

Washington State
Department of Transportation



City of
OLYMPIA

West Olympia Access Study

Prepared by

Washington State Department of Transportation
Olympic Region
5720 Capitol Boulevard
Tumwater, WA 98501

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What is the West Olympia Access Study?

Mounting traffic congestion on Olympia's west side raises concerns about how to maintain mobility in the future. City and state infrastructure are showing the strain of sustained residential and economic growth. Nowhere is this more evident than at the intersection of Black Lake Boulevard and Cooper Point Road, and the adjacent Black Lake / US 101 interchange. Traffic delays during the p.m. peak period are approaching unacceptable levels. A strategy is needed to ensure future mobility can be maintained.

The City of Olympia and the Washington State Department of Transportation (WSDOT) partnered on the West Olympia Access Study to determine what system changes are needed to preserve future mobility. The West Olympia Access Study (WOAS) was initiated with the purpose of evaluating current and future mobility concerns on Olympia's west side, and identifying a strategy for improving access and circulation. The partnership recognized that both agencies have a vested interest in addressing mobility concerns on Olympia's west side.

The core study team included staff representatives from the City of Olympia, WSDOT, Thurston Regional Planning Council (TRPC), and the consulting firm Parametrix. This core team worked closely with representatives from the WSDOT Headquarters and the Federal Highway Administration (FHWA) to get conceptual approval of the technical process to be employed in evaluating traffic issues and opportunities.

Purpose for Action

The purpose of the West Olympia Access Study is to evaluate current and future mobility concerns on Olympia's west side and to identify a range of measures to address mobility and improving access and circulation.

Need for Action

This study has been identified in the WSDOT Highway System Plan (HSP) 2003-2022 as well as the current HSP 2007-2026 as a need for a conceptual planning study. In addition the City of Olympia Comprehensive Plan identifies the need for additional access to West Olympia from US 101.

There is growing concern within the community about congestion on both the local and state networks. Mounting congestion raises questions about the best ways to accommodate growth while maintaining safe and acceptable levels of mobility.

The existing transportation network in West Olympia, which encompasses the Black Lake and Crosby Boulevard/Cooper Point Road interchanges and Cooper Point/Black Lake Boulevard intersection, is inadequate to meet growing demand based on forecasts. A primary indicator of this west side congestion is the Black Lake Boulevard/Cooper Point Road intersection, where delay often impacts vehicle trips, including emergency responders who must access Capital Medical Center. The 2025 Regional Transportation Plan indicates that even with efficiency measures, the Cooper Point Road/Black Lake Boulevard intersection will fail within the next 20 years. This would cause undesirable delays and would also adversely impact nearby roads and intersections, including US 101 interchange operations.

Short weave sections, frequent lane change maneuvers, and steep grades in some areas currently cause congestion along US 101 in the West Olympia vicinity during peak periods. Substantial traffic volume increases on US 101 and Interstate 5 (I-5) are expected to worsen poor operating conditions in the year 2030. In 2030, 14 sections of US 101 and I-5 are expected to experience heavy traffic congestion and unacceptable level of service (LOS) E and LOS F conditions.

In addition to US 101 and I-5 mainline challenges, the local transportation systems in West Olympia and Tumwater are also forecasted to substantially degrade and experience long delays and queues in the year 2030. Of particular concern are the Black Lake Boulevard Single Point Urban Interchange (SPUI), Black Lake Boulevard SW/Cooper Point Road SW intersection, and the Cooper Point Road SW/Top Foods Driveway intersection. The traffic demand at these locations is estimated to substantially exceed capacity and the resulting queues are expected to create bottleneck traffic congestion along eastbound US 101 from the Black Lake off-ramp to west of the Evergreen Parkway interchange.

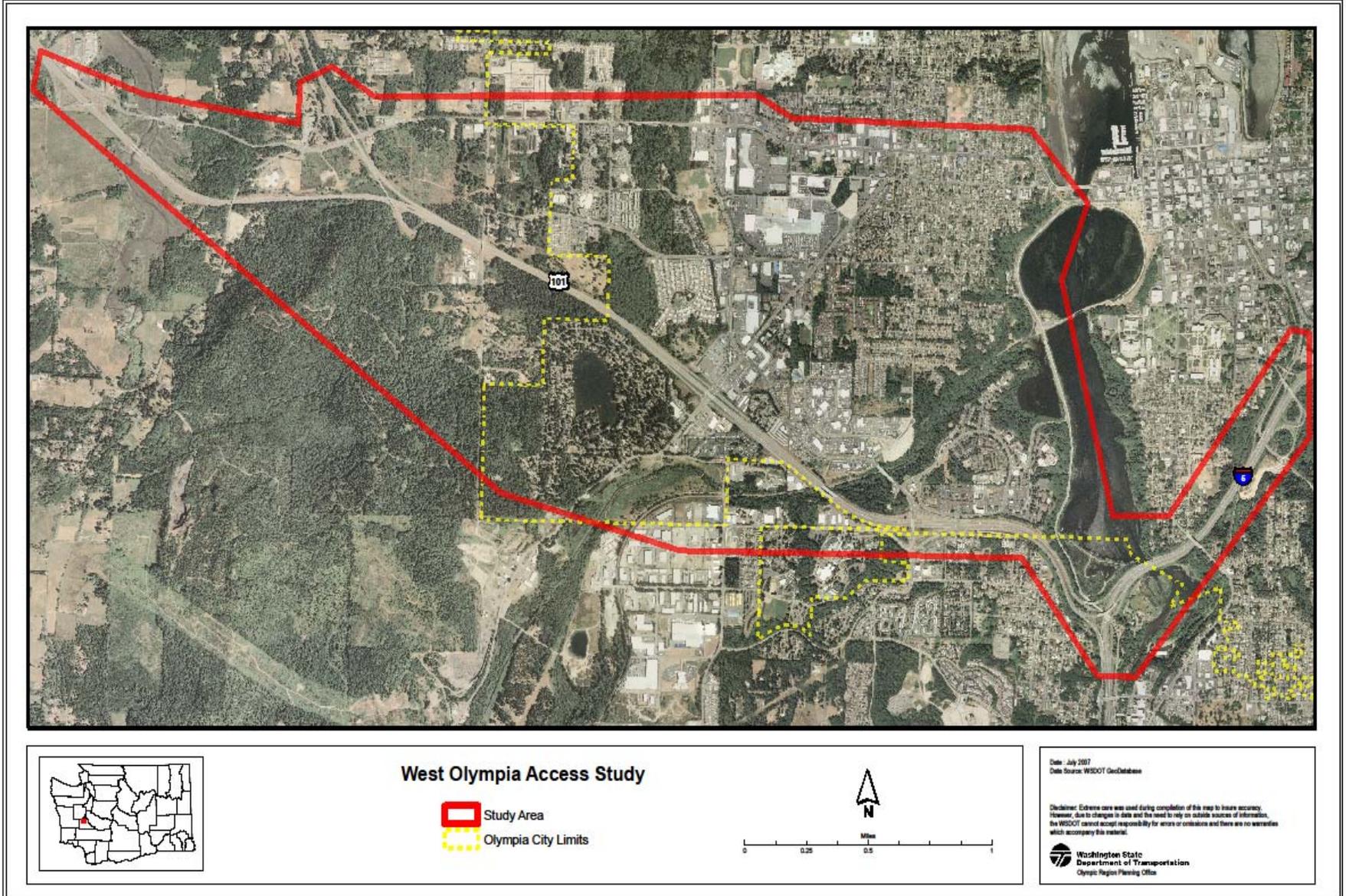
Study Area

The study area, as shown in Figure S-1, extends from the Mud Bay Road (MP 362.83) interchange on the US 101 corridor to I-5 (MP 367.41) and includes arterials in Olympia north and south of US 101. The study boundaries are Mud Bay Road/Harrison Avenue along Deschutes Parkway to the vicinity of I-5 at the Henderson Boulevard/City Center Interchange (MP 105.07) to the north; Mottman Road to the vicinity of I-5 milepost 104 to the south; Mud Bay Road/US 101 interchange to the west; and Capitol Boulevard to the east.

The West Olympia Access Study area can be broadly categorized from a traffic operations perspective as two systems: freeway corridors (I-5 and US 101) and the local transportation system in the cities of Olympia and Tumwater. The study area along the I-5 corridor is approximately 2.81 miles long and includes interchanges with US 101 and the southern half of the City Center interchange. The portion of the US 101 corridor within the study area is approximately 4.82 miles long and spans four interchanges, including Mud Bay Road, Evergreen Parkway, Black Lake Boulevard, and Crosby Boulevard/Cooper Point. The study area for the local transportation system is in the cities of Olympia and Tumwater and is located to the north and south of US 101.

The US 101 corridor serves as the major east-west corridor through Olympia, and has three interchanges that directly serve this community. US 101 predominantly serves regional travel demand and connects the Olympic Peninsula to major activity centers on the east side of Puget Sound and provides access to I-5, the major north-south freeway, interstate travel through Washington and provides connections between some of the largest cities in the Puget Sound region. Access to the West Olympia area is primarily provided through three main intersections: Cooper Point Road at Black Lake Boulevard; the roundabout at Harrison Avenue and West Bay Drive; and the intersection of Evergreen Parkway at Mud Bay Road (Harrison Avenue).

Figure S-1



How were the proposed Improvements Selected?

Existing and Projected Traffic Conditions

The 2030 Thurston Regional Planning Council (TRPC) travel demand model was used to develop traffic volume forecasts for the 2030 design year. The 2030 WOAS model included all transportation improvement projects adopted in the Regional Transportation Plan (RTP) for which funds have been secured. The transportation improvement projects assumed for the 2030 design year are shown in the table below.

Project Name	Project Description
4th/5th Avenue Corridor Bridge Project	Project is completed
Harrison Avenue Widening, Phase II	Widen from 2 lanes to 4/5 lanes from Yauger Way to Kaiser Road
Evergreen Parkway Repair and Upgrade	Reduce number of lanes on Evergreen Parkway from 4 lanes to 2 lanes from 17th Avenue to Kaiser Road
College Station Connection	Connection from Mud Bay to Kaiser Road
Harrison Avenue/Kaiser Road Signal	Add a signal to the Harrison Avenue/Kaiser Road intersection and widen Harrison Avenue to five lanes for 300' of either side of the intersection

The TRPC EMME/2 travel demand model information was transferred to VISUM to evaluate the West Olympia sub-area. The EMME/2 travel demand model provided a travel demand matrix output that was assigned to the VISUM subarea model. Further VISUM model assumptions, calibration, and validation results are documented in the *West Olympia Access Study Model Documentation* (PTV America 2007).

To analyze traffic operations for existing and design conditions VISSIM was used to simulate freeway operations along the I-5 and US 101 corridors, including all mainline basic segments, ramps, interchanges, weave sections, and freeway connections and SYNCHRO was used for city streets and freeway ramp terminals to determine level of service.

Screening Process

The West Olympia Access Study adopted a planning level approach whereby solutions or concepts are gradually screened down. Improvement options considered range from local road improvements and/or highway access modifications, to Travel Demand Management (TDM) strategies. The planning approach included conducting a broad public outreach to address neighborhood and public issues in the area and get informed consent for the study.

The first step of the initial screening process included reviewing input received during the preceding public outreach efforts, which included interviews with local jurisdictions and resource agencies and conducting a fatal flaw analysis. The purpose of the fatal flaw analysis was to eliminate the options that did not meet the objectives of the study.

On August 14, 2007 the stakeholder group met to identify the initial set of improvements, including low cost TSM/TDM options to be analyzed. Options were evaluated based on planning level estimates, qualitative technical review and other available information. The initial screening was conducted at a broad, non-quantitative level to rate each option from most impacts (worst) to least impacts (best).

Based on the preliminary screening process, options that were selected for further consideration were packaged into scenarios to assess their effectiveness as a system. A more detailed traffic evaluation of the scenarios was conducted in the second screening process. This analysis focused on reviewing traffic changes and identifying whether the scenarios would relieve traffic congestion at failing intersections and congested freeway locations.

Improvement Scenarios

The result of the screening process effort eliminated potential improvement options with fatal flaws and identified a set of reasonable scenarios to be carried forward for further consideration.

No Build Scenario — The No Build Scenario was developed to provide a baseline with which to compare all of the other scenarios; it was not intended to depict a likely future scenario. The No Build scenario assumed that no additional funding would be available for any transportation projects on the west side except for those that are currently funded and are scheduled to be built.

Build Scenarios — The ‘build’ scenarios all assumed some additional level of investment in transportation facilities by 2030. The scenarios were basically identified as; Local Only; Black Lake Interchange; and Evergreen Parkway Interchange.

Local Only — This scenario focus on changes to the local transportation system only and did not modify highway access. Improvements included additional turn lanes at intersections, new street connections, signalization, street widening, etc.

Black Lake Interchange — Black Lake interchange would be modified with an additional lane diverging from the westbound off-ramp that connects to Yauger Way SW, and another lane from Yauger Way SW would connect to the existing eastbound on-ramp prior to merging with the US 101 mainline. The Black Lake interchange scenario includes local system improvements, which consist of additional turn lanes at selected intersections, signalization, and the widening of Black Lake Boulevard SW to three lanes from the Black Lake Single Point Urban Interchange (SPUI) to Black Lake Belmore Road.

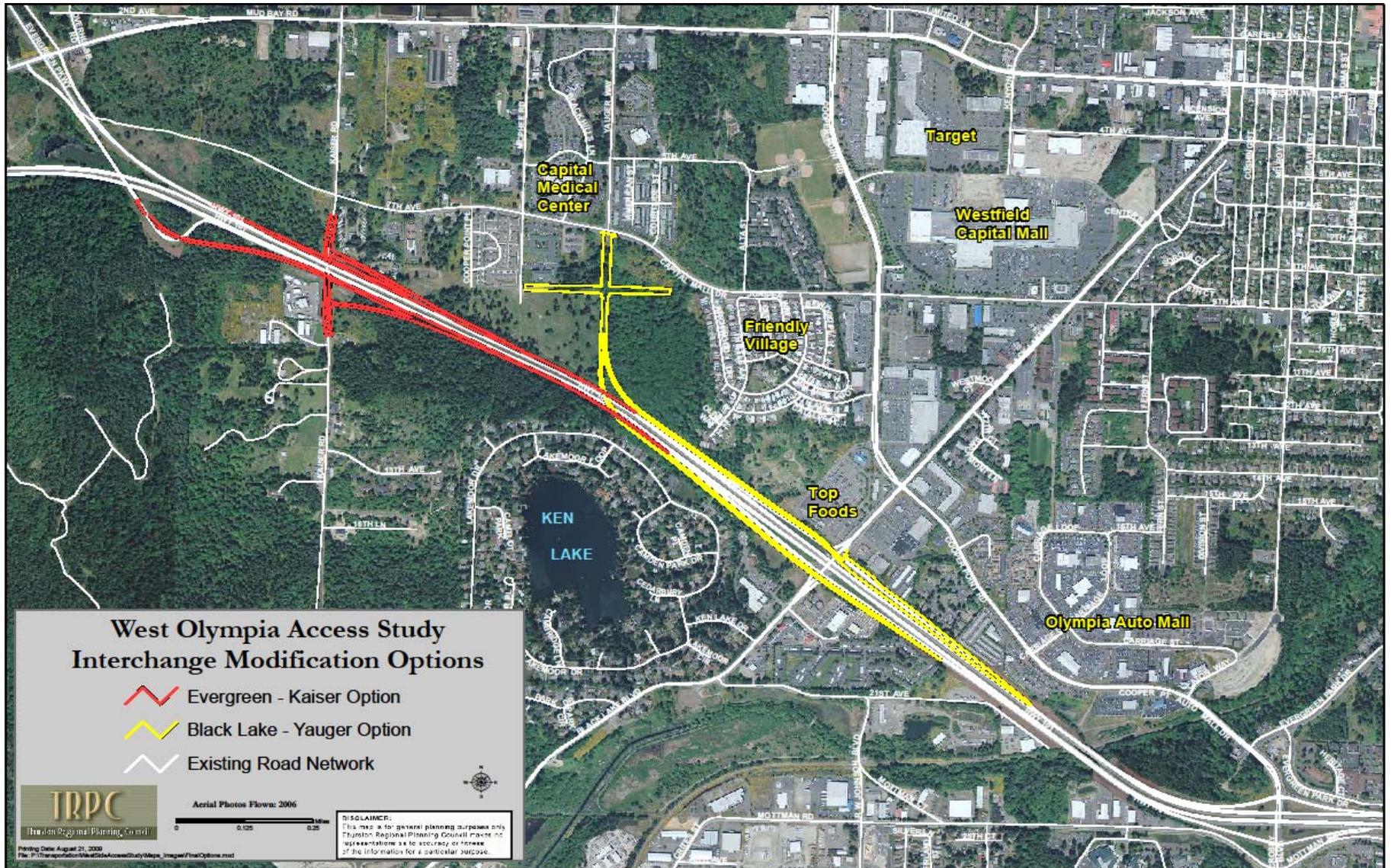
Evergreen Parkway Interchange — Evergreen Parkway interchange would primarily consist of adding an eastbound off-ramp and a westbound on-ramp, which would provide full access to and from all directions of travel at the Evergreen interchange. The existing eastbound on-ramp and westbound off-ramp would also be re-aligned to provide an at-grade connection with Kaiser Road SW prior to merging/after diverging from the US 101 mainline. The Evergreen Parkway Interchange assumed all of the local system improvements common to the build scenarios as well as a new east-west connection between Yauger Way SW to the vicinity of Top Foods (Cooper Point Road SW).

Analysis and Findings

During the analysis of the Build Scenarios it was determined that the Local System Only Scenario impacts were substantially higher than other build scenarios. Analysis indicated there is no traffic volume reduction at the highly congested US 101/Black Lake Boulevard SPUI and Black Lake Boulevard/Cooper Point Road intersections. With feasible improvements only, several intersections operate at unacceptable LOS E or F conditions with high delay at US 101/Black Lake Boulevard SPUI, Black Lake Boulevard/Cooper Point Road as well as three to four other intersections. In addition there is no accessibility or travel time benefit to Capital Medical Center and other key locations compared to other build scenarios.

Based on this evaluation a recommendation to eliminate the Local System Only Scenario from further consideration was presented to the Stakeholder Group on September 29, 2008. At which time the group agreed the surface street improvements evaluated will not accommodate future traffic demand in the study area.

Figure S-2

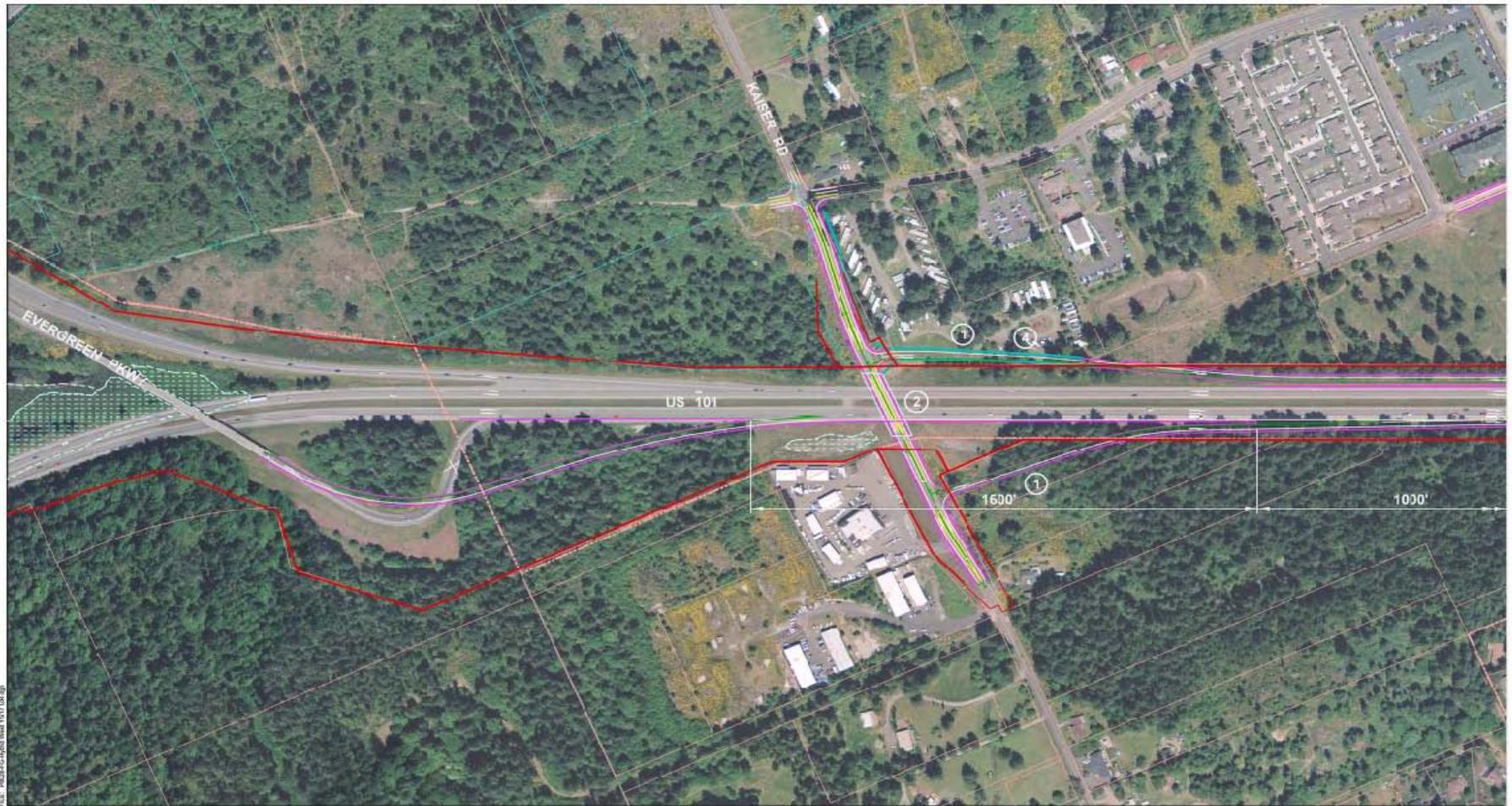


However, analysis showed that both the Black Lake and Evergreen interchange scenarios had merit and could potentially address future mobility issues facing the west side. Differences between the two were minor enough to render both of them as feasible options warranting further consideration. Further evaluation of the Black Lake and Evergreen interchange scenarios were conducted in an effort to identify a single preferred alternative to move forward into the Interchange Justification Report (IJR) process.

During the evaluation the City of Olympia proposed an additional interchange improvement to consider, the Hybrid Interchange alternative, and expressed a desire to conduct an evaluation of the additional interchange improvement. This improvement alternative is a hybrid of the Black Lake and Evergreen Interchange improvements (Figures S-3 and S-4). Similar to the Black Lake interchange scenarios, a second ramp would be constructed that diverges from the existing Black Lake westbound off-ramp and would connect to Yauger Way SW. Unlike the Black Lake interchange scenarios, this new ramp would continue westbound and terminate at Kaiser Road. For the eastbound direction of US 101, an additional eastbound on-ramp from Kaiser Road would be constructed downstream of the existing on-ramp from Evergreen, which would also be straightened and connect to US 101 further east of its current location. As with the Black Lake Interchange and Evergreen Parkway Interchange scenarios the Hybrid alternative also includes local system improvements.

Table S-1 provides a brief description and summary of the impacts for all interchange scenarios with respect to the evaluation criteria. The advantages and disadvantages of these interchanges identified in the table were quantified according to a scoring system as agreed to by the Stakeholder Group.

Figure S-3



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West Olympia Access Study
EB: On-ramps from Evergreen Pkwy and Kaiser Rd
WB: C/D Braid Over Black Lake Blvd Interchange Ramps
C/D Off-ramps to Kaiser Rd and Younger Way

Hybrid Interchange (West)

Figure S-4



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West Olympia Access Study
 EB: On-ramps from Evergreen Pkwy and Kaiser Rd
 WB: C/D Braid Over Black Lake Blvd Interchange Ramps
 C/D Off-ramps to Kaiser Rd and Yauger Way

Hybrid Interchange (East)

Table S-1

Criteria	Element	Black Lake Interchange	Evergreen Interchange	Hybrid Interchange
1. Built Environmental Impacts	<i>Disruptions and Displacements</i>	<ul style="list-style-type: none"> No displacements No disruptions of access identified 	<ul style="list-style-type: none"> Potential relocation of 3 mobile homes Potential disruption of access to residential and commercial properties in the US 101/Kaiser interchange area 	<ul style="list-style-type: none"> Potential relocation of 3 mobile homes Potential disruption of access to residential and commercial properties in the US 101/Kaiser interchange area
	<i>Right-of-Way</i>	<ul style="list-style-type: none"> Less right-of-way acquisition (147,000 SF) Impacts to platted developments and existing commercial developments (15,700 SF) 	<ul style="list-style-type: none"> More right-of-way acquisition (240,000 SF) No impacts to platted developments or existing commercial developments 	<ul style="list-style-type: none"> More right-of-way acquisition (310,000 SF) No impacts to platted developments or existing commercial developments
2. Natural Environmental Impacts	<i>Wetlands/Shorelines</i>	<ul style="list-style-type: none"> Slightly less wetland and buffer impacts (1.7 acres) 	<ul style="list-style-type: none"> Slightly more wetland and buffer impacts (2.5 acres) 	<ul style="list-style-type: none"> Slightly more wetland and buffer impacts (2.1 acres)
	<i>Water Resources (Stormwater)</i>	<ul style="list-style-type: none"> Less water resource impacts based on proximity to Allison Springs (11.7 acres) Slightly more impervious surface (8 acres) 	<ul style="list-style-type: none"> More water resource impacts based on proximity to Allison Springs (21.4 acres) Slightly less impervious surface (7 acres) 	<ul style="list-style-type: none"> More water resource impacts based on proximity to Allison Springs (30.8 acres) Slightly less impervious surface (14.2 acres)
3. Constructability	<i>Constructability</i>	<ul style="list-style-type: none"> Most difficult to construct: periodic and major disruptions to traffic during construction Most bridge structures and retaining wall required 	<ul style="list-style-type: none"> Least difficult to construct: periodic disruptions to traffic during construction, can be built mostly outside of roadway Least bridge structures and less retaining wall required 	<ul style="list-style-type: none"> Moderately difficult to construct: periodic disruptions to traffic during construction, can be built mostly outside of roadway Fewer bridge structures and less retaining wall required
	<i>Probable Construction Cost</i>	<ul style="list-style-type: none"> Higher estimated construction cost (\$86M) 	<ul style="list-style-type: none"> Lower estimated construction cost (\$34M) 	<ul style="list-style-type: none"> Lower estimated construction cost (\$85M)
4. Safety	<i>Compatibility with Freeway Safety</i>	<ul style="list-style-type: none"> Slightly better than Evergreen operations Does not affect interchange spacing 	<ul style="list-style-type: none"> Essentially worse operations than Black Lake and Hybrid Shortens interchange spacing in both directions 	<ul style="list-style-type: none"> Slightly better than Evergreen operations Shortens interchange spacing in one direction
	<i>Compatibility with Local Street Safety</i>	<ul style="list-style-type: none"> Essentially equal with other scenarios 	<ul style="list-style-type: none"> Essentially equal with other scenarios 	<ul style="list-style-type: none"> Essentially equal with other scenarios
	<i>Ability to Meet Design Standards</i>	<ul style="list-style-type: none"> Potential design deviation and more design issues 	<ul style="list-style-type: none"> No design deviations identified and fewer design issues 	<ul style="list-style-type: none"> Potential design deviation and more design issues
5. Transportation Benefits	<i>VMT and VHT</i>	<ul style="list-style-type: none"> Slightly less VMT and VHT 	<ul style="list-style-type: none"> Slightly more VMT and VHT 	<ul style="list-style-type: none"> Slightly less VMT and VHT
	<i>Compatibility with Freeway Operations</i>	<ul style="list-style-type: none"> Slightly better at key locations 	<ul style="list-style-type: none"> Slightly worse at key locations 	<ul style="list-style-type: none"> Slightly worse at key locations
	<i>Compatibility with Local System Operations</i>	<ul style="list-style-type: none"> Essentially equal with other scenarios at key intersections 0 intersections operating at LOS F at key locations 4 new turn pockets at key locations ("Triangle" intersections and coordinated system) 	<ul style="list-style-type: none"> Essentially equal with other scenarios at key intersections 1 intersections operating at LOS F at key locations 4 new turn pockets at key locations ("Triangle" intersections and coordinated system) 	<ul style="list-style-type: none"> Essentially equal with other scenarios at key intersections 0 intersections operating at LOS F at key locations 4 new turn pockets at key locations ("Triangle" intersections and coordinated system)

What Conclusions were Reached?

Based on the analysis conducted, screening process results, and extensive coordination efforts by the Study Team the following recommendations were presented to Stakeholder Group on May 19, 2010.

- Eliminate the stand-alone Black Lake interchange alternative from further consideration; this recommendation is based on the high eastbound on-ramp traffic volume with a short weave section, high construction costs, and impacts to the Ken Lake neighborhood (e.g., aesthetic and noise).
- Advance the Hybrid interchange alternative into the next phase of project development, which includes; completion of the Interchange Justification Report (IJR) process (Engineering and Operational Acceptability); completion of the necessary environmental documentation to comply with the National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA); and obtain final IJR approval in order to commence preliminary engineering.

In addition it was recommended to phase the Hybrid interchange during the next phase of work effort. By using a phased approach for the Hybrid interchange it does not cost any more to complete the IJR than just moving forward with the Evergreen Parkway-Kaiser. Phasing of the Hybrid interchange could consist of:

- Phase 1 – Kaiser on- and off-ramps – would provide a cost-effective and timely solution to current and future access and circulation needs, and serve existing land use and planned future land uses. These ramps are recommended to be the first phase of this long-term project because it provides both on- and off-ramps to US 101 as compared to Yauger Way, which would only provide an off-ramp.
- Phase 2 – Westbound Yauger Way off-ramp – would allow even greater distribution of traffic serving both current commercial and future uses, as growth occurs as planned; further alleviate growing traffic volumes at the intersection of Black Lake Boulevard and Cooper Point Road; and potentially provide access and circulation to the proposed development land use changes for Friendly Village.
- Phase 3 – Evergreen eastbound on-ramp re-alignment – would be an independent project that consists of improving the ramp design speed and geometry, could be constructed at any time depending on funding availability. The planning level cost estimate for the re-alignment is approximately \$8,500,000.

At that meeting the Stakeholder Group agreed to the recommendations as presented by the Study Team.

How will Improvements be Implemented?

Next Steps

This feasibility study has demonstrated improvements to surface streets are not sufficient to mitigate 2030 congestion. The study further demonstrated improvements to existing interchanges would reasonably mitigate 2030 congestion and improve access to the Westside. The study concludes it is warranted to advance the Hybrid interchange alternative further to the Interchange Justification Report (IJR) stage. Study during preparation of the IJR will analyze the recommended solution presented in this report in more detail to determine which improvements should advance to the design phase.

Due to the need to secure additional funding and conduct further analysis it is estimated that the identified improvements would be implemented over a time frame of 10 to 15 years. The next step in the process is to complete an environmental analysis along with completing the IJR process, to satisfy both state and federal requirements. Once the IJR is approved, further design of the improvements can occur.

The following steps are needed to implement the proposed improvements:

- Step 1: Update Regional Plans and State Highway System Plan (HSP)
- Step 2: Complete the Interchange Justification Report (IJR) process (Engineering and Operational Acceptability)
- Step 3: Complete environmental documentation to comply with the National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA), and obtain final IJR approval
- Step 4: Prepare Final Design, complete preliminary engineering and right-of-way acquisition (if needed)
- Step 5: Construct approved improvements

Description of Technical Memorandums and Background Reports

This report is a compilation of technical memoranda and background reports that were developed to inform and document the West Olympia Access Study. The following is a description of those documents:

West Olympia Access Study Traffic Assumptions - This section details the approach, assumptions, and criteria, such as traffic volumes, design year, opening date, travel demand assumptions, baseline conditions, and design year conditions modeling tools to be used, and facilities to be evaluated.

Technical Memorandum #1 Evaluation Methods and Screening - This section details the evaluation and screening process used as well as addresses the initial work performed to develop the improvement options for the West Olympia Access Study

Technical Memorandum #2 Existing 2007 and Year 2030 No-Build - This section details the freeway and local traffic analysis process and results for the West Olympia Access Study. This documentation includes a discussion on existing local and freeway road characteristics, data collection and methodology, micro-simulation model calibration and validation, and existing 2007 and future year 2030 No-Build traffic conditions.

Technical Memorandum #3 Traffic Analysis - This section details the freeway and local traffic operational analyses for the West Olympia Access Study build scenarios. This documentation includes a review of the existing local and freeway road characteristics, data collection and methodology, micro-simulation model calibration and validation, and existing 2007 traffic conditions as noted in Technical Memorandum 2. It also contains a discussion of the resulting traffic analysis for the future year 2030 No-Build and Build scenarios traffic conditions and operations.

Technical Memorandum #4 Alternative Screening Evaluation and Concept Design - This section details the evaluation that builds on the conclusions and recommendations of the previous traffic operations analyses and evaluates the Black Lake, Evergreen, and Hybrid interchange improvement scenarios with respect to other factors, that should be taken into consideration during the decision-making process. It also provides study recommendations.

Synopsis of Previous Plans Associated With the Study Area - This section provides a synthesis of all known plans and studies that may have bearing on the study area or which resulted in decisions that the study needed to accommodate.

Project Background Reports - These four background reports provide an overview of existing characteristics and conditions associated with West Olympia:

Background Report #1 – Significant Transportation and Land Use Events - This section provides a historical insight into the three “gateway intersections” of the West Olympia Access Study area: Harrison Avenue at 4th Avenue; Cooper Point Road at Black Lake Boulevard; and Evergreen Parkway at Mud Bay Road. These three intersections evolved over time as a result of transportation and land use decisions over the last several decades.

Background Report #2 – Transportation Characteristics - This section provides an overview of the local transportation and freeway systems within the West Olympia Access Study area, such as street and highway classifications, public transportation, non-motorized facilities, and traffic conditions.

Background Report #3 – Land Use and Environment Characteristics - This section provides an overview of the existing baseline conditions of the natural environment (critical areas) and built environment (land use and zoning) within the West Olympia Access Study area.

Background Report #4 – Social and Economic Characteristics - This section provides an overview of demographics and economic characteristics (employment, businesses, etc.) within the West Olympia Access Study area