

West Olympia Access Study

Traffic Analysis Assumptions

Prepared for

Washington State Department of Transportation
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CITATION

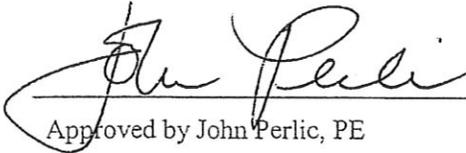
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CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.



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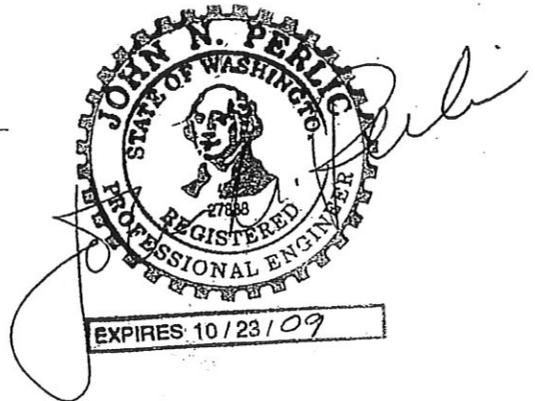


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ACRONYMS

FHWA	Federal Highway Administration
IJR	Interchange Justification Report
LOS	level of service
PHF	peak hour factor
RTP	Regional Transportation Plan
TDM	travel demand management
TRPC	Thurston Regional Planning Council
v/c	volume/capacity
WOAS	West Olympia Access Study
WSDOT	Washington State Department of Transportation

STAKEHOLDER ACCEPTANCE

The undersigned parties concur with the Traffic Analysis Assumptions for the West Olympia Access and Circulation Project that are presented in this document.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND AND DESCRIPTION

The City of Olympia's westside is bound by Budd and Eld Inlets to the north and west, by West Bay and Capitol Lake to the east, and by the City of Tumwater to the south. West Olympia is currently home to almost 24,000 people and 17,000 jobs. The City of Olympia and Thurston County Comprehensive Plans identify increases in commercial and residential development in this area in accordance with the Washington State Growth Management Act. The expected future growth in this area is anticipated to further strain mobility to and from West Olympia on both the freeway and local street network.

Two major freeways provide regional access to and from West Olympia. The US 101 corridor serves as the major east-west corridor through Olympia, and has three interchanges that directly serve this community. US 101 also provides access to I-5, the major north-south freeway, just east of West Olympia. 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).

The West Olympia Access Study (WOAS) is a joint project among the Washington State Department of Transportation (WSDOT) Headquarters office, Olympic Region and the City of Olympia. WSDOT and the City of Olympia are co-lead agencies on this project partnering with the Thurston Regional Planning Council (TRPC). The study will consist of public outreach activities, conducting and documenting transportation needs and options analysis, and recommending future transportation improvements and strategies.

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 strategy for improving access and circulation. During the study process, the project team intends to identify a range of improvement options, developed through input from the project team and the public. After an initial qualitative screening process, the traffic team will identify several feasible alternatives for more in depth analysis, and develop a list of recommended future options. The purpose of this report is to obtain agency concurrence on several key project assumptions including: the project study area; traffic forecasting and analysis methodology; and future roadway improvements that will be assumed in future analysis years 2010 and 2030.

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2. PROJECT STUDY AREA

The study area, as shown in Figure 2-1, 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.

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3. ANALYSIS METHODOLOGY / MODELING

3.1 SHORT-TERM ANALYSIS YEAR AND DESIGN YEAR

The assumed short-term analysis year will be 2010. The existing TRPC regional travel demand model land use assumptions as well as any roadway or intersection improvements that are expected to be completed by 2010 will be included in the traffic analysis. This study will evaluate only those future land use assumptions identified in Olympia’s adopted Comprehensive Plan and will not consider alternative land use concepts.

The design year, 2030, is consistent with the regional strategic planning horizon and environmental documentation. It is approximately 20 years past the short-term analysis year and is the forecast year for the recently updated Thurston Regional Transportation Plan (RTP). The RTP contains employment, and population forecasts for 2030 as well as regionally-significant transportation projects and programs for the entire region. This plan, as adopted by TRPC in June 2004, was amended to include a forecast horizon of 2030. Adoption of this most recent RTP amendment occurred in June 2007.

3.2 TRAVEL DEMAND MODEL ASSUMPTIONS AND FORECASTS

The 2030 TRPC travel demand model will be used to develop no build traffic volume forecasts for 2010 (short-term analysis year) and 2030 (design year). The 2030 TRPC model includes a base year model of 2005 from which the 2010 analysis model will be developed. The 2010 and 2030 WOAS models include all transportation improvement projects adopted in the RTP for which funds have been secured. The transportation improvement projects assumed for the 2010 short-term analysis year and 2030 design year scenarios are shown in Table 3-1. This table provides a brief description of the network assumptions for each project. Future no build scenarios will not include any representation of network elements that are currently being contemplated as study options, or for which construction funds have not yet been secured. In particular, any new or modified ramps at Yauger Way and US 101, or any additions or changes to connections between southwest Olympia and west Tumwater will not be included in the no build networks. These planned long-range projects are not included in the 2010 or 2030 No Build network, but may be evaluated as part of the build options.

Table 3-1. Projects Included in the 2010 and 2030 No Build Networks

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 has been transferred to VISUM to evaluate the West Olympia sub-area. The EMME/2 travel demand model will provide travel demand matrix output that will be 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)

3.3 FREEWAY OPERATIONS ANALYSIS

The project requires a simulation model capable of analyzing freeway and interchange modifications based on methodologies in the Highway Capacity Manual (HCM) 2000 including weaving sections, and complex intersection geometries (single point urban interchanges and roundabouts). The simulation model is needed to evaluate possible new or modified interchanges along US 101 within the study area. VISSIM was selected for the simulation of the study area because it meets these needs while also providing animation graphics for use in public meetings and workshops. The Federal Highway Administration (FHWA) report "Guidelines for Applying Traffic Microsimulation Modeling Software" will be used to develop and calibrate the VISSIM model

Using the VISUM travel demand model as a source for future forecast volumes and origin/destination patterns, a VISSIM micro-simulation model will be developed to analyze ramp and mainline sections along US 101 from the Mud Bay interchange to I-5 and along I-5 between the City Center interchange and the Deschutes Parkway/2nd Avenue ramps. The model will also include or highlight the following:

- Weave analysis between the I-5/US 101 interchange and the I-5/City Center interchange to the north, and I-5/Deschutes Parkway/2nd Avenue ramps to the south (Northbound and Southbound), including AM peak hour operations
- Merge/diverge operations at Crosby/Cooper interchange (first interchange west of I-5) and weave analysis between the I-5/US 101 and Crosby/Cooper interchanges
- Intersection operations at Crosby/Cooper interchange ramp terminals
- Intersection operations at Evergreen Parkway/Automall Drive/Cooper Point (immediately north of Crosby/Cooper interchange)
- Merge/diverge operations at Black Lake interchange (second US 101 interchange west of I-5) and weave analysis between the Black Lake and Crosby/Cooper interchanges
- Merge/diverge operations at Mud Bay interchange and weave analysis between the Evergreen Parkway and Mud Bay interchanges
- Intersection operations at Black Lake interchange ramp terminals (single point urban interchange)
- Intersection operations at Black Lake/Cooper Point (immediately north of Black Lake interchange). This intersection is also included in the Surface Street Intersection Operations Analysis scope of work using Synchro.

Operational modeling of the freeway corridor will be conducted after the initial alternative screening process, and only for the 2007 existing conditions, the 2010 and 2030 horizon years for the no build alternative, and up to two preferred alternatives for the 2010 and 2030 horizon years. The PM peak hour will be analyzed for each alternative and will include the areas in the bulleted list above. The AM peak hour will be analyzed only through the I-5/US

101 interchange area due to congested conditions and weaving movements between the City Center and US 101 interchanges.

The VISSIM modeling effort will maintain the same geometric and operational inputs used in the travel demand model and in the Synchro model being used for local intersection operations analysis. This includes, but is not limited to:

- Signal timing and phasing;
- Pedestrian conflicts;
- Heavy vehicle percentages (local percentages from available City of Olympia data or default values in Synchro, freeway percentages from the TRPC travel demand model or available data from WSDOT). Heavy vehicle percentages used in the 2010 short-term analysis year and 2030 design year analysis will be increased by 1% to 2% to reflect anticipated truck traffic growth.

The VISSIM modeling effort will supplement and validate the local surface street intersection analysis, including confirming the Synchro queuing analysis and providing corridor travel times, speeds and density. The model will also be used to develop two-dimensional animations highlighting the operational improvements or impacts of the various improvements.

3.4 SURFACE STREET INTERSECTION OPERATIONS ANALYSIS

The surface street intersection operations analysis will include interchange ramp terminals, adjacent arterial intersections and critical locations of interest. Currently, several of these intersections are operating poorly, and will most likely continue to degrade in the future. The surface street signalized intersections will be analyzed using the Synchro 7 software application while unsignalized intersections will be analyzed using Highway Capacity Software Version 5.2 (HCS+).

At locations where roundabouts are present or are going to be considered as an alternative option, the Sidra 3.2 model will be used to determine the delay characteristics at the roundabout location instead of Synchro.

The following intersections, selected by the project team and listed below will be analyzed for the PM peak hour only:

- Cooper Point Rd Automall Drive at Evergreen Park Drive
- Cooper Point Rd at Black Lake Blvd
- Cooper Point Rd at Capital Mall Blvd
- Cooper Point Rd at Harrison/Mud Bay
- Black Lake Blvd at 9th Ave/Capital Mall Drive
- Black Lake Blvd at Capital Mall entrance
- US 101/Black Lake Blvd ramp intersection
- Harrison Ave at Division St
- Harrison Ave at Kenyon St
- Harrison Ave at Yauger Way

- Harrison Ave at McPhee Road
- Harrison Ave at Kaiser Road
- Mud Bay Road at Evergreen Parkway
- Lakeridge Drive at Deschutes Parkway
- US 101/Crosby Blvd/Cooper Point Road ramp intersections
- Crosby Blvd at Mottman Road
- Crosby Blvd at Irving St
- Cooper Point Road at Top Foods Entrance
- Capital Mall Drive at Yauger Way

Results will be summarized into level of service (LOS) tables. Average intersection delay, intersection LOS, intersection volume/capacity (v/c) ratio, and 95th percentile queuing (compared to actual/effective storage) will be used as performance measures for all scenarios. Queuing results will be taken from Synchro HCM output tables and from Sidra 3.1 output.

All intersections will be analyzed using a peak one-hour analysis period. Up to 19 study area intersections for all options will also be analyzed using a two-hour system peak to provide information using the City of Olympia concurrency methodology. The City of Olympia will provide an adjustment factor for both the 2010 and 2030 analysis years to convert one-hour peak volumes to two-hour peak volumes.

Existing conditions analysis will be based on traffic volumes collected in the study area from 2005-2007. Heavy vehicle percentages used in the 2010 short-term analysis year and 2030 design year analysis will be increased from existing conditions by 1% to 2% to reflect anticipated truck traffic growth. Additional Synchro input assumptions include:

- 5 conflicting pedestrians per hour for each intersection approach in non-central business district (CBD) areas. If actual pedestrian count data is available, it will be used in lieu of these assumptions.
- Pedestrian crossing times at all intersections will be estimated at four feet per second times crosswalk length.
- An intersection peak hour factor (PHF) of 0.92 will be used as a default for the existing and 2010 base scenarios. At locations where the existing intersection peak hour factor is established through ground counts, the maximum (0.92 or the existing intersection PHF) will be used at that location for all 2010 base scenarios. For the year 2030, the default PHF will be increased to 0.95.

Other Synchro inputs, such as bus blockages and conflicting bicycles will not be initially coded into the model; however, may be added into the model at a later date if necessary.

3.5 ADDITIONAL ANALYSIS CONSIDERATIONS

In March 2006 the study group met with representatives from WSDOT and FHWA to obtain input on preparation of the study. It was agreed that impacts, such as traffic volume changes on I-5 resulting from WOAS scenarios – particularly at the I-5/City Center and US 101/I-5 interchanges – must be considered during the evaluation of options. The development of strategies to improve the operation of I-5 and associated interchanges will not be an element of the West Olympia Access Study; however, local street improvement impacts to state facilities will be identified and addressed. The study will also consider opportunities to

include travel demand management (TDM) strategies including facilities and programs, and measure the effectiveness of options to meet regional TDM goals and the level of impact in addressing capacity issues.

Options developed during the course of the study will be evaluated by many criteria, including how access is affected to the hospital and other medical facilities, major commercial and residential areas, and other major activity centers identified in existing and future land-use plan. The project team will screen a list of initial options against criteria such as accident reduction, natural environment impacts, community impacts, feasibility, multi-modal impacts, and traffic mobility. No individual criterion will be weighted higher than another criterion in this evaluation process. Information from the evaluation of options will be used by the project's technical committee in a consensus-based decision-making process to eliminate some options from further consideration, and advance others for more detailed analysis.

3.6 DESIGN CONSIDERATIONS

Full WSDOT standards will be followed as the basis for any improvements or new access to state facilities per the WSDOT Design Manual.

If an added access point (interchange, ramp, or connection to the state system) or modification to an existing access point is proposed as the preferred alternative, a Finding of Engineering and Operational Acceptability of an Interchange Justification Report (IJR) will be developed. As required by the IJR process, one of the options that will be considered is improvements to the City arterial street network with no state action (i.e., without new access to US 101). If an access point is selected as the preferred option, HCS+ will be used to validate the VISSIM freeway analysis conducted as part of this feasibility study.

3.7 ENVIRONMENTAL CONSIDERATIONS

Environmental impact analysis of considered options will be made at a conceptual level using existing documentation and data. The need to conduct any SEPA documentation will be re-examined at a milestone point prior to the completion of the study as determined by the study partners.