West Olympia Access Study

Background Report #2

Transportation Characteristics

City of Olympia
Washington State Department of Transportation

Prepared by
Thurston Regional Planning Council
The West Olympia Access Study is a partnership project between the City of Olympia and the Washington State Department of Transportation. It is funded by City of Olympia funds and a WSDOT Transportation Partnership Project earmark.

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Cover Photo: 1954-56 construction of the I-5 / US 101 interchange (WSDOT Archives)
# Table of Contents

WEST OLYMPIA ACCESS STUDY BACKGROUND REPORTS

**Introduction** ........................................................................................................................................... v

**BACKGROUND REPORT #2 – TRANSPORTATION CHARACTERISTICS**

**Overview** .................................................................................................................................................. 1

Transportation Context ................................................................................................................................. 1

Historical Context ......................................................................................................................................... 2

The Interstate Highway Era ........................................................................................................................... 3

Changes in Land Use ....................................................................................................................................... 4

**Local Transportation System** .................................................................................................................... 5

**Physical Elements** ..................................................................................................................................... 5

Streets, Sidewalks, and Bike Lanes ................................................................................................................. 5

Street Connectivity .......................................................................................................................................... 12

Public Transportation .................................................................................................................................... 13

Intercity Transit ............................................................................................................................................... 13

Other Public Transportation Service ............................................................................................................ 15

Shared-Use Trails .......................................................................................................................................... 15

Travel Demand Management .......................................................................................................................... 17

Parking Pricing .............................................................................................................................................. 17

Commute Trip Reduction ............................................................................................................................... 17

**Local Network Travel Conditions** ............................................................................................................. 18

Vehicular Congestion ...................................................................................................................................... 18

Operational Inefficiencies ............................................................................................................................... 18

Measuring Congestion .................................................................................................................................. 18

Strategy Corridors ......................................................................................................................................... 20

Concurrency ................................................................................................................................................... 20

Congestion Impacts ....................................................................................................................................... 22

Non-Motorized Travel Considerations ........................................................................................................... 22

Safety ............................................................................................................................................................. 24
Planned Transportation Projects ............................................................................. 26
Short-Range Projects ......................................................................................... 25
Long-Range Projects ......................................................................................... 25

State Transportation System ............................................................................. 29

Highway Classifications ..................................................................................... 27
US 101 Classifications ......................................................................................... 27
National Highway System ................................................................................... 27
Freight and Goods System .................................................................................. 28
Highway of Statewide Significance .................................................................... 28
Functional Classification .................................................................................... 28
Access Classification ........................................................................................... 28
Washington State Scenic Byway ......................................................................... 29

Travel Conditions on State Highway System ..................................................... 29
Congestion ........................................................................................................ 29
Safety ................................................................................................................. 33
Collision Rates ................................................................................................... 31
High Collision Locations and Corridors ............................................................... 31

List of Figures:
Figure 1 – Study Area Boundary – West Olympia Access Study ....................... vi
Figure 2 – Map of WOAS Study Area ................................................................ 2
Figure 3 – 1954-56 Construction of I-5 Over Capitol Lake .................................. 3
Figure 4 – Capitol Auto Mall – 1990 ................................................................. 4
Figure 5 – City of Olympia Arterial Street Standards ......................................... 6
Figure 6 – Photo of Arterial with Mid-Block Pedestrian Crossing ....................... 6
Figure 7 – City of Olympia Major Collector Street Standards ............................ 7
Figure 8 – Photo of Major Collector ................................................................. 7
Figure 9 – City of Olympia Neighborhood Collector Street Standards ............... 8
Figure 10 – Photo of Neighborhood Collector .................................................... 8
Figure 11 – City of Olympia Local Access Street Standards .............................. 9
List of Figures:

Figure 12 – Photo of Local Access Street ................................................................. 9
Figure 13 – Map of Local Street Classification within the WOAS Study Area ............... 11
Figure 14 – Comparison of Dense and Sparse Street Connectivity ................................ 12
Figure 15 – Intercity Transit Bus at Transit Stop ...................................................... 13
Figure 16 – Map of Intercity Transit Routes in WOAS Study Area ............................ 14
Figure 17 – McLane School Forest Trail ................................................................. 15
Figure 18 – Map of Regional Trails Plan Off-Street Recommendations, WOAS Study Area .... 16
Figure 19 – Example of Off-Peak Intersection Delay ............................................. 19
Figure 20 – Map of Olympia’s Roadway LOS Standards and Strategy Corridors ........... 21
Figure 21 – Pedestrian Crossing at West 4th Avenue ........................................... 23
Figure 22 – Congestion on I-5 Northbound at US 101 ............................................ 30

List of Tables:

Table 1 – Primary Street Characteristics Based on Functional Classification ................... 10
Table 2 – Summary of Intercity Transit Fixed-Route Service in WOAS Study Area .......... 13
Table 3 – Vehicle Collisions by Type on City Arterials in Study Area 2003-2005 ............. 24
Table 4 – City Arterial Intersections in Study Area With 10 or More Collisions 2003-2005 .... 24
Table 5 – Collisions Involving Cyclists/Pedestrians on WOAS Corridors 2003-2005 ......... 24
Table 6 – Congestion Measurement Thresholds for State Highways ............................ 30
Table 7 – Vehicle Collisions on State Highways in WOAS Study Area by Type, 2003-2005 .... 31
Table 8 – US 101 Collisions in WOAS Study Area by Severity 2003-2005 ....................... 31
Table 9 – I-5 Collisions in WOAS Study Area by Severity 2003-2005 .......................... 32
Introduction

The West Olympia Access Study (WOAS) is a joint project between the Washington State Department of Transportation Olympic Region (WSDOT) and the City of Olympia. The State and the City contracted with Thurston Regional Planning Council (TRPC) to facilitate the public involvement process and provide other project support.

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 to maintain safe and acceptable access and circulation. The study will consist of outreach activities, conducting and documenting transportation needs and options analyses, and recommending improvements and strategies.

The West Olympia Access Study is needed because:

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

- 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.

- The current street and highway network hampers the ability to meet West Olympia’s needs for emergency services, efficient transit service, better pedestrian and bicycle access, and more even distribution of local traffic.

The WOAS study area boundaries are shown on Figure 1. The study area includes 5.6 square miles within the cities of Olympia, Tumwater, and Thurston County, Washington. Within this area are 4.6 miles of the US Highway 101 corridor and approximately one mile of Interstate 5.

The study area boundaries of the West Olympia Access Study generally extend east from Eld Inlet to Budd Inlet and Capitol Lake. The northern boundary of the WOAS study area is about 0.1 mile north of Harrison Avenue and Mud Bay Road. The southern boundary generally parallels US Highway 101, but varies in distance from 0.1 mile south of the highway corridor near Eld Inlet and Capitol Lake to about 0.7 mile south along Black Lake Boulevard, encompassing the Ken Lake neighborhood.
The WOAS study area also extends both east and west to include the interchanges of US Highway 101 at Mud Bay Road (2nd Avenue) and Interstate 5 at Henderson Boulevard. In these areas the boundary parallels the corridor being about 0.1 mile north and south of the roadways.

West Olympia can generally be described as that portion of Olympia west of Capitol Lake and Budd Inlet. This area is currently home to almost 24,000 people and 17,000 jobs. Comprehensive Plans adopted by the cities of Olympia, Tumwater, and Thurston County call for increases in commercial and residential development in this area in accordance with the Washington State Growth Management Act.

A series of background reports have been developed regarding general characteristics of the study area. These reports are:

- Report #1 – Significant Transportation and Land Use Events
- Report #2 – Transportation Characteristics
- Report #3 – Land Use and Environment Characteristics
- Report #4 – Social and Economic Characteristics

Taken together, these four background reports provide an overview of baseline conditions within the West Olympia Access Study area.
Overview

This paper describes characteristics of the existing transportation system serving the study area for the West Olympia Access Study (WOAS). The study area includes many different kinds of transportation facilities functioning together as part of an integrated system. The West Olympia Access Study will include detailed operational characteristics of the transportation system as an integral part of its analyses. This paper describes the most relevant baseline characteristics of that system.

Transportation Context

Transportation, as it is used in the WOAS context, refers to all modes of travel. In terms of West Olympia, this includes travel by car and truck, public transportation, and the non-motorized means of bike and foot travel. In most cases, the intent is for the transportation system to support most or all of these modes concurrently. This is what is referred to as a “multimodal” transportation system. This is done in different ways depending on the land use to be served. The transportation system that supports these modes of travel includes streets, highways, bike lanes, sidewalks, and transit services. A “complete street” does this in a way that accommodates all appropriate modes of transport safely and efficiently.

For purposes of this paper, characteristics of the transportation system are broken out by local and state systems. The characteristics and functions of those two systems are very different. This is due to the different roles and responsibilities of local and state agencies and the need to maintain an appropriate balance between transportation mobility and land use access.

When looking at transportation, the land uses served by the transportation system must be considered. Transportation itself is a means, not an end. The end is access and access relates directly to land use. The City of Olympia and the Washington State Department of Transportation (WSDOT) work to achieve and maintain balance between transportation mobility and land use access. The transportation system must be compatible with existing and planned land uses in order for either transportation or land use to function efficiently. A separate WOAS study area background report (Report #3 – Land Use and Environment Characteristics) details current land use characteristics of the study area.

Special challenges arise where the local and state transportation systems intersect. The intent of the state highway system is to maximize vehicle mobility whereas the local system must be responsive to the need for land access and mobility for all modes of transport. Conflicts can
arise in the area of transition between the two systems, typically in the vicinity of interchanges. The juncture of these local – state issues is complex. Characteristics described in this background report provide some context for these challenges that the West Olympia Access Study will explore and address.

**Historical Context**

It is often said that transportation and land use are like the chicken and the egg. Does transportation drive land use or does land use drive transportation? The answer is, yes. This is illustrated neatly with a quick look at how the westside transportation system evolved over the last one hundred years.

A map of the WOAS study area indicates a dissimilar pattern of streets. Figure 2 reveals a tightly-gridded street network in close proximity to Capitol Lake. This is an area of older residential neighborhoods established in the early 1900s. The era in which those neighborhoods were established coincided with the advent of private vehicles, but cars were not yet the dominant mode of transport. In those days few households had access to a car. People were as likely to travel on foot, by bike, or by trolley. This is reflected in the way neighborhoods and supporting street systems were laid out. Commercial activities were concentrated along Harrison Avenue. That primary east-west corridor was served by a trolley system in the early 1900s, and was bounded by relatively high-density residential neighborhoods on either side within convenient walking distance of the corridor.

**Figure 2 Map of WOAS Study Area**
A primary characteristic of that older residential area is the street grid. Older residential and commercial areas were built along short city blocks served by an interconnected street grid. These provided short, redundant access routes throughout the neighborhood and were convenient to walk or bike as well as to drive. That land use pattern and its supporting street system provided multiple routes that served all modes of transport well.

Contrast that with the street system to the center and left of the map. This part of the study area was developed primarily after construction of Interstate 5 and U.S. 101 in the late 1950s. The system is characterized by a few wide, sweeping thoroughfares. Intersections are much farther apart. Instead of a street grid, local streets were often built as cul-de-sacs and other patterns serving a limited area and providing few connections to the overall system. Traffic was funneled onto a few major arterials serving large volumes of cars. This pattern of streets was thought to be most efficient for moving cars, which had become the dominant mode of personal transport in suburban communities like Olympia by the 1960s.

**The Interstate Highway Era**

The significance of Interstate 5 and US 101 in shaping Olympia’s west side should not be underestimated. Prior to the construction of I-5, travelers heading west from Olympia went by way of Harrison Avenue / Mud Bay Road. This was the eastern terminus of the Old Olympic Highway. The primary north-south route was Capitol Way / Capitol Boulevard / Old Highway 99, which then was part of the Old Pacific Highway that connected Seattle to California.

Decisions in the 1950s to build an interstate highway system, and then to locate what would become I-5 and US 101 where it is located today, had a profound influence on west Olympia’s transportation and land use. Figure 3 is a WSDOT archive photograph of I-5 construction over Capitol Lake. Had decision makers routed I-5 along the Old Pacific Highway or Log Cabin Road, or had the intersection of I-5 and US 101 been in the vicinity of today’s Trosper Road interchange, conditions on Olympia’s westside would be different today. Those were all options that were considered but rejected in favor of the alignment that today influences the issues and opportunities the West Olympia Access Study will evaluate.

For more detail on the history of the transportation system in the study area, please refer to the separate Background Report #1 – *Significant Transportation and Land Use Events.*
Changes in Land Use

As the street system changed in the era of auto-mobility, land use patterns also changed. The scale of commercial development increased commensurate with highway access. Figure 4 is a 1990 aerial photo of commercial development on Cooper Point Road between the Crosby Boulevard and Black Lake Boulevard interchanges at US 101. Highway access dramatically increased the size of the service area from which any one business could draw. The scale and character of future commercial development changed accordingly.

Not only did the streets and highways need to accommodate more cars, commercial development sites had to be large enough to provide sufficient parking space for cars. Vast expanses of parking lots characterized the highway-oriented retail pattern that began to emerge in west Olympia in the seventies.

The proximity of the two established transportation systems and their associated land uses – the compact residential and small-scale commercial areas of the pre-World War II era and the sweeping, auto-oriented commercial and suburban residential patterns of post-World War II – contribute to the complexity of the West Olympia Access Study objectives. Plans and policies in place today are slowly modifying those established patterns, taking the best that both have to offer while avoiding or retrofitting less beneficial characteristics. Historically speaking, West Olympia’s transportation system and the land use patterns it serves are still evolving. Many patterns are already in place but others are ready to emerge. A workable strategy for future mobility will draw from lessons learned in the past.
Local Transportation System

The West Olympia Access Study is an area-wide, system-wide evaluation of mobility and circulation. From this macroscopic vantage point the transportation network reveals itself as a series of interconnected corridors functioning in varying degrees of effectiveness as an integrated transportation system. This section looks at the characteristics of the local system, starting with physical elements of the transport system and then at operating characteristics of that system.

Physical Elements

Streets, Sidewalks, and Bike Lanes

The transportation system to be evaluated by WOAS serves all modes of travel. One way of describing basic characteristics is to break that network out into its individual components – streets, sidewalks, bike lanes, and so forth. This has the advantage of focusing on each individual mode of travel and the facilities to serve that travel, but it does not speak to the way in which the multi-modal system functions as a whole. A more comprehensive approach – consistent with City and regional philosophies about an integrated transportation system compatible with current and planned land uses – is to describe the local network based on the functions it serves. This is referred to as the functional classification of the street system.

Functional classification reflects the relationship between transportation and land use. For WOAS this framework effectively underscores the dynamic and evolving relationship between transportation and land use on Olympia’s westside. It accounts for all of the transportation system within the City’s right-of-way. It also supports the macroscopic view of corridors and circulation that WOAS will undertake. For these reasons, this background report assesses relevant baseline characteristics of the local transportation system in terms of functional classification.

An integrated multi-modal view of the City’s transportation system delineates the West Olympia system into arterials, collectors, and local access facilities. Collectors are further distinguished by major collectors and neighborhood collectors, depending on the function they serve. These arterials, collectors, and local access streets function as distinct elements of an integrated local transportation system. Most trips typically rely on all three types of facilities, regardless of whether the trip is made by car, bus, bike, walking or some combination of modes. Following is a general description of the facilities and the City’s adopted street standards as defined in the City’s Engineering Design and Development Standards.¹

¹ These descriptions apply to City of Olympia street standards. Thurston County shares the same standards within the Urban Growth Area. Tumwater’s standards are similar. Standards change somewhat outside the Urban Growth Area, where shared-use shoulders replace separate bike lanes and sidewalks, and where posted travel speeds are typically higher.
**Arterials** are usually the largest local facilities and are intended to move the most traffic. Arterials connect major centers of commercial activity or connect highway interchanges to those areas of activity. Intended to carry upwards of 40,000 motor vehicles a day, arterials typically serve regional or city-wide travel needs. At least 85% of arterial traffic originates more than a mile away. Posted speed limits are generally between 30 – 35 miles per hour. The number of lanes on an arterial is dependent on current and projected traffic volumes.

**Figure 5 - City of Olympia Arterial Street Standards**

<table>
<thead>
<tr>
<th>ARTERIAL</th>
<th>SIDEWALK</th>
<th>PLANTING</th>
<th>BIKE LANE</th>
<th>LEFT LANE</th>
<th>R/W BEHIND</th>
<th>CURB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F1</td>
</tr>
<tr>
<td>2 LANES</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>14</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>3 LANES</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>14</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>4 LANES</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>14</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>5 LANES</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>14</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

* SEE DESIGNATED BICYCLE ROUTES FOR DETERMINATION IF C=0 THEN D1 APPLIES, IF C=5 THEN D APPLIES

**Figure 6 – Photo of Arterial with Mid-Block Pedestrian Crossing**
Major collectors provide connections between arterials and concentrations of residential and commercial activities. Major collectors typically carry between 3,000 and 14,000 motor vehicles a day and serve sub-regional travel needs. As much as 70% of vehicular traffic originates more than a mile away. Posted speed limits are usually between 25 – 35 miles per hour. The number of lanes on a major collector is dependent on current and projected traffic volumes.

Figure 7 - City of Olympia Major Collector Street Standards

![City of Olympia Major Collector Street Standards Diagram]

<table>
<thead>
<tr>
<th>MAJOR COLL.</th>
<th>SIDEWALK</th>
<th>PLANTING</th>
<th>BIKE LANE</th>
<th>LANE TURN</th>
<th>LANE BEHIND</th>
<th>R/W BEHIND</th>
<th>CURB</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 LANES</td>
<td>6 8 5 10 14 0 1 OR 2</td>
<td>60</td>
<td>0.5</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 LANES</td>
<td>6 8 5 10 14 11 1 OR 2</td>
<td>71</td>
<td>0.5</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 LANES</td>
<td>6 8 5 10 14 0 1 OR 2</td>
<td>80</td>
<td>0.5</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+ SEE DESIGNATED BICYCLE ROUTES FOR DETERMINATION
+ IF C=0 THEN D1 APPLIES, IF C=5 THEN D APPLIES

Figure 8 – Photo of Major Collector

![Photo of Major Collector]
Neighborhood collectors collect and distribute traffic between a residential neighborhood and an arterial or major collector. Neighborhood collectors may carry 500 to 3,000 motor vehicles a day and serve sub-regional and local traffic needs. In contrast to arterials and major collectors, no more than 30% of neighborhood collector traffic is generated more than a mile away. The posted speed limit is 25 miles per hour. Parking is typically required on one side of the street.

Figure 9 - City of Olympia Neighborhood Collector Street Standards

Figure 10 – Photo of Neighborhood Collector
Local access streets carry local traffic within a neighborhood and may provide connections to collectors or arterials. Local access streets typically carry no more than 500 motor vehicles a day. Usually no more than 20% of traffic originates more than a mile away. Speed limits are between 20 – 25 miles per hour. Parking is typically required on one side of the street.

Figure 11 - City of Olympia Local Access Street Standards

Figure 12 – Photo of Local Access Street
Table 1 summarizes some primary characteristics by functional classification of local street types found within the WOAS study area.

Table 1 – Summary of Primary Street Characteristics Based on Functional Classification

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Arterial</th>
<th>Major Collector</th>
<th>Neighborhood Collector</th>
<th>Local Access Street</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Daily Vehicles</td>
<td>14,000 – 40,000</td>
<td>3,000 – 14,000</td>
<td>500 – 3,000</td>
<td>0 - 500</td>
</tr>
<tr>
<td>Local Traffic</td>
<td>0% - 15%</td>
<td>0% - 30%</td>
<td>70% - 100%</td>
<td>80% - 100%</td>
</tr>
<tr>
<td>Design Speed</td>
<td>30 – 35 mph</td>
<td>25 – 35 mph</td>
<td>25 mph</td>
<td>20 – 25 mph</td>
</tr>
<tr>
<td>Street Spacing</td>
<td>1 – 2 miles</td>
<td>2 – ¾ miles</td>
<td>1000’ – 1500’</td>
<td>350’ – 500’</td>
</tr>
<tr>
<td>Drive-Way Access</td>
<td>No</td>
<td>No, except existing</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum vehicle lanes</td>
<td>2 each direction, optional center turn lane</td>
<td>2 each direction, optional center turn lane</td>
<td>1 each direction</td>
<td>1 travel lane</td>
</tr>
<tr>
<td>Vehicle Lane Widths</td>
<td>10’ travel lanes and 11’ center turn lane</td>
<td>10’ travel lanes and 11’ center turn lane</td>
<td>1 lane of 10’ and 1 lane of 9’</td>
<td>1 lane of 12’</td>
</tr>
<tr>
<td>Sidewalks</td>
<td>8’, both sides</td>
<td>6’, both sides</td>
<td>5’, both sides</td>
<td>5’, both sides</td>
</tr>
<tr>
<td>Bike lanes</td>
<td>5’, both sides</td>
<td>5’, both sides</td>
<td>On designated streets only</td>
<td>On designated streets only</td>
</tr>
<tr>
<td>Planting strips</td>
<td>10’, both sides</td>
<td>8’, both sides</td>
<td>8’, both sides</td>
<td>8’, both sides</td>
</tr>
<tr>
<td>Street Trees</td>
<td>Yes, 40’ on center</td>
<td>Yes, 40’ on center</td>
<td>Yes, 40’ on center</td>
<td>Yes, 40’ on center</td>
</tr>
<tr>
<td>On-Street Parking</td>
<td>No</td>
<td>No</td>
<td>6’, one side</td>
<td>6’, one side</td>
</tr>
</tbody>
</table>


Note: Local Traffic refers to those trips that have origins and destinations within a one mile radius of the street.

Not all existing streets have all the multi-modal facilities described in the current adopted street standards. That is usually because these streets were built before the current standards were put into place. Bike lanes and planter strips are the two features most frequently missing from streets built before the mid-1990s. When possible, missing features are added when streets undergo reconstruction or some other major renovation activity. Most streets built or widened since adoption of the current standards will include all features.

Olympia’s street standards are reinforced by City and regional policies that restrict the width of arterials and major collectors in order to maintain an appropriate scale for this small urban city.

*Road Width and Community Scale:* Generally, a road should not be widened beyond two through lanes in each direction with auxiliary turn lanes as appropriate. Roads with more than five lanes are perceived by the public as beyond the scale that is appropriate for this community. (Resolution #11866, 12/21/98)

Source: Olympia Comprehensive Plan (Transportation Chapter, pages 13 and 14)

Figure 13 describes the designated arterials, collectors, and local access streets within the WOAS study area.
Figure 13 – Local Street Classification within the WOAS Study Area
Street Connectivity

Street connectivity is a central feature of Olympia’s transportation strategy. The City’s transportation policies call for an interconnected network of two-lane streets to serve the City’s current and future transportation needs. Figure 14 illustrates the difference between a dense network of street connections and a sparse hierarchy of wide arterials and cul-de-sacs.

Figure 14 – Comparison of Dense and Spare Street Connectivity

The WOAS study area is characterized by a mix of traditional interconnected streets as well as more conventional wide arterials and large intersections. City policies strive to increase the density of intersections and street connections and retrofit or minimize wide arterials.

A network of interconnected, two lane streets can operate more efficiently than a hierarchical network of wide streets served by a few large intersections. That is because an interconnected network allows vehicle traffic to disperse more uniformly than it can when concentrated onto just a few major arterials with limited street connections. Trip origins and destinations are closer and people can travel shorter distances. The smaller intersections serving a traditional street grid can operate more efficiently than large, multi-lane intersections that must provide enough time for concentrated turning and through movements. It is easier and safer for pedestrians to cross smaller intersections. Studies have demonstrated that a traditional, interconnected network of narrower streets can move more vehicles with less congestion than the conventional hierarchical network with its few large intersections.\(^2\) Additionally, a well-connected network provides more route options on low-volume streets for bicyclists.

Public Transportation

Public transportation on Olympia’s west side is provided by transit agencies and school districts. Although there are no public schools within the immediate study area boundaries, there are two elementary schools, two middle schools, and one high school located close by. The Olympia School District provides extensive bus service throughout the area’s residential neighborhoods as well as service targeted towards the District’s special needs population. While this is an important element of the overall transportation system, this paper focuses on the general purpose transportation provided by public transit agencies.

Intercity Transit

Most transit service within the study area is provided by Intercity Transit (Figure 15). Intercity Transit, or IT, provides fixed-route and paratransit services throughout much of the area via eight routes. Westfield Capital Mall is a primary transfer station.

Principle characteristics of the area’s fixed-route service are summarized in Table 2. Figure 16, on the next page, identifies the streets served by these routes; note that routes overlap in some corridors. Intercity Transit buses stop only at designated transit stops in this area. For specific route and stop detail, please refer to Intercity Transit’s on-line route information at www.intercitytransit.com.

Table 2 - Summary of Intercity Transit Fixed-Route Service in WOAS Study Area

<table>
<thead>
<tr>
<th>Route</th>
<th>Route Type</th>
<th>Minute Headway (Service Frequency)</th>
<th>2006 Boardings Board / Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Peak</td>
<td>Weekday</td>
</tr>
<tr>
<td>41 Division St / TESC</td>
<td>Trunk</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>42 SPSCC / Family Court</td>
<td>Special</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>43 SPSCC / Tumwater Sq.</td>
<td>Secondary</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>44 SPSCC / Capital Mall</td>
<td>Trunk</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>45 Conger / Capital Mall</td>
<td>Secondary</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>47 Cap Mall/Cap Med Ctr</td>
<td>Secondary</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>48 Harrison Ave / TESC</td>
<td>Trunk</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>49 Capital Mall</td>
<td>Trunk</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Figure 16 – Map of Intercity Transit Routes in WOAS Study Area
**Other Public Transportation Service**

In addition to Intercity Transit service, two other transit agencies provide limited service within the WOAS study area.

- Mason Transit’s Route 6 provides service between Mason County and downtown Olympia via Harrison Avenue / Mud Bay Road. Weekday service runs eight round-trips between 6:40 a.m. and 8:00 p.m. Saturday service runs four round-trips between 8:10 a.m. and 6:00 p.m. Buses stop at designated transit stops. In addition, buses will stop on request at unmarked locations on along the western segments of Harrison Avenue / Mud Bay Road where there are no IT stops.

- Grays Harbor Transit’s Route 40 provides service between Grays Harbor and downtown Olympia via Harrison Avenue / Mud Bay Road. Weekday service runs six round-trips between 7:15 a.m. and 7:15 p.m. Weekend service runs four round-trips each on Saturday and Sunday between 9:30 a.m. and 7:00 p.m. Buses stop at designated transit stops.

**Shared-Use Trails**

In addition to on-street bike and pedestrian facilities included as a part of adopted street standards, a system of off-street, shared-use facilities dedicated to non-motorized travel is beginning to emerge on Olympia’s westside. Shared-use trails, such as the McLane School Forest Trail in Figure 17, provide cyclists and pedestrians with a limited number of additional route options between key destinations. They include Class I bike paths, urban trails, bikeways, and other types of off-street facilities. While the system is still fairly disconnected on the westside, plans are taking shape to provide more linkages both within the study area as well as to points outside the study area.

Thurston Regional Planning Council adopted a Regional Trails Plan in December 2007. That plan identifies existing routes and potential new corridor alignments. Figure 18 identifies those alignments that are already in place or are currently proposed for the WOAS study area as well as the alignments of operating rail lines. The abandonment of rail lines is often the most expedient way for a jurisdiction to acquire the dedicated, off-street corridors necessary to support a comprehensive trail network.

For more information on ways in which regional trails may increase westside transportation choices in the future, please see TRPC’s Regional Trails Plan, available on-line at [www.trpc.org](http://www.trpc.org).
Figure 18 – Map of Regional Trails Plan Off-Street Recommendations for the WOAS Study Area
Travel Demand Management

While not a physical component of the local transportation system, travel demand management programs directly relate to how that system operates. Travel demand management, or TDM, is a means of increasing system efficiency. This is done through a variety of measures that encourage the use of alternatives to driving alone or that reduce the need to travel altogether. In its broadest sense, investments in bicycle and pedestrian facilities and increases in transit programs are TDM measures, as is transportation-efficient land use development which results in increased densities of jobs, housing and commerce with an urban form that supports alternatives to driving alone.

More traditionally, though, TDM refers to programs that target employee trip reduction. In Olympia this includes parking management programs that charge fees for employee parking and employer-based programs that provide incentives to walk, bike, ride the bus, carpool and vanpool.

Parking Pricing

The availability and cost of parking is a major factor influencing a person’s decision to drive. The majority of parking in Olympia is provided free of charge or at significantly subsidized rates. At this time there is no priced parking on Olympia’s westside except for parking associated with the South Puget Sound Community College and The Evergreen State College and some limited priced parking associated with the Thurston County Courthouse complex. All other public, retail, and commercial parking is available free of charge.

Commute Trip Reduction

The City aggressively pursues its CTR goals for employer-based trip reduction and is currently updating its plan and objectives. By law, employers with 100 or more “affected employees” – employees who arrive at a worksite between 6 am and 9 am – are “affected employers” and are required to participate in a jurisdiction’s CTR program. Olympia currently has four affected employers on the westside:

- Capital Medical Center with 174 affected employees out of a total of 455 employees;
- Thurston County with 750 affected employees out of a total of 1,410 employees;
- Washington State Department of Licensing with 363 employees, all of whom are affected; and
- Western Institutional Review Board with 222 affected employees out of 243 total employees.

Note that large employment centers like Capital Mall are not affected since any one employer within the mall does not have 100 or more employees arriving between 6 am and 9 am.

Employer-based programs can include preferential parking for car- and vanpools; subsidized transit passes; telework and flexible work schedule options; parking cash out options and financial incentives for not driving alone; outreach, education, and support for ridesharing; guaranteed rides home in case of emergency; and support infrastructure for bikers and walkers.
Local Network Travel Conditions

Congestion and safety are the primary characteristics of how well the transportation system works for vehicles. These provide an indication of operational performance. Technical analyses for WOAS will assess operational conditions in great detail as a part of scenario development and evaluation. This background summarizes known operational characteristics that affect baseline travel conditions on the local network.

Vehicular Congestion

Vehicular congestion is one indicator of system performance. Recurring congestion is a function of: time-of-day traffic volumes, left-turn movements, and directional flow; and intersection capacity, spacing, and control devices. Congestion may indicate there is not enough system capacity to handle the traffic volumes or turning movements. It may also indicate inefficiencies somewhere in the system operations. Rarely is the problem of congestion attributable to a single cause; it is usually due to a combination of factors. Managing congestion requires on-going evaluation of a variety of contributing factors and then making appropriate adjustments.

Operational Inefficiencies

Congestion does not necessarily indicate a need for street widening. Detailed operational analysis is used to diagnose the problem and potential solutions. Operational inefficiencies can lead to congestion. They can be caused by factors like traffic signals that are not timed properly, too many turning movements into and out of driveways that disrupt traffic flows, or a lack of street connectivity that forces traffic into inefficient travel patterns and over-burdens existing streets and intersections. Operational inefficiencies can also be caused by poor driver behaviors like speeding, red-light running, and intersection blocking. It can also be caused by overwhelming demand concentrated at one time such as the congestion created during the holiday shopping season or the peak of the evening rush hour. Widening existing streets probably won’t solve congestion in these cases and may make it worse in the long term or simply push the problem to a new location.

Measuring Congestion

A certain amount of traffic congestion should be expected in a robust, active suburban environment such as that found in the WOAS study area. It is not reasonable to expect a free flow of vehicles all the time, especially during periods of heavy demand like rush hour or the peak holiday shopping season. A comprehensive transportation / land use strategy can make it easier for more people to reach their destinations despite worsening vehicular congestion. Concentrating a mix of land use activities – home, work, shopping, services – in close proximity to each other and serving it with a full complement of transportation choices makes it easier for more people to accomplish some or all of their travel needs without having to drive. That said, some congestion may be indicative of system failures that can and should be addressed.

Olympia has adopted Level of Service (LOS) indicators to gauge vehicular congestion on its streets. LOS serves as a performance measure to determine acceptable versus unacceptable
levels of congestion. It is measured two ways. One is by comparing volumes of traffic to the maximum designed capacity of the street during the peak two-hour travel period. This is typically measured mid-block between intersections. The other is measuring delay at intersections. Figure 19 illustrates typical off-peak intersection delay at the Black Lake Boulevard / Cooper Point intersection.

**Figure 19 - Example of Off-Peak Intersection Delay**

![Image of off-peak intersection delay](image)

Actual recorded volumes are used to evaluate current conditions; forecasted or projected volumes are used to estimate future conditions. The closer volumes come to the design capacity, the “fuller” the street is. As it approaches 100% of its design capacity a street is more prone to gridlock and unacceptable congestion. Non-recurring incidents like car crashes are more disruptive and it takes the system longer to recover when they are cleared. Increases in left turn movements result in longer queues on cross streets which in turn take longer signal cycles to move through intersections.

LOS standards for traffic congestion are often expressed through a letter system ranging from “A” (the best) to “F” (the worst). These LOS standards are based on vehicle travel conditions, typically during the most congested time of day.

Olympia’s Comprehensive Plan and the Regional Transportation Plan define LOS for city streets. Acceptable congestion on most city streets in the WOAS study area should achieve a minimum rating of LOS “D” for the two-hour pm peak period, which extends from 4:00 to 6:00 p.m. What this means for drivers is that they may have to wait through at least one full cycle to get through a signalized intersection on these streets during the evening peak period commute.

Some City streets have an adopted LOS of “E.” These are busier streets like arterials where more congestion is to be expected. On corridors with an LOS of “E” drivers are likely to wait through at least two full signal cycles before proceeding through the intersection during the peak of the evening commute.
**Strategy Corridors**

In addition to these LOS standards, the Regional Transportation Plan establishes “strategy corridors.” Strategy corridors are those local facilities where traditional LOS standards do not necessarily trigger concurrency issues if congestion exceeds adopted levels. This is because the arterial is already at its maximum five lane mid-block width\(^3\), or it is constrained by environmental or land use factors that prohibit its widening any further. Congestion levels in these strategy corridors are likely to exceed adopted LOS standards in the future. A comprehensive package of strategies including efficiency measures, multi-modal travel alternatives, travel demand management, land use intensification, and street connectivity will be needed to maintain future mobility and access.

Figure 20 shows which local streets in the WOAS study area have an adopted LOS of “D” and which have an LOS of “E,” and which are designated as strategy corridors. Note that those areas that are outside either city or unincorporated urban growth area boundaries have an LOS of “C.”

**Concurrency**

The City conducts an annual evaluation of its streets to assess current volumes and congestion levels. It then projects what conditions will be like in six years by looking at recent trends in traffic volumes and at the development proposals working their way through the planning process in Olympia and adjacent communities. The City uses this information to determine if any locations will experience unacceptable congestion within that six-year period so that actions can be taken ahead of time to mitigate the problem. This is part of the City’s “concurrency process” to help ensure that growth does not have an undue impact on mobility.

There are a few locations within the WOAS study area where congestion is approaching an unacceptable level during the two hour evening commuter period. These are areas that the City is monitoring closely. Those areas are:

- Intersection of Black Lake Boulevard and Cooper Point Road
- Harrison Avenue between Yauger Way and Kaiser Road (City received grant to widen this road segment, which should be complete by 2010)
- Intersection of Division Street and Harrison Avenue

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\(^3\) Regional transportation policies limit mid-block street width to two through-lanes in each direction plus an optional two-way center turn lane. This five-lane configuration is deemed the maximum street width that is compatible with the scale of this community. Additional turn lanes may be warranted at intersections.
Figure 20 – Map of Olympia’s Roadway LOS Standards and Strategy Corridors
Congestion Impacts

Congestion is not just a problem for car drivers.

- Congestion severely impacts transit service when buses are stuck in car traffic. Transit must maintain schedules; congestion makes it more difficult and more expensive to keep buses running on time and on schedule.
- Congestion impacts service and delivery vehicles, making it harder and more expensive for entities like Fed Ex and the postal service to serve their customers. It also increases the cost of delivery services to businesses both small and large.
- Cyclists and pedestrians feel the impact of vehicular congestion, too. As drivers get more frustrated they are less likely to yield to pedestrians at crosswalks or driveways, or to allow space for cyclists in the travel lane.
- Congestion that makes it difficult to get into or out of business driveways impacts businesses.

While some degree of congestion is to be expected during peak travel times, unacceptable congestion can be detrimental for all modes of transport and the community it supports. That is why it is so important that system efficiency be maximized so that congestion and its negative impacts can be minimize.

Non-motorized Travel Considerations

The City’s level of service standards provide a tool for assessing system performance for vehicular travel but they offer little insight as to how well the system performs for non-motorized travel. Instead, system continuity and connectivity are key indicators of system performance for cyclists and pedestrians. That is because the availability of infrastructure – along with supportive land uses and design standards – is one of the most important factors in making walking or cycling a viable travel alternative.

Figure 21 - Pedestrian Crossing at West 4th Ave

The City of Olympia’s Bicycle Pedestrian Advisory Committee, or BPAC, conducts a variety of evaluations in conjunction with City staff to assess system deficiencies throughout the city and to prioritize needed investments. Studies and evaluations include the Bicycle Facilities Program (1997), the City of Olympia Sidewalk Program (2003), and the Pedestrian Crossing Improvement Program (on-going).

Many new sidewalks and bike lanes throughout the City are built as part of street projects as called for in current
adopted street standards or as developer mitigation requirements. There are many other locations where bike lanes and/or sidewalks are absent though and there are no associated street or development projects in the foreseeable future. City priorities for bicycle and pedestrian projects are based on the evaluation and prioritization processes conducted by the BPAC and staff help target limited funds to those places with the greatest deficiency, typically as measured by vehicle volumes and speeds and adjacent land uses.

In 2005 citizens voted for a tax increase in their private utility bills to increase funds available for sidewalks and parks. This adds approximately $1 million per year (or more if private utility rates increase) to build the prioritized sidewalk network. This results in stand-alone sidewalk or bike lane projects that are included in the six-year Capital Facilities Plans or longer range Comprehensive Plans, and are built as funding is available.

Several of these stand-alone sidewalk, pedestrian crossing and bike lane projects are located within the WOAS study area. In addition to the full street standard projects the City plans to construct, they will extend system continuity and connectivity for non-motorized travel throughout the westside.

While most of the non-motorized network is located within the City’s street right-of-ways, some additional opportunity is available for dedicated off-street trails. The City identifies the need for a Percival Creek Canyon Trail in its Comprehensive Plan, which would follow the railroad alignment from Capitol Lake to the Mottman industrial complex south of US 101. Additional trails are proposed in the 2007 Regional Trails Plan.

**Safety**

Traveler safety is a paramount consideration for the City of Olympia. Collision data is an important source of information about system safety and operations.

The local arterial within the WOAS study area with the highest number of collisions between January 1, 2003 and December 31, 2005 was Cooper Point Road with 227 crashes. Nine of those crashes involved a bicyclist or pedestrian. Rear end collisions were the leading type of crash on WOAS arterials.

Table 3 presents a summary of vehicle crash data on City arterials within the WOAS study area for the time period between 2003 and 2005, identifying the most common types of collision. Most of these resulted in property damage only. There were no fatalities.
Table 3 Vehicle Collisions by Type on City Arterials in Study Area 2003 – 2005

<table>
<thead>
<tr>
<th>Street</th>
<th>Rear End</th>
<th>Side swipe</th>
<th>Right Angle</th>
<th>Approach Turn</th>
<th>All Others</th>
<th>Total Collisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooper Point Rd – Study Area Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Harrison &amp; Carriage St</td>
<td>120</td>
<td>22</td>
<td>33</td>
<td>9</td>
<td>26</td>
<td>210</td>
</tr>
<tr>
<td>Between Carriage St &amp; US 101</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Harrison Avenue – Between Kaiser Rd &amp; Olympic Way</td>
<td>83</td>
<td>24</td>
<td>51</td>
<td>18</td>
<td>20</td>
<td>196</td>
</tr>
<tr>
<td>Black Lake Boulevard – Between 4th Ave &amp; 21st Ave SW</td>
<td>82</td>
<td>30</td>
<td>27</td>
<td>8</td>
<td>25</td>
<td>172</td>
</tr>
</tbody>
</table>

# of Collisions by Type

|                  | 290 | 78  | 118 | 36  | 73  | 595  |

Source: City of Olympia
Notes: Under 23 United States Code – Section 49, this data cannot be used in discovery or as evidence at trial in any action for damages against the City of Olympia.

Intersections are a frequent location of crashes. Table 4 identifies the intersection locations on the three arterials that were associated with ten or more collisions between January 1, 2003 and December 31, 2005. The intersection of Black Lake Boulevard and Cooper Point Road is the single highest location of vehicle collisions within the study area.

Table 4 City Arterial Intersections in Study Area With Ten or More Collisions 2003 – 2005

<table>
<thead>
<tr>
<th>Arterial</th>
<th>Intersecting Street / # of collisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooper Point Road</td>
<td>Black Lake Blvd 12th Avenue / 21st Ave / Capital Mall Dr / 9th Ave / 13 collisions</td>
</tr>
<tr>
<td>Harrison Avenue</td>
<td>Kenyon St / Cooper Point Rd / Division Street / 15 collisions</td>
</tr>
<tr>
<td>Black Lake Boulevard</td>
<td>US 101 / Capital Mall Dr / 9th Ave / 14 collisions</td>
</tr>
</tbody>
</table>

Source: City of Olympia
Notes: Under 23 United States Code – Section 49, this data cannot be used in discovery or as evidence at trial in any action for damages against the City of Olympia.

Sometimes vehicle crashes involve bicyclists or pedestrians. Table 5 identifies the number of crashes involving cyclists or pedestrians by corridor. As with vehicular crashes, there were no fatalities associated with non-motorized incidents during this time period. However, most vehicle/non-motorized crashes result in some sort of injury for the cyclist or pedestrian.

Table 5 Collisions Involving Cyclists/Pedestrians on WOAS Corridors 2003-2005

<table>
<thead>
<tr>
<th>City Street Corridor</th>
<th>Collision Location At Intersection</th>
<th>Between Intersections</th>
<th>Total Collisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harrison Ave from Kaiser Rd to Olympic Way</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Cooper Point Rd from US 101 to Harrison Ave</td>
<td>6</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Black Lake Blvd from 21st Ave SW to 4th Ave</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Capital Mall Dr from City Limits to Black Lake Blvd</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Lakeridge Dr from Evergreen Park Dr to Deschutes Pkwy</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total Collisions Involving Cyclists or Pedestrians</td>
<td>16</td>
<td>13</td>
<td>29</td>
</tr>
</tbody>
</table>

Source: City of Olympia
Notes: Under 23 United States Code – Section 49, this data cannot be used in discovery or as evidence at trial in any action for damages against the City of Olympia.
Planned Transportation Projects

Through its on-going planning and programming processes, the City of Olympia has identified a number of capital projects throughout the westside that will improve traveler mobility, safety, and access. Some of these projects are planned for implementation in the short term, from about 2008 through 2013, depending on the availability of funding. These projects are identified in the City’s Capital Facilities Plan. Other projects will be implemented over the long term, from 2014 through 2030. Because of their time horizon they are not included in the short-range Capital Facilities Plan but are included in one or more other plans or investment strategies.

Following is a summary of the planned projects envisioned for the WOAS study area that are included in the City’s Capital Facilities Plan, Comprehensive Plan, sidewalk and bicycle improvement programs, recreational walkway program and neighborhood traffic management program.

Short-range Projects

Westside transportation projects included in the Capital Facilities Plan (2008-2013)

- 16th Avenue Emergency Vehicle Access Gate
- Mottman Road Half-Street Improvements from Mottman Ct to SPSCC entrance
- Right turn lane with sidewalks on Division Street, northbound, at Harrison Avenue
- Pedestrian refuge island at intersection of Capital Mall Drive and Archwood Drive
- Sidewalk on Kaiser Road, from Harrison Avenue to 6th Avenue
- Sidewalk on Decatur Street, from 9th Avenue to 13th Avenue
- Installation of audible crosswalk signals at Cooper Pt / Harrison Ave intersection
- Installation of audible crosswalk signals at Cooper Pt / Capital Mall Dr intersection
- New ADA ramps on 5th Avenue at Milroy St, Thomas St, Plymouth St, and Rogers St
- New ADA ramps on 7th Avenue at Thomas St and Plymouth St
- New ADA ramps on 8th Avenue at Milroy St
- New ADA ramps on Decatur Street at 5th Ave, 7th Ave, and 8th Ave
- New ADA ramps on 9th Avenue at Caton Way, Thomas St, Plymouth St, and Rogers St
- Retrofit of all incandescent traffic and pedestrian signals to light emitting diodes (LED)
- Widen Harrison Avenue between Yauger Way and Kaiser Road to 4-5 lane arterial
- Install traffic signal at intersection of Harrison Avenue and Kaiser Road

Long-range Projects

Additional westside projects included in long range plans (2014 - 2030)

- Sidewalk on Decatur Street from 13th Avenue to Caton Way
- Sidewalk on Fern Street from 9th Avenue to 14th Avenue
• Sidewalk on Mottman Road from Mottman Court to SPSCC
• Sidewalk on McPhee Road from Harrison Avenue to Capital Mall Drive
• Additional priority projects from the Sidewalk Program
• Priority projects from the Bicycle Improvement Program
• Widen Mud Bay Road between Kaiser Road and Evergreen Parkway to 4-5 lane arterial
• Extend Kaiser Road as a major collector south to Black Lake Boulevard
• Add new neighborhood collector with development southwest of Ken Lake
• Add turn lanes at the intersection of Capital Mall Drive and Cooper Point Road

Note that City and regional transportation plans call for street connections at 16\textsuperscript{th} Street and Decatur Street. The City has determined that any decision on whether to connect Decatur Street to Caton Way and open 16\textsuperscript{th} Avenue as through vehicular connections will not be made until the West Olympia Access Study is complete.
State Transportation System

Many of the issues on which the West Olympia Access Study will focus are related to the intersection of the local transportation system and the state transportation system. Not only are these two transportation systems governed by different agencies they also serve very different functions and are evaluated in different ways. This section focuses on characteristics of the state highway system that serves the WOAS study area.

Highway Classifications

Highway classifications influence the ways in which state facilities develop. Classifications dictate such things as how and where local streets can access a highway, what level of design must be applied to construction projects, funding priorities, etc. Some of those classifications are established at the federal level while others are established at the state level.

US 101 Classifications

The segment of US 101 inside the study area (from the Mud Bay interchange, milepost [MP] 362.23, to its terminus at its intersection with I-5, MP 367.41), has the following classification designations:

- Part of the National Highway System – NHS Route
- Freight and Goods Transportation System – T1 Route
- Highway of Statewide Significance
- Federal Functional Classification - Urban Principal Arterial - Freeway
- Access Classification – Full Controlled Limited Access
- Washington State Scenic Byway

National Highway System

As part of the National Highway System, US 101 plays an important role in the surface transportation network. The National Highway System consists of approximately 160,000 miles of roadway important to the nation’s economy, defense, and mobility. It includes highways, principal arterials, the strategic highway network and its major connectors, and its intermodal connectors. The system encourages states to focus on a limited number of high priority routes and to concentrate on improving them with federal aid funds. At the same time, states can incorporate design and construction improvements that address their traffic needs safely and efficiently. Operational improvements, such as stalled vehicle removal, and Intelligent Transportation System technology are also important projects and can be funded with federal aid funds.

As a NHS route, full design standards apply to all proposed safety and mobility projects.
**Freight and Goods Transportation System**

The Washington State Department of Transportation Freight and Goods Transportation System classification tracks the tonnage carried by all state and many county routes. Its purpose is to provide meaningful data for use by planners and decision makers responsible for prioritizing route improvements.

Within the study area, US 101 is considered a T1 freight route, a designation indicating that the road carries over 10,000,000 tons of freight per year. This is the highest classification in the system. In the year 2000, over 15,000,000 tons of freight traveled this segment of US 101.

**Highway of Statewide Significance**

The designation of Highway of Statewide Significance (HSS) was mandated by the 1998 Washington State Legislature. Highways of Statewide Significance include, at a minimum, interstate highways and other principal arterials that are needed to connect major communities in the state.

**Functional Classification**

Federal Functional Classification is one of the determining factors of eligibility for Federal transportation funding. Federal Functional Classification reflects the residential, commercial and industrial uses served by the route, municipal boundaries, and the urbanized area designations of the U.S. Bureau of the Census.

State Functional Classifications group highways, roads and streets by the character of service they provide. The system was developed for transportation planning purposes. It recognizes the various roles that individual routes play in the transportation network. Functional classification at this level is used to identify how to manage travel throughout the transportation network in the most logical and efficient manner.

US 101 within the study area is classified as an Urban Principal Arterial. Routes in this classification serve substantial statewide travel and are a part of an integrated network. The function and design of arterials places a higher priority on mobility than on land access.

**Access Classification**

The Access Classification of US 101 within the study area is Full Controlled Limited Access Highway. This means that the WSDOT has purchased all access rights. Public access is allowed only at interchanges. Any change in access must be approved by the WSDOT.
Washington State Scenic Byway

US 101 is classified as a Washington State Scenic Byway. In this capacity it is known as the Pacific Coast Scenic Byway. It is not a Federal Scenic Byway. The master plan developed for this byway is the Washington Coastal Corridor (revised March 1997), US 101 Corridor Master Plan. The master plan applies only to right-of-way owned and under the jurisdiction of WSDOT. Ideas for enhancements outside the right-of-way would be opportunities for partnership between local jurisdictions and organizations and WSDOT.

The segment of US 101 being studied lies within Planning Area 5 South. Olympia is an existing urbanized area on US 101 and most opportunities for scenic development and enhancement lie outside this developed segment of the corridor.

The “eastern gateway” to the Coastal Corridor on US 101 is considered to be at Eld Inlet. The master plan suggests that a gateway center in this location could mark this as the eastern entry point to scenic US 101. Eld Inlet is at the edge of the West Olympia Access Study boundary. The study segment of US 101 serves as the approach to the scenic corridor gateway.

The specific scenic corridor opportunity identified for potential implementation within the study area is to maintain the view of farms and pastures in the vicinity of Mud Bay at Eld Inlet. In general, the strategy in this planning area is to maintain or open pastoral views, screen views that detract from the scenic character, and develop a varied forest edge.

Travel Conditions on State Highway System

The two state highways included within the WOAS study area carry significantly more traffic than the local transportation network. This is vehicular traffic only, primarily private passenger vehicles and trucks.

Traffic volumes on US 101 range from about 50,000 vehicles a day just east of the Evergreen Parkway interchange to about 97,000 vehicles per day just east of the Cooper Point / Crosby Boulevard interchange. Traffic volumes on I-5 range from about 100,000 vehicles a day just north of the Trosper Road interchange to about 142,000 per day at the US 101 interchange, decreasing somewhat to 122,000 per day at Eastside Street. All figures are for calendar year 2005.

These volumes speak to the importance of understanding and managing congestion- and safety-related issues on the state highway system.

Congestion

WSDOT seeks to move the largest number of people and the largest amount of freight as efficiently as possible. This is done in part by increasing the number of people in a vehicle and then maximizing the number of vehicles that the highway can move through the system.
The ability to move the largest number of vehicles through the system is a function of travel speed. There is an optimum travel speed at which the greatest number of vehicles can move through a freeway segment. WSDOT research finds that the maximum traffic throughput on a typical urban freeway segment is achieved at about 50 miles per hour, or roughly 85% of the posted speed limit. When speeds fall below 70% of posted speed (about 40 miles per hour), the highway has lost so much efficiency that it is congested. Below 35 miles per hour the highway is considered to be severely congested.

Table 6 describes the congestion measurement thresholds used by WSDOT to evaluate highways.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Highway Speed Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posted speeds</td>
<td>52 mph or above</td>
<td>Highway is at less than maximum productivity because drivers are at greater than optimal spacing</td>
</tr>
<tr>
<td></td>
<td>(posted speed)</td>
<td></td>
</tr>
<tr>
<td>Maximum throughput</td>
<td>51 mph – 41 mph</td>
<td>Highway is operating at maximum productivity</td>
</tr>
<tr>
<td></td>
<td>(~ 85% - 70% of posted speed)</td>
<td></td>
</tr>
<tr>
<td>Congestion</td>
<td>40 mph</td>
<td>Highway is at less than maximum productivity because drivers are jammed at less than optimal spacing</td>
</tr>
<tr>
<td></td>
<td>(below 70% of posted speed)</td>
<td></td>
</tr>
<tr>
<td>Severe congestion</td>
<td>35 mph or below</td>
<td>Highway is well below maximum productivity</td>
</tr>
<tr>
<td></td>
<td>(~ 60% or less of posted speed)</td>
<td></td>
</tr>
</tbody>
</table>

Source: "Measures, Markers, and Mileposts." (Gray Notebook) September 2006. WSDOT

Traffic on urban highways is increasingly spread throughout the day, with peaks in the morning, midday, and evening. WSDOT data and analysis suggests that the evening commutes are generally worse than morning commutes. This may be due to more non-commute trips using the highway than in the morning. Congestion associated with evening commutes tends to last longer, with lower speeds and less reliable travel times.

**Safety**

Analysis was performed of collisions that occurred on US 101 from the Mud Bay interchange (milepost [MP] 362.23) to its terminus at its intersection with I-5 (MP 367.41). Analysis was also conducted for I-5 from the US 101 interchange (MP 103.86) to Plum Street (MP 106.62). This includes the corridor segments within the West Olympia Access Study area limits and area of influence.
The history of collisions helps to identify safety concerns. Collision data used in the analysis is from January 1, 2003 through December 31, 2005. In this timeframe there were a total of 393 collisions on US 101 and 625 collisions on I-5. About half of all collisions were rear end-type crashes. This was true for collisions occurring on the highway itself as well as for those occurring within interchanges. A major contributing factor in over half of the collisions was vehicles exceeding a reasonable speed for the driving conditions present at the time.

Table 7 summarizes the three most common types of collisions that occurred within the study area on US 101 and I-5 during the analysis time period. Rear end-type collisions are the most prevalent. Vehicles running off the road are the next most prevalent. This includes overturned vehicles. Vehicles sideswiping other vehicles are the third most prevalent type of collision.

<table>
<thead>
<tr>
<th>Type of Collision</th>
<th>US 101</th>
<th>I-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear end</td>
<td>187</td>
<td>293</td>
</tr>
<tr>
<td>Single Vehicle Run Off the Road</td>
<td>67</td>
<td>141</td>
</tr>
<tr>
<td>Sideswipe</td>
<td>44</td>
<td>97</td>
</tr>
<tr>
<td>Other</td>
<td>95</td>
<td>94</td>
</tr>
<tr>
<td>Total Collisions</td>
<td>393</td>
<td>625</td>
</tr>
</tbody>
</table>

Source: WSDOT Olympic Region
Notes: Under 23 United States Code - Section 49, this data cannot be used in discovery or as evidence at trial in any action for damages against the Washington State Department of Transportation or the State of Washington.

Collision type is a significant factor in the severity of resulting injuries. For example, head-on collisions often result in severe injuries or even death while rear-end type collisions most often occur at lower speeds; if any injuries are sustained they are usually minimal. It is significant that a majority of collisions within the WOAS study area have been non-injury collisions. Table 8 summarizes collisions by severity for US 101 and Table 9 summarizes collisions by severity for I-5, both within the study area boundaries.

<table>
<thead>
<tr>
<th>Severity of Collision</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal collision</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Disabling injury collision</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Evident injury collision</td>
<td>15</td>
<td>9</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Possible injury collision</td>
<td>33</td>
<td>43</td>
<td>32</td>
<td>108</td>
</tr>
<tr>
<td>Property damage only collision</td>
<td>91</td>
<td>84</td>
<td>77</td>
<td>252</td>
</tr>
<tr>
<td>Total collisions</td>
<td>141</td>
<td>137</td>
<td>115</td>
<td>393</td>
</tr>
</tbody>
</table>

Source: WSDOT Olympic Region
Notes: Under 23 United States Code - Section 49, this data cannot be used in discovery or as evidence at trial in any action for damages against the Washington State Department of Transportation or the State of Washington.
**Table 9 I-5 Collisions in WOAS Study Area by Severity – 2003-2005**

<table>
<thead>
<tr>
<th>Severity of Collision</th>
<th>Number of Collisions by Severity of Collision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
</tr>
<tr>
<td>Fatal collision</td>
<td>1</td>
</tr>
<tr>
<td>Disabling injury collision</td>
<td>1</td>
</tr>
<tr>
<td>Evident injury collision</td>
<td>16</td>
</tr>
<tr>
<td>Possible injury collision</td>
<td>59</td>
</tr>
<tr>
<td>Property damage only collision</td>
<td>136</td>
</tr>
<tr>
<td><strong>Total collisions</strong></td>
<td><strong>213</strong></td>
</tr>
</tbody>
</table>

*Source: WSDOT Olympic Region*

*Notes: Under 23 United States Code - Section 49, this data cannot be used in discovery or as evidence at trial in any action for damages against the Washington State Department of Transportation or the State of Washington.*

During the 3-year analysis period, three collisions resulted in fatal injuries on US 101 within the WOAS study area. There were also three fatal injury collisions on I-5 within the study area. All three fatal injury collisions on US 101 involved alcohol. Alcohol was a factor in one of the fatal collisions on I-5.

**Collision Rates**

Collision rates are a measure of the number of crashes per million vehicle miles traveled on a particular facility. This enables comparisons between different facilities and with statewide averages.

The overall collision rate for US 101 within the study area for the 3-year time period January 1, 2003 through December 31, 2005 was 1.18 collisions per million vehicle miles traveled. The statewide average collision rate for similar highways during the same time period was 2.45 collisions per million vehicle miles.

The collision rate for I-5 within the study area for the same 3-year time period was 1.33 collisions per million vehicle miles traveled, while the average statewide rate for urban interstates during the same time period was 1.36 collisions per million vehicle miles traveled.

**High Collision Locations and Corridors**

*High Collision Locations* are spot locations typically 0.10 miles long which have experienced a higher than average rate of severe accidents during the two year analysis period. For the 2-year time period from January 1, 2003 through December 31, 2004 there were 11 high collision locations within or adjacent to the WOAS study area. Five of these locations were on US 101 while the remaining six were on I-5. These are as follows:

- **High Collision Locations on US 101**
  - Eastbound Off-Ramp at Black Lake Boulevard
  - Eastbound On-Ramp at Black Lake Boulevard
  - Westbound Off-Ramp at Black Lake Boulevard
  - Westbound On-Ramp at Black Lake Boulevard
  - US 101 from MP 366.90 to MP 367.41
High Collision Locations on I-5
- Northbound Off-Ramp at State Capitol
- Southbound Off-Ramp at State Capitol
- Northbound On-Ramp at US 101
- Southbound Off-Ramp at 2nd Avenue
- Northbound Off-Ramp at Deschutes Parkway
- Southbound Off-Ramp at Trosper Road

High Collision Corridors are sections of highway one or more miles in length which have a higher than average number of severe accidents over a continuous period of time. There are two High Collision Corridors located within or adjacent to the WOAS study area. These are as follows:

- I-5 from MP 105.62 to MP 107.61
  City Center/State Capitol interchange to Pacific Avenue interchange

- US 101 from MP 366.59 to MP 367.41
  Cooper Point Rd./Crosby Blvd / Mottman Road interchange to I-5/US 101 interchange

The US 101 High Collision Corridor was the fourth highest ranked corridor in the Olympic Region. A recently installed cable median barrier should help to reduce collisions in this corridor.

WSDOT analysis of collision data concludes that congestion is a major contributing factor to highway collisions within the study area as is excessive speed for the driving conditions present. This is reflected in the large share of collisions resulting in property damage only, and in the large share of rear end collisions.
This is one of four background reports for the West Olympia Access Study:

Report #1 – Significant Transportation and Land Use Events
Report #2 – Transportation Characteristics
Report #3 – Land Use and Environment Characteristics
Report #4 – Social and Economic Characteristics

Additional information on the study area can be found in the report, *Synopsis of Previous Plans and Studies Associated with the Study Area*.

These reports and maps were prepared for the City of Olympia and the Washington State Department of Transportation (WSDOT) by Thurston Regional Planning Council with the generous assistance of staff from the Olympia, WSDOT and various stakeholders in the West Olympia Access Study.

Information on the West Olympia Access Study can be found on-line at

www.wsdot.wa.gov
and
www.trpc.org/westolympia

or by calling 360.956.7575.