Jefferson County
Quimper Peninsula Transportation Study
January 2012
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EXECUTIVE SUMMARY

The Quimper Peninsula Transportation Study is a key component in a multi-year planning process undertaken to identify transportation needs and projects in the Irondale and Port Hadlock Urban Growth Area (UGA) and along the SR 19 and SR 20 corridors. The study establishes a vital link between land use and the transportation facilities needed to address current system deficiencies and to support future growth, economic development, recreation, tourism, livability, and overall quality of life in northeastern Jefferson County.

Why conduct the study now?

Several factors contributed to the overall need and timing to conduct the study. They included:

- Preparation of the study allows the recommended improvement projects to be integrated into the Transportation Element update of the County’s Comprehensive Plan, anticipated to be completed by mid-2016.
- The transportation study, which included the development of a travel demand model, provides the necessary tools and technical basis to prioritize projects every year as part of the County’s six-year Transportation Improvement Program (TIP) update.
- In 2004, the legislative authority of Jefferson County, the Board of County Commissioners, designated an unincorporated UGA, referred to as the Irondale and Port Hadlock UGA. As UGA planning transitions into implementation, there was a need to update and refine the UGA Transportation Plan based on the results of this study.
- Subsequent to this planning effort, the Washington State Department of Transportation (WSDOT) began efforts to prepare a corridor plan for the State Route (SR) 19 and SR 20 corridor from SR 104 to the ferry terminal in Port Townsend. The County desired to share the results of this broader transportation study that evaluated alternative improvement strategies that focused on the County roadway system, in addition to the state highway system.
- Jefferson County Public Works (JCPW) desired to construct a travel demand and operations model for the study area to evaluate existing and future needs to provide policymakers with technical information and policy recommendations when prioritizing and funding projects.

What did the study evaluate?

The study evaluates the existing and future transportation conditions on the Quimper Peninsula, specifically focusing on the Irondale and Port Hadlock UGA. The evaluation focuses on the street system, traffic controls, traffic volumes, and traffic operations of the major roadways and intersections in the study area.

To provide a framework for future transportation system needs, the study considered the transportation needs of future growth. A needs assessment was conducted to provide the framework by which to identify projects to address the transportation needs in the study area. Specific transportation improvement projects have been identified and evaluated to address the needs. The transportation projects focus on the needs for motor vehicles to improve mobility, safety, circulation, and access within the study area. Non-motorized transportation improvement projects were not specifically identified and will be addressed as part of a subsequent phase.

Eventually the improvement projects identified in the Quimper Peninsula Transportation Study may be incorporated into updates of the County Comprehensive Plan and six-year TIP.
What are the specific findings of the study?

- Forecast population growth through 2031 will result in a proportional increase in traffic on many of the Quimper Peninsula roadways. The highest amount of vehicle volume growth will occur along the SR 19 and SR 20 corridors between the Chimacum Crossroads (SR 19 intersection with Chimacum Road and Center Road) and the City of Port Townsend. Traffic volumes along the corridor will range from 400 vehicles per hour (vph) in each direction near the Chimacum Crossroads to approximately 1,500 vph in each direction just south of Mill Road.

- Most of the County-maintained arterials, collectors and local roadways on the Quimper Peninsula will be able to adequately handle forecast traffic growth.

- The capacity of the SR 19/20 corridor is between 1,200 and 1,400 vehicles per hour per lane. Forecast traffic volumes will approach or exceed the capacity of the corridor thereby causing congestion and high amounts of delay, especially for side street approaches.

- The summer season represents the peak traffic throughout the Quimper Peninsula.

- Residents will likely have a greater interest in alternative modes of transportation or change their travel patterns to make trips during off-peak hours due to the expected increase in congestion along the SR 19/20 corridor.

- There are no comparable, direct alternate routes between the Irondale and Port Hadlock UGA and the City of Port Townsend which results in the need to either consider widening the SR 19/20 corridor or providing improved travel options such as a system of trails and sidewalks, carpooling incentives, bicycle facilities, and increased transit service.

- The unsignalized intersections along the SR 19/20 corridor between Chimacum Crossroads and the City of Port Townsend are forecast to operate at level of service (LOS) F. Motorists attempting to enter the corridor from the side streets will find fewer gaps in traffic to make a safe maneuver.

- With increased traffic volumes on the roadways, pedestrians and bicyclists will experience more conflicts with motorized vehicles; especially on routes that do not have sidewalks, adequate shoulders, bike lanes, or pedestrian crossings and signals.

What are the recommended improvement projects?

Specific improvement projects have been identified and evaluated to address the existing and future transportation needs and issues within the study area. The transportation projects focus on improving mobility, safety, circulation, and access within and around the Irondale and Port Hadlock UGA. The improvements also focus on specific corridors such as SR 19 and SR 20 between Four Corners Road and the City of Port Townsend.

The transportation improvement projects have been sorted into three categories: intersection, roadway, and access management improvements. The projects are illustrated in Figure 1 and are color coded by type of improvement. A description of each improvement project is provided in Chapter 5 and Appendix C.
What are the next steps?

The Quimper Peninsula Transportation Study identifies roadway related projects to improve mobility, safety, circulation, and access in the Irondale and Port Hadlock UGA and along the SR 19/20 corridor. Since available revenue to implement the identified improvements is very limited, the County should work to complete the following steps to identify funding and eventually implement the identified projects.

- Update the UGA Transportation Plan based on the results of this study.
- Complete the identification of needed non-motorized projects in the Irondale and Port Hadlock UGA and incorporate them into an update of the County’s non-motorized plan.
- Incorporate the recommended improvements into the County’s Transportation Element of the Comprehensive Plan.
- Review and update development codes and roadway design standards, specifically along SR 116, to support implementation of the desired streetscapes, connections, Transportation Demand Management (TDM) strategies, and facilities identified in the UGA Transportation Plan.
- Revise or develop an updated project prioritization process used to rank all transportation projects annually.
- As funding or opportunities arise, incorporate the recommended improvements into the County’s six-year TIP.
- Work with WSDOT and the Peninsula Regional Transportation Organization (PRTPO) to incorporate the projects identified for the SR 19/20 corridor and also in the WSDOT Corridor Plan into the State’s Highway System Plan (HSP) and the PRTPO Regional Transportation Plan (RTP).
Chapter 1. INTRODUCTION

The Quimper Peninsula Transportation Study is a key component in a multi-year planning process undertaken to identify transportation needs and projects in the Irondale and Port Hadlock Urban Growth Area (UGA). The following provides more background about the timing and purpose of the study.

Why conduct the study now?

Several factors contributed to the overall need and timing to conduct the study. They included:

Washington State Growth Management Act

The Washington State Growth Management Act (GMA) requires that Jefferson County review and, if necessary, revise its Comprehensive Plan and development regulations in 8-year cycles [RCW 36.70A.130(5)(b)]. Jefferson County Public Works (JCPW) is responsible for providing technical information and related policy recommendations for the consideration of policymakers in updating the Transportation Element of the Comprehensive Plan. As a key part of the overall strategy for updating the Transportation Element, JCPW desired a study that included the development of a travel demand model, to assist in prioritizing and selecting among numerous transportation challenges and opportunities in the Quimper Peninsula study area. Preparation of such a study would provide the evaluation of long-term transportation needs and a recommended project list that then could be included in the Transportation Element update. The next Comprehensive Plan update was originally targeted for 2011, so the study began in 2008 to meet this deadline. However the State Legislature extended the deadline to complete local Comprehensive Plan updates to 2014 and then 2016 due to statewide economic conditions and the lack of funding to complete such updates.

Priority Programming

According to Washington State law, JCPW prepares and the Board of County Commissioners (BoCC) adopts a rolling six-year Transportation Improvement Program (six-year TIP) that lists the capital projects projected for the next six-year period. The Annual Construction Program is the portion of the adopted annual budget that relates to the first year of the six-year TIP. Local governments preparing six-year TIPs are required to employ priority programming to assist in identifying and prioritizing needed improvements. Most of the State rules and guidance for priority programming relate to road segments. JCPW desired to evaluate comparisons between traditional road projects—including segment, intersection and safety upgrades—with non-motorized transportation projects, and non-traditional transportation projects that principally address community values related to livability and quality of life. The transportation study and development of a travel demand model would provide the necessary tools and technical basis to prioritize projects every year as part of the six-year TIP update.

UGA Transportation Planning

In 2004, the legislative authority of Jefferson County, the BoCC, designated an unincorporated UGA, referred to as the Irondale and Port Hadlock UGA. The designation was based on previous work completed in the Tri-Area / Glen Cove Special Study and studies completed for the 2004 adoption, including a UGA Transportation Plan. The UGA Transportation Plan serves as the basis for the transportation components of the Capital Facilities Plan for the UGA and was used to support an update of the Transportation Element of the Comprehensive Plan. As UGA planning transitions into implementation, there was a need to update and refine the UGA Transportation Plan based on the results of a new travel
demand model that better incorporated and evaluated impacts of the expected land use growth.

**SR 19/20 Corridor Plan**

Subsequent to this planning effort, the Washington State Department of Transportation (WSDOT) began efforts to prepare a corridor plan for the State Route (SR) 19 and SR 20 corridor from SR 104 to the ferry terminal in Port Townsend. JCPW desired to get out ahead of that process by supplying information, sharing data, initiating public involvement, and generating ideas and plans for transportation improvements along the State Routes, including SR 116 to the turn-off to Indian and Marrowstone Islands, as well as County roads along the corridor. In addition, the modeling tools developed as part of the Quimper Peninsula Transportation Study could be shared with WSDOT during the corridor planning process to assist in providing consistent assumptions, with the intent of developing similar results and priorities.

**Transportation Model**

JCPW desired to construct a travel demand and operations model for the study area to evaluate existing and future needs based on the County’s adopted land use plan. The transportation models were built as part of the study effort and were designed to assist JCPW in providing policymakers with technical information and policy recommendations related to each of the items described above.

**What is the goal of the County’s transportation planning program?**

*Definition:* “Goals convey the overall, broad intent of the proposed project – what will be accomplished.”

To proactively and positively influence the experience of traveling through, visiting, and residing in the study area.

**What are the desired outcomes for the study area transportation system?**

*Definition:* “Outcomes are products or results. This is what can be achieved based on the problem and need statements.”

- A vision—as expressed in an updated UGA Transportation Plan and in an SR 19/20 Corridor Plan—that enjoys enthusiastic community buy-in and provides an implementation blueprint for future development and transportation improvements in the Tri-Area and surroundings.
- The County’s transportation system is fully integrated with the City of Port Townsend, neighboring jurisdictions and services (e.g., Washington State Ferries), and the Peninsula Regional Transportation Planning Organization (PRTPO) Regional Transportation Plan (RTP).
- Sustainability indicator measurement, involving both the transportation system and overall community livability, is a component of an ongoing Visionary Transportation Planning program.
- Safety and mobility concerns and objectives are addressed and achieved for road segments and intersections in the study area.
- The Tri-Area is known for safe, desirable neighborhoods.
• School children are able to walk and bike to school and between amenities like libraries and parks safely and comfortably.
• A Transportation Demand Management (TDM) program reduces the number of trips, particularly automobile trips, required by the resident and visiting population.
• Public transportation modes are integrated, synchronized, simple to use, accessible and affordable.
• The transportation system includes efficient and effective multi-modal connections between nodes.
• Commercial and public services are available to residents in neighborhood nodes that are accessible by non-motorized transportation.

What are the objectives of the transportation study process?

Definition: “Objectives are statements of intended outcomes that can be measured.”

1. JCPW will develop a travel demand model for the Quimper Peninsula, focusing on the SR 19/20 and SR 116 corridors, with which to continuously prioritize improvements and analyze scenarios.
2. JCPW will work with the Chimacum School District and the Jefferson County Sheriff to develop a “Safe Routes to School” plan and apply for implementation funding through the State of Washington based on outcomes of the study.
3. JCPW will use the information considered and generated in the study to:
   a. More fully integrate transportation planning with community development and land use planning in the Tri-Area and beyond.
   b. Enhance transportation priority programming for the subject corridor and countywide for use in developing the six-year transportation improvement program (six-year TIP).
   c. Develop and implement concurrency management, access management, and transportation demand management programs.
   d. Develop an implementation plan and schedule that builds upon and updates the current UGA Transportation Plan.
   e. Update the Transportation and Capital Facilities Elements of the Comprehensive Plan (CP) for the required 2016 update under GMA.
   f. Help meet or exceed the Level of Service (LOS) standards adopted in the original 2002 version, the 2010 update, and subsequent versions of the Jefferson County Non-Motorized Transportation and Recreational Trails Plan, with concentration on the Tri-Area.
   g. Strategize on when and how to update the travel demand model for future applications.
4. Within five years, the Tri-Area has one or more functioning gathering spots for pedestrians, cyclists, and visiting motorists to increase community cohesion.

What is defined as the study area?

The Quimper Peninsula Transportation Study focuses on locations within and around the Irondale and Port Hadlock UGA, but includes a broader area to account for surrounding land uses and travel patterns. The study area encompasses everything south of Port Townsend, east of South Discovery Road, and north of Chimacum Crossroads (intersection of SR 19, Chimacum Road and Center Road), and includes the planned Irondale and Port Hadlock UGA.

The primary roadways in the study area are SR 19, SR 20, SR 116, South Discovery Road, Irondale Road, Chimacum Road, and Four Corners Road. Traffic operations analysis was conducted at the intersections illustrated in Figure 1 and for both the SR 19 and SR 20 corridors. Aerial photos of the study area are presented in Appendix E.
**Legend**

- Red Circle: Study Intersections
- Blue Circle: Other Intersections
- Light Gray: Port Townsend
- Darker Gray: Port Hadlock UGA
- Yellow: Study Area
- Brown: Airport

**Study Area**

*Quimper Peninsula Transportation Study*
Chapter 2. EXISTING CONDITIONS EVALUATION

The transportation conditions evaluation summarizes the existing traffic conditions in the Quimper Peninsula, specifically focusing on the Irondale and Port Hadlock UGA. One component of the transportation study is to evaluate current traffic operations and levels of service (LOS) at key locations along SR 19 and SR 20, and within the Irondale and Port Hadlock UGA. The existing conditions evaluation focuses on the street system, traffic controls, traffic volumes, and traffic operations.

What is the purpose of this analysis?

The purpose of the existing conditions analysis is to determine existing traffic operational conditions throughout the study area. The results are presented in terms of LOS. The existing conditions analysis identifies locations operating near or below LOS standards. Existing traffic volumes and travel patterns were collected to complete the evaluation.

What are the traffic volumes in the study area?

Traffic volume data in the study area were collected for intersections and roadway segments for the PM Peak Hour. Average daily traffic (ADT) volumes for many of the major roadways were compiled from JCPW and WSDOT. A seasonal adjustment factor was applied to the intersection counts to reflect peak summer conditions for all data collected in non-summer months. PM Peak Hour roadway segment volumes and intersection turning movements are illustrated in Figures 3 and 4.

Data Collection

Existing traffic count data from 2005 to 2007 was assembled from JCPW, WSDOT, and City of Port Townsend. The data included both PM Peak Hour traffic volumes and ADT volumes. The majority of the data received from JCPW and WSDOT were tube count data. Additional traffic count needs were identified, and new PM Peak Hour intersection turning movements were collected at key intersections within the study area in January 2008.

Seasonal Adjustment Factors

The summer season represents the peak traffic throughout the Quimper Peninsula. Numerous tourism and recreational activities attract additional people to the area during the summer months and result in a significant increase in traffic volumes. As a result, the intersection counts collected in January were adjusted to reflect peak summer conditions.

The seasonal adjustment factor was derived from tube and intersection counts taken during the summer between 2005 and 2007 compared to the January 2008 intersection counts and wintertime tube counts from 2005 to 2007 at corresponding locations. The January 2008 counts were increased by an average of 20 percent to match summer travel patterns based on historical differences between winter and summer counts.

Average Daily Traffic (ADT) Volumes

Daily traffic volumes were compiled from the JCPW and WSDOT data sources. The counts were collected between 2005 and 2007. The counts were collected along SR 19, SR 20, SR 104, and US 101. The volumes represent average daily traffic (ADT) because they represent the average of counts collected in both directions at selected locations all day for two to seven days during a year. These differ from average annual daily traffic (AADT) volumes,
which represent the total, two-way volume of vehicle traffic on a selected roadway for a year, divided by 365 days.

Along SR 20 between Port Townsend and the intersection with SR 19 the average daily roadway volumes northbound and southbound are approximately 10,500 vehicles. South of the intersection with SR 19, the volumes on SR 20 decrease to less than 3,000 vehicles per day in each direction. The daily roadway volumes on SR 19 between the intersection with SR 20 to the north and Irondale Road to the south are approximately 8,000 vehicles northbound and southbound. On SR 19, within the Irondale and Port Hadlock UGA, daily volumes are approximately 8,000 vehicles in each direction north of SR 116 and approximately 6,000 vehicles south of SR 116. The roadway segment volumes on other major arterials, secondary arterials, collector roads, and along SR 116 are less than 3,500 vehicles in each direction per day.

**PM Peak Hour Volumes**

The PM Peak Hour roadway segment volumes are shown on Figure 3. Along SR 20 between Port Townsend and the intersection with SR 19 the roadway volumes are approximately 1,030 vehicles southbound and 715 vehicles northbound. South of the intersection with SR 19, the volumes on SR 20 decrease to less than 220 vehicles in both directions. The roadway volumes on SR 19 between the intersection with SR 20 and Irondale Road are approximately 800 vehicles southbound and 595 vehicles northbound. On SR 19, within the Irondale and Port Hadlock UGA, volumes north of SR 116 are approximately 600 vehicles northbound of and 690 vehicles southbound. The roadway volumes on other major arterials and along SR 116 are less than 330 vehicles in either direction during the PM Peak Hour.

The PM Peak Hour volumes are used to evaluate LOS at key intersections and along specific highway segments in the study area. The notable observations from the review of the PM Peak Hour traffic volumes include:

- South of Port Townsend, the majority of traffic is traveling southbound, away from the city center.
- Traffic on the major arterials and state routes in the Irondale and Port Hadlock UGA is approximately equal in both directions, indicating that there is not a visible peak direction of travel around the UGA during the PM Peak Hour.

**How do the study area intersections operate today?**

An LOS model was developed to evaluate the intersections throughout the study area. The results of the LOS analysis provide a baseline against which the traffic forecasts and improvement alternatives can be compared.

**Intersection Level of Service Methodology**

The operational characteristics of an intersection are determined by calculating the intersection’s LOS. The intersection as a whole and its individual turning movements can be described alphabetically with a LOS range of A through F. LOS A indicates free-flow traffic and LOS F indicates extreme congestion and long vehicle delays. LOS is measured in average control delay per vehicle and is reported for the intersection as a whole at signalized intersections and for the approach or turning movement that experiences the most delay at unsignalized intersections. Control delay is defined as the combination of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Appendix A details the intersection LOS methodology.
Existing LOS, delays, and volume-to-capacity (V/C) ratios were calculated at the study intersections based on methods contained in the *Highway Capacity Manual 2000* (HCM). Synchro (version 6.0) was used for these calculations.

**2008 Intersection Levels of Service**

In general, the intersections along SR 20 between Port Townsend and the Irondale and Port Hadlock UGA and the intersections along SR 19 through the UGA have high delays along the side street approaches and operate below typical intersection standards. However, most other intersections in the study area are generally operating at or above typical standards. Table 1 summarizes the LOS results at the study intersections. Appendix B contains detailed LOS worksheets for existing PM Peak Hour conditions.

For the LOS analysis, existing traffic volumes were rounded to the nearest five vehicles because weekday volumes fluctuate day-to-day. Figure 2 shows the study intersections and Figure 4 summarizes the existing PM Peak Hour turning movements at each study intersection. Figure 5 illustrates the LOS at each study intersection.

### Table 1. 2008 Existing Intersection Level of Service Summary

<table>
<thead>
<tr>
<th>ID</th>
<th>Intersection</th>
<th>Control Type</th>
<th>LOS Standard</th>
<th>2008 Existing Conditions</th>
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<td>D</td>
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<td>F</td>
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</table>

1. TWSC = Two-Way Stop Control, AWSC = All-Way Stop Control, Round = Roundabout, Signal = Signal
2. LOS standard is according to common rural and urban area standards; intersection operations are deficient if calculated LOS exceeds the standard. There are no intersection LOS standards designated by the County or WSDOT.
3. Level of service, based on 2000 Highway Capacity Manual methodology. Bold font represents intersections with LOS E or F.
4. Average delay in seconds per vehicle. Bold font represents intersections with LOS E or F.
5. Volume-to-capacity ratio reported for signalized intersections. Bold font represents intersections with LOS E or F.
6. Worst movement reported for unsignalized intersections. Bold font represents intersections with LOS E or F.
7. The Peak Hour Factor (PHF) of each approach was used instead of the PHF for the intersection as a whole.
8. Two-stage gap (TWLTL median type in Synchro) was assumed in LOS calculations for this intersection.
As illustrated in Table 1, all intersections except the following operate at LOS D or better during the PM peak hour:

- SR 19 and SR 116
- SR 19 and Irondale Road
- SR 19 and Prospect Avenue
- SR 19 and Airport Road
- SR 20 and Seton Road
- SR 20 and Fredericks Street
- SR 20 and Jacob Miller Road

The poor intersection operations at these locations are due to high traffic volumes on the state highways during the PM Peak Hour. These intersections are all unsignalized and vehicles turning left onto the state routes are delayed trying to find sufficient gaps in the traffic to safely turn. These intersections are located between the Irondale and Port Hadlock UGA and the City of Port Townsend on roadway segments carrying a high volume of traffic during the PM Peak Hour.

**How do the study area highways operate today?**

An operational analysis of SR 19 and SR 20 was conducted using the PM Peak Hour traffic volume data. SR 19 and SR 20 were divided into highway segments with each segment consisting of nearly uniform characteristics in grade, shoulders, lane widths, and access points such as intersections and driveways. The following describes the methodology used to calculate the LOS for the study segments and the results of the LOS analysis.

**Highway Level of Service Methodology**

Highway LOS was determined in accordance with the *Highway Capacity Manual 2000* (HCM) methodology using the *Highway Capacity Software* (HCS+). Factors influencing highway LOS include traffic volumes, percentage of heavy vehicles, design speed of the highway, number of passing zones, shoulder and lane widths, grade, and directional distribution of traffic. The roadway segments include:

- Segment 1 – SR 19 between SR 104 and Chimacum Road
- Segment 2 – SR 19 between Chimacum Road and SR 116
- Segment 3 – SR 19 between SR 116 and SR 20
- Segment 4 – SR 20 between SR 19 and Mill Road
- Segment 5 – SR 20 between Mill Road and Kearney Street
- Segment 6 – SR 20 between Kearney Street and Monroe Street

Traffic operations for highway segments are described alphabetically with a range of LOS similar to the intersection LOS, with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. For rural two-lane highways, LOS is measured as a combination of an average vehicle speed and a percent-time-spent-following (PTSF), or percent of the time a vehicle is hindered by slower vehicles and unable to pass. For urban arterials, LOS is measured using an average vehicle speed which accounts for delays caused by signalized intersections. Since SR 19 and SR 20 have very few traffic signals, the rural two-lane highway LOS methodology was used for all segments. Appendix A includes a detailed description of the highway LOS methodology. Appendix B includes the HCS+ reports for each roadway segment.
2008 Highway Levels of Service

Table 2 summarizes the highway LOS results for the study segments along SR 19 and SR 20. Table 2 includes the average speed per vehicle in miles per hour, and the PTSF. The LOS results are also illustrated in Figure 5.

<table>
<thead>
<tr>
<th>Segment Boundary</th>
<th>Type</th>
<th>LOS</th>
<th>Average Speed (mph)</th>
<th>PTSF (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Route 19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 SR 104 to Chimacum Road</td>
<td>TWTL</td>
<td>C</td>
<td>38.0</td>
<td>62.7</td>
</tr>
<tr>
<td>2 Chimacum Road to SR 116</td>
<td>TWTL</td>
<td>D</td>
<td>29.0</td>
<td>71.1</td>
</tr>
<tr>
<td>3 SR 116 to SR 20</td>
<td>TWTL</td>
<td>D</td>
<td>34.5</td>
<td>80.0</td>
</tr>
<tr>
<td>State Route 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 SR 19 to Mill Road</td>
<td>TWTL</td>
<td>E</td>
<td>31.5</td>
<td>86.5</td>
</tr>
<tr>
<td>5 Mill Road to Kearney Street</td>
<td>TWTL</td>
<td>E</td>
<td>25.8</td>
<td>83.4</td>
</tr>
<tr>
<td>6 Kearney Street to Monroe Street</td>
<td>TWTL</td>
<td>E</td>
<td>24.6</td>
<td>68.5</td>
</tr>
</tbody>
</table>

1. HCM LOS methodology used: TWTL is two-way, two-lane highway.
2. PTSF = Percent time-spent-following

SR 19 operates at LOS C from SR 104 to Chimacum Road because the amount of travel time that a vehicle spends following another vehicle is only around 63 percent. SR 19 from Chimacum Road to SR 20 operates at LOS D because more vehicles are using the roadway as motorists from the Irondale and Port Hadlock UGA enter SR 19 to head north to Port Townsend or south to SR 104 during the PM Peak Hour and the time that an average motorist spends following other vehicles is fairly high.

The highway LOS results for SR 20 indicate that the segment operates at LOS E during the PM Peak Hour. The highway segments between the Irondale and Port Hadlock UGA and the City of Port Townsend serve a high number of work- and shopping-related trips and few alternate routes are available for motorists traveling between the two areas.
Chapter 3. DEVELOPMENT OF THE TRAVEL FORECASTS

This chapter summarizes the methodology used to develop the travel forecasts and presents the resulting forecast traffic volumes. To provide a framework for future transportation system needs, the study considered the transportation needs of future growth. Jefferson County selected a 2031 horizon year to provide a long range look at the transportation system needed to support anticipated growth in the UGA and other communities inside and outside the study area. Travel forecasts have been developed and analysis has been conducted for average weekday conditions during the PM peak hour.

How were the travel forecasts developed?

A travel demand model was constructed and calibrated to aid in the analysis of future transportation needs on the Quimper Peninsula. The land use data upon which the travel demand model was built was compiled by Jefferson County and included existing land uses, such as housing and employment data, and population statistics. A comprehensive survey of existing transportation facilities and characteristics was completed to ensure that the travel demand model network accurately represented the existing conditions.

Transportation Analysis Zones (TAZs) were defined for the model and used to divide the study area into similar areas in terms of land use and travel characteristics. The TAZs were used to summarize land use data, which were then used to estimate traffic volumes coming to and from each TAZ.

The transportation network represents the local area road system within the model. The model includes all arterial and collector streets. Some local streets were also included to allow the model to more accurately represent travel patterns. Each roadway was divided into segments based on the location of key intersections and locations of land uses. Each road segment was coded with data based on the functional classification, number of travel lanes, speed, and an estimate of capacity. Capacity values were also assigned to each intersection (or node) in the model.

Trip tables represent the travel to/from each zone to all other TAZs (both internal and external TAZs). The travel demands for each internal TAZ were estimated based on the land uses in that zone. Trip generation equations, which convert the land use data to number of vehicle trips, and trip distribution, which identifies the specific zone-to-zone interchanges, were the basic tools for developing the trip table. Vehicle trips were distributed by the model using zone-to-zone allocations based on travel times and distances. These parameters were adjusted as part of the model calibration.

The final step in developing the base year travel forecasting model was to assign the trip table to the transportation network. The model assignment results were compared to the actual traffic counts to calibrate the model to base year conditions. Calibration was an iterative process in which refinements were made to the model until a satisfactory result was achieved. The model was calibrated to generally accepted standards and thus provides a basis for developing and evaluating future travel demands.

The travel demand model has been documented in a report titled Quimper Peninsula Travel Demand Model Documentation from October 2008.
What information is output from the travel demand model?

The model focuses on traffic conditions during the PM Peak Hour of the spring and summer months. This time period coincides with the tourist and recreation based economy of the Quimper Peninsula. Identifying transportation system needs for this time period means that lesser travel conditions throughout the remainder of the year are adequately served. Jefferson County and the City of Port Townsend have concluded this time period is a reasonable representation for which transportation solutions should be planned.

The calibrated model was used to generate traffic forecasts for the year 2031. The Comprehensive Plan for Jefferson County evaluates anticipated needs over a 20-year planning horizon. Future land use data were generated after careful consideration of available buildable lands, projects currently planned, comprehensive and subarea plans, and redevelopment potential. The forecast volumes were loaded onto a representation of a baseline 2031 roadway network. The combination of forecast traffic volumes and the ability to superimpose those volumes on a future baseline roadway network has created the opportunity to identify areas where traffic volumes will approach or exceed the capacity of the roadway or intersection. The travel demand model also highlights areas where traffic might shift to parallel corridors to avoid excessive delays and congestion.

What are the existing and forecast land uses?

Land use data were used in the modeling process to estimate the quantity of travel activity associated with each TAZ in the model. The land use process was a coordinated effort between Transpo, Jefferson County, and the City of Port Townsend. Jefferson County was primarily responsible for providing the 2007 and 2031 land use data outside of Port Townsend. Existing and future land use data provided by Jefferson County were quantified according to the categories shown in Table 3. The process by which the land use was calculated and defined for the model is documented in the Quimper Peninsula Travel Demand Model Documentation Report.

<table>
<thead>
<tr>
<th>Land Use Type</th>
<th>Units</th>
<th>Land Use Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFDU</td>
<td>Dwelling Units</td>
<td>Single-family dwelling units in Port Townsend</td>
</tr>
<tr>
<td>CntySFDU</td>
<td>Dwelling Units</td>
<td>Single-family dwelling units outside Port Townsend</td>
</tr>
<tr>
<td>MFDU</td>
<td>Dwelling Units</td>
<td>Multi-family dwelling units, including duplexes</td>
</tr>
<tr>
<td>RetireDU</td>
<td>Dwelling Units</td>
<td>Retirement dwelling units/second homes</td>
</tr>
<tr>
<td>NRC</td>
<td>Employees</td>
<td>Natural resource and construction employment</td>
</tr>
<tr>
<td>Manuf</td>
<td>Employees</td>
<td>Manufacturing and Industrial employment</td>
</tr>
<tr>
<td>CTU</td>
<td>Employees</td>
<td>Communication, Transportation, Utilities employment</td>
</tr>
<tr>
<td>Whole</td>
<td>Employees</td>
<td>Wholesale employment</td>
</tr>
<tr>
<td>Retail-High</td>
<td>Employees</td>
<td>Retail employment along Upper Sims Way</td>
</tr>
<tr>
<td>Retail-Low</td>
<td>Employees</td>
<td>Retail employment along Lower Sims Way/Water Street</td>
</tr>
<tr>
<td>CntyRetail</td>
<td>Employees</td>
<td>Retail employment outside of Port Townsend</td>
</tr>
<tr>
<td>FIRE</td>
<td>Employees</td>
<td>Finance, Insurance, and Real Estate employment</td>
</tr>
<tr>
<td>Edu</td>
<td>Employees</td>
<td>Education employees (Elementary and Secondary)</td>
</tr>
<tr>
<td>Med</td>
<td>Employees</td>
<td>Medical employment</td>
</tr>
<tr>
<td>Office/Other</td>
<td>Employees</td>
<td>Office or other services employment</td>
</tr>
<tr>
<td>CntyOffice</td>
<td>Employees</td>
<td>Office or other services employment outside of Port Townsend</td>
</tr>
<tr>
<td>GOV</td>
<td>Employees</td>
<td>Government employment</td>
</tr>
<tr>
<td>Motel</td>
<td>Rooms</td>
<td>Motels, hotels, and resort destinations</td>
</tr>
</tbody>
</table>

Table 3. Quimper Peninsula Travel Demand Model Land Use Categories
Table 4 summarizes the existing and future land use data for households and employment organized by sub-area including Port Townsend, North Peninsula, Mid-Peninsula, the Port Hadlock UGA, South Peninsula, and the Port Ludlow MPR.

Table 4. 2007 and 2031 Employment and Household Land Use Data

<table>
<thead>
<tr>
<th>Model Sub-Area</th>
<th>Number of Household Units</th>
<th>Number of Employment Units</th>
<th>Percent Increase</th>
<th>Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td>2031</td>
<td>2007</td>
<td>2031</td>
</tr>
<tr>
<td>Port Townsend</td>
<td>4,643</td>
<td>7,437</td>
<td>60 %</td>
<td>5,451</td>
</tr>
<tr>
<td>North Peninsula</td>
<td>1,270</td>
<td>1,699</td>
<td>34 %</td>
<td>649</td>
</tr>
<tr>
<td>Mid-Peninsula</td>
<td>1,692</td>
<td>2,193</td>
<td>30 %</td>
<td>927</td>
</tr>
<tr>
<td>Port Hadlock UGA</td>
<td>1,230</td>
<td>2,315</td>
<td>86 %</td>
<td>1,007</td>
</tr>
<tr>
<td>South Peninsula</td>
<td>1,644</td>
<td>2,129</td>
<td>30 %</td>
<td>229</td>
</tr>
<tr>
<td>Port Ludlow MPR</td>
<td>1,328</td>
<td>2,250</td>
<td>69 %</td>
<td>330</td>
</tr>
<tr>
<td>Total</td>
<td>11,807</td>
<td>18,023</td>
<td>53 %</td>
<td>8,593</td>
</tr>
</tbody>
</table>

1. Data provided by the City of Port Townsend and Jefferson County.
2. The boundaries of the model sub-areas as represented in the model documentation may or may not exactly match the boundaries as defined and adopted by local agencies because the model documentation boundaries are based on the model TAZ structure which is not as refined. However, the boundaries should be fairly close.

Household land use data account for single-family and multi-family dwelling units as well as homes of person who are retired, and second homes or vacation homes that may or may not be occupied year round. The employment land use data comprise several categories ranging from office jobs to retail, manufacturing, and wholesale jobs as well as education-related employment as outlined in Table 3. Figure 6 illustrates the model sub-areas that are listed in Table 4 while a detailed map of each sub-area can be found in the Quimper Peninsula Model Documentation report.

**Residential Forecasts**

Residential land use growth can be characterized by the following:

- A majority of the residential growth will most likely occur in the City of Port Townsend, the Port Hadlock UGA, and the Port Ludlow MPR. A majority of the retirement housing or second home/vacation home growth will most likely occur in the Port Ludlow MPR and along Paradise Bay Road from SR 104 to the Port Hadlock UGA. The Port Ludlow MPR is a master planned resort community and the total number of dwelling units at build-out is capped by the programmatic Environmental Impact Statement that was completed in 1993.

- Most of the 134 percent growth in multi-family units will most likely occur in the City of Port Townsend west of Discovery Road and between Sims Way and Hastings Avenue as well as along lower Sims Way. Significant multi-family growth outside of Port Townsend will most likely occur in the Port Hadlock UGA when sewer service is available.

**Employment Forecasts**

Employment growth can be characterized by the following:

- Strong growth in Manufacturing, Wholesale, and Retail jobs, are anticipated with moderate growth in the other employment categories.
• The greatest increase in the density and number of new employees will likely occur in the southern portion of the City of Port Townsend along Sims Way (SR 20), Water Street, and along Discovery Road between Jacob Miller Road and Sheridan Street. The growth along Sims Way and Water Street will be concentrated mainly in the existing downtown core, the land around the southwestern portion of Discovery Bay Road and Howard Street, and the southern end of Sheridan Street.

• A significant increase in Manufacturing employment is projected where the existing paper mill is located, on the vacant land between the Glen Cove light industrial/commercial area and the city boundary, and on the Jefferson County International Airport property in the Four Corners area.

• Only small amounts of employment growth are forecast for areas outside of Port Townsend, the Port Hadlock UGA, and the Port Ludlow MPR.

Regional Growth

Growth occurring external to the model was also accounted for by increased traffic on external connectors to the model. Growth on external connectors was determined with the help of historical growth data on state highways provided by the WSDOT. Ferry traffic was estimated to represent the peak off-loading capacity for the vessel most likely to be in service in the year 2031 as planned for by the Washington State Ferry System report for the Port Townsend-Keystone ferry route.

What are the resulting travel forecasts?

The travel forecasts provide a technical basis for identifying needed transportation improvement projects to support the future land use. Figures 6 and 7 illustrate the forecast traffic volumes along the major roadways and at most major intersections on the Quimper Peninsula. The greatest increase in volumes is expected on SR 19 and SR 20 between the Port Hadlock UGA and the City of Port Townsend. Development in the City and Port Hadlock UGA will increase the number of trips to and from both areas during the PM Peak Hour as residents seek employment and services in Port Townsend and vice versa. The traffic growth along SR 19 and SR 20 between these urbanized areas will be much greater than the traffic growth from external sources such as Sequim / Port Angeles or the Greater Seattle Metropolitan Region. For example, traffic on SR 19 near Chimacum Road is forecast to be around 400 to 500 vph in each direction, increasing to 900 vph around Irondale Road, and nearing 1,200 to 1,500 vph on SR 20 just south of Mill Road.
Legend
Model Sub-Areas
- Mid-Peninsula
- North Peninsula
- Port Hadlock UGA
- Port Ludlow MPR
- Port Townsend
- South Peninsula
Chapter 4. NEEDS ASSESSMENT

The needs assessment provides the framework by which to identify projects to address the transportation needs in the study area. The needs assessment describes and documents the future roadway, intersection, and non-motorized transportation needs in the Quimper Peninsula by year 2031. The analysis interprets and builds on the outputs of the travel demand model that was constructed to aid in the forecast of travel patterns and evaluation of transportation operations and system alternatives. Primary non-motorized needs, such as trails, and pedestrian and bicycle facilities, have also been identified in conjunction with existing non-motorized plans as outlined in the Jefferson County Non-Motorized Transportation and Recreational Trails Plan, updated in 2010.

The area of the Quimper Peninsula where a majority of the growth is expected to occur is in and around the proposed Irondale and Port Hadlock UGA. As such, a primary focus has been placed on specific corridors such as SR 19 as it passes through Chimacum and Port Hadlock; SR 116 from SR 19 to Marrowstone Island; and SR 20 between Four Corners Road and the City of Port Townsend.

How were the future transportation needs assessed?

The development of the travel demand model, a traffic operations model, and the forecast traffic volumes in conjunction with the survey of the existing transportation system, land use plans, aerial photography, parcel data, and other base mapping materials have created a significant amount of information that when appropriately combined allows for useful insights into the performance of the future transportation system and the deficiencies that will need to be addressed.

The forecast traffic volumes from the travel demand model and existing and forecast roadway characteristics were analyzed according to LOS methodologies outlined previously. A comparison of forecast traffic volumes and estimated future roadway capacities were useful in identifying locations where volumes will exceed capacity and congestion will likely occur or safety will be degraded.

The forecast traffic volumes that were post-processed from the travel demand model were also used to analyze and identify transportation needs at major intersections on the Quimper Peninsula through the use of an intersection operations model. Intersections where demand will exceed capacity and motorists are likely to experience large delays in attempting to maneuver through the intersection are prime candidates for improvements. The existing intersection and roadway conditions serve as a baseline against which future needs are measured.

Jefferson County has a comprehensive plan for its non-motorized system that includes trails, bicycle facilities, and pedestrian pathways to parks, commercial districts, and residential areas. Primary non-motorized connections and facility needs have been identified in and around the Tri-Area (Irondale, Port Hadlock and Chimacum) that address connectivity, safety, and mobility issues and bring a more system-wide approach to non-motorized planning. Non-motorized needs have primarily been identified for the UGA where urban land use densities are envisioned to support alternative travel options, such as walking and biking.

What are the future roadway and intersection conditions?

The future transportation system needs focus mainly on traffic flow and capacity constraints, and intersection delay and LOS. Deficiencies and needs were identified through the use of the travel demand and traffic operations models.
Highway Traffic Flow

Figure 9 illustrates the 2031 future highway LOS as detailed in Table 5. The highway LOS forecasts for SR 19 and SR 20 are LOS D and E. The highway LOS is based on the percentage of time that a motorist spends following other vehicles without the ability to pass or to travel at a speed that they otherwise would if there were no traffic. The average speed calculation is based on the length of each segment divided by an estimated travel time needed to traverse the segment. The time it takes to traverse a segment of the corridor is affected by many variables including delays caused by left-turns onto or off of the highway, or when motorists are trapped behind slower moving vehicles.

Table 5. 2008 Existing and 2031 Highway LOS Summary

<table>
<thead>
<tr>
<th>Segment Boundary</th>
<th>Type</th>
<th>LOS</th>
<th>Average Speed (mph)</th>
<th>PTSF (%)</th>
<th>LOS</th>
<th>Average Speed (mph)</th>
<th>PTSF (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Route 19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. SR 104 to Chimacum Road</td>
<td>TWTL</td>
<td>C</td>
<td>38.0</td>
<td>62.7</td>
<td>D</td>
<td>34.7</td>
<td>75.5</td>
</tr>
<tr>
<td>2. Chimacum Road to SR 116</td>
<td>TWTL</td>
<td>D</td>
<td>29.0</td>
<td>71.1</td>
<td>D</td>
<td>26.0</td>
<td>80.2</td>
</tr>
<tr>
<td>3. SR 116 to SR 20</td>
<td>TWTL</td>
<td>D</td>
<td>34.5</td>
<td>80.0</td>
<td>E</td>
<td>27.6</td>
<td>91.0</td>
</tr>
<tr>
<td>State Route 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. SR 19 to Mill Road</td>
<td>TWTL</td>
<td>E</td>
<td>31.5</td>
<td>86.5</td>
<td>E</td>
<td>25.2</td>
<td>93.2</td>
</tr>
<tr>
<td>5. Mill Road to Kearney Street</td>
<td>TWTL</td>
<td>E</td>
<td>25.8</td>
<td>83.4</td>
<td>E</td>
<td>22.3</td>
<td>89.0</td>
</tr>
<tr>
<td>6. Kearney Street to Monroe Street</td>
<td>TWTL</td>
<td>E</td>
<td>24.6</td>
<td>68.5</td>
<td>E</td>
<td>23.5</td>
<td>73.3</td>
</tr>
</tbody>
</table>

1. TWTL = The two-way, two-lane highway HCM LOS methodology used to evaluate LOS.
2. The average speed is based on a free-flow speed assumption of 50 miles per hour. It is based on a series of calculations and roadway characteristics, so the average speed does not necessarily relate to actual speeds. An in-field speed study may show a higher speed.
3. PTSF = Percent time-spent-following

The future volumes along SR 19 and SR 20 are forecasted to meet or exceed the capacity of the roadway between Irondale Road and Sheridan Street with the worst segments falling between Airport Road and Old Fort Townsend Road, and Howard and Thomas Streets. The Quimper Peninsula Travel Demand Model Documentation Report provides detailed information on the model output for future traffic conditions, including volume-to-capacity ratio plots that illustrate the sections of roadway that are expected to approach or exceed capacity.

Traffic forecasts for the remainder of roadways on the Quimper Peninsula suggest that the roadways will operate below capacity in the future although the section on SR 19 between SR 116 and Irondale Road will approach capacity and more traffic congestion will occur, making it difficult to provide full access to the adjoining developments during the peak hours. The expected growth in commercial development along this section of SR 19 contributes to the issue.

Mobility and access are inversely related. As development increases, the demand for access will also increase, causing decreased mobility and traffic flow problems as friction occurs between vehicles traveling through the corridor and vehicles turning onto and off of the side streets and business driveways. Motorists on side streets have a harder time accessing the main roadways and may have to alter their routes or travel patterns to other times of the day to avoid congestion.
Legend

2031 Intersection LOS Signalized
- A thru C
- D
- E
- F

Unsignalized
- A thru C
- D
- E
- F

2031 Roadway LOS Road LOS
- C
- D
- E
A decline in mobility is often reflected in terms of highway segment LOS as illustrated in Figure 9. The LOS for SR 19 between SR 104 and Irondale Road is forecast to be LOS D. As traffic increases on two-lane highways, the average speed of vehicles drops as motorists are caught behind slower moving vehicles, while also slowing down to accommodate vehicles entering and leaving the highway. The percentage of time that motorists spend following other vehicles also increases and the opportunities to pass slower moving vehicles is reduced due to higher volumes of oncoming vehicles and less passing opportunities. Motorists in rural areas, like the section on SR 19 between SR 104 and Chimacum Road, expect to be able to travel at or near the speed limit and to pass slower moving vehicles when needed. Expectations in rural areas are higher than along corridors in urban areas where motorists are used to more delay.

The highway LOS on SR 19 and SR 20 between Irondale Road and Port Townsend is forecast to be LOS E. The same principles are at work as described for the corridor on SR 19 south of Chimacum Road, but the traffic volumes are even higher. Factors other than traffic volumes, such as percentage of heavy vehicles and roadway grades, can contribute to a decrease in LOS. Corridors that are frequently traveled by heavy vehicles and recreational vehicles often experience a decrease in capacity and a degradation of LOS due to the fact that heavy and recreational vehicles do not accelerate as fast after slowing down or stopping and do not traverse steep grades as well as passenger cars. The grades experienced on SR 19 between the Irondale and Port Hadlock UGA and SR 20 can cause delay among passenger vehicles as heavy vehicles and recreational vehicles slow down during the ascent and few opportunities to pass are available due to a lack of sight distance, passing lanes, and the high volume of on-coming vehicles.

**Intersection Delay and LOS**

Travel demand models are primarily built to measure and quantify traffic volumes and route choices on roadways and to test roadway improvement alternatives. Traffic operations models are typically used to evaluate intersection operations and the effectiveness of intersection traffic control alternatives.

During model calibration the outputs of the travel demand model link volumes and turning movements were compared to actual traffic counts that had been collected during the existing conditions survey. The difference in the actual turning movement count and the model turning movement volume was then applied to forecast model turning movement volumes to ensure that any inherent model biases were accounted for.

The post-processed forecast traffic volumes were then input into a traffic operations model to analyze future traffic control alternatives. Figure 9 illustrates the 2031 future baseline intersection operations LOS, which is also detailed in Table 6.
Table 6. 2008 Existing and 2031 Future Baseline Intersection LOS

<table>
<thead>
<tr>
<th>ID</th>
<th>Intersection</th>
<th>2008 Existing</th>
<th>2031 Future Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LOS&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Delay&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>1</td>
<td>SR 19 &amp; Chimacum Rd</td>
<td>D 30</td>
<td>EB</td>
</tr>
<tr>
<td>2</td>
<td>SR 19 &amp; West Valley Rd</td>
<td>D 26</td>
<td>EBL</td>
</tr>
<tr>
<td>3</td>
<td>SR 19 &amp; Anderson Lake Rd</td>
<td>D 26</td>
<td>EB</td>
</tr>
<tr>
<td>4</td>
<td>SR 19 &amp; SR 116</td>
<td>F 93</td>
<td>WBL</td>
</tr>
<tr>
<td>5</td>
<td>SR 19 &amp; Irondale Rd</td>
<td>F &gt;100</td>
<td>WBL</td>
</tr>
<tr>
<td>6</td>
<td>SR 19 &amp; Four Corners Rd</td>
<td>D 26</td>
<td>EBL</td>
</tr>
<tr>
<td>7</td>
<td>SR 19 &amp; Prospect Ave&lt;sup&gt;6&lt;/sup&gt;</td>
<td>E 35</td>
<td>WBL</td>
</tr>
<tr>
<td>8</td>
<td>SR 19 &amp; Airport Rd</td>
<td>F 56</td>
<td>WB</td>
</tr>
<tr>
<td>9</td>
<td>SR 19 &amp; SR 20</td>
<td>B 15</td>
<td>0.70  Signal</td>
</tr>
<tr>
<td>10</td>
<td>SR 20 &amp; Old Fort Townsend Rd&lt;sup&gt;6&lt;/sup&gt;</td>
<td>D 32</td>
<td>WB</td>
</tr>
<tr>
<td>11</td>
<td>SR 20 &amp; Seton Rd&lt;sup&gt;6&lt;/sup&gt;</td>
<td>F 88</td>
<td>EB</td>
</tr>
<tr>
<td>12</td>
<td>SR 20 &amp; Fredericks St</td>
<td>F &gt;100</td>
<td>EB</td>
</tr>
<tr>
<td>13</td>
<td>SR 20 &amp; Jacob Miller Rd&lt;sup&gt;6&lt;/sup&gt;</td>
<td>F 82</td>
<td>EB</td>
</tr>
<tr>
<td>14</td>
<td>SR 20 &amp; Mill Road</td>
<td>B 20</td>
<td>0.82  Signal</td>
</tr>
<tr>
<td>15</td>
<td>SR 20 &amp; Four Corners Rd</td>
<td>C 18</td>
<td>WB</td>
</tr>
<tr>
<td>16</td>
<td>S Discovery Rd &amp; Jacob Miller Rd</td>
<td>C 17</td>
<td>WB</td>
</tr>
<tr>
<td>17</td>
<td>S Discovery Rd &amp; Mill Rd</td>
<td>C 19</td>
<td>WB</td>
</tr>
<tr>
<td>18</td>
<td>SR 116 &amp; Oak Bay Rd</td>
<td>B 14</td>
<td>SBL</td>
</tr>
<tr>
<td>19</td>
<td>SR 116 &amp; Irondale Rd</td>
<td>B 12</td>
<td>NB</td>
</tr>
<tr>
<td>20</td>
<td>SR 116 &amp; Cedar Ave</td>
<td>C 21</td>
<td>SB</td>
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<tr>
<td>21</td>
<td>Montgomery Rd &amp; Irondale Rd</td>
<td>B 14</td>
<td>EB</td>
</tr>
</tbody>
</table>

1. Level of service, based on 2000 Highway Capacity Manual methodology. Bold font represents intersections with LOS E or F.
2. Average delay in seconds per vehicle. Bold font represents intersections with LOS E or F.
3. Volume-to-capacity ratio reported for signalized intersections. Bold font represents intersections with LOS E or F.
4. Worst movement reported for unsignalized intersections. Bold font represents intersections with LOS E or F.
5. TWSC = Two-Way Stop Control, AWSC = All-Way Stop Control, Round = Roundabout, Signal = Signal
6. The Peak Hour Factor (PHF) of each approach was used instead of the PHF for the intersection as a whole.
7. The PHF was assumed to be 0.95 for all future intersection approaches as a planning level estimate.
8. Two-stage gap (TWLTL median type in Synchro) was assumed in LOS calculations for this intersection.

Thirteen of the 15 study intersections on SR 19 and SR 20 between Chimacum Road and Port Townsend are forecast to operate at LOS E or F by the year 2031. The high traffic volumes on SR 19 and SR 20 make left-turns to and from the minor street approaches difficult as there are fewer gaps in traffic on the main line to allow for safe turns. In addition, there are few if any alternate routes to many of the areas along the corridor.

**SR 19 from Chimacum Road to SR 20**

The Chimacum Road and SR 19 intersection (Chimacum Crossroads) is all-way stop controlled. The volumes are high on both legs of SR 19 and there are enough vehicles on Chimacum Road to create a situation where every approach likely has a vehicle waiting to proceed through the intersection at the same time. This results in long delays for vehicles on SR 19 because they share equal opportunity through the intersection with the Chimacum Road vehicles, even though the volumes on SR 19 are almost four times higher than Chimacum Road. As a result, all approaches to the intersection operate at LOS F except for northbound Chimacum Road, which operates at LOS C.
The intersections of West Valley Road, Anderson Lake Road, SR 116, Irondale Road, Four Corners Road, and Prospect Avenue with SR 19 operate at LOS F during the PM Peak Hour because the side street traffic is delayed while waiting for a gap in the through traffic on SR 19. The LOS for the side street approaches are LOS F while the through traffic on SR 19, which is free flowing, usually operates at LOS A or B. The volume of traffic on SR 19 is between 400 to 900 vph south of Irondale Road and above 900 vph north of Irondale Road. The through traffic on SR 19 is high enough that even the eastbound approach of SR 116 (which is a business driveway) operates at LOS F, but only serves 15 vehicles an hour. Delays along the side streets are often compounded by the fact that traffic on SR 19 flows at a steady rate because there are no signals to cause gaps in traffic.

The intersection of Airport Road and SR 19 serves as a key gateway into the airport and the development that is planned in the vicinity of the airport. The intersection is already experiencing congestion during the PM Peak Hour and the congestion will only increase with development.

East Jefferson Fire-Rescue plans to build a station south of the airport. If the station is built, improved access will need to be provided onto SR 19 at Prospect Avenue, and along Four Corners Road and SR 20. According to preliminary plans, the access on Four Corners Road will be for both emergency vehicles and public access to the station while the access onto SR 19 and SR 20 will be for emergency vehicles only. Adding emergency vehicle access on the west leg of Prospect Avenue will most likely require a traffic signal, not only to improve side street operations, but for the safe and timely entrance of emergency vehicles onto the corridor during emergencies.

**SR 20 from SR 19 to Mill Road**

The intersections of Seton Road, Fredericks Street, and Jacob Miller Road with SR 20 all operate at LOS F for the same reason that unsignalized intersections on SR 19 operate at LOS F: side street traffic does not have sufficient gaps in through traffic to make safe and efficient maneuver onto the highway. The traffic volumes on SR 20 will range between 1,200 and 1,500 vph in each direction, which exceeds the theoretical capacity of a two-lane highway under ideal conditions. There will not be enough capacity to meet the expected future demand or an alternate route to relieve congestion. However it is possible "peak spreading" will occur before the roadway reaches capacity because some motorists will choose to make their trips earlier or later than the PM Peak Hour. Alternatively, others will choose to travel by another mode such as bus, bicycle, or carpool. Even with a shift in travel patterns, the demand along SR 20 will exceed adopted roadway level of service standards.

An important study intersection is the intersection of SR 20 and Mill Road that serves as a gateway into the City of Port Townsend. The intersection is projected to operate at LOS F by 2031. Difficulties arise when planning for the intersection of SR 20 and Mill Road because of the close proximity of the Discovery Road and Mill Road intersection. Both intersections must be designed to work together or combined into one intersection to serve the future needs of motorists entering and leaving the City of Port Townsend on SR 20 or Discovery Road. Additionally, the changes to this intersection will affect the SR 20 and Discovery Road intersections with South Jacob Miller Road. Improvements that address all of these intersections at the same time would be optimal.

**Other County Intersections**

The intersection of Mill Road and Discovery Road is expected to operate at LOS F due in large part to the poor operating conditions at the intersection of Mill Road and SR 20 as described previously. The only other study intersection off of SR 19 and SR 20 where problems are expected to occur is the intersection of SR 116 and Cedar Avenue. Motorists turning into and out of Cedar Avenue will experience increased delays as traffic increases on SR 116. In addition, the County’s planned non-motorized improvements will bring pedestrians
and/or cyclists to the intersection to continue along on SR 116. Improvements should be considered for the non-motorized crossings along SR 116 and other non-motorized crossings along the major roadways in the Tri-Area.

What are the future non-motorized needs?

Several non-motorized facility improvements are planned in and around the Tri-Area. The County is focused on connecting the commercial land uses on SR 19 and SR 116 to the surrounding residential areas. In order for the non-motorized transportation system to be effective it must not only provide adequate mobility but also adequate access.

There are some important areas where access is limited, and with more urban types of development, will need to be improved in order to make walking and biking a viable option. As commercial development occurs along SR 19 between SR 116 and Irondale Road, improved pedestrian and bicycle access will need to be provided to and from the residential areas to the east and north. Access and mobility to and from the residential and commercial areas in the Port Hadlock UGA is currently limited by the topography of the region as Chimacum Creek runs along the west side and north side of most of the existing residential development in the UGA. In addition, few complete sidewalk or pathway segments connect to the established commercial area around SR 116 and Chimacum Road.

The high forecast traffic volumes on SR 19 and SR 116 will serve as an impediment and safety risk to pedestrians and cyclists trying to cross the roadways, especially during the PM Peak Hour. In particular, the parks and schools on the west side of SR 19, including the Sunfield School, the Chimacum School, Cederbrook Adventist Christian School, and Chimacum Park need to have safe access provided.

Improved facilities and access to and from the residential neighborhoods north of SR 116 to Irondale Beach Park should be provided, along with improved access between the commercial area around SR 116 and Chimacum Road to the waterfront area at the base of the slope along Lower Hadlock Road.

The non-motorized facilities should be considered in terms of a system-wide network. Pedestrian and bicycle facilities that are not interconnected and that are not consistent discourage the use of the system. Adequate connections between proposed and existing non-motorized facilities and improved connections into the residential areas should be considered so that users of the facilities have a uniform system to accommodate their needs, especially because existing facilities are scarce or non-existent.

The non-motorized network should complement the motorized transportation system and multi-modal connections should be created to tie the non-motorized facilities to transit facilities and the motorized facilities. Expanded Park & Ride capacity and express transit routes between the Port Hadlock UGA and Port Townsend could assist in relieving some of the congestion on the state highways thereby improving the system for all users.

What types of roadway improvements should be considered?

Although capacity could be added to SR 19 and SR 20 through the addition of new travel lanes, the expansion of the highways would be costly and would not fit into the character of the surrounding land uses or the identity of the neighboring urban areas. In addition, a corridor of signalized intersections is not likely the best long-term solution.

Alternatives to adding through lane capacity and numerous signalized intersections include: the addition of right and left-turn pockets or turn lanes at key intersections; the construction of auxiliary lanes such as left-turn refuge/merge lanes; the addition of passing/truck lanes for
heavy vehicles on roadways with extended grade changes; the construction of gateway roundabouts at entrances to the UGA to demonstrate the transition from a rural to an urban environment; and well planned access management techniques coupled with improved side street and alternate route circulation strategies.

Below is a description of types of improvements that were considered in the study area. The improvements are further illustrated and described in Figure 10.

**Turn Lanes (see Type L)**

**Right and Left-Turn Pockets or Turn Lanes**

Right and left-turn pockets or turn lanes allow vehicles who are accessing side streets to slow down and make a maneuver without having to slow other vehicles behind them. On a roadway that is at or near capacity, any slight disturbance in traffic flow can cause a chain reaction that ripples down the corridor and causes traffic flow to break down. Right and left-turn pockets may be effective at the intersections all along SR 19 and SR 20.

**Left-Turn Merge/Refuge Lanes**

Left-turn merge/refuge lanes are a viable option at intersections where side street traffic is fairly low but where there are sufficient gaps in main line traffic to allow for safe and efficient left-turns. Low side street traffic volumes might make extensive traffic control measures like signals or roundabouts less cost effective because they would be underutilized when considering the construction and maintenance costs of such facilities.

The left-turn refuge/merge lanes allow motorists the ability to break the left-turn movement up into two steps thereby reducing the need to find gaps in traffic from both directions and allowing the motorists to focus on gaps in one direction at a time. The left-turn refuge/merge lanes allow motorists to focus on crossing the travel lane of vehicles going in the opposite direction first and then have sufficient space to accelerate to prevailing highway speeds in order to merge with vehicles traveling in the same direction. Left-turn merge/refuge lanes might work well at SR 19 and the intersections of West Valley Road and Anderson Lake Road.

**Access Management (see Type A)**

Access management techniques are used to create an environment where less traffic flow interruptions occur to vehicles on the main line by regulating the location, frequency, and type of access that is granted along a corridor. Access management techniques on SR 19 and SR 20 will be important as development intensifies. Washington State Department of Transportation (WSDOT) has jurisdiction over SR 19 and SR 20 and both highways are considered Managed Access highways with rules governing the frequency and types of access that can be granted. Specific rules governing Managed Access highways were created in 1991 and roadway accesses granted before 1991 were grandfathered in so that the new rules only apply when redevelopment occurs. There are five Managed Access classifications in WSDOT’s system with Class 1 allowing for the least amount of access and greatest mobility and Class 5 allowing for the most access with potentially less mobility. Table 7 lists the access classifications of sections of SR 19 and SR 20 as defined by WSDOT.
Intersection Improvements
Install a traffic signal or a roundabout; modify existing traffic signals; and add turn pockets at an existing intersection or interchange.

Cost Per Intersection:

Roadway Reconstruction
Widening or adding shoulders, and/or improving the surface and base material.

Cost Per Mile:

Costs assumed for County arterials and collectors. Improvements along State Highways are typically much more expensive.

Non-Motorized Improvements
Construct non-motorized facilities such as sidewalks or shared-use pathways.

Cost Per Mile:

Access Management
Direct access to and from the roadway through consolidated points along the roadway by limiting driveways to standard widths, consolidating driveways, and controlling where turning movements are made.

Cost Per Mile:

Note: Projects often include several improvement types

Types of Transportation Improvements to Consider

Quimper Peninsula Transportation Study
**Left Turn and Right Turn Lanes**

Install left turn and right turn pockets at intersections.

**New RoadwayConnections**

Construct new roadways and/or extend existing roadways to provide key connections.

**Bicycle Facilities**

Expand and enhance bicycle facilities such as:

- **Shared Use Path**
  Provides a completely separate right of way for the exclusive use of bicycles and pedestrians.

- **Bike Lane**
  Provides a striped lane for one-way bike travel on a street or highway.

- **Bike Route Signed Shared Roadway**
  Provides for shared use with motor vehicle traffic, typically on lower volume roadways.

**Transit**

Provide additional transit service such as new routes or more frequency on an existing route. Provide improved amenities such as shelters or new Park & Ride lots.

**Cost Per Item:**

![Cost Per Item](chart)

**Cost Per Mile:**

![Cost Per Mile](chart)

*Note: Projects often include several improvement types*
Table 7. Managed Access Sections on SR 19 and SR 20 on the Quimper Peninsula

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Access Management Section</th>
<th>WSDOT Access Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 19</td>
<td>SR 104 to Chimacum Road</td>
<td>Class 2</td>
</tr>
<tr>
<td></td>
<td>Chimacum Road to SR 20</td>
<td>Class 3</td>
</tr>
<tr>
<td>SR 20</td>
<td>SR 19 to Mill Road</td>
<td>Class 2</td>
</tr>
<tr>
<td></td>
<td>Mill Road to Decatur Street</td>
<td>Class 3</td>
</tr>
<tr>
<td></td>
<td>Decatur Street to Ferry Terminal</td>
<td>Class 4</td>
</tr>
</tbody>
</table>

1. Access granted before 1991 is grandfathered in and management techniques only apply to new development or redevelopment.

The sections of SR 19 and SR 20 on the Quimper Peninsula are all Class 2, 3, or 4 Managed Access roadways. On Class 2 roadways, mobility is favored over access thereby restricting access to the roadway except where no other reasonable access to the development exists. Access is only allowed every 660 feet and each contiguous parcel under the same ownership only gets one access unless the frontage is greater than 1,320 feet. On Class 3 roadways WSDOT tries to balance the need for mobility and access. Access is only allowed every 330 feet with only one access per contiguous development under the same ownership. Joint access to neighboring development is preferred. With Class 4 roadways access is allowed every 250 feet with one access per contiguous parcel under the same ownership, except with justification.

The section of SR 19 between SR 116 and Irondale Road is a good example where access management techniques should be considered. As growth occurs on SR 19, improved access will be needed to make development viable. Reducing the number of driveways and consolidating access points will be an important improvement strategy to address both safety and mobility, while also allowing for more redevelopment opportunities along the corridor. Intersections such as SR 19 and SR 116, SR 19 and Kennedy Road, and SR 19 and Irondale Road could be designed as key intersections from which access points to new local circulation roads and new development is provided.

North of Irondale Road, access to Theatre Road may need to be limited to one location instead of the two existing access locations. Further intersection treatments and improvements will need to be made in combination with access management techniques to continue providing access to adjoining property owners along the corridor.

The section of SR 20 between Old Fort Townsend Road and Fredericks Street provides unique opportunities to design and implement access management techniques before development increases in the future and while existing access points are scarce and not well established. One strategy on this segment of SR 20 may include upgrading the intersections of Seton Road and Fredericks Street to serve as access points to frontage roads on either side of SR 20.

New Roadway Connections (see Type N)

As development occurs along SR 19 and SR 20, new local circulation roads, or frontage roads, could be built or existing roads improved so that access can be provided to development from County roadways. The section of SR 19 between SR 116 and Irondale Road is a good example. Although the number of driveways may be limited on SR 19 due to access management techniques described earlier, circulation roadways could be created or existing frontage roads improved on the east and west sides to allow motorists to access development from the rear. The same techniques could be applied on SR 20 between Old Fort Townsend Road and Fredericks Street. At the north end of the study area, access points and frontage roads on the west side of SR 20 could be created should development occur;
but right-of-way could be planned for and acquired in advance. In addition, Otto Street on the east side of SR 20, is an existing roadway that could be upgraded and extended to Mill Road to provide access to development as it occurs along SR 20.

**Intersection Improvements (see Type I)**

Traffic signals, roundabouts, and all-way stops are all options to improve safety and mobility on the Quimper Peninsula. Most of the intersections along SR 19 and SR 20 will require some form of traffic control improvement with the forecast traffic growth as left-turns to and from the highways will become more and more difficult thereby dramatically increasing delays and reducing safety. However access management and circulation improvements may reduce the number of intersections for which traffic control upgrades will be necessary.

Each individual intersection has been analyzed using the travel demand and intersection operations models. It is important when addressing the transportation challenges in a particular community to understand the needs and visions of those who live and work in the area and will depend on the improvements to address their daily transportation needs.

Intersection improvements will need to be made at key intersections to compliment the access management improvements and circulation roads. By making targeted intersection improvements on access controlled corridors, traffic is encouraged to funnel to key locations that are designed to accommodate the demand while reducing the amount of traffic conflict points and the need for uncontrolled locations elsewhere, thus reducing delays at the remaining intersections.

**Roundabouts**

Roundabouts provide traffic control at intersections in lieu of signalization when appropriate. Roundabouts could be strategically placed at the ingress and egress routes to urbanized areas to act as "gateways." Roundabouts can be designed to help motorists recognize the transition from rural to urban environments in an attempt to increase awareness that more vehicular and non-motorized traffic conflicts can be expected. Roundabouts may even have two lanes to accommodate higher traffic volumes and separate left-turns from through movements, but taper back into one lane several hundred feet after the roundabout.

Roundabouts can have additional landscaping or other features which provide a welcoming atmosphere for visitors. Slip lanes can be provided to serve higher right-turning volumes, especially at locations on the outskirts of urbanized areas where more right-of-way is typically available and less pedestrian traffic is present.

Intersections on the Quimper Peninsula that might be suitable locations for gateway roundabouts are the Chimacum Crossroads (SR 19 intersection with Chimacum Road and Center Road), SR 19 and Four Corners Road, and the Port Hadlock Crossroads (SR 116 intersection with and Chimacum Road and Irondale Road) because they demarcate the transition into and out of the Port Hadlock UGA. Other intersections include SR 20 in the vicinity of Mill Road, which marks the transition to the City of Port Townsend, and at the intersection of SR 19 and Airport road that serves as a gateway into the airport development. Another potential location for a roundabout would be the intersection of SR 19 and SR 116. Each of these locations will be further analyzed in the next phase of the work program.

**Passing/Truck Lanes**

Steep or prolonged grades on two-lane highways negatively affect average travel speeds and traffic flow when frequently traveled by heavy commercial vehicles and recreational vehicles. As the heavy vehicles and recreational vehicles ascend the grade they tend to slow down. Without opportunities to pass, passenger vehicles must slow down causing a ripple effect down the entire corridor. It can also make it difficult for motorists turning onto the roadway
from side streets as vehicle platoons on the highway lengthen, thereby decreasing adequate
gaps that might occur with more compact vehicle platoons. A passing/truck lane allows
slower vehicles to ascend problematic grades while leaving a lane open for passenger
vehicles to continue their journey unimpeded. Additional industrial development around the
Airport could contribute to a higher number of trucks in the future. A passing/truck lane could
be a beneficial alternative for SR 19 on the grade between Irondale Road and SR 20, in
combination with intersection improvements and access management strategies.

What types of non-motorized improvements should be considered?

A need exists to complete a network of trails, sidewalks, pathways, and bicycle routes on the
Quimper Peninsula. Plans and projects are already moving forward on the Larry Scott Trail,
Rick Tollefson Trail, Olympic Discovery Trail, and connections between them. Connections to
the Rick Tollefson Trail, H.J. Carroll Park, and Chimacum Park and the Port Hadlock UGA
are recommended along SR 19. The connections could include a combination of dedicated
right-of-ways for pedestrians and wider shoulders for cyclists along SR 19.

Although the County has a great start on non-motorized improvement plans, the overall
system needs to be considered. Major corridors in and around the Port Hadlock UGA already
have planned improvements but a focus should be made to ensure that any remaining gaps
are filled and that connections to the residential areas are provided in the form of improved
facilities, crossings or proper signage.

Below is a description of types of non-motorized improvements that could be considered in
the study area.

Non-Motorized Improvements (see Type P)

New Pedestrian Connections and Facilities

The geographic obstacle presented by Chimacum Creek should be bridged between the east
and west halves of the Port Hadlock UGA so that an alternative to vehicle travel exists. Even
with non-motorized improvements planned for SR 116, the indirect route for people who live
in core residential neighborhoods north of SR 116 to commercial development on SR 19
increases the distance that they would have to walk or cycle, thereby diminishing the
probability that a non-motorized trip would be made. An appropriate connection might be
made between Kennedy Road and Mason Street or Foster Street. A trail connection should
also be considered between Irondale Road and Prospect Avenue to encourage non-
motorized travel between the development to the north of the Port Hadlock UGA including the
parks and commercial development.

The waterfront accessed by Lower Hadlock Road is an integral part of the community and
connections to the development around SR 116 and Chimacum Road should be provided.
There is a steep grade that creates an obstacle and most pedestrians and cyclists have to
travel along SR 116 to Lower Hadlock Road to avoid the slope or follow a rough trail that
already exists down the slope. Appropriate improvements might include a paved pathway
with steps and handrails where appropriate, as well as adequate lighting and signage.

A connection between the Rick Tollefson Trail, Bob Bates Fields, and development in and
around SR 116 and Chimacum Road will fill an important void in the system. Other non-
motorized connections should be considered between the Port Hadlock UGA and Irondale
Beach Park, Glen Cove, and the City of Port Townsend, as well as Anderson Lake State Park
and the eventual connecting trails to the Olympic Discovery Trail and Larry Scott Trail.
Facilities or signage and pavement markings should be considered for residents along 7th Avenue and Mason Street to connect to Cedar Avenue and Irondale Road with a possible bridge over Chimacum Creek to the commercial areas along SR 19. Facilities should also be considered along Irondale Road for those who may be traveling from development to the north or persons wishing to access Irondale Beach Park. Routes may include 7th Avenue, 4th Avenue, and Moore Street.

Improved Crossings

Obstacles to safe movement between non-motorized facilities need to be addressed. Locations of particular interest are along SR 19 near or at the intersections with Four Corners Road, SR 116, Irondale Road, Chimacum Road and Chimacum Creek. An undercrossing or grade separated crossing is a possibility on SR 19 between H.J. Carroll Park and Chimacum Park on the Rick Tollefson Trail. This type of improvement will become increasingly important in the future as traffic volumes increase and fewer gaps in traffic will be available. A crossing along Irondale Road at 5th Avenue is suggested to encourage non-motorized trips between the two neighborhoods, with eventual connections to the commercial land uses along SR 19 and along SR 116. An undercrossing or controlled at-grade crossing along SR 19 in the vicinity of Kennedy Road might also be appropriate as development along SR 19 intensifies along with a crossing on Chimacum Road for the Rick Tollefson Trail between Old Hadlock Road and the Bob Bates Fields.

Bicycle Facilities (see Type B)

Bicycle facilities will also be a part of the non-motorized improvements mentioned above. The shared-use trails will primarily cater to recreational bicyclists as well as pedestrians. Arterial and collector roadway improvements will either have wide shoulders for bicyclists or dedicated bike lanes to serve commuter bicyclists. Many of the rural County collectors have been identified as bicycle routes in the County’s Non-Motorized Plan. Proper signage along with improved shoulder width should be part of any roadway improvement project for any of the designated bicycle routes outside the UGA.

Transit Facilities (see Type T)

In order to encourage a shift in travel modes between personal vehicles and transit, a reliable option needs to be available. A shift in trips from personal vehicles to van-pool, car-pool, or buses would increase the available capacity for other system users, reduce congestion, and reduce vehicle emissions. A strong relationship exists and will continue to grow between development in the Irondale and Port Hadlock UGA and the City of Port Townsend. Work trips and single purpose trips between the two areas would be better served by increased transit or car pool opportunities if the incentive to switch is adequate. A savings in travel time and travel related stress due to the expected increase in congestion in the future might be available through the use of auxiliary lanes at signalized intersections and traffic control preemptions along the corridor of SR 19 and SR 20 between the urban areas. The auxiliary lanes and signal preemptions combined with regularly scheduled service and strategically placed Park & Ride and transfer facilities could go a long way in meeting the needs of the local residents who are already open to alternative transportation modes.
Chapter 5. RECOMMENDED IMPROVEMENT PROJECTS

Specific transportation improvement projects have been identified and evaluated to address the needs and issues identified in the prior needs assessment. The transportation projects that have been identified only address the needs for motor vehicles and focus on improving mobility, safety, circulation, and access primarily in and around the Irondale and Port Hadlock UGA. There has also been an emphasis on the SR 19 and SR 20 corridor between Four Corners Road and the City of Port Townsend. Non-motorized transportation improvement projects were not specifically identified and will be addressed as part of a subsequent phase.

Eventually the improvement projects identified in the Quimper Peninsula Transportation Study will be incorporated into updates of the County Comprehensive Plan and six-year Transportation Improvement Program (TIP).

How were the transportation improvement projects developed?

An intersection traffic operations model and the Quimper Peninsula travel demand model were used to evaluate improvement alternatives. Low-cost improvements were evaluated before more complex and expensive solutions were analyzed. Low-cost improvements included minor traffic control changes, signal timing or phasing changes, or the addition of turn pockets. More complex solutions included the addition of through lanes, changes in traffic control devices, or geometric reconstruction and/or realignment of intersections and roadways. Each improvement project was treated as an integral component of the transportation system as a whole, and the effects of each improvement project on adjacent roads and intersections were factored into the analysis.

What are the recommended transportation improvement projects?

The transportation improvement projects have been sorted into three categories: intersection, roadway, and access management improvements. The projects are illustrated in Figure 11 and are color coded by type of improvement. Table 8 lists each improvement project and includes a brief description of the project. Appendix C contains a detailed description of each project and a brief justification summary.

The following describes each specific improvement.

*Intersection Improvements*

Intersection improvement projects include the construction of left-turn lanes, right-turn lanes, refuge/merge lanes, roundabouts, and traffic signals.

*SR 19 Improvements*

The Chimacum Crossroads—the intersection of SR 19 with Chimacum Road and Center Road—is one of the most important intersections in the Tri-Area (Chimacum, Port Hadlock and Irondale) because it is the first major intersection and the first stop-control that motorists travelling northbound on SR 19 experience for many miles. The intersection serves as a gateway into the Port Hadlock UGA and as a transition point between the rural land use to the south with the more urban land.
Port Townsend Bay

Legend
Improvement Type
- Traffic Control
- Emergency Vehicle Access
- Turn Lanes/Channelization/Access
- New Roadways
- Roadway Widening/Reconstruction
- Access Management

Other Features
- Irondale & Port Hadlock UGA
- Jefferson County International Airport
- Port Townsend
- Parks & Multi-Use Trails

Transportation Improvement Projects
Quimper Peninsula Transportation Study
<table>
<thead>
<tr>
<th>Map ID</th>
<th>Intersection</th>
<th>Description of Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>SR 19 &amp; Center/Chimacum Rd</td>
<td>Construct a one-lane roundabout to improve traffic flow and safety, and serve as a gateway into the Port Hadlock UGA.</td>
</tr>
<tr>
<td>I2</td>
<td>SR 19 &amp; West Valley Rd</td>
<td>Construct a refuge/merge lane for motorists turning left off of West Valley Road to improve mobility, safety, and access. Would be combined with pedestrian crossing enhancements as part of the Rick Tollefson Trail and/or a Safe Routes to School project.</td>
</tr>
<tr>
<td>I3</td>
<td>SR 19 &amp; Anderson Lake Rd</td>
<td>Add a left-turn lane on Anderson Lake Road and a left-turn refuge/merge lane and northbound left-turn lane on SR 19 to improve mobility and safety.</td>
</tr>
<tr>
<td>I4</td>
<td>SR 116 &amp; Chimacum/Irondale Rd</td>
<td>Construct a roundabout to eliminate the 4-way stop control which would improve mobility, safety, and serve as a gateway into the Port Hadlock UGA.</td>
</tr>
<tr>
<td>I5</td>
<td>SR 116 &amp; Cedar Ave</td>
<td>Add a southbound left-turn lane to Cedar Avenue and an eastbound left-turn lane to SR 116 to improve mobility and safety.</td>
</tr>
<tr>
<td>I6</td>
<td>SR 19 &amp; SR 116</td>
<td>The intersection serves as a placeholder to identify the general area between SR 116 and Irondale Road where intersection improvements could be made to compliment access management treatments on SR 19, such as Project #A1. Further study may show that a location in the vicinity of Kennedy Road may be better suited to provide frontage road traffic control or an opportunity for u-turn movements to provide improved circulation and access to development along SR 19.</td>
</tr>
<tr>
<td>I7</td>
<td>SR 19 &amp; Kennedy Rd</td>
<td>Construct a two-lane roundabout to improve traffic operations and improve mobility and safety. A roundabout can serve as a gateway to the Port Hadlock UGA. Coordinate with the re-assignment of Four Corners Road (Project #R6).</td>
</tr>
<tr>
<td>I8</td>
<td>SR 19 &amp; Irondale Rd</td>
<td>Install a traffic signal, or construct a roundabout, with emergency vehicle access signage and channelization improvements for the proposed fire station south of the airport. The intersection could serve as an alternate access point to a new local access street serving the Port property south of the airport on the west side of SR 19 while also improving safety and access to Prospect Avenue to the east.</td>
</tr>
<tr>
<td>I9</td>
<td>SR 19 &amp; Prospect Ave</td>
<td>Access needs to be provided to the new fire station and emergency command center for emergency vehicles and the general public onto Four Corners Road.</td>
</tr>
<tr>
<td>I10</td>
<td>Four Corners Rd Fire Station Access</td>
<td>A new intersection would be created to serve as a western access point to an eventual extension of local access streets north of the airport connecting both SR 19 and SR 20.</td>
</tr>
<tr>
<td>I11</td>
<td>New SR 20 Intersection</td>
<td>Construct a traffic signal, or roundabout, with a dedicated northbound left-turn lane to improve traffic operations, mobility, and safety. Coordinate with possible widening of SR 19 to add a northbound passing lane.</td>
</tr>
<tr>
<td>I12</td>
<td>SR 19 &amp; Airport Rd</td>
<td>Restrict left-turns to and from Old Fort Townsend Road and provide for signage of alternate access route via Otto Street at Seton Road after completion of Project #I14.</td>
</tr>
<tr>
<td>I13</td>
<td>SR 20 &amp; Old Fort Townsend Rd</td>
<td>Construct a traffic signal, or roundabout, to serve as the main access point to the Glen Cove light industrial/commercial district as part of a broader access management strategy along SR 20.</td>
</tr>
<tr>
<td>I14</td>
<td>SR 20 &amp; Seton Rd</td>
<td>Provide channelization, signage, and illumination improvements as development occurs in the area to address safety and access concerns.</td>
</tr>
<tr>
<td>I15</td>
<td>SR 20 &amp; Fredericks St</td>
<td>Construct a two-lane roundabout to improve traffic flow, safety, and serve as a gateway into Port Townsend. Relocate the South Discovery Road and South Jacob Miller Road approaches. Convert the existing Mill Road westbound approach to SR 20 to right-out only and coordinate with extension of Jacob Miller Road (Project #R1).</td>
</tr>
<tr>
<td>I16</td>
<td>SR 20/Mill Rd &amp; Discovery Rd/Jacob Miller Rd</td>
<td>Reconstruct intersection to provide improved channelization on the west approach and center left-turn lanes along Chimacum Road to improve mobility, safety, and access. Includes pedestrian crossing enhancements as part of the Rick Tollefson Trail and gateway features to identify the entrance into the Port Hadlock UGA.</td>
</tr>
</tbody>
</table>

1. The Map ID of each project corresponds to the project ID as illustrated in Figure 11.
be more attractive than a traffic signal in that it could help shape urban and rural form as a transitional gateway between the Irondale and Port Hadlock UGA and the rural areas to the south.

The intersections of SR 19 with West Valley Road and Anderson Lake Road will operate poorly in the future if no improvements are made because it will be difficult for motorists making a turn onto or off of the side streets to find sufficient gaps in traffic on SR 19 to safely complete the maneuver. A traffic signal or roundabout at each intersection would improve the operations and safety for left-turns but would only serve a small number of vehicles during the PM Peak Hour and the traffic signal would not meet signal warrants. The addition of a refuge/merge lane at both intersections, and eastbound and northbound left-turn lanes at Anderson Lake Road should be sufficient to safely handle the vehicles that attempt a left-turn maneuver during the PM peak period and throughout the day. Non-motorized improvements and pedestrian crossing enhancements should be coordinated with improvements at each intersection and should be further evaluated as part of the Rick Tollefson Trail project and a potential Safe Routes to School project associated with the Chimacum school campus.

The intersection of SR 19 with SR 116 is forecast to operate poorly because the through volumes on SR 19 will conflict with motorists making left and right-turns onto and off of SR 116. Installation of a traffic signal and a northbound right-turn lane—or a one-lane roundabout with a northbound right-turn slip lane—would improve operations and safety. Improvements at this intersection should take into account the operations and improvements at adjacent intersections and driveways. Improved pedestrian crossings, illumination, and signage would be part of any future intersection improvement.

The intersection of SR 19 with Kennedy Road, or a location in the vicinity of Kennedy Road, could be improved to allow for access to frontage/circulation roads on the west side of the corridor. Or, if access management strategies along the corridor included the use of median treatments, then the intersection or a nearby location could serve as a convenient place to allow u-turns to improve access to adjoining properties.

The size and configuration of a roundabout or traffic signal at the intersection of SR 19 with Irondale Road is tied to the improvements at the intersection of SR 19 with Four Corners Road. One option would be to realign Four Corners Road to intersect with SR 19 at Irondale Road. If the realignment does not occur then a traffic signal or roundabout will be needed at both intersections to safely and adequately serve side street traffic while also providing improved pedestrian crossing locations. If Four Corners Road is realigned then motorists accessing the Port Hadlock UGA via Four Corners Road can travel straight across SR 19 instead of having to make two turning maneuvers onto and off of SR 19. Removing motorists from SR 19 should improve traffic flow for the remaining motorists and reduce the number of conflict points and the total amount of delay experienced at both intersections. Four Corners Road realignment would likely require the installation of a traffic signal or a two-lane roundabout at the intersection with SR 19 and Irondale Road. A roundabout may be the most appropriate form of traffic control because the intersection serves as a gateway between the development in the Port Hadlock UGA and a more rural environment to the north, in the area between Port Hadlock and Port Townsend. A two-lane roundabout would provide the needed circulating capacity, but then quickly transition back to a one-lane approach along SR 19.

The intersection of SR 19 with Prospect Avenue could serve as one access point to a new fire station and emergency command center that has been proposed south of the airport. Installation of a traffic signal, or roundabout, would serve the needs of motorists accessing development to the east of SR 19 and provide safe and efficient access to emergency vehicles from the proposed fire station to the west. The traffic control would also provide for an enhanced pedestrian crossing of the highway. A traffic signal with emergency vehicle preemption may be better for emergency vehicles than a roundabout and should be evaluated in more detail if the fire station and emergency command center moves forward.
Safe and efficient access to the Jefferson County International Airport, and related activities managed by the Port of Port Townsend, is vital to the growth and economic development of industries in the area. The portion of SR 19 which intersects with Airport Road is on a slight grade. The speed of heavy vehicles decreases on the ascent causing vehicles behind them to slow down which increases congestion and lowers the operational efficiency of the roadway. The addition of a truck climbing/passing lane is proposed on SR 19 on the ascent between Prospect Avenue and SR 20. The addition of a truck climbing/passing lane would need to be combined with intersection improvements at Airport Road to allow safe access into and out of the Woodland Hills community to the east. Improvements to the traffic control or geometry of the SR 19 intersection with Airport Road should take into consideration the operation of heavy vehicles and passenger vehicles with the addition of an extra through lane at the intersection to avoid larger vehicles from stopping on an uphill slope. Traffic signal control may be a better option than a roundabout because it would probably be easier for heavy vehicles to navigate a traffic signal while ascending or descending the slope than a roundabout.

**SR 20 Improvements from SR 19 to Fredericks Street**

The transportation improvements for the intersections of SR 20 with Old Fort Townsend Road, Seton Road, and Fredericks Street are intertwined. All three intersections are forecast to serve low volumes of side street traffic because limited infill growth is forecast for the area along SR 20 between SR 19 and Mill Road. Although the side street traffic forecasts are relatively low, the Glen Cove light industrial/commercial district does generate local traffic and truck traffic. Motorists trying to turn onto or off of the side streets will come into conflict with through traffic on SR 20 which is forecast to be at or above the capacity of the highway by the year 2031. Delays will likely be excessive for side street traffic, and safety problems could arise if traffic control improvements are not made.

Several alternatives were tested at all three intersections including the installation of traffic signals or roundabouts, restricting the side street movements to right-in/right-out only, or closing off access to some of the side streets. Alternatives were tested with and without extending Otto Street to Mill Road on the north and to the intersection of SR 19 with SR 20 on the south.

A signal, or roundabout, at the intersection of SR 19 with Seton Road provides a central access point to development along the corridor. It will serve what is already forecast to be the highest volume of traffic of the three intersections, and will allow the greatest amount of spacing of traffic control devices between major intersections. Left-turn and right-turn pockets might be needed at the SR 20 intersection with Seton Road to meet WSDOT standards and to allow turning vehicles to queue without disrupting mainline flow.

**Port Townsend Entryway Improvements**

Efficient ingress and egress to the City of Port Townsend is one of the most important transportation needs on the Quimper Peninsula. Vehicular traffic on the Quimper Peninsula is funneled to either the SR 20 or Discovery Road corridors, the two main roadways leading into and out of Port Townsend.

The most heavily travelled of the two main roadways is SR 20, which is forecast to operate at or near the estimated capacity of the roadway by the year 2031. Motorists can also access the City via Discovery Road. Discovery Road is often underutilized because motorists have to make two maneuvers from SR 20, via Mill Road or Jacob Miller Road, to access Discovery Road. Motorists who choose to access Discovery Road via Mill Road have to wait at a traffic signal to make a left-turn off of SR 20 onto Mill Road and then make a right-turn from Mill Road onto Discovery Road. The reverse happens when motorists leave the City via
Discovery Road except that they must stop before making a left-turn from Discovery Road onto Mill Road. Motorists can make a similar shift to Discovery Road via Jacob Miller Road.

Several Port Townsend entryway improvement scenarios were proposed in a 2008 memorandum titled Port Townsend Entryway System Improvement Concepts. One of the most comprehensive scenarios presented is Scenario 3 which involves consolidating the intersections of Jacob Miller Road, Discovery Road, and Mill Road with SR 20 at a new 5-legged roundabout intersection. The new two-lane roundabout would create a direct connection between Discovery Road, Jacob Miller Road and SR 20. In addition, it would allow for an extension of Jacob Miller Road to the east of SR 20 to provide for improved access to possible future development.

The new roundabout would allow for the section of Discovery Road that forms the west leg of the intersection with SR 20 and Mill Road to be vacated. The remaining T-shaped intersection of SR 20 and Mill Road would become a stop controlled intersection with the westbound approach being limited to right-out only. The section of Jacob Miller Road between SR 20 and Discovery Road could also be vacated thereby eliminating the intersection of SR 20 with Jacob Miller Road. As a result, the delay and conflicts of four separate intersections are eliminated or greatly reduced while providing greater access and mobility at one single intersection that can move vehicles safely and more efficiently. A roundabout would also serve as an attractive and prominent gateway into the City of Port Townsend creating a smooth transition between rural and urban environments.

**SR 116 Improvements**

The Port Hadlock Crossroads—the intersection of SR 116 with Chimacum Road and Irondale Road—is within the primary retail center of the Port Hadlock UGA. The intersection could be reconstructed to create the feeling of a town center. While modeling shows that a traffic control improvement at this location should not be necessary due to LOS issues, a roundabout would serve to improve livability and to enhance pedestrian crossings and safety. The intersection is also a likely crossing location for the future extension of the Rick Tollefson Trail.

Analysis of the intersection of SR 116 on southbound Cedar Avenue indicates that motorists, on average, experience delays and queues as they wait to make a left-turn onto SR 116 or are forced to wait behind left-turning vehicles to make a right turn. Due to the forecast increase of motorists traveling on SR 116 there will be fewer gaps in traffic for motorists to make turns onto or off of SR 116. Operations at the intersection could be enhanced with the addition of a southbound left-turn lane and an eastbound left-turn lane. The southbound left-turn lane on Cedar Avenue would allow left-turning vehicles to queue without blocking other motorists who wish to make a right-turn. Intersection improvements at Cedar Avenue and SR 116 should be coordinated with pedestrian crossing enhancements as part of a Safe Routes to School project or other UGA non-motorized network project.

**Chimacum Road Improvements**

The intersection of Chimacum Road with Elkins Road is located just west of the County Sheriff’s office and north of Bob Bates Fields. The west approach intersects with the Old Hadlock Road and Pomwell Road. At its present state, the intersection is awkwardly designed with the west approach having no defined channelization or lane markings which makes it a potentially unsafe location for vehicles as well as pedestrians and bicyclists. The intersection is also a likely crossing location for the Rick Tollefson Trail.

Reconstruction of the intersection will provide improved channelization on the west approach and a center left-turn lane along Chimacum Road to improve mobility, safety, and access. The improvements at the intersection will also include pedestrian crossing enhancements as part of the Rick Tollefson Trail and gateway features to identify the entrance into the Port
Hadlock UGA. This intersection also could be the main access location to the proposed sewer treatment facility to the west and currently provides access to a gravel pit, so future designs will need to consider the needs and movements of heavy vehicles.

**Roadway Improvements**

Roadway improvements include the construction of new roadways, extending and/or reconstructing existing roadways, adding truck climbing/passing lanes, and realigning roadways. Roadway reconstruction projects involve rehabilitating or improving the base, sub-base, and pavement surface of old or sub-standard roadways. Reconstruction might also include roadway widening to increase lane widths and/or add shoulders, or the addition of curb, gutter, sidewalk, street lights, and storm water facilities, where necessary. Table 9 lists the roadway improvement projects and includes a brief project description of each.

<table>
<thead>
<tr>
<th>Map ID</th>
<th>Roadway</th>
<th>Limits</th>
<th>Description of Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>Jacob Miller Road Extension</td>
<td>SR 20 to Mill Rd</td>
<td>Extend Jacob Miller Road (or yet to be named roadway) to the east to accommodate growth in the Mill Road area by improving circulation and access.</td>
</tr>
<tr>
<td>R2</td>
<td>Otto Street North Extension</td>
<td>Jacob Miller Rd Extension to Glen Cove Rd</td>
<td>Extend roadway to improve access to the Glen Cove light industrial/commercial district to create an alternative corridor to improve circulation and access to the area.</td>
</tr>
<tr>
<td>R3</td>
<td>Otto Street</td>
<td>Glen Cove Rd to Old Fort Townsend Rd</td>
<td>Reconstruct the roadway to urban standards to improve access and circulation to developments in the Glen Cove area. Coordinate with key intersection improvements.</td>
</tr>
<tr>
<td>R5</td>
<td>SR 19</td>
<td>Prospect Ave to Theatre Rd</td>
<td>Construct a northbound truck climbing/passing lane on the ascent to SR 20 to improve mobility and safety. Combine with intersection improvement I12 to provide safe access into and out of Woodland Drive.</td>
</tr>
<tr>
<td>R6</td>
<td>Four Corners Roadway Realignment</td>
<td>From the existing intersection with SR 19 to Irondale Rd</td>
<td>Realign the roadway by moving the intersection with SR 19 south to align with the intersection of Irondale Road.</td>
</tr>
</tbody>
</table>

1. The Map ID of each project corresponds to the project ID as illustrated in Figure 11.

Jacob Miller Road should be extended from SR 20 to Mill Road to serve possible growth and redevelopment east of SR 20. The new roadway could access SR 20 as the fifth leg of a proposed roundabout as part of the Port Townsend Entryway Concept improvement as outlined previously. The roadway would likely be a condition of future development.

Limited infill growth is forecast for the areas along SR 20 and Otto Street between Old Fort Townsend Road and Mill Road. Extending Otto Street to Mill Road at the north end should be considered in conjunction with any planned development. If little or no development occurs, then the roadway extension would likely not be needed. As more development enters the area and traffic increases, Otto Street could be reconstructed and could serve as the main access to the Glen Cove light industrial/commercial district. Otto Street could also serve as an important alternative for local businesses and residents to SR 20 during periods of traffic congestion due to peak flows, recreational traffic, or crashes. Traffic control changes to the intersections of SR 20 with Old Fort Townsend Road, Seton Road, and Fredericks Street have been discussed previously.

Recreational and commercial vehicles tend to slow down while ascending moderate to steep grades and even gradual grades that extend over several thousand feet like the grade on SR 19 between Prospect Avenue and SR 20. The addition of a truck climbing/passing lane on SR 19 would improve traffic operations and safety by allowing faster moving vehicles to pass slower moving recreational or commercial vehicles without having to find gaps in oncoming
traffic. The addition of a truck climbing/passing lane along SR 19 would need to be combined with intersection improvements at Airport Road to allow safe access into and out of the Woodland Hills community to the east.

One of the best ways to improve operations and safety on a corridor is to limit the number of intersections and increase the spacing between remaining intersections. The intersection of SR 19 with Four Corners Road is a prime candidate for realignment to the intersection of SR 19 with Irondale Road because each intersection is very close to one another and they serve similar travel patterns. The realignment of Four Corners Road to Irondale Road would eliminate the need for another traffic control device on SR 19. The intersection improvements that could be implemented at each intersection have been discussed previously in the section describing intersection improvements.

**Access Management Improvements**

Access management improvements include circulation road improvements, driveway consolidations, median treatments, restricted turn movements, improved pedestrian crossings, and targeted intersection improvements. Table 10 lists the access management improvement projects and includes a brief project description of each.

<table>
<thead>
<tr>
<th>Map ID</th>
<th>Area</th>
<th>Limits</th>
<th>Description of Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>SR 19</td>
<td>SR 116 to Irondale Rd</td>
<td>Access management, driveway consolidation, and circulation road improvements coordinated with improvements to facilitate turn movements or u-turns at or near the intersection of SR 19 with Kennedy Road.</td>
</tr>
<tr>
<td>A2</td>
<td>SR 19</td>
<td>Theatre Rd (north) to Theatre Rd (south)</td>
<td>Create a single access point with adequate spacing between adjacent intersections and adequate queue storage for vehicles coming from and going to the theater during movie showings.</td>
</tr>
</tbody>
</table>

Strong development potential exists along SR 19 between SR 116 and Irondale Road. The volume of vehicles traveling along SR 19 is attractive to business owners. Plans for the Port Hadlock UGA encourage greater densities in the UGA so that areas outside the UGA can retain the rural feel that local resident’s value. As densities and development increase, there will be more demand for access to parcels along SR 19, which is a managed access highway administered by WSDOT. WSDOT has established guidelines for future development along managed access highways that call for adequate spacing between driveways, thereby reducing the number of accesses afforded.

Redevelopment of existing land uses along a WSDOT managed access corridor means that property access will need to meet the most current WSDOT standards for spacing and frequency. One of the ways that greater demand for development could occur while maintaining or even improving operations and safety along SR 19 would be to create circulation or frontage roads parallel to SR 19. Such a strategy could be combined with consolidating existing driveways along SR 19 and providing median treatments to reduce the number of potential conflict points and the severity of collisions. Since the intersection of SR 19 with Kennedy Road is nearly half-way between SR 116 and Irondale Road it could serve as an ideal location to facilitate u-turns should median treatments be included as part of the access management strategies. A frontage road system needs to be investigated more closely to understand feasible locations. In some cases, it could be a public street right-of-way providing access to only a few properties. However, there are few opportunities for new frontage road connections along the corridor.
The outdoor movie theater south of the intersection of SR 19 and SR 20 generates traffic during off-peak times when it is operational during the summer. Ingress and egress to the movie theater occurs via Theatre Road which intersects with SR 19 to the north and south of the development. The offset of the north driveway is close to the intersection of SR 19 and SR 20, which creates a spacing issue. The surge in vehicle queues before and after movie showings, when combined with limited sight distance at both ingress and egress points and high speeds, causes concerns with safety and traffic operations. An access management project should be considered when the area redevelops which would improve operations by providing access at a single location with improved sight distance, signage, and queue storage. Other improvements would be needed to handle vehicle queues on site. Topography issues and right-of-way constraints will need to be further explored to develop a viable solution. Any access management improvement along SR 19 in the vicinity of Theatre Road should also consider treatments to improve access to Parkridge Drive, which has been a location with recent rear-end collisions.

How will the improvements affect the transportation system?

During the transportation needs assessment, a total of 21 intersections were evaluated. Of the 21 intersections, it was found that seven intersections operated at a LOS E or F during the PM Peak Hour under existing conditions. The forecast traffic volumes for the year 2031 were overlaid on a model of the existing transportation system to understand what would happen in the future if no transportation improvements were implemented. Modeling the future baseline scenario provided a tool whereby future deficiencies and needs could also be identified.

Under future baseline conditions eight additional intersections will operate at LOS E or F by the year 2031 in addition to the seven that operate poorly under existing conditions. A roadway operations analysis of SR 19 and SR 20 showed that both corridors would likely operate at LOS D or E with forecast volumes approaching or exceeding the estimated capacity of the roadway by the year 2031.

The intersection improvements that have been described are intended to reduce or eliminate the number of intersections that will operate poorly in the future by reducing average control delays, improving mobility and safety, and providing better access to adjoining areas. The roadway improvements will provide additional capacity to key sections of SR 19 and SR 20, thereby improving operating conditions and helping to relieve future congestion. The travel demand model was used to test the transportation improvements. The effects of each improvement project on adjacent roads and intersections were factored into the analysis of alternatives. Adjustments were made to each improvement project until an equilibrium was reached in which the improvements at each study location accounted for not only the forecast traffic volumes and operating conditions but also the effects of improvements at other study locations. The scenario which represents future conditions with all improvements is known as the “With Projects” scenario.

Table 11 contains a summary of intersection LOS for existing conditions, future baseline conditions, and future “With Projects” conditions for each study intersection. Intersections that operate at LOS E or F under each scenario are highlighted in Bold font. Two additional intersections have been added including a new proposed roundabout that will combine the intersections of Discovery Road, Mill Road, and Jacob Miller Road with SR 20; and the intersection of SR 19 and Kennedy Road which is part of an access management strategy for SR 19 between SR 116 and Irondale Road. A detailed summary of intersection LOS and channelization for each scenario can be found in Appendix B.
<table>
<thead>
<tr>
<th>ID</th>
<th>Intersection</th>
<th>2008 Existing</th>
<th>2031 Baseline</th>
<th>2031 With Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Control¹ LOS² Delay³ V/C or WM⁴</td>
<td>Control LOS Delay V/C or WM</td>
<td>Control LOS Delay V/C or WM</td>
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<tr>
<td>1</td>
<td>SR 19 &amp; Center/Chimacum Rd</td>
<td>AWSC D 30 EB</td>
<td>AWSC F &gt; 100 EB/WB</td>
<td>1-Lane Round C 25 SB</td>
</tr>
<tr>
<td>2</td>
<td>SR 19 &amp; West Valley Rd</td>
<td>TWSC D 26 EBL</td>
<td>TWSC F 92 EBL</td>
<td>TWSC C 20 EBL</td>
</tr>
<tr>
<td>3</td>
<td>SR 19 &amp; Anderson Lake Rd</td>
<td>TWSC D 29 EB</td>
<td>TWSC F 94 EB</td>
<td>TWSC C 20 EBL</td>
</tr>
<tr>
<td>4</td>
<td>SR 19 &amp; SR 116</td>
<td>TWSC F 93 WBL</td>
<td>TWSC F &gt; 100 WBL</td>
<td>Signal B 19 0.75</td>
</tr>
<tr>
<td>5</td>
<td>SR 19 &amp; Irondale Rd⁵</td>
<td>TWSC F &gt; 100 WBL</td>
<td>TWSC F &gt; 100 WBL</td>
<td>2-Lane Round C 27 EB</td>
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<tr>
<td>6</td>
<td>SR 19 &amp; Four Corners Rd⁶</td>
<td>TWSC D 26 EBL</td>
<td>TWSC F 82 EBR</td>
<td>N/A N/A N/A N/A</td>
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<tr>
<td>7</td>
<td>SR 19 &amp; Prospect Ave</td>
<td>TWSC E 35 WBL</td>
<td>TWSC F &gt; 100 WBL</td>
<td>Signal C 23 0.88</td>
</tr>
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<td>8</td>
<td>SR 19 &amp; Airport Rd</td>
<td>TWSC F 56 WB</td>
<td>TWSC E 46 WB</td>
<td>Signal A 7 0.80</td>
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<td>9</td>
<td>SR 20 &amp; SR 19</td>
<td>Signal B 15 0.70</td>
<td>Signal C 33 0.96</td>
<td>Signal D 35 0.97</td>
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<td>SR 20 &amp; Old Fort Town. Rd⁸</td>
<td>TWSC D 32 WB</td>
<td>TWSC F 52 WB</td>
<td>TWSC C 25 WB</td>
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<td>SR 20 &amp; Seton Rd</td>
<td>TWSC F &gt; 100 EB</td>
<td>TWSC F &gt; 100 EB/WB</td>
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<td>SR 20 &amp; Fredericks St⁹</td>
<td>TWSC C 21 EB</td>
<td>TWSC C 20 WB</td>
<td>TWSC C 19 WB</td>
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<td>SR 20 &amp; Jacob Miller Rd¹⁰</td>
<td>TWSC C 17 WB</td>
<td>TWSC D 27 WB</td>
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<td>SR 20 &amp; Mill Rd</td>
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<td>Discovery Rd &amp; Jacob Miller Rd</td>
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<td>TWSC C 22 NBT/NBR</td>
<td>1-Lane Round B 11 WB</td>
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<td>16</td>
<td>Discovery Rd &amp; Mill Rd¹¹</td>
<td>TWSC B 14 EB</td>
<td>TWSC C 20 EB</td>
<td>TWSC C 20 EB</td>
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<td>SR 19 &amp; Cedar Ave Rd</td>
<td>TWSC C 19 EB</td>
<td>TWSC F &gt; 100 WB</td>
<td>N/A N/A N/A N/A</td>
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<td>18</td>
<td>SR 19 &amp; Kennedy Road¹²</td>
<td>TWSC B 14 SB</td>
<td>TWSC C 15 SB</td>
<td>TWSC C 15 SBL</td>
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<td>19</td>
<td>SR 116 &amp; Oak Bay Rd</td>
<td>TWSC C 12 NB</td>
<td>TWSC C 22 NBT/NBR</td>
<td>1-Lane Round B 11 WB</td>
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<tr>
<td>20</td>
<td>SR 116 &amp; Chimacum/Irondale Rd</td>
<td>TWSC C 21 SB</td>
<td>TWSC E 40 SB</td>
<td>TWSC C 23 EB</td>
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<tr>
<td>21</td>
<td>SR 116 &amp; Cedar Ave Rd</td>
<td>TWSC C 14 EB</td>
<td>TWSC C 18 EB</td>
<td>TWSC C 20 EB</td>
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<td>22</td>
<td>Port Townsend Roundabout</td>
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</tr>
</tbody>
</table>

1. TWSC = Two-Way Stop Control, AWSC = All-Way Stop Control, Round = Roundabout, Signal = Signal
2. Level of service, based on 2000 Highway Capacity Manual methodology. Bold font represents intersections with LOS E or F.
3. Average delay in seconds per vehicle. Bold font represents intersections with LOS E or F.
4. Volume-to-capacity ratio reported for signalized intersections. Bold font represents intersections with LOS E or F.
5. Worst movement reported for unsignalized intersections. Bold font represents intersections with LOS E or F.
6. 2031 With Projects LOS assumes Four Corners Rd has been realigned to intersection with SR 19 at Irondale Rd.
7. No LOS for 2031 With Projects Scenario assuming Four Corners Rd has been realigned to intersection with SR 19 at Irondale Rd.
8. 2031 With Projects LOS assumes Seton Rd signal is complete and Old Fort Townsend Rd becomes right-in/right-out only.
9. 2031 With Projects LOS assumes Seton Rd signal is complete and Fredericks St continues to allow for all movements.
10. The intersection will be realigned to the Discovery Rd/Mill Rd intersection with SR 20 assuming the construction of a new roundabout.
11. The intersection will be realigned to Jacob Miller Road/Mill Rd intersection with SR 20 assuming the construction of a new roundabout.
12. SR 19 & Kennedy Road improvements assumed to occur with development of access management techniques along SR 20.
13. The proposed roundabout on SR 20 would incorporate Discovery Rd, Jacob Miller Rd, and Mill Road into one intersection.
The identified transportation improvement projects should reduce the number of intersections operating at LOS E or F to one location in year 2031. The intersection that will operate poorly during the PM peak hour is the intersection of SR 20 with Fredericks Street. The intersection will operate poorly because side street vehicles will have a difficult time finding an acceptable gap in the traffic on SR 20 because the highway will be operating at or above capacity. However, motorists who need to make a protected left or right-turn from the Glen Cove industrial/commercial district will have the option of using the traffic signal or roundabout at the SR 20 and Seton Road intersection if conditions at Fredericks Street are less than desirable.

While additional intersection improvements will reduce delay for side street traffic volumes and improve local access, they are likely to increase travel times for regional highway users along both the SR 19 and SR 20 corridors. In general, the intersection improvements described in Table 8 are not expected to noticeably improve future highway LOS results previously listed in Table 5. The County and WSDOT should consider the trade-offs between corridor mobility and local access needs when prioritizing and implementing the intersection improvements identified for the state highways.

**How do the transportation improvement recommendations compare to those in the SR 19/20 Corridor Plan?**

The WSDOT SR 19/20 Corridor Plan\(^1\) was completed in February 2011 and identified transportation safety and mobility improvement projects along the corridor. The plan guides WSDOT’s investments in the corridor over the next 20 years and targets items such as congestion, safety and roadside issues that travelers often encounter.

Project recommendations were identified for six corridor segments as illustrated in the project maps attached as Appendix F. The projects were derived through stakeholder and public input, and through technical analysis and evaluation of improvement options.

*Projects of Special Interest – High Priority Projects*

Through a stakeholder and public involvement process, “Projects of Special Interest” were identified and adopted (Figure S-1 in Appendix D). These projects resonated with the community and received the most interest and support from agency partners and public outreach efforts.

Projects of special interest were derived from lists of recommendations developed for the six identified corridor segments through stakeholder and public input and through technical analysis and evaluation of improvement options using alternatives evaluation criteria adopted by a Corridor Working Group.

A total of eight projects were identified as “Projects of Special Interest” and five of the projects directly align with projects identified as part of the Quimper Peninsula Transportation Study. The five projects have been highlighted in **Bold** text in Table 12 and are designated as high priority projects along the corridor by WSDOT.

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\(^1\) [http://www.wsdot.wa.gov/projects/sr19/corridorplan](http://www.wsdot.wa.gov/projects/sr19/corridorplan)
### Table 12. Project List Comparison to WSDOT SR 19/20 Corridor Plan Priorities

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Project Location</th>
<th>Project Limits</th>
<th>WSDOT Priority Ranking</th>
<th>HSP Tier</th>
<th>Differences between plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>Jacob Miller Rd Extension to Mill Rd</td>
<td>N/A</td>
<td>N/A</td>
<td>County project</td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>Otto St North Extension to Glen Cove Rd</td>
<td>N/A</td>
<td>N/A</td>
<td>County project</td>
<td></td>
</tr>
<tr>
<td>R3</td>
<td>Otto St to Old Fort Townsend Rd</td>
<td>N/A</td>
<td>N/A</td>
<td>County project</td>
<td></td>
</tr>
<tr>
<td>R5</td>
<td>Prospect Ave to Theatre Rd</td>
<td>35</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R6</td>
<td>From the existing intersection with SR 19 to Irondale Rd</td>
<td>33</td>
<td>1</td>
<td>Only includes channelization</td>
<td></td>
</tr>
<tr>
<td>I1</td>
<td>SR 19 &amp; Center/Chimacum Rd</td>
<td>Intersection</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>I2</td>
<td>SR 19 &amp; West Valley Rd</td>
<td>Intersection</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>I3</td>
<td>SR 19 &amp; Anderson Lake Rd</td>
<td>Intersection</td>
<td>9</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>I4</td>
<td>SR 116 &amp; Chimacum/Irondale Rd</td>
<td>Intersection</td>
<td>N/A</td>
<td>N/A</td>
<td>Located off SR 19/20</td>
</tr>
<tr>
<td>I5</td>
<td>SR 116 &amp; Cedar Ave</td>
<td>Intersection</td>
<td>N/A</td>
<td>N/A</td>
<td>Located off SR 19/20</td>
</tr>
<tr>
<td>I6</td>
<td>SR 19 &amp; SR 116</td>
<td>Intersection</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>I7</td>
<td>SR 19 &amp; Kennedy Rd</td>
<td>Intersection</td>
<td>Not included</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I8</td>
<td>SR 19 &amp; Irondale Rd</td>
<td>Intersection</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>I9</td>
<td>SR 19 &amp; Prospect Ave</td>
<td>Intersection</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>I10</td>
<td>Four Corners Rd Fire Station Access</td>
<td>Intersection</td>
<td>Not included</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I11</td>
<td>New SR 20 Intersection</td>
<td>Intersection</td>
<td>N/A</td>
<td>N/A</td>
<td>Located off SR 19/20</td>
</tr>
<tr>
<td>I12</td>
<td>SR 19 &amp; Airport Rd</td>
<td>Intersection</td>
<td>15</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>I13</td>
<td>SR 20 &amp; Old Fort Townsend Rd</td>
<td>Intersection</td>
<td>25</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>I14</td>
<td>SR 20 &amp; Seton Rd</td>
<td>Intersection</td>
<td>7</td>
<td>1</td>
<td>Improvement at either Seton Rd or Fredericks St</td>
</tr>
<tr>
<td>I15</td>
<td>SR 20 &amp; Fredericks St</td>
<td>Intersection</td>
<td>7</td>
<td>1</td>
<td>Improvement at either Seton Rd or Fredericks St</td>
</tr>
<tr>
<td>I16</td>
<td>SR 20/Mill Rd &amp; Discovery Rd/Jacob Miller Rd</td>
<td>Intersection</td>
<td>1 &amp; 2/3</td>
<td>Corridor Plan separates into (1) alternatives study and (2) improvements</td>
<td></td>
</tr>
<tr>
<td>I17</td>
<td>Chimacum Rd &amp; Elkins Rd</td>
<td>Intersection</td>
<td>N/A</td>
<td>N/A</td>
<td>County project</td>
</tr>
<tr>
<td>A1</td>
<td>SR 19</td>
<td>SR 116 to Irondale Rd</td>
<td>36</td>
<td>3</td>
<td>Adds additional lanes</td>
</tr>
<tr>
<td>A2</td>
<td>SR 19</td>
<td>Theatre Rd (north) to Theatre Rd (south)</td>
<td>35</td>
<td>2</td>
<td>Included as part of R5</td>
</tr>
</tbody>
</table>

1. The ID of each project corresponds to the project ID as illustrated on Figure 11.
2. The priority ranking shown in Table 5-2 in the WSDOT Corridor Plan. Projects of Special Interest have been identified as a number one priority.
3. Highway System Plan (HSP) priority tiers relates to the overall cost of the project. Tier I projects are lower cost, and Tier III are high cost solutions as defined in WSDOT’s HSP.
4. Projects in **BOLD** are of special interest and received the most interest and support from the community. They have been identified as number one priorities by WSDOT.
5. The Corridor Plan included two separate projects for the Port Townsend Entryway intersections. The project identified as a number one priority is to conduct a study to evaluate alternatives to address multiple intersection issues in the Port Townsend Entryway area.
**Remaining Corridor Plan Priorities**

The remaining projects in the Corridor Plan were broken out by WSDOT by tiers and TDM strategies as defined in the WSDOT Highway System Plan. The project recommendations were defined as follows:

**Tier 1 Recommendations**

TIER 1 recommendations focus on low-cost projects that may deliver a high return on capital investment and have short delivery schedules (Figure S-2 in Appendix D). These include incident management, Intelligent Transportation System, access management, turn lanes and intersection improvements.

**Tier 2 Recommendations**

TIER 2 recommendations focus on moderate to higher cost improvements that reduce congestion on both highways and local roads (Figure S-3 in Appendix D). These include improvements to parallel corridors (including local roads), adding auxiliary lanes, and constructing additional access points.

**Tier 3 Recommendations**

TIER 3 recommendations focus on the highest-cost projects that can deliver corridor-wide benefits (Figure S-4 in Appendix D). These include adding general purpose lanes, and, building or modifying highway interchanges.

**TDM and Intelligent Transportation Systems (ITS)**

Transportation Demand Management (TDM) is an umbrella term for strategies that reduce vehicle trips or shift use of the roadway to off peak periods (Figure S-5 in Appendix D). Intelligent Transportation Systems is the application of computers, communications & sensor technology to surface transportation.

**Comparison of Priorities**

Most of the projects identified along the SR 19 and SR 20 corridors in the Quimper Peninsula Transportation Study were also included in the SR 19/20 Corridor Plan. Table 12 summarizes all the projects in the Quimper Peninsula Transportation Study and notes the resulting SR 19/20 Corridor Plan priority number and Highway System Plan (HSP) Tier.

**What are the next steps?**

The Quimper Peninsula Transportation Study identifies roadway-related projects to improve mobility, safety, circulation, and access in the Irondale and Port Hadlock UGA and along the SR 19/20 corridor. Since available revenue to implement the identified improvements is very limited, the County should work to complete the following steps to identify funding and eventually implement the identified projects.

- Update the UGA Transportation Plan based on the results of this study.
- Complete the identification of needed non-motorized projects in the Irondale and Port Hadlock UGA and incorporate them into an update of the County’s non-motorized plan.
- Incorporate the recommended improvements into the County’s Transportation Element of the Comprehensive Plan.
• Review and update development codes and roadway design standards, specifically along SR 116, to support implementation of the desired streetscapes, connections, TDM strategies, and facilities identified in the UGA Transportation Plan.

• Revise or develop an updated project prioritization process used to rank all transportation projects annually. Consider the trade-offs between corridor mobility and local access needs when prioritizing and implementing intersection improvements along the state highways.

• As funding or opportunities arise, incorporate the recommended improvements into the County’s six-year TIP.

• Work with WSDOT and the Peninsula Regional Transportation Organization (PRTPO) to incorporate the projects identified for the SR 19/20 corridor and also in the WSDOT Corridor Plan into the State’s Highway System Plan (HSP) and the PRTPO Regional Transportation Plan (RTP).