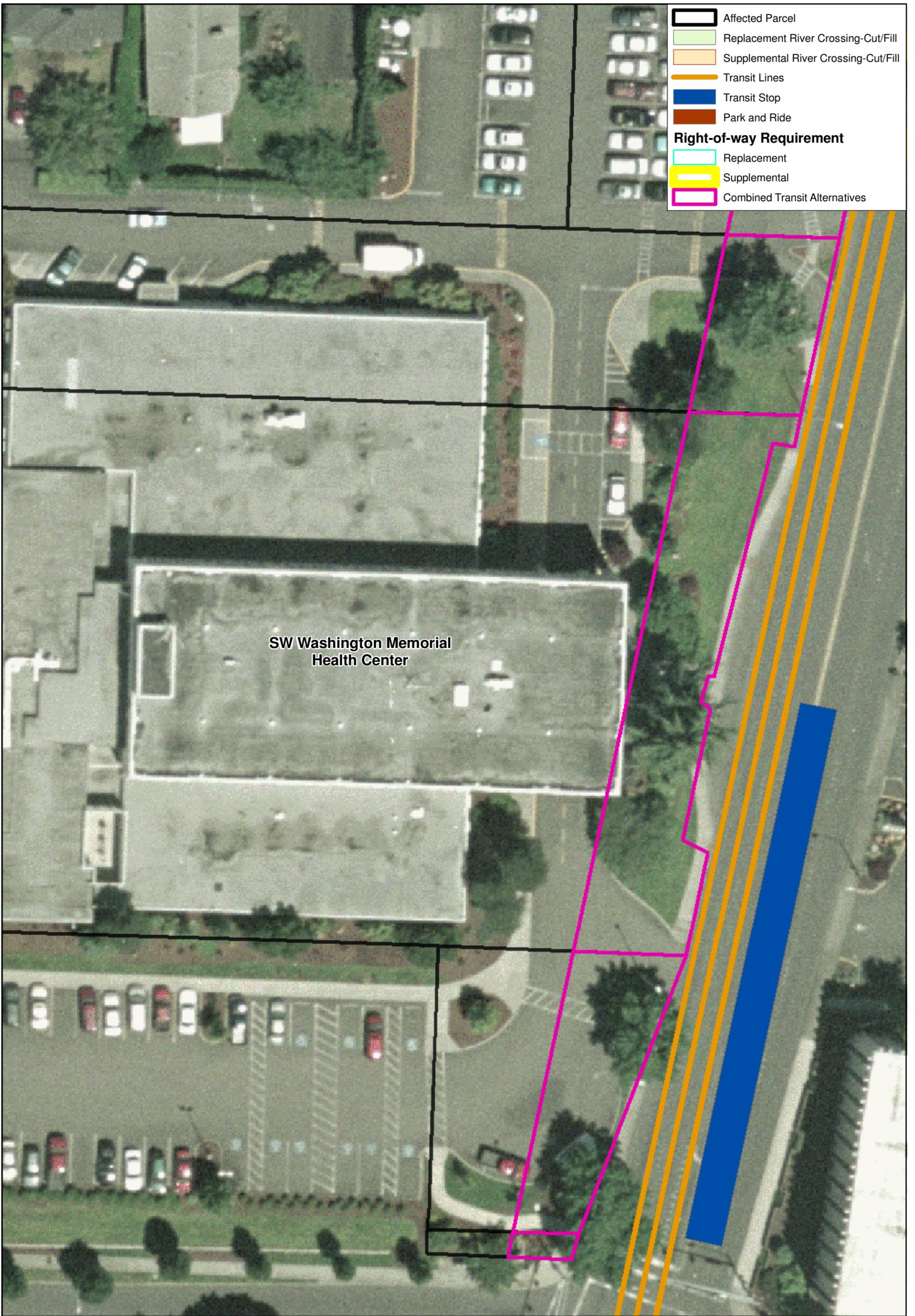
Under the No-Build Alternative there would be no direct physical impacts to public services. Long-term indirect effects for the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) generally include increased travel times and congested intersections. Over time these changes would result in increased response times for emergencies, and increased travel times with less predictability for school transportation services.

5.3.5 Segment B: Mill Plain District to North Vancouver - Transit Alternatives

Exhibit 5-13 summarizes differences in direct impacts from LRT and BRT alignments in Segment B. Indirect impacts from traffic congestion for Segment B are discussed in Section 5.3.5.4. Exhibits 5-14 through 5-17 show right-of-way impacts in this area.

Exhibit 5-13. Segment B: Mill Plain District to North Vancouver BRT and LRT Options

Segment B: Mill Plain District to North Vancouver BRT and LRT Options		
Major alignment	Vancouver to Lincoln P&R	I-5 to Kiggins
SW Washington Memorial Health Center	A strip of property along the hospital's boundary with Main St. would be acquired. Access to the pull-through entry to the hospital would be shortened. No building impact.	No Impact
Vancouver School of Arts and Academics	Minor right-of-way acquisition. No building impact.	No Impact
Clark College – Recreation Fields	Partial right-of-way acquisition. No building impact.	Partial right-of-way acquisition. No building impact.
WSDOT Maintenance Facility	Full acquisition and displacement.	No impact.



- Affected Parcel
 - Replacement River Crossing-Cut/Fill
 - Supplemental River Crossing-Cut/Fill
 - Transit Lines
 - Transit Stop
 - Park and Ride
- Right-of-way Requirement**
- Replacement
 - Supplemental
 - Combined Transit Alternatives

SW Washington Memorial
Health Center

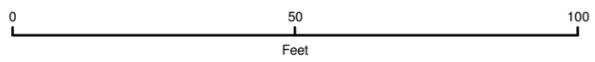


Exhibit 5-14: ROW impacts at SW Washington Memorial Health Center*



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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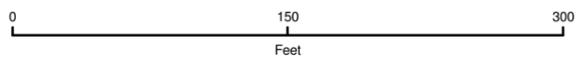


Exhibit 5-15: ROW impacts at Vancouver School of Arts and Academics*



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

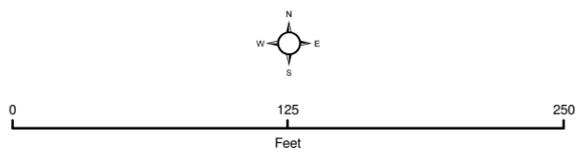
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- Affected Parcel
- Replacement River Crossing-Cut/Fill
- Supplemental River Crossing-Cut/Fill
- Transit Lines
- Transit Stop
- Park and Ride
- Right-of-way Requirement**
- Replacement
- Supplemental
- Combined Transit Alternatives

Clark College Recreation Fields

Exhibit 5-16: ROW impacts at Clark College Recreation Fields*



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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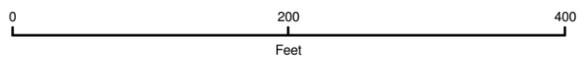
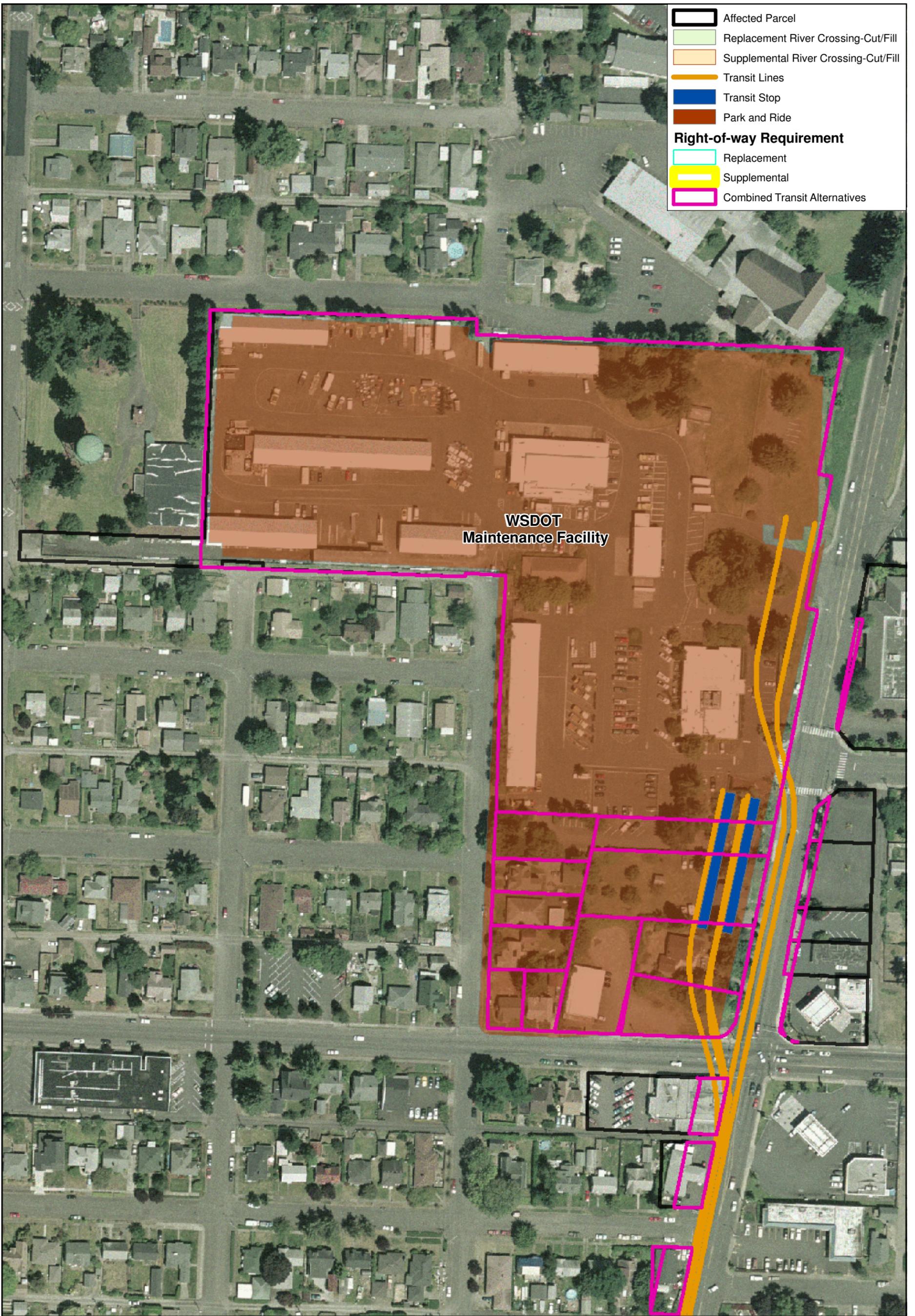


Exhibit 5-17: ROW impacts at WSDOT Maintenance Facility*



The property boundaries are shown slightly misaligned from the aerial photo and project data. This is a known issue, that is adjusted for within the project analysis.

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5.3.5.1 No-Build

Under the No-Build Alternative there would be no direct physical impacts to public services. Long-term indirect effects for the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) generally include increased travel times and congested intersections. Over time these changes would result in increased response times for emergencies, and increased travel times with less predictability for school transportation services. No-Build traffic conditions for Segment B are described in Section 5.3.2.1.

5.3.5.2 Vancouver Transit Alignments

Four public service locations would have direct physical impacts with the Vancouver transit alignments. Two impacts would occur on Main Street and would apply to all Vancouver alignments. The other, at the Clark College recreation fields, would occur under the I-5 transit alignments. See Exhibit 5-17 for a description of the impacts.

Exhibit 5-18. Public Service Direct Impacts Segment B – Vancouver Transit

Public Service	Address	Impact
SW Washington Memorial Health Center	3400 Main St.	A strip of property along the hospital's boundary with Main St. would be acquired. The area is primarily landscaped with grass and trees. Access to the pull-through entry to the hospital will be shortened.
Vancouver School of Arts and Academics	3101 Main St.	A strip of property along the school property's border with Main St. would be acquired. The area consists of grass and trees. No building or access impact.
Clark College – Recreation Fields	1800 E McLoughlin Blvd.	A park and ride would be constructed at the former WSDOT rest area adjoining the Clark College baseball fields. Some right-of-way along the west side of the fields would be acquired. No building impact, no impacts to recreation fields or structures, and no impacts to access.
WSDOT Maintenance Facility		Entire property acquired for the construction of the Lincoln Park and Ride. All maintenance facilities displaced.

Long-term indirect impacts to the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) are discussed by interchange area within Segment B in Section 5.3.5.4, below. There would be no noise or vibration impacts to outdoor school areas that cannot be mitigated.

5.3.5.2.1 LRT or BRT Broadway Two-Way

The Broadway two-way transit option includes the following elements:

- 24th Street station
- 33rd Street station
- Lincoln Park and Ride
- Kiggins Bowl Park and Ride

Indirect effects of these project components in Segment B primarily would affect public schools. The station at 33rd and the Kiggins Bowl Park and Ride are located near public school properties and increase access to these areas. Vancouver School District has expressed concern that locating transit stations near middle and high schools may have crime and safety implications. Although no research specific to crime and transit stations near schools could be found, some studies have shown that the introduction of transit stations to neighborhoods does not result in increased crime incidence in those neighborhoods (Department of Urban Planning at UCLA 2002). The CRC team is currently holding discussions with Vancouver School District to evaluate their concerns and identify any necessary mitigation measures.

Traffic analysis did not model the different effects of the various alignment options for the Vancouver alignments, so no comparative results are available for these options.

5.3.5.2.2 LRT or BRT Main/Broadway Couplet

The Main/Broadway couplet transit alignment would include the following elements:

- 24th Station on Main and Broadway
- 33rd Station
- Lincoln Park and Ride
- Kiggins Bowl Park and Ride

Indirect effects of these project components in Segment B primarily would affect public schools and are identical to those in the Broadway two-way option.

5.3.5.3 I-5 Transit Alignment

One direct impact to public services would occur with the North I-5 transit alignment (Exhibit 5-18).

Exhibit 5-19. Public Service Direct Impacts Segment B – Vancouver Transit

Public Service	Address	Impact
Clark College – Recreation Fields	1800 E McLoughlin Blvd.	A park and ride would be constructed at the former WSDOT rest area adjoining the Clark College baseball fields. Some right-of-way along the west side of the fields would be acquired. There would be no building impact, no impacts to recreation fields or structures, and no impacts to access.

Long-term indirect impacts to the mobile portion of the services (i.e., fire, ambulance, and police emergency response and school transportation) are discussed by interchange area within Segment B in Section 5.3.5.4, below. There would be no noise or vibration impacts to outdoor school areas that cannot be mitigated.

5.3.5.3.1 LRT or BRT McLoughlin or 16th 1-5 Alignment

The options for the I-5 transit alignment include the following components:

- Arnada station
- Clark College Park and Ride
- 33rd Street station
- Kiggins Bowl Park and Ride

Indirect effects of station and park and ride locations for this transit alternative would be less than those of the Vancouver alignment because the Kiggins Bowl Park and Ride is the only station proposed near a public school. Vancouver School District has expressed concern that locating transit stations near middle and high schools may have crime and safety implications. Although no research specific to crime and transit stations near schools could be found, some studies have shown that the introduction of transit stations to neighborhoods does not result in increased crime incidence in those neighborhoods (Department of Urban Planning at UCLA 2002). The CRC team is currently holding discussions with Vancouver School District to evaluate their concerns and identify any necessary mitigation measures.

Traffic analysis did not model the different effects of the various options for the I-5 transit alignments, so no comparative results are available for these options.

5.4 Impacts from Other Project Elements

5.4.1 Minimum Operable Segment

Under the minimum operable segments, HCT would terminate at the proposed Clark College Park and Ride or at the Mill Plain station. There would not be additional transit access provided near either Discovery Middle School or Vancouver School of Arts and Academics. Exhibit 5-21 summarizes the direct impacts to public services in Segment B that result from these MOS. Impacts to public services in Segments A1 and A2 are the same as those for the full-length transit alignments.

Exhibit 5-20. Clark College and Mill Plain MOS impacts to Public Services

Segment B: Mill Plain District to North Vancouver BRT and LRT Options		
Major alignment	Clark College MOS	Mill Plain MOS
SW Washington Memorial Health Center	No Impact	No Impact
Vancouver School of Arts and Academics	No Impact	No Impact
Clark College – Recreation Fields	Partial right-of-way acquisition. No building impact.	Partial right-of-way acquisition. No building impact.
WSDOT Maintenance Facility	No Impact.	Full acquisition and displacement.

5.4.2 Transit Maintenance Base Options

No direct or indirect impacts to public services are expected to occur due to the maintenance base options. For a description of land uses surrounding the maintenance facility options, see the Acquisitions Technical Report.

5.5 Impacts from System-Level Choices

5.5.1 River Crossing Type and Capacity: How does the supplemental crossing compare to the replacement crossing?

There are minor differences in direct impacts to public service facilities between the supplemental 8-lane crossing and the replacement 10/12-lane crossing. The number of lanes is not a causal factor in the direct impact differences. Exhibit 5-18 shows the facilities with right-of-way impact and the nature of impact to each. Overall, impacts to public services from the highway river crossing type are minor and do not provide enough substantial difference to direct decision making on this choice.

Exhibit 5-21. Public Service Direct Impacts Highway River Crossing Type

	Replacement	Supplemental
Segment A: Delta Park to Mill Plain District		
City of Vancouver Police Administration and Traffic Office	Minor right-of-way acquisition. No building impact	No Impact
ODOT Permitting Station	Partial right-of-way acquisition and displacement.	Partial right-of-way acquisition and displacement.
Clark PUD Building	Full acquisition	Partial right-of-way acquisition and displacement.
FHWA Western Federal Lands Building	Partial right-of-way acquisition and possible building impact	Minor right-of-way acquisition. No building impact
Segment B: Mill Plain District to North Vancouver		
Discovery Middle School	Minor right-of-way Acquisition. No Building Impact	Minor right-of-way Acquisition – less than Replacement. No Building Impact
Clark County Center for Community Health- Veterans Administration Campus	Minor right-of-way Acquisition. No Building Impact	Minor right-of-way Acquisition. No Building Impact

5.5.2 Transit Mode: How does BRT compare to LRT?

Based on information provided in the Traffic Technical Report, LRT would provide better travel times and reliability than BRT. In addition, BRT buses travel with mixed traffic outside the project area, and are thus subject to congestion-induced delays before they enter the exclusive guideway in the project area. Such delays can cause the buses to miss their schedules and increase travel-times. This introduces an element of unreliability that could deter ridership. Increasing the frequency of buses (Increased Transit) would further reduce BRT travel times by placing so many vehicles in the guideway that the buses cause congestion and slow down. The larger capacity of LRT trains would allow lower overall frequencies while providing the same or greater capacity.

For public services, considering which transit mode has more beneficial effects or fewer detrimental effects primarily depends on predicted traffic congestion due to each type of mode. As seen in Exhibit 5-17 above in Section 5.3.5.5, the number of intersections failing to meet operation standards is very close between the BRT and LRT Vancouver alignments. LRT would impact the most intersections during the morning peak whereas BRT would impact intersections almost equally during the morning and afternoon peaks. Because emergencies can occur at any time of the day, there is no appreciable benefit to reduced congestion in the morning compared with the afternoon.

5.5.3 Balance of Transit vs. Highway Investment: Increased Transit System Operations with Aggressive TDM/TSM Measures, and Efficient Transit System Operations with Standard TDM/TSM Measures

There are no direct or indirect effects to public services from the balance of Transit vs. Highway Investment choices.

5.5.4 Major Transit Alignment: How do the Vancouver alignments compare to the I-5 alignments?

The Vancouver alignments would have marginally more direct and indirect impacts to public services. The Vancouver School District school properties (with the exception of Kiggins Bowl) and WSDOT Maintenance Facility would not be affected under the I-5 alignments. Additionally, the number of intersections predicted to fail operations standards is fewest under the I-5 alignments.

5.5.5 Tolling: How do the tolling options compare (no toll, standard or higher toll on I-5, toll on both I-5 and I-205)?

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 tollbooths. 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 administered for both directions of travel along I-5, for example, a vehicle traveling south across the bridge at 9 a.m. and then north across the bridge at 5 p.m. would pay tolls in both directions.

With 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 bridge, while I-205's crossings would increase by 6,000 vehicles per day. Overall, there would be 6,000 fewer vehicle crossings of the Columbia River via I-5 and I-205 with the replacement bridge than with the no-build option.

There would be no direct impacts to public services from tolling choices, and indirect traffic impacts on local streets were not analyzed. Based on available information the tolling scenarios would not have different affects to public services.

6. Temporary Effects

6.1 Introduction

The build alternatives may include the temporary effects listed below. Mitigation measures for these effects are discussed in Section 8 of this report.

- Temporary easements for construction staging areas. These temporary acquisitions could be returned to the landowner after construction is complete or purchased for transit-oriented development. The locations of staging areas are yet to be confirmed based on final engineering designs.
- Noise impacts due to construction
- Vibration from construction
- Effects to air quality due to construction equipment
- Traffic spillover during construction
- Traffic detours and delays during construction

6.2 Regional and System-Wide Impacts

Increased delays and traffic on streets under construction may cause response time delays for mobile public services. Construction on bridge structures would cause delays for mobile services needing to access or leave Hayden Island.

There are no regional and system-wide temporary impacts unique to transit alternatives.

6.3 Segment A: Delta Park to Mill Plain District

6.3.1 Impacts Common to All Alternatives

Because Hayden Island would be affected by both transit and highway alternatives in close proximity to each other, temporary impacts on Hayden Island are common to all alternatives.

Temporary effects to public services on Hayden Island include temporary increased delays for the fire services stationed on Hayden Island to access and drive on the highway to reach areas in North Portland. Other services, such as law enforcement, would also experience delays accessing Hayden Island from North Portland or Vancouver.

6.3.2 Impacts Unique to Transit Alternatives and Options

Construction of transit alternatives within downtown Vancouver may cause delays for mobile public services traveling either through downtown to another destination, or traveling within downtown to reach an emergency location near areas under construction.

6.3.3 Impacts Unique to Highway Alternatives and Options

There would be no temporary Segment A impacts unique to highway alternatives.

6.4 Segment B: Mill Plain District to North Vancouver

6.4.1 Impacts Common to All Alternatives

There would be no temporary Segment B impacts common to all alternatives.

6.4.2 Impacts Unique to Transit Alternative and Options

Access to and from the 37th and Main Street Vancouver Fire Department Station 86 during construction on Main would be affected by the Vancouver transit alignments.

Temporary construction noise adjacent to the Academy of Arts and Academics and Discovery Middle School may be disturbing to classroom activities.

6.4.3 Impacts Unique to Highway Alternatives and Options

At the Discovery Middle School construction of the highway under either the replacement or supplemental alternatives would require temporary disturbance in the southeast corner of the property. Right-of-way would be acquired in this area; however, most of the permanent effects will be underground. The existing parking and internal circulation drive, though unusable during construction, would be available for school use after construction is complete.

7. Mitigation for Long-Term Effects

Many of the intersections that do not meet standards are intersections (or corridors) for which the project team, in cooperation with sponsoring agencies, will develop mitigation strategies. The data presented here show the preliminary findings before mitigation techniques have been employed. The mitigations strategies would include road widening and the acquisition of new right-of-way only to mitigated cases of extreme delay, and only when no other mitigations will produce acceptable conditions. Unacceptable intersection operations accompanying the supplemental alternatives would be more difficult to mitigate than those with the replacement alternatives because the delays generally would be far worse. Certain mitigations would improve an intersection that is just below standards, such as many intersections under the Replacement option, but these same mitigations would be ineffective for intersections with extreme delay.

The displacement of publicly owned facilities, such as the ODOT permit Center, FHWA Western Federal Land building, or WSDOT maintenance facility could be mitigated by functionally replacing the property acquired with another facility that would provide equivalent utility.

Transit impacts to public services predominately occur along Main Street. For the sidewalk and landscaped area in front of SW Washington Memorial Health Center & Memorial Urgent Care Center, the project could provide funds for re-landscaping the remaining area adjacent to the street.

At the Vancouver School of Arts and Academics where there would be minor right-of-way acquisition along the existing sidewalk and no building impact, the project could provided revegetation to replace the mature trees that would be lost with the right-of-way acquisition.

At the Clark College property where partial acquisition would occur along the western edge of baseball fields, no mitigation is proposed. It appears that no facilities would need to relocate for the project.

In addition to the direct impacts caused by right-of-way purchase and construction, the CRC team is holding discussions with the Vancouver School District to develop a strategy for safety and security at HCT station near schools. At this time those discussions are underway and no resulting mitigation measures have been identified.

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8. Mitigation for Temporary Effects

8.1 Mitigation Common to All Build Alternatives

For all temporary construction activities, detailed coordination about construction locations and phasing will be provided to the appropriate parties at law enforcement and fire, emergency responder services, and school transportation services. Especially for the emergency responders, this coordination needs to include any temporary access restrictions to highway on-ramps and exits, and critical emergency access routes.

To mitigate for temporary removal of parking and a portion of an internal circulation drive at the Discovery Middle School, the project may provide assistance reconfiguring parking striping within the remaining parking lot and providing a new circulation drive giving access to Kiggins Bowl during construction if needed.

During construction, fire engines should be able to enter and exit Station 86 at 37th and Main either through construction design or through operating procedures.

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9. Permits and Approvals

There are no federal, state, or local permits associated with public services.

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