

### 3.17 Transportation System

The proposed Thurston Highlands Master Planned Community is located within a portion of 2,000 acres that was annexed by the City of Yelm in 1993. An Environmental Impact Statement (EIS) was prepared for the annexation proposal. The 1993 EIS evaluated development of the area as a mix of residential, recreational and commercial uses similar to the current proposal, although with a lower residential density. The street and access system in the current proposal is very similar to the transportation system envisioned in the 1993 EIS, and includes several arterial street connections to the existing City street grid. Figure 3.17-1 illustrates the Thurston Highlands site in relation to the transportation system.

The City of Yelm identified several new transportation routes in its 1992 *Comprehensive Transportation Plan* that would be necessary to accommodate the Thurston Highlands area future growth, as well as growth throughout the City's urban growth area (UGA). These new corridors were analyzed in the following documents:

- Southwest Yelm Annexation, DEIS and FEIS (1993)
- City of Yelm Comprehensive Plan (1995)
- Amendment to the 1995 Comprehensive Plan (December 2000)
- Revised Environmental Assessment for the Y2/Y3 Corridor (February 2000)
- Updates to City of Yelm Comprehensive Transportation Plan (1997 and 2001)
- 2025 Thurston Regional Transportation Plan (2004).

Based on the analyses in these documents, the City of Yelm identified 13 projects in its 2001 *Transportation Plan* to meet projected future transportation needs of the community. Each project is designated with a "Y" (Yelm), and is listed in numerical order in the current *Comprehensive Transportation Plan*. The corridors known as Y2 and Y3 loop highways are also listed in the Washington State Department of Transportation (WSDOT) *Route Development Plan* (RDP) documents, which support the need for these future loop highways to improve mobility, access and safety throughout the Yelm UGA.

New corridors being planned include:

#### **Y1. 93rd Avenue SE/Thurston Highlands Connector**

Projected growth in the southwest portion of the Yelm UGA indicated the potential need for an arterial roadway between the two major state highways, SR 510 and SR 507. If required, connection to the north in the vicinity of 93rd Avenue SE would be based on future uses within Thurston Highlands.

#### **Y2. SR 507/Five Corners Connector**

Y2 would provide a continuous southern loop around the City Center, reducing through-trips and traffic congestion in the City Center. During the course of the Y2 Corridor Study, it became apparent that Y2 alone would not reduce the congestion on Yelm Avenue to acceptable levels. In order to thoroughly address traffic problems on SR 507 and SR 510, it is also necessary to include the northern portion of the loop known as the SR 510 North Loop (Y3).



Insert Figure 3.17-1. Relationship of the Thurston Highlands Site to the Regional Transportation System.



### **Y3. SR 510 North Loop**

Similar to the south loop (Y2), this northern loop would provide an alternative for traffic traveling through and around the Yelm City Center. The future state highway would provide more than 4 miles of limited-access roadway around the northern area of the City. The north connection would be in the vicinity of Mud Run on SR 510, and the southern terminus near the Wal-Mart on SR 507. WSDOT is currently purchasing right-of-way for this corridor. Construction could begin as early as 2009, based on current project funding and project schedule determined by WSDOT.

While it is expected that the Thurston Highlands project would have a measurable impact on the City's transportation system, the City of Yelm has anticipated master planned community development of the site, and has identified local and regional transportation facilities to accommodate it. Specific details of planned transportation improvements are described in the City's 2001 *Comprehensive Transportation Plan*.

#### **City of Yelm Connectivity Policy**

The City of Yelm has an adopted policy requiring connected streets. The 2001 *Comprehensive Transportation Plan*, Section 13, includes the following connectivity policy: *To provide a highly interconnected network of streets and trails for ease and variety of travel.* Increasing connections throughout the City not only reduces traffic congestion, but also increases community unity. Therefore, the City limits the use of cul-de-sacs, dead-end streets, loops, and other designs that would result in travel barriers.

#### **Study Context**

A *Transportation Impact Analysis* (TIA) was prepared to evaluate the specific transportation impacts of the Thurston Highlands project as proposed (Transportation Engineering Northwest 2008). A TIA is a specialized study of the impacts that a development will have on the surrounding transportation system. The primary purpose of a TIA is to:

- Determine the impacts of new development traffic on the existing and future street network
- Determine and assess the appropriate layout and design of the proposed street system
- Determine if the new development can meet acceptable traffic performance measures and the City's regulatory standards for concurrency under the Growth Management Act
- Identify appropriate traffic solutions and mitigation measures to accommodate the planned traffic growth and development impacts.

The City of Yelm has adopted specific guidelines and requirements for preparation of a TIA for new development. Because of the potential for the Thurston Highlands proposal to impact neighboring jurisdictions, the City of Yelm held traffic scoping meetings with Thurston County and WSDOT to identify specific elements to be addressed in the TIA. All jurisdictions agreed that the TIA must evaluate impacts of the project on area transportation facilities in 2012 and 2015, as well as arterial roadway location impacts in 2025, the estimated date of full build-out.

The *Thurston Highlands Master Planned Community TIA* addressed a total of 21 local study area intersections (16 existing and 5 future locations), and 35 regional study area intersections. The intersections are listed in the TIA for the project and are further discussed below.

### 3.17.1 THE PROPOSED ACTION AND DEVELOPMENT PHASING

The Draft EIS evaluates three conceptual land use alternatives for development of the Thurston Highlands Master Planned Community. Vehicle trip generation estimates were prepared for each alternative. The Preferred Alternative was found to generate the highest number of evening (PM) peak hour trips. The Preferred Alternative was therefore used to evaluate the transportation impacts of the project.

The Thurston Highlands Preferred Alternative consists of approximately 3,382 single-family homes, 1,618 multi-family units, 825,000 square feet of neighborhood retail space, and approximately 136,000 square feet of offices. Construction of the Master Planned Community would be phased, with major milestones in 2012 and 2015, and final build-out anticipated by approximately 2025. Each phase is discussed below.

Over the next 20 years, major transportation corridors will be constructed that will affect the traffic flow to the Thurston Highlands site as well as in and around the City. Y3, the SR 510 North Loop, is anticipated to be in place prior to completion of Thurston Highlands Phase 2 in 2015. Due to this timing, the transportation analysis assumed that the SR 510 North Loop would be in place at the time Phase 2 opens. Anticipated development within major project phases is as follows:

#### **2012 – Phase 1 Residential (without the SR 510 North Loop)**

The Phase 1 conceptual site plan includes construction of approximately 597 single-family homes and 411 condominium/townhouse homes, for a total of approximately 1,008 residential units. Access to the project would be provided from:

- SR 510 at Killion Road
- SR 510 at Berry Valley Road/Cullens Street
- SR 510 at Longmire Street
- SR 507 at Mosman Street.

#### **2015 - Phase 2 Mixed-Use (with the SR 510 North Loop)**

The applicant estimates that approximately 1,500 additional residential units would be constructed in Phase 2, including approximately 1,300 single-family homes and 200 condominiums/townhouses. Phases 1 and 2 would therefore total approximately 2,500 residential units. A neighborhood retail shopping center approximately 100,000 square feet in size is also proposed in Phase 2. Access points would remain the same as in Phase 1, with one additional point of entry, via Tahoma Boulevard at the property southern terminus with SR 507.

#### **2025 – Full Build-out (with the SR 510 North Loop)**

It is estimated that the remaining 1,485 single-family homes and 1,007 condominiums/townhouses would be constructed by 2025, for a total of 5,000 dwelling units at full build-out. An additional 725,000 square feet of neighborhood retail shopping space, and approximately 135,000 square feet of general office space are also anticipated as part of full build-out. The primary access system would remain the same as in Phase 2, with future planning and considerations for roadway extensions to the west via 118th Avenue SE and to the north via 93rd Avenue SE.

Trips generated by the Regional Sports Complex component of Thurston Highlands Master Planned Community have not been included in this analysis, but will be analyzed with later phases. Final facilities within this complex had not yet been defined at the time of this writing; therefore, traffic impacts associated with the Regional Sports Complex will be evaluated when the sports program is determined in future phases. Only small components of this area would be developed initially, and it will function as a community park rather than a Regional Sports Complex in the early phases of Thurston Highlands.

### 3.17.2 TRANSPORTATION STUDY AREA CONTEXT

#### 3.17.2.1 Roadway Inventory

Several existing roadways that will be used as major routes for access to Thurston Highlands are described below. Thurston Highlands would impact roads within the City of Yelm and the Cities of Lacey and Rainier, Thurston County, Pierce County, and several Washington State Department of Transportation facilities. Roads serving the development are managed by each local jurisdiction if within the corporate limits, with the exception of three State routes. Outside the City, Thurston County or Pierce County manage and maintain their own facilities.

Roadways are designated by “functional classification;” i.e., arterial, commercial collector, neighborhood collector, etc. The functional classification identifies specific traffic volume thresholds, carrying capacities and design and construction requirements for each type of roadway.

#### Local Roadways

- *Major Arterials*  
The City of Yelm classifies First Street as a major arterial from the Y1/Y2 intersection to Yelm Avenue.
- *Urban Arterial*  
Urban Arterials within the City include: Yelm Avenue East (SR 507) and Yelm Avenue West (SR 510), First Street north of Yelm Avenue, and Bald Hills Road SE
- *Neighborhood Collectors*  
93rd Avenue SE, Cullens Road, Mosman Avenue SE, and Killion Road NW
- *Commercial Collector*  
Killion Road NW (adjacent to commercially-zoned areas)
- *Local Access Commercial*  
Longmire Street SW
- *Boulevard Swale*  
Berry Valley Road SW

### WSDOT Roadways

- *Urban Principal Arterial*  
Marvin Road SE (SR 510) and SR 7 are classified by WSDOT as Urban Principal Arterials. Each has four travel lanes with a two-way center turn lane.
- *Rural Minor Arterial*  
SR 702 is a two-lane Rural Minor Arterial.

### Thurston County Roadways

- *Arterial*  
Old Pacific Highway, Reservation Road, Rainier Road SE, and Yelm Highway SE, Old Highway 99 N and Highway 99 S.
- *Local Access*  
Manke Road SE (Koeppen Road).
- *Collector*  
Mullen Road SE is classified as a Collector in Thurston County and Minor Arterial in the City of Lacey.

### City of Lacey Roadways

Martin Way SE and College Street are four-lane Major Arterials, and Pacific Avenue is classified by the City as a Minor Arterial.

### City of Rainier Roadways

Centre Street is a two-lane urban arterial.

### Pierce County Roadways

Nisqually Road, 228th Street S, 40th Avenue S, and Harts Lake Road are all two-lane Secondary Arterials.

#### **3.17.2.2 Study Area Intersections**

A total of 21 local study area intersections (16 existing and 5 future intersections), and 35 regional study area intersections were analyzed in the *Thurston Highlands Master Planned Community TIA*. The intersections are identified with the following letters indicating the jurisdiction in which they are located:

- Y – Yelm
- L – Lacey
- R – Rainier
- PC – Pierce County
- T – Tenino
- TC – Thurston County

Several of the intersections are WSDOT facilities that are located within the identified City or County. The study area intersections are shown on Figures 3.17-2 and 3.17-3. Channelization and traffic control at each intersection is discussed further in the sections below, and also illustrated in the *Thurston Highlands Master Planned Community TIA*.

### 3.17.3 EXISTING TRAFFIC CONDITIONS

#### 3.17.3.1 Existing Traffic Volumes

The two time periods of the day with the highest volume of vehicles on the road and the most vehicle delays occur between 6:00 AM and 8:00 AM, and between 4:00 PM and 6:00 PM. Typically, the evening (PM) peak traffic period represents the highest volume of traffic and the most congested time of the day for commuter and local trips.

Traffic counts were taken at the study area intersections in September 2006 and February 2007. These counts were used to establish a baseline of current PM peak hour traffic conditions.

#### 3.17.3.2 Level of Service

Existing traffic operations were analyzed to determine the current Level of Service (LOS). LOS serves as an indicator of the quality of traffic flow at an intersection or along a road segment during a specific time period. It ranges from LOS A (little or no delay) to LOS F (long delays, congestion). Each type of intersection (signalized, unsignalized, roundabout) has different criteria to measure Level of Service.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, and increased travel time. The average delay for all movements is used to measure LOS at signalized intersections.

At two-way stop-controlled intersections, the movement with the poorest LOS defines the overall intersection LOS. This is typically the minor street left-turn for vehicles waiting for an acceptable gap in the traffic stream before entering the major street. Given that unsignalized intersections create different driver expectations and congestion levels than signalized intersections, delay criteria are lower for unsignalized intersections. Table 3.17.3-1 illustrates how LOS criteria for unsignalized intersections differ from those used at signalized intersections.

Table 3.17.3-1. Level of service criteria.

Level of Service	Signalized Average Total Delay per Vehicle (seconds)	Unsignalized (Stop-Sign) Stopped Delay per Vehicle (seconds)
A	±10	±10
B	>10-20	>10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50



Insert Figure 3.17-2. Local Study Area Intersection Locations.



Insert Figure 3.17-3. Regional Study Area Intersection Locations.



Each of the affected jurisdictions has adopted level of service standards for use in assessing the impacts of new developments. The level of service standards for each study area jurisdiction is summarized below:

#### City of Yelm

- LOS C in all residential zones.
- LOS D in all commercial and light industrial zones.
- LOS F is considered acceptable in the urban core on Yelm Avenue (Solberg Street to 4th Street) where mitigation to create traffic diversions, alternate routes and modes of transportation are being planned, funded and implemented. The LOS standard for the urban core area does not preclude the City's ability to require necessary safety improvements (i.e., signalization and channelization) of intersections impacted by "new development."

#### Thurston County

- LOS C for all rural roadway and intersection facilities.
- LOS D for roadway and intersections within the UGA.
- LOS E for designated "core" areas and "High Density Urban" corridors as defined in the TRPC 2025 Regional Transportation Plan. Martin Way is designated as a strategy corridor within the high-density urban area in the Lacey UGA.

#### City of Lacey

- LOS D for roadways and intersections within the UGA.
- LOS E for designated "core" and "High Density Urban" corridors as defined in the TRPC 2025 Regional Transportation Plan.

#### Pierce County

The study area roadways and intersections located within Pierce County are all state-owned facilities. The LOS standards for these facilities follow the adopted regional and local designations, including specific exception areas and strategy corridors.

### **3.17.3.3 Traffic Evaluation Software**

The computer program *Synchro 6, Traffic Signal Coordination Software* was used for analysis of signalized and unsignalized intersections within the City of Yelm, and for all signalized regional study area intersections. The *Highway Capacity Software* (version 4.1e/f) was used to evaluate LOS at unsignalized regional study area intersections, and the SIDRA software program was used to analyze roundabout intersections.

### **3.17.3.4 Existing Intersection Level of Service**

Tables 3.17.3-2 and 3.17.3-3 summarize the LOS and delay for each of the study intersections during the PM peak period for base year (2007) conditions. Following the tables is a brief description of current traffic operations and intersection performance.

Table 3.17.3-2. Local Study Area PM peak hour level of service and delay summary: 2007 (TENW 2008).

Intersection #	Intersection	Signalized	Unsignalized Intersection	
		Intersection Average LOS (Delay)	Minor Street Left Turn LOS (Delay)	Intersection Average LOS (Delay)
8	Yelm Ave (SR 510)/First Street	D (38)		
11	Yelm Ave (SR 510)/Clark Road SE	B (20)		
12	Yelm Ave/Bald Hills Rd/Creek St.	D (36)		
1	Yelm Ave (SR 510)/Burnett Road		C (24)	A (1)
2	Yelm Ave (SR 510)/93 <sup>rd</sup> Avenue		D (28)	A (3)
3	Yelm Ave/Mountain View Road		D (42)	A (1)
4	Yelm Ave/Killion Road		E (49)	A (1)
5	Yelm Ave/Cullens Road		F (63)	A (3)
6	Yelm Ave/Longmire St.		E (41)	A (1)
7	Yelm Ave/Edwards St.		F (>100)	A (10)
9	Rhoton Road/Northern Pacific Rd.		B (11)	A (3)
10	First St NE/Railway NE		B (12)	A (2)
13	Yelm Ave/(SR 507)/Grove Road		D (30)	A (1)
14	First St. /Mosman Ave. WB		C (24)	A (7)
15	Longmire St/Terra Glen St.		A (9)	A (2)

Note: Unsignalized intersections show LOS and control delays for the worst directional movement and weighted average delay for all approaches.

Table 3.17.3-2 above illustrates that a number of unsignalized intersections along Yelm Avenue have turning movements that currently operate at poor service levels during the PM peak hour, including:

- Yelm Avenue/Mountain View (southbound movements)
- Yelm Avenue/Killion Road (southbound movements)
- Yelm Avenue/Cullens Road (northbound and southbound movements)
- Yelm Avenue/Edwards Street (southbound movements).

While some of the intersection approaches and movements operate below accepted levels, the overall intersection operates at or above adopted LOS standards. All other signalized intersections and the weighted average of all approach movements at unsignalized intersections within the local study area operate at LOS D or better under existing conditions.

Table 3.17.3-3. Regional study area PM peak hour level of service and delay summary: 2007 (TENW 2008).

Intersection #	Intersection	Signalized	Unsignalized Intersection	
		Intersection Average LOS (Delay)	Minor Street Left Turn LOS (Delay)	Intersection Average LOS (Delay)
L1	Marvin Road/I-5 SB Ramps	C (31)		
L2	Marvin Road/I-5 NB Ramps	B (13)		
L3	Marvin Road/Martin Way	D (39)		
L4	Marvin Road/Steilacoom Road	D (38)		
L6	College Street/Yelm Highway SE	C (31)		
PC2	SR 507/SR 7	B (13)		
PC3	SR 7/SR 702	B (13)		
PC5	SR 507/SF 702	B (14)		
TC14	SR 510/Muk Sut Wei Dr.	B (16)		
TC1	SR 510/Old Pacific Hwy		F (>100)	D (26)
TC2	SR 510/Mullen Road SE		B (13)	B (11)
TC3	Old Pacific Hwy/Kuhlman Rd SE		C (23)	C (19)
TC4	Old Pacific Hwy/Reservation Rd SE		B (10)	A (8)
TC5	SR 510/Reservation Rd SE		F (>100)	D (33)
TC6	SR 510/Yelm Hwy SE		F (>100)	F (>100)
TC7	SR 507/Vail Rd SE		F (>100)	F (>100)
TC8	Bald Hills Rd/Vail Rd SE		All Way Stop	B (13)
TC9	Vail Rd SE/Hannus Rd SE		B (12)	A (1)
TC10	SR 507/Manke Road		C (17)	A (3)
TC11	SR 507/Vail Cutoff Rd SE		B (12)	A (3)
TC12	SR 507/Military Rd SE		A (10)	A (2)
TC13	Rainier Rd SE/Stedman Rd SE		C (16)	A (2)
R1	SR 507/Centre St.		D (31)	D (25)
R2	SR 507/Minnesota Ave		A (10)	B (10)
T1	SR 507/Old Hwy 99N		B (15)	A (6)
T2	SR 507/Morningside/Wichman St		B (14)	A (2)
T3	SR 507/Hwy 99S		B (14)	A (5)
PC1	Nisqually Rd/I-5 SB Ramps		C (18)	C (17)
PC2	Nisqually Rd/I-5 NB Ramps		C (16)	A (1)
PC4	SR 507/288th St. S		B (14)	A (1)
PC6	SR 702/Harts Lake Rd SE		C (17)	A (6)
PC7	SR 702/40th Ave S		B (12)	A (2)
TC15	I-5 SB Ramps/US 12		D (27)	A (6)
TC16	I-5 NB Ramps/US 12		C (16)	B (10)

Note: Unsignalized intersections show LOS and control delays for the worst directional movement and weighted average delay for all approaches.

Existing PM peak hour LOS results for the regional study area intersections show that the following unsignalized intersections have movements that presently operate at poor service levels:

- SR 510/Old Pacific Highway (westbound movement)
- SR 510/Reservation Road (southbound movement)
- SR 510/Yelm Highway (northbound movement)
- SR 507/Vail Road (northbound movement)
- SR 702/SR 7 (eastbound movement).

Each of these intersections, with the exception of the SR 507/Vail Road and SR 510/Yelm Highway locations, operate at acceptable levels based on the overall intersection performance. All signalized intersections and other controlled movements at unsignalized intersections within the regional study area operate at LOS D or better under existing conditions.

### **3.17.3.5 High Accident Locations**

WSDOT examines accident histories over two-year periods to determine high accident locations or corridors, and identifies severity, frequency and proximity of accidents. Accidents are assigned a severity score on a ten-point scale (property damage only is assigned one point, possible injury 3 points, evident injury 5 points, and disabling injury 9 points). Within a 0.1 mile interval, if six or more accidents with a total severity score of 10 points or higher are observed within a two-year period, the roadway segment is classified as a severe accident location (SAL).

Accident clusters classified as severe accident locations are then combined into one of six roadway categories (rural and full access control, urban and full access control, etc.) The length of a roadway segment resulting from combining accident clusters is typically less than one mile. Any roadway segment with accident clusters that exceed the average severity rate for its category is designated as a High Accident Location (HAL). Additionally, if two or more fatal accidents occur on the 0.1-mile segment within a two-year period, classification as a HAL is warranted.

The following study area locations were identified as high accident locations by WSDOT between January 1, 2003 and December 31, 2004:

- I-5 between milepost 110.84 and 112.43 (SR 510 Off-Ramp to SR 510 On-Ramp)
- I-5 between Milepost 113.70 to 114.65 (between Nisqually Road ramps)
- SR 510 between milepost 0.00 to 15.67 (between I-5 and the SR 507/First Street intersection in the City of Yelm).

### **3.17.3.6 Public Transportation**

Intercity Transit Route 94 provides weekday service between Olympia, Lacey and Yelm approximately every hour between 5:50 AM and 7:25 PM. Weekend service is provided approximately every two hours between 8:45 AM and 7:10 PM. The stops closest to the Thurston Highlands site are on Yelm Avenue (SR 510) in the vicinity of Burnett Road SE, Mountain View Road SE, Cullens Street, and Rice Street.

### **3.17.3.7 Nonmotorized Transportation Facilities**

Raised sidewalks and bicycle lanes are provided on Longmire Street and Tahoma Boulevard, and raised sidewalks are also available on Berry Valley Road. A paved trail, separated from vehicle traffic, is located on the west side of SR 507 west of City Hall. Raised sidewalks and/or wide paved shoulders are also provided along various segments of Yelm Avenue and First Street SE.

The Yelm-Tenino Trail was completed in 2004 and is approximately 14.5 miles in length. This trail connects with the 22-mile Chehalis-Western Trail, linking to the Olympia-Lacey-Tumwater area. The trail includes a 10-foot wide, paved surface for multi-purpose nonmotorized use. Also see the Parks and Recreation section of this Draft EIS for additional information (Section 3.15).

### *3.17.4 TRANSPORTATION SYSTEM IMPACTS*

Construction of Thurston Highlands will generate additional traffic on area roadways and will have a measurable impact on those roadways and intersections. This section describes potential transportation system impacts of the phased build-out of the Thurston Highlands Master Planned Community.

#### **3.17.4.1 Planned Transportation Improvements**

A number of transportation improvements are planned by the City of Yelm, Thurston County, Pierce County and WSDOT for roadways and intersections that may be impacted by the Thurston Highlands Master Planned Community. A complete list of these improvements is included in Appendix C of the TIA prepared for the project. In general, projects on the list of improvements are not guaranteed to be constructed; the list identifies transportation needs that should be addressed as funding becomes available. The following funded projects have been identified in coordination with the City of Yelm, and have been assumed as completed by 2012 and 2015 as baseline conditions for the Thurston Highlands analysis:

#### 2012 Baseline Conditions

- Y4 – Installation of a traffic signal at Yelm Avenue (SR 510) and Killion Road.
- Y17 – Installation of a fully-actuated traffic signal at the intersection of Longmire Street and Tahoma Boulevard (to be constructed as part of Thurston Highlands Phase 1 development).
- Y20 – Installation of a traffic signal and construction of a roadway connection to private development at the future SR 507/SR 510 North Loop intersection.
- Realignment of Mosman Avenue between Edwards Street and SR 507.
- Construction of a Stevens Avenue connection from First Street to Edwards Street. The road will be widened to new collector standards and a new connection will be constructed between First Street and Railroad Avenue.

#### 2015 Baseline Conditions

- All improvements listed above as 2012 baseline conditions, plus
- SR 510 North Loop - Construction of the North Yelm Loop SR 510 bypass.

Three future land use and transportation network scenarios were evaluated for development of the Thurston Highlands Master Planned Community. All future scenarios were analyzed both with phased development of Thurston Highlands and without the project.

- 2012 – Phase 1 without the SR 510 North Loop. This scenario assumes the existing transportation network plus planned improvements listed in 2012 baseline conditions above (see Figure 3.17-4).
- 2015 – Phase 2 with the SR 510 North Loop. This scenario assumes the same transportation network as 2012 Phase 1, along with construction of the SR 510 North Loop (see Figure 3.17-5).
- 2025 – Full Build-Out with the SR 510 North Loop. This scenario assumes the same transportation network as 2015 Phase 2, along with the transportation improvements identified in Appendix C of the *Thurston Highlands Master Planned Community TIA* (see Figure 3.17-6).

#### **3.17.4.2 Travel Demand Forecasts: 2012 and 2015**

Future traffic volumes with and without the Thurston Highlands Master Planned Community were estimated for PM peak hour conditions in 2012 and 2015; i.e., at the projected occupancy dates of Phases 1 and 2. Future traffic projections include traffic forecasts for “pipeline” developments and background growth.

##### Pipeline Developments

A pipeline development project is defined as a development within the project study area that is either under construction, approved for construction, or in the permitting process. For this study, nine local area projects and 32 projects within the City of Lacey and its UGA were identified. The trip generation potential of these projects was calculated and assigned to the area road network using data in the TIA for each of the projects. If the TIA was not available, the traffic was assigned to the network using engineering judgment. The *Thurston Highlands Master Planned Community TIA* lists the pipeline projects included in the analysis.

##### Background Traffic Growth

In addition to traffic from the identified pipeline developments, it is anticipated that other background growth will occur within the study area that may affect traffic volume conditions at study area intersections. To estimate the non-specific traffic growth that will occur, an annual growth rate of 2 percent was applied to the base year traffic volumes, as determined by the City of Yelm. The combined effect of including the high amount of pipeline development traffic and background growth traffic provides a conservative representation of traffic conditions by the 2012 and 2015 project horizons.

The 2012 and 2015 traffic forecasts for the future baseline conditions are illustrated in Appendix B of the *Thurston Highlands Master Planned Community TIA*.

Insert Figure 3.17-4. 2012 Network 1 Baseline Transportation Improvement Assumptions.



Insert Figure 3.17-5. 2015 Network 2 Baseline Transportation Improvement Assumptions.



Insert Figure 3.17-6. 2025 Network 3 Baseline Transportation Improvement Assumptions.



### 3.17.4.3 Southwest Yelm Area EMME/2 Model: 2025

For the 2025 full build-out scenario, travel demand forecasts were estimated based on land use forecasting information from the *2025 Southwest Yelm Area EMME/2 Model*. Turning movement counts taken at intersections in 2006 during PM peak hours were used as “existing conditions.” A forecasting distribution method developed by Thomas Frater was used to adjust traffic forecasts associated with the 2025 future network. A complete description of the steps involved in estimating the distribution of trips is included in the *Thurston Highlands Master Planned Community TIA*.

### 3.17.5 PROJECT TRIP GENERATION

Project vehicle trip generation was calculated using the trip generation rates contained in the *Trip Generation Handbook* (2003), prepared by the Institute of Transportation Engineers (ITE). The *Trip Generation Handbook* outlines recommended methods and procedures that were used to estimate Thurston Highlands vehicle trips. Because the Thurston Highlands Preferred Alternative would generate the highest number of PM peak hour trips, this alternative was the basis for the analysis.

#### 3.17.5.1 Phase 1 Trip Generation: 2012

Trip generation rates for Single-Family Detached Housing (ITE Land Use Code 210) and Residential Condominium/Townhouse (ITE Land Use Code 230) were used to calculate traffic that would be generated by the Thurston Highlands Phase 1 development concept. Total trip generation expected from Phase 1 development was calculated by applying the appropriate trip generation rate to the conceptual land uses. Thus, total estimated Phase 1 project trip generation is shown in Table 3.17.5-1.

Table 3.17.5-1. Thurston Highlands conceptual Phase 1 project trip generation: 2012 (TENW 2008).

Land Use	Size <sup>(2)</sup>	AM Peak Hour Trip Generation <sup>(1)</sup>			PM Peak Hour Trip Generation <sup>(1)</sup>			Daily Trip Generation
		Enter	Exit	Total	Enter	Exit	Total	
Single-family Detached Housing (LU 210)	591 DU	107	320	427	337	198	535	5,400
Residential Condominium / Townhouse (LU 230)	411 DU	27	133	160	129	63	192	3,800
<b>Total</b>	<b>1008</b>	<b>134</b>	<b>453</b>	<b>587</b>	<b>466</b>	<b>261</b>	<b>727</b>	<b>9,200</b>

<sup>(1)</sup> Average rate equations for single-family detached housing and residential condominium/townhouse, ITE *Trip Generation Manual*, 7<sup>th</sup> Edition, 2003.  
<sup>(2)</sup> DU is dwelling unit.

#### 3.17.5.2 Phase 2 Trip Generation: 2015

In addition to the Single-family Detached Housing and Residential Condominium/Townhouse land uses, the average rate for Shopping Center (ITE Land Use Code 820) was used to estimate Phase 2 vehicle trips.

*Retail Pass-by Trips.* Many of the vehicle trips to new retail developments are not “new” trips. A project such as a commercial center tends to attract a large amount of traffic from people already driving on area roadways. These trips are not new trips added to the local roadways, but represent “pass-by” trips, defined as follows:

Pass-by trips are trips made as an intermediate stop from an origin to a primary destination (i.e., stopping to shop on the way home from work) by vehicles passing directly by the project driveway.

Pass-by trips are not considered to have direct impacts on adjacent roadways; it is only the impacts created by trips diverted onto different routes and “new” trips that would not be made unless the retail development occurred, that are considered to be transportation impacts specific to the retail development. The ITE *Trip Generation Handbook* identifies an average 34 percent pass-by rate for a shopping center use; for this study pass-by rates were assumed to be half of the average rate, or 17 percent.

*Internal Trips.* Because the Master Planned Community would be a mixed-use development, it is expected that a certain amount of traffic would be “captured” within the development. These trips would occur among uses within the community, and therefore would not impact the off-site street network. ITE research shows that the potential for internal trips ranged from approximately 5 percent to 25 percent depending upon the type, size and amount of retail, jobs and residents. For the Thurston Highlands development, a conservative adjustment of 10 percent was used to account for trips that would occur internally between land uses.

*2015 Phase 2 Trip Generation Estimates.* Table 3.17.5-2 summarizes total estimated traffic potential following completion of Thurston Highlands Phase 2. As shown, a total of approximately 1,884 new-to-network peak hour trips and 22,200 daily trips would be generated at completion of Thurston Highlands Phase 2.

Table 3.17.5-2. Thurston Highlands Phase 2 project trip generation: 2015 (TENW 2008).

Land Use	Size <sup>(2)</sup>	AM Peak Hour Trip Generation <sup>(1)</sup>			PM Peak Hour Trip Generation <sup>(1)</sup>			Daily Trip Generation
		Enter	Exit	Total	Enter	Exit	Total	
Single-family Detached Housing	1,900 DU	334	1,005	1,339	956	561	1,517	15,600
Residential Condominium/Townhouse	610 DU	37	182	219	178	87	265	5,500
Shopping Center	100,000 GLA	49	54	103	180	195	375	4,300
<b>Total Project Trip Generation</b>		<b>420</b>	<b>1,241</b>	<b>1,661</b>	<b>1314</b>	<b>843</b>	<b>2,157</b>	<b>25,400</b>
Less Pass-by Trips (17%)		-9	-9	-18	-32	-32	-64	-700
Less Internal Trips (10%)		-41	-123	-164	-128	-81	-209	-2,500
<b>Net Project Trip Generation</b>		<b>371</b>	<b>1,109</b>	<b>1,480</b>	<b>1,154</b>	<b>730</b>	<b>1,884</b>	<b>22,200</b>

<sup>(1)</sup> Average rate equations, ITE *Trip Generation Manual, 7<sup>th</sup> Edition, 2003.*  
<sup>(2)</sup> DU is dwelling unit; GLA is square feet of Gross Leasable Area.

### 3.17.5.3 Full Build-Out Trip Generation Estimates: 2025

Table 3.17.5-3 summarizes estimated net new trip generation by 2025 of full site build-out of the Thurston Highlands Master Planned Community. Three conceptual land use alternatives (Preferred Alternative, Traditional Development Alternative, and Urban Village Alternative) are evaluated in this Draft EIS, and are compared below. For reasons previously described in Section 3.17.1, the Preferred Alternative was selected for analysis because it would generate the highest number of PM peak hour trips at full build-out of the three land use alternatives evaluated.

Table 3.17.5-3. Thurston Highlands full build-out trip generation: 2025 (TENW 2008).

Land Use	Size <sup>(2)</sup>	AM Peak Hour Trip Generation <sup>(1)</sup>			PM Peak Hour Trip Generation <sup>(1)</sup>			Daily Trip Generation
		Enter	Exit	Total	Enter	Exit	Total	
<b>PREFERRED ALTERNATIVE (Hybrid)</b>								
Single-family Detached Housing	3,382 DU	595	1,785	2,375	1,605	945	2,550	26,500
Residential Condominium/Townhouse	1,618 DU	80	395	480	395	195	590	13,500
Shopping Center	825,000 sf GLA	410	440	850	1,495	1,610	3,095	35,400
Office	135,000 sf GFA	210	30	240	40	190	230	1,700
<b>Total New Preferred Alternative Trips</b>		<b>1,295</b>	<b>2,650</b>	<b>3,945</b>	<b>3,535</b>	<b>2,940</b>	<b>6,465</b>	<b>77,100</b>
Less Pass-by Trips (17%)		-75	-70	-145	-260	-265	-525	-6,000
Less Internal Trips (10%)		-120	-260	-380	-325	-270	-595	-7,100
<b>Total Net New Preferred Alternative Trips</b>		<b>1,100</b>	<b>2,320</b>	<b>3,420</b>	<b>2,940</b>	<b>2,405</b>	<b>5,345</b>	<b>64,000</b>
<b>TRADITIONAL DEVELOPMENT ALTERNATIVE</b>								
Single-family Detached Housing	4,280 DU	750	2,255	3,005	1,985	1,165	3,150	33,000
Residential Condominium/Townhouse	720 DU	40	210	250	205	100	305	6,400
Shopping Center	480,000 sf GLA	240	255	495	865	935	1,800	20,600
Office	150,000 sf GFA	230	30	260	40	205	245	1,800
<b>Total New Traditional Development Alternative Trips</b>		<b>1,260</b>	<b>2,750</b>	<b>4,010</b>	<b>3,095</b>	<b>2,405</b>	<b>5,500</b>	<b>61,800</b>
Less Pass-by Trips (17%)		-40	-45	-85	-155	-150	-305	-3,500
Less Internal Trips (10%)		-125	-270	-395	-295	-225	-520	-5,850
<b>Total Net New Traditional Development Alternative Trips</b>		<b>1,095</b>	<b>2,435</b>	<b>3,530</b>	<b>2,645</b>	<b>2,030</b>	<b>4,675</b>	<b>52,450</b>
<b>URBAN VILLAGE ALTERNATIVE</b>								
Single-family Detached Housing	1,868 DU	330	990	1,320	940	555	1,495	15,400
Residential Condominium/Townhouse	3,132 DU	135	675	810	680	335	1,015	24,700
Shopping Center	850,000 sf GLA	420	455	875	1,530	1,660	3,190	36,500
Office	620,000 sf GFA	710	95	805	130	640	770	5,400
<b>Total New Urban Village Alternative Trips</b>		<b>1,595</b>	<b>2,215</b>	<b>3,810</b>	<b>3,280</b>	<b>3,190</b>	<b>6,470</b>	<b>82,000</b>
Less Pass-by Trips (17%)		-75	-75	-150	-270	-270	-540	-6,200
Less Internal Trips (10%)		-150	-215	-365	-300	-295	-595	-7,600
<b>Total Net Urban Village Alternative Trips</b>		<b>1,370</b>	<b>1,925</b>	<b>3,295</b>	<b>2,710</b>	<b>2,625</b>	<b>5,335</b>	<b>68,200</b>

<sup>(1)</sup> Institute of Transportation Engineers, *Trip Generation Manual, 7th Edition*, 2003.  
<sup>(2)</sup> DU is dwelling unit; GLA is Gross Leasable Area, GFA is Gross Floor Area.

### 3.17.5.4 Trip Distribution and Assignment

The directional distribution of traffic to and from Thurston Highlands was estimated using the 2025 Southwest Yelm Area transportation model. The model, developed using the EMME/2 software package, has been calibrated to accurately represent the existing vehicle travel patterns throughout Thurston County.

In addition, the EMME/2 model has been enhanced to include more detail and definition for the Yelm Urban Growth Area (UGA). The enhancements were made to improve the reliability of

the traffic assignment and distribution patterns for vehicle trips entering and leaving the Yelm UGA. Based on these model improvements, a trip-distribution analysis was performed for this project by conducting a "Select Zone Analysis" for the area that includes the Thurston Highlands site.

This feature of the EMME/2 software package allows all of the traffic into and out of a particular zone to be isolated and shown separately from the rest of the traffic on the network. This graphically shows the percentage of vehicles currently using each of the available routes into and out of the area (Yelm Avenue, First Street, etc.). From this information, regional distribution percentages were calculated for future traffic attributable to the proposed Thurston Highlands Master Planned Community for the horizon years 2012 Phase 1 (without the SR 510 North Loop), and 2015 Phase 2 (with the SR 510 North Loop).

Project traffic distribution to and from the site is based primarily on:

- Area street system characteristics
- Current travel patterns on area roadways
- The proposed access system for the project
- The location of residential and employment areas and shopping/commercial centers.

The Phase 2 development concept includes a retail shopping center in addition to residential uses, which would affect the travel pattern of project-generated trips. By completion of Phase 2, it is also anticipated that the SR 510 North Loop would be constructed. The percentage of vehicles using various routes in and out of the project would therefore vary between Phase 1 and 2.

Projected trip distribution in 2012 and 2015 is shown on Figures 3.17-7 through 3.17-10. Phase 1 local trips from the project are generally distributed as follows:

- 28 percent via Killion Road
- 5 percent via Cullens Street
- 33 percent via Longmire Street
- 24 percent via Mosman Avenue.

2015 Phase 2 local trips are distributed:

- 41 percent via Killion Road
- 5 percent via Cullens Street
- 22 percent via Longmire Street
- 32 percent via Mosman Avenue.

Insert Figure 3.17-7. 2012 Phase 1 Project Trip Distribution (Local Study Area).



Insert Figure 3.17-8. 2015 Phase 2 with Y-3 Loop Project Trip Distribution (Local Study Area).



Insert Figure 3.17-9. 2012 Phase 1 Project Trip Distribution (Regional Study Area).



Insert Figure 3.17-10. 2015 Phase 2 Project Trip Distribution (Regional Study Area).



Regional trip distribution was assumed to be as follows for 2012 Phase 1 and 2015 Phase 2 conditions:

- 35 percent northwesterly via SR 510
- 25 percent (Phase 1) and 20 percent (Phase 2) northeasterly and easterly via SR 507, SR 702, and SR 7
- 20 percent (Phase 1) and 25 percent (Phase 2) southwesterly and westerly via SR 507 and Rainier Road SE
- 20 percent local within the Yelm commercial district on SR 510, SR 507 and First Street.

Project trip turning movements at all study area intersections are illustrated on Figures 20 through 25 in the *Thurston Highlands Master Planned Community TIA*.

### 3.17.6 TRAFFIC OPERATIONS ANALYSIS

#### 3.17.6.1 Phase 1: 2012

Without the addition of Thurston Highlands conceptual Phase 1 traffic, three local study area intersections and four regional study area intersections would operate at LOS F by 2012, and two local study area intersections and four regional study area intersection would operate at LOS E. With the addition of Thurston Highlands Phase 1 traffic, six local study area intersections and seven regional study area intersections would operate at LOS F.

Table 3.17.6-1 summarizes the results of the operations analysis for local study area intersections, with and without Thurston Highlands conceptual Phase 1 traffic. For unsignalized intersections, the LOS is shown for the worst stop-controlled movement and for the weighted average of all approaches. The delay is indicated in seconds.

Table 3.17.6-1. Local study area PM peak hour intersection level of service impacts: 2012 with and without Thurston Highlands conceptual Phase 1 development (TENW 2008).

Intersection	Control	Movement	2012 Without Project		2012 With Project	
			LOS	Delay	LOS	Delay
SR 510/Burnett Road	Unsignalized	SB	F	52	F	85
		All	A	1	A	2
SR 510/93rd Avenue SE	Unsignalized	NB	F	>100	F	>100
		All	A	8	C	20
SR 510/Mountain View	Unsignalized	SB	F	>100	F	>100
		All	C	18	F	>100
SR 510/Killion Road	Signalized	All	C	26	C	31
SR 510/Cullens Road	Unsignalized	NB/SB	F	>100	F	>100
		All	A	3	F	>100
SR 510/Longmire St.	Unsignalized	NB/SB	F	>100	F	>100
		All	F	>100	F	>100
SF 510/Edwards St.	Unsignalized	NB/SB	F	>100	F	>100
		All	F	>100	F	>100
SR 510/First St/SR 507	Signalized	All	F	88	F	>100
Rhoton Road/NP Road	Unsignalized	WB	B	13	B	14
		All	A	4	A	4
First St/Railway Road	Unsignalized	WB	C	21	C	23
		All	A	3	A	4
SR 507/Clark Road	Signalized	All	E	56	F	82
SR 507/Bald Hills/Creek	Signalized	All	E	57	E	71
SR 507/Grove Road	Unsignalized	SB	F	>100	F	>100
		All	B	11	C	17
SR 507/Mosman	Signalized	All	B	13	B	14
Longmire/Terra Glen	Unsignalized	SF	B	11	C	19

Intersection	Control	Movement	2012 Without Project		2012 With Project	
			LOS	Delay	LOS	Delay
Tahoma Terra Blvd/ Tahoma Terra Circle	Unsignalized	All	A	2	A	1
		NB	A	9	A	10
Longmire/Tahoma Terra Blvd	Unsignalized Signalized	All	A	3	A	2
			A	8	E	49
SR 510/510 North Yelm Loop	Signalized				B	10
			D	38	D	38

### Local Study Area Intersections

As shown in Table 3.17.6-1 above, the following intersections would operate at LOS F in 2012 during the PM peak hour without conceptual Phase 1 development within Thurston Highlands:

- Y6 – SR 510/Longmire Street
- Y7 – SR 510/Edwards Street
- Y8 – SR 510/First Street/SR 507.

The following local study area intersections would operate at LOS E during the 2012 PM peak hour without Thurston Highlands traffic:

- Y11 – SR 507/Clark Road SE
- Y12 – SR 507/Bald Hills Road/NE Creek Street.

With the addition of Thurston Highlands conceptual Phase 1 traffic, three additional local study area intersections would decline to LOS F during the 2012 PM peak hour:

- Y3 - SR 510 (Yelm Avenue)/Mountain View Road
- Y5 – SR 510 (Yelm Avenue)/Cullens Road
- Y11 – SR 507/Clark Road SE.

Southbound movements at Intersection Y1 (SR 510/Burnett Road) would operate at LOS F either without or with Thurston Highlands conceptual Phase 1 traffic in 2012. Overall operations at this intersection would be LOS A.

Figures 26 through 31 in the *Thurston Highlands Master Planned Community TIA* illustrate PM peak hour traffic volumes at all intersections.

### Regional Study Area Intersections

Results of the Thurston Highlands Phase 1 operations analysis for the regional study area intersections are shown in Table 3.17.6-2 below.

Table 3.17.6-2. Regional study area PM peak hour intersection level of service impacts: 2012 with and without Thurston Highlands conceptual Phase 1 development (TENW 2008).

Intersection	Control	Movement	2012 Without Project		2012 With Project	
			LOS	Delay	LOS	Delay
Marvin Road/I-5 SB Ramps	Signalized		D	50	D	50
Marvin Road/I-5 NB ramps	Signalized		C	32	C	32
Marvin Road/Martin Way	Signalized		E	71	E	74
Marvin Road/Steilacoom Rd	Signalized		E	66	E	66
Marvin Road/Pacific Ave	Roundabout		B	13	B	13
College St/Yelm Hwy SE	Signalized		D	38	D	40
SR 510/Old Pacific Hwy	Unsignalized	WB	F	>100	F	>100
		All	F	82	F	92
SR 510/Mullen Road	Unsignalized	NB	C	16	C	17
		All	A	1	A	1
Old Pacific Hwy/ Kuhlman Road SE	Unsignalized	EB	E	42	F	51
		All	A	6	A	7
Old Pacific Hwy/ Reservation Road	Unsignalized	WB	B	12	B	12
		All	A	6	A	7
SR 510/ Reservation Road	Unsignalized	SB	F	>100	F	>100
		All	F	>100	F	>100
SR 510/Yelm Hwy	Unsignalized	NB	F	>100	F	>100
		All	F	>100	F	>100
SR 507/Vail Road	Unsignalized	NB	F	>100	F	>100
		All	F	>100	F	>100
Bald Hills Rd/Vail Road	Unsignalized	AWSC	B	14	B	15
Vail Road SE/Hannus Rd SE	Unsignalized	EB	B	13	B	13
		All	A	1	A	1
SR 507/Manke Road	Unsignalized	EB	D	33	E	49
		All	A	5	A	6
SR 507/Vail Cutoff Rd	Unsignalized	NB	C	15	C	16
		All	A	3	A	3
SR 507/Waldrick Rd/ Military Road SE	Unsignalized	SB	B	11	B	12
		All	A	1	A	1
Rainier Road SE/Stedman Rd SE	Unsignalized	EB	C	18	C	18
		All	A	2	A	2
SR 507/Center Ave	Unsignalized	EB/WB	F	>100	F	>100
		All	E	44	F	61
SR 507/Minnesota Ave	Unsignalized	EB	F	>100	F	>100
		All	E	44	F	62
SR 507/Old Hwy 99	Unsignalized	SB	C	22	C	25
		All	A	8	A	9
SR 507/Morningside Dr SE/Wichman St	Unsignalized	SB	C	17	C	17
		All	A	2	A	2
SR 507/Hwy 99 SE	Unsignalized	NB	C	19	C	20
		All	A	6	A	6
Nisqually Road/ I-5 SB Ramps	Unsignalized	WB	D	32	E	41
		All	D	31	E	39
Nisqually Road/ I-5 NB Ramps	Unsignalized	EB	C	21	C	22
		All	A	1	A	1
SR 507/SR 7	Signalized		B	17	B	17
SR 507/228th St S	Unsignalized	WB	C	22	E	39
		All	A	2	A	3
SR 507/SR 702	Signalized		C	24	C	32
SR 702/Harts Lake Rd	Unsignalized	NB	D	28	D	34
		All	A	8	A	10
SR 702/40th Ave S	Unsignalized	NB/SB	C	16	C	17
		All	A	3	A	3
SR 510/Muk Sut Wei Dr	Signalized		B	12	B	16
SR 7/SR 702	Unsignalized	EB	F	>100	F	>100
		All	C	74	F	>100
US 12/I-5 SB Ramps	Unsignalized	SB	F	100	F	>100
		All	C	23	C	24
US 12/I-5 NB Ramps	Unsignalized	NB	F	96	F	>100
		All	D	29	E	35

Without the addition of traffic from Thurston Highlands conceptual Phase 1, four regional study area intersections would operate at LOS F during the PM peak hour in 2012:

- TC1 – SR 510/Old Pacific Highway SE
- TC5 – SR 510/Reservation Road
- TC6 – SR 510/Yelm Highway SE
- TC7 – SR 507/Vail Road SE.

The following additional regional intersections would operate at LOS F during the PM peak hour in 2012 with the addition of Thurston Highlands Phase 1 traffic:

- R1 – SR 507/Center Avenue
- R2 – SR 510/Minnesota Avenue
- PC8 - SR7/SR 702.

In addition, the following regional intersections would have specific traffic movements that would experience poor operations with the Thurston Highlands conceptual Phase 1 (2012) development scenario.

*TC3 – Old Pacific Highway/Kuhlman Road SE.* Eastbound movements at this intersection would operate at LOS E in 2012 without Thurston Highlands traffic, and LOS F with project traffic. However, overall operations would remain LOS A with or without Phase 1 traffic.

*TC10 – SR 507/Manke Road.* With the addition of traffic from Thurston Highlands Phase 1 in 2012, eastbound movements at this intersection would operate at LOS E; however, the overall intersection would continue to operate at LOS A.

*TC16 – I-5 NB Ramps/US 12.* The overall intersection would operate at LOS D during the 2012 PM peak hour without project traffic. With the addition of Thurston Highlands Phase 1 traffic, overall intersection operations are anticipated to operate at LOS E and northbound movements at LOS F.

*PC4 – SR507/228th Street S.* With the addition of Thurston Highlands Phase 1 traffic, westbound movements at this intersection would operate at LOS E by 2012; however, overall operations would continue to operate at LOS A.

*PC25 – Nisqually Road/I-5 SB Ramps.* The overall intersection would operate at LOS E during the 2012 PM peak hour with the addition of traffic from Thurston Highlands Phase 1 development.

All other local and regional study area intersections would operate at LOS D or better during the PM peak hour with or without Thurston Highlands conceptual Phase 1 traffic in 2012.

### **3.17.6.2 Phase 2: 2015**

Tables 3.17.6-3 and 3.17.6-4 summarize local and regional study area intersection operations in 2015, with and without traffic from Thurston Highlands conceptual Phase 1 and Phase 2 development.

Table 3.17.6-3. Local study area PM peak hour intersection level of service impacts: 2015 with and without Thurston Highlands conceptual Phase 1/Phase 2 development (TENW 2008).

Intersection	Control	Movement	2015 Without the SR 510 NORTH LOOP Without Project		2015 With the SR 510 NORTH LOOP With Project	
			LOS	Delay	LOS	Delay
SR 510/Burnett Road	Unsignalized	SB	C	16	D	26
		All	A	1	A	1
SR 510/93rd Avenue SE	Unsignalized	NB	C	23	F	58
		All	A	3	A	4
SR 510/Mountain View	Unsignalized	SB	E	38	F	>100
		All	A	2	A	4
SR 510/Killion Road	Signalized	All	B	11	D	48
SR 510/Cullens Road	Unsignalized	NB/SB	F	>100	F	>100
		All	F	>100	F	>100
SR 510/Longmire St	Unsignalized	NB/SB	F	>100	F	>100
		All	F	>100	F	>100
SF 510/Edwards St.	Unsignalized	NB/SB	F	>100	F	>100
		All	E	40	F	>100
SR 510/First St/SR 507	Signalized	All	E	78	F	>100
Rhoton Road/NP Road	Unsignalized	WB	B	13	B	14
		All	A	4	A	4
First St/Railway Road	Unsignalized	WB	C	20	D	29
		All	A	3	A	6
SR 507/Clark Road	Signalized	All	C	23	D	53
SR 507/Bald Hills/Creek	Signalized	All	D	41	E	61
SR 507/Grove Road	Unsignalized	SB	F	56	F	>100
		All	A	3	A	4
SR 507/Mosman	Signalized	All	B	13	E	61
Longmire/Terra Glen	Unsignalized	SB	B	11	F	>100
		All	A	2	A	8
Tahoma Terra Blvd/ Tahoma Terra Circle	Unsignalized	NB	A	9	A	9
		All	A	3	A	1
Longmire/Tahoma Terra Blvd	Unsignalized	AWSC*	A	8	A	8
SR 510/SR 510 North Loop	Signalized		B	12	C	29
SR 510 North Loop/ Killion Road	Unsignalized	NB	D	28	F	>100
		All	A	4	F	>100
SR 507/THE SR 510 NORTH LOOP North Yelm Loop	Signalized		B	15	C	26

\*AWSC – All Way Stop Control.

### Local Study Area Intersections

The following two local study area intersections would operate at LOS F during the PM peak hour in 2015 without the addition of Thurston Highlands Phase 1/Phase 2 traffic:

- Y5 – SR 510/Cullens Road
- Y6 – SR 510/Longmire Street.

With the addition of traffic from Thurston Highlands conceptual Phase 1/Phase 2 in 2015, three additional local study area intersections would decline to LOS F during the PM peak hour:

- Y7 – SR 510/Edwards Street
- Y8 – SR 510/First Street/SR 507
- Y19 – SR 510 North Loop/Killion Road.

In addition, the following local intersections would have specific traffic movements that would experience poor operations with the 2015 Phase 1/Phase 2 development:

Y2 – *SR 510/93rd Avenue SE*. With the addition of Thurston Highlands Phase 1/Phase 2 traffic, northbound movements at this intersection would operate at LOS F, through overall intersection operations would remain at LOS A.

Y3 - *SR 510/ Mountain View Road*. Without traffic from Phase 1/Phase 2 Thurston Highlands, southbound movements at this intersection would operate at LOS E. However, the overall intersection would operate at an acceptable LOS A. With the addition of Phase 1/Phase 2 traffic, the southbound movement would decline to LOS F, although overall operations would remain at LOS A.

Y12 – *SR 507/Bald Hill Road/NE Creek Road*. With the addition of Thurston Highlands Phase 1/Phase 2 traffic, overall intersection operations would decline to LOS E by the 2015 PM peak hour.

Y13 – *SR 507/Grove Road*. With the addition of Thurston Highlands Phase 1/Phase 2 traffic, the southbound movements at this intersection would operate at LOS F, through overall intersection operations would remain at LOS A.

Y14 – *SR 507/Mosman Avenue*. This intersection would operate at LOS E in 2015 with the addition of Thurston Highlands Phase 1/Phase 2 traffic.

Y15 – *Longmire Street/Terra Glen*. With the addition of Thurston Highlands Phase 1/Phase 2 traffic, southbound movements at this intersection would operate at LOS F, with overall intersection operations remaining at LOS A.

#### Regional Study Area Intersections

Table 3.17.6-4 summarizes operations of the Regional Study Area intersections in 2015, with and without Thurston Highlands conceptual Phase 1/Phase 2 development.

Table 3.17.6-4. Regional study area PM peak hour intersection level of service impacts: 2015 with and without Thurston Highlands conceptual Phase 1/Phase 2 development (TENW 2008).

Intersection	Control	Movement	2015 Without the SR 510 North Loop Without Project		2015 With the SR 510 North Loop With Project	
			LOS	Delay	LOS	Delay
Marvin Road/I-5 SB Ramps	Signalized		E	58	E	61
Marvin Road/I-5 NB ramps	Signalized		D	38	D	39
Marvin Road/Martin Way	Signalized		F	85	F	94
Marvin Road/Steilacoom Rd	Signalized		E	79	F	85
Marvin Road/Pacific Ave	Roundabout		B	14	C	22
College St/Yelm Hwy SE	Signalized		D	42	D	44
SR 510/Old Pacific Hwy	Unsignalized	WB	F	>100	F	>100
		All	E	41	F	82
SR 510/Mullen Road	Unsignalized	NB	B	14	C	16
		All	A	1	A	1
Old Pacific Hwy/ Kuhlman Road SE	Unsignalized	EB	F	55	F	>100
		All	A	8	B	14
Old Pacific Hwy/ Reservation Road	Unsignalized	WB	B	12	B	15
		All	A	6	A	8
SR 510/ Reservation Road	Unsignalized	SB	F	>100	F	>100
		All	F	>100	F	>100
SR 510/Yelm Hwy	Unsignalized	NB	F	>100	F	>100
		All	F	>100	F	>100
SR 507/Vail Road	Unsignalized	NB	F	>100	F	>100
		All	F	>100	F	>100
Bald Hills Rd/Vail Road	Unsignalized	AWSC	C	15	C	17
Vail Road SE/Hannus Rd SE	Unsignalized	EB	B	14	B	14
		All	A	1	A	1
SR 507/Manke Road	Unsignalized	EB	E	36	F	>100
		All	A	5	F	87
SR 507/Vail Cutoff Rd	Unsignalized	NB	C	16	C	23
		All	A	3	A	4
SR 507/Waldrick Rd/ Military Road SE	Unsignalized	SB	B	11	B	14
		All	A	1	A	1
Rainier Road SE/Stedman Rd SE	Unsignalized	EB	C	20	C	20
		All	A	2	A	2
SR 507/Center Ave	Unsignalized	EB/WB	F	>100	F	>100
		All	F	81	F	>100
SR 507/Minnesota Ave	Unsignalized	EB	F	>100	F	>100
		All	F	64	F	>100
SR 507/Old Hwy 99 SE	Unsignalized	SB	D	26	E	40
		All	A	9	B	12
SR 507/Morningside Dr SE/Wichman St	Unsignalized	SB	C	18	C	19
		All	A	2	A	2
SR 507/Hwy 99 SE	Unsignalized	NB	C	20	C	24
		All	A	6	A	7
Nisqually Road/ I-5 SB Ramps	Unsignalized	WB	E	44	F	90
		All	E	42	F	87
Nisqually Road/ I-5 NB Ramps	Unsignalized	EB	C	22	D	28
		All	A	1	A	1
SR 507/SR 7	Signalized		B	20	C	22
SR 507/228th St S	Unsignalized	WB	C	28	F	60
		All	A	2	A	3
SR 507/SR 702	Signalized		C	30	D	52
SR 702/Harts Lake Rd	Unsignalized	NB	D	32	F	55
		All	A	9	C	15
SR 702/40th Ave S	Unsignalized	NB/SB	C	16	C	20
		All	A	3	A	3
SR 510/Muk Sut Wei Dr	Signalized		B	13	D	45
SR 7/SR 702	Unsignalized	EB	F	>100	F	>100
		All	F	>100	F	>100
US 12/I-5 SB Ramps	Unsignalized	SB	F	>100	F	>100
		All	E	40	E	48
US 12/I-5 NB Ramps	Unsignalized	NB	F	>100	F	>100
		All	F	>100	F	>100

The following eight regional study area intersections would operate at LOS F in 2015 in the PM peak hour without Thurston Highlands conceptual Phase 1/Phase 2 traffic:

- L3 – SR 510 (Marvin Road E)/Martin Way SE
- TC5 – SR 510/Reservation Road
- TC6 – SR 510/Yelm Highway SE
- TC7 – SR 507/Vail Road SE
- R1 – SR 507/Center Avenue
- R2 – SR 510/Minnesota Avenue
- PC15 – SR 7/SR 702
- PC16 – I-5 NB Ramps/US 12.

Without Phase 1/Phase 2 traffic, the following four regional study area intersections would operate at LOS E during the PM peak hour:

- L1 – Marvin Road/I-5 SB Ramps
- L4 – SR 510 (Marvin Road E)/Steilacoom Road SE
- TC1 – SR 510/Old Pacific Highway SE
- TC15 – I-5 SB Ramps/US 12
- PC1 – Nisqually Road/I-5 SB Ramps.

With the addition of Thurston Highlands conceptual Phase 1/Phase 2 traffic, four additional regional study area intersections would decline to LOS F during the PM peak hour:

- L4 – SR 510 (Marvin Road E)/Steilacoom Road
- TC1 – Old Pacific Highway SE/SR 510
- TC10 – SR 507/Manke Road
- PC1 – Nisqually Road/I-5 SR Ramps.

Intersection T1 – SR7/Old Highway 99 would operate at LOS E in the PM peak hour. All other local and regional study area intersections would operate at LOS D or better with or without Thurston Highlands traffic in 2015.

### **3.17.6.3 Impacts to Local Arterials: 2012 and 2015**

As shown above, some local study area intersections along key arterial corridors are forecast to operate at LOS F in 2012 or 2015, with or without Thurston Highlands development. Overall performance of the arterials was evaluated to determine potential traffic impacts with project development.

Table 3.17.6-5 below summarizes forecasted LOS in 2012, with and without Thurston Highlands traffic. As shown, with build-out and occupancy of conceptual Phase 1 development in 2012, westbound arterial speeds on SR 507 (Yelm Avenue) between First Street and Clark Road would operate at LOS E. All other eastbound and westbound arterial speeds on SR 507 and SR 510 would operate at LOS D or better.

Table 3.17.6-5. Arterial LOS impacts: 2012 with and without Thurston Highlands conceptual Phase 1 build-out (TENW 2008).

Arterial Roadway	Location	2012 Without Thurston Highlands		2012 With Thurston Highlands		2012 With Thurston Highlands		2012 With Thurston Highlands	
		Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS
SR 510	Tahoma Blvd to First Street	14.3	C	22.1	B	12.5	D	21.2	B
SR 507	First Street to Clark Road	11.2	D	11.4	D	9.5	D	8.4	E
SR 507	Clark Road to Five Corners	16.2	C	17.5	C	15.0	C	14.3	C
SR 507	Five Corners to Wal-Mart	23.0	B	14.2	C	22.8	B	11.6	D

By 2015, westbound speeds on SR 507 between First Street and Clark Road are forecast to operate at LOS F with completion of Thurston Highlands conceptual Phase 1/Phase 2 development. All other eastbound and westbound speeds on SR 507 and SR 510 are forecast to operate at LOS D or better. Table 3.17.6-6 summarizes forecasted LOS in 2015, both with and without Thurston Highlands traffic .

Table 3.17.6-6. Arterial LOS impacts: 2015 with and without Thurston Highlands conceptual Phase 1/Phase 2 development (TENW 2008).

Arterial Roadway	Location	2015 Without Thurston Highlands		2015 With Thurston Highlands		2015 With Thurston Highlands		2015 With Thurston Highlands	
		Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS
SR 510	Tahoma Blvd to First Street	14.9	C	22.9	B	9.6	D	20.1	B
SR 507	First Street to Clark Road	15.1	C	12.0	D	11.8	D	5.4	F
SR 507	Clark Road to Five Corners	17.7	C	20.5	B	16.2	C	17.2	C
SR 507	Five Corners to Wal-Mart	22.9	B	19.1	B	22.4	B	15.2	C

### 3.17.6.4 Arterial Roadway Capacity Thresholds: 2025

Forecasted traffic volumes on arterial roadways were compared to capacity thresholds that were identified in the *Southwest Yelm Area EMME/2* model for 2025, both with and without full build-out of the Thurston Highlands Preferred Alternative. A number of road segments were selected and used to evaluate capacity thresholds on the arterials. Local arterial roadway segments are shown on Figure 3.17-11 and include:

1. Northwest Yelm (SR 510, 93rd Avenue SE, and the SR 510/North Yelm Loop)
2. North Central Yelm
3. Yelm Core Area
4. East Yelm (SR 507 and SR 510 North Yelm Loop).

Five local arterials are forecast to be “at” or “over” capacity in 2025. Roadway segments that are projected to be at or over capacity are listed in Table 3.17.6-7, below. Traffic generated by the Thurston Highlands Preferred Alternative is shown as a percentage of total traffic on the roadway segment. Forecasts of 2025 arterial capacity thresholds on all selected roadway segments are illustrated in Table 12 in the *Thurston Highlands Master Planned Community TIA*.



Insert Figure 3.17.11. Local Arterial Roadway Capacity Locations.



Table 3.17.6-7. Arterial capacity threshold analysis (with proposed site access roadways): 2025 (TENW 2008).

Roadway Segment	Direction	Without Thurston Highlands				With Thurston Highlands				% Project Traffic
		Traffic Volumes	Capacity Thresholds	Difference	Capacity	Traffic Volumes	Capacity Thresholds	Difference	Capacity	
1b	WB	755	1,200	445	Under	810	1,200	390	Under	6%
	EB	1,205	1,200	-5	At	1,285	1,200	-85	At	
1c	WB	905	1,200	295	Under	1,005	1,200	195	Under	11%
	EB	1,680	1,200	-480	Over	1,880	1,200	-680	Over	
2b	WB	655	880	225	Under	660	880	220	Under	3%
	EB	1,075	880	-195	Over	1,110	880	-230	Over	
3b	WB	820	880	60	Under	825	880	55	Under	0%
	EB	955	880	-75	At	955	880	-75	At	
3d	NB	895	880	-15	At	1,220	880	-340	Over	27%
	SB	645	880	235	Under	900	880	-20	At	

### 3.17.6.5 Site Access and Circulation

The proposed Thurston Highlands Master Planned Community would be constructed in phases, with specific access points included in each phase as follows:

- 2012 – Phase 1 Residential without SR 510 North Loop – Access would be provided from SR 510 at Killion Road, SR 510 at Berry Valley Road/Cullens Road, SR 510 at Longmire Street, and SR 507 at Mosman Avenue. Tahoma Boulevard will be constructed as a four-lane internal boulevard with Phase 1 from its eastern terminus to the Phase 1 boundary of Thurston Highlands.
- 2015 – Phase 2 Mixed-use with SR 510 North Loop – Same access points as 2012 Phase 1, plus additional access to the south via SR 507 at Tahoma Boulevard. Phase 2 will extend Tahoma Boulevard as a two-lane roadway to SR 507.
- 2025 – Full Build-Out with SR 510 North Loop – Same access points as 2012 and 2015. Tahoma Boulevard will be widened from two to four travel lanes with a center landscaped median.

The analysis was conducted assuming additional access to the south via SR 507 at Tahoma Boulevard under 2015 Phase 2 conditions. This additional site access is planned to be constructed with Phase 2, and would alleviate congestion at local study area intersections Y14 (SR 507/Mosman Avenue) and Y15 (Longmire Street at Terra Glen Street). It is anticipated that these intersections would operate at LOS E/F without the additional access to the south.

### Other Connections

As several local arterial segments are forecast to be over capacity in 2025 with or without the Thurston Highlands project, some additional access connections were tested. These are not presently proposed or required, but they would be instrumental in achieving the City of Yelm Connectivity Policy.<sup>1</sup> The proximity of the Thurston Highlands Master Planned Community to these potential offsite connections can be viewed on Figure 3.17-2.

<sup>1</sup> City of Yelm 2008 *Comprehensive Land Use Plan Policy 2.4*

Connection to 118th Avenue SE. This connection would involve construction of a two-lane road from the Thurston Highlands site southerly to 118th Avenue SE in order to provide an alternative route to SR 507 and SR 510 for drivers destined to Olympia/Lacey. It was determined that this site access connection would not result in any significant reduction or elimination of off-site traffic impacts; however, it would be consistent with the City's connected streets policy. The connection would improve flow on SR 510 between 93rd Avenue SE and Tahoma Boulevard by allowing an alternate route to the west to avoid the busy arterial corridors in the City of Yelm.

93rd Avenue SE. This north-south connection would involve construction of a two-lane road between the Thurston Highlands site and SR 510 in the vicinity of 93rd Avenue SE and potentially to a point west of the future SR 510 North Loop. This connection would provide an alternative route to Yelm Avenue or the SR 510 North Loop for drivers destined to Lacey or Interstate 5. This street connection is not required to mitigate potential traffic impacts of Thurston Highlands and would not eliminate the need for the local and regional transportation improvements. However, with completion of this site access connection, only two local arterial segments would be over capacity: SR 510 between Tahoma Boulevard and Longmire Street (Segment 2b), and First Street SE south of Yelm Avenue (Segment 3d). This connection would reduce traffic levels on the SR 510 segment between 93rd Avenue SE and Tahoma Boulevard, which would improve system performance and travel times through the corridor.

In addition, this connection would be an important linkage and component in creating alternative routes to the primary arterial and highway facilities serving the Yelm community. Street connections are very important elements of the City's transportation system and are well-defined by City policy to provide for transportation options and interconnected streets. In addition to providing good internal vehicular circulation, connected streets would also enhance and improve travel routes and options for emergency services, school buses and other public service providers.

#### **3.17.6.6 Public Transportation Impacts**

Intercity Transit Route 94 provides the nearest transit service to the Thurston Highlands site, with stops on SR 510 (Yelm Avenue). The applicant proposes to work with Intercity Transit to provide bus stops, shelters, pullouts and layover space for future flexible and fixed-route transit service within and through the Thurston Highlands Master Planned Community. The proposal also includes making a site available to Intercity Transit for future development of a park-and-ride facility or transit center. Future construction of a park-and-ride facility within the project would provide opportunities for ridesharing in carpools and vanpools, a destination for visitors to the Farmers Market and retail/commercial area of the development, and other transit amenities.

#### **3.17.6.7 Nonmotorized Transportation Impacts**

Improvements proposed within the Thurston Highlands Master Planned Community will include curbs, gutters and raised sidewalks on all new roadways. Bicycle lanes are planned on Tahoma Boulevard. An at-grade signalized crossing is proposed to provide access across the Yelm-Tenino trail adjacent to SR 507.

### **3.17.6.8 School Safe Walk Routes**

The Thurston Highlands Master Planned Community is located within both the Yelm Community Schools District and the Rainier School District. Existing schools closest to the project include Mill Pond Elementary School, Southworth Elementary School, Yelm Middle School and Yelm High School. School sites are proposed within the project for construction of new elementary schools. Until new schools are constructed, all school children would be bused to the offsite locations within designated school district boundaries and zones. See additional information in Draft EIS Section 3.18.4. The applicant proposes to work with the school district(s) to provide safe walk routes for students within the development.

### **3.17.6.9 Construction Impacts**

Phased development of the Thurston Highlands site is not expected to generate a significant number of heavy vehicle trips associated with clearing and grading. (See the Clearing and Grading Proposal described in Draft EIS Section 2.7.) Normal construction activity associated with commercial and individual home building would not generate significant levels of heavy truck loads or overall traffic levels higher than forecast with phased build-out of the site. Consequently, no specific analysis of construction traffic was performed.

### **3.17.6.10 Concurrency Evaluation**

Transportation Concurrency is typically not addressed at the Master Plan approval level. Instead, the applicable requirements of RCW 36.70A will be addressed for each project development phase. A separate TIA and concurrency evaluation will be prepared for each phase of the Thurston Highlands Master Planned Community to ensure that the necessary transportation facilities are in-place at the time of each specific application, or that a financial guarantee has been made by the agency to construct the improvement within 6 years.

### **3.17.6.11 Thurston Highlands Added to Background Growth**

Trips generated by pipeline development projects and background growth were taken into account in the 2012, 2015 and 2025 travel demand forecasts (see Draft EIS Section 3.17.4.2). As pipeline projects are constructed and as non-specific background growth occurs, additional traffic will use local roadways, and overall congestion will increase. The analysis for Thurston Highlands used a general growth rate of 2 percent to account for impacts on the local roadway system caused by background growth, or development on existing vacant parcels. At the same time, transportation improvements will be constructed by the Thurston Highlands Master Planned Community and other pipeline development projects as conditions of their approval in order to mitigate impacts to transportation facilities.

### **3.17.6.12 Indirect Impacts**

A roadway network will be constructed within the Thurston Highlands Master Planned Community. Once the network is completed, the new roads and sidewalks will allow drivers, bicyclists and pedestrians new options for traveling around the area. Some of the new roads that will be constructed to serve Thurston Highlands will be extended through areas that currently have limited vehicular access. Construction of these roads may increase the desirability of the areas they cross for development. However, as development occurs, it will do so at the level currently anticipated in the City of Yelm *Comprehensive Plan* and currently

allowed by zoning; permitted densities and zoning would not change because of the improved access.

### 3.17.7 MITIGATION STRATEGY

Development of the proposed Thurston Highlands Master Planned Community has been anticipated in the City's planning process for some time. The City of Yelm has prepared comprehensive and project-specific documents over the past 15 years that address the traffic potential of this large-scale master planned community in the southwest quadrant of the City. While it is expected that the Thurston Highlands project would have a measurable impact on the City's transportation system, local and regional transportation corridors have been identified to accommodate this significant development as well as other anticipated growth in the area not associated with Thurston Highlands. Even with these planned corridors and transportation improvements in place, project-specific impacts would be realized and mitigation measures will be necessary to accommodate new traffic from the Thurston Highlands development.

The Thurston Highlands Master Planned Community is proposed to be constructed over a 10 to 30-year period, and will be developed in distinct project phases. Overall, the project will add approximately 5,345 evening PM peak hour trips and 64,000 daily trips on the local and regional transportation system. Given the large scale of this development proposal and the projected timeline to reach the full build-out potential, specific mitigation measures have only been identified for the initial two development phases.

The *Thurston Highlands Master Planned Community TIA* has addressed project-related impacts for two development horizons: 2012 (Phase 1) and 2015 (Phase 2). Based on the results of the technical analyses, each of these development phases would have a measurable impact on the existing transportation network. In order to adequately mitigate these impacts, specific measures have been identified for these development horizons.

To assist public service providers with planning for early stages of development within Thurston Highlands, a Phase 1 development concept has been quantitatively described (see Draft EIS Section 2.5.3). Future phases are more conceptual in nature. Phase 2 will be further refined during build-out of Phase 1. Based on the Phase 1 development concept, mitigation can be more definitive and specific to the proposed action. However, because of the time duration and scale of subsequent phases, potential mitigation measures have been listed and quantified, but with less certainty that these specific measures will address the full impact of Phase 2 and beyond. Therefore, after each development phase, the project proponent will update the TIA and assess the impacts based on traffic conditions at the time of the development application. Each updated TIA will be used to identify appropriate mitigation measures and network strategies.

The mitigation measures listed below are categorized into four types of developer contributions and responsibilities. Each of these types is described briefly below, and the mitigation that follows for the project is organized according to these types:

*Developer-Funded Offsite Infrastructure Improvements* – Improvements that are required to meet current level of service and concurrency standards if the proposed development creates impacts that affect service levels, safety and/or operational constraints. The following thresholds will be evaluated and considered when requiring fully-funded improvements by the developer:

- The percentage of site traffic to the total intersection or link is greater than 3 percent

- LOS is below adopted standards and can be mitigated to acceptable levels
- Intersection approach legs operating below adopted LOS standards, where specific improvement can mitigate back to pre-development conditions.

*Site Access and Circulation Improvements* – Street and intersection improvements to accommodate internal site access and circulation. These requirements often include provisions for future street connections and corridors linking to adjacent developable properties and identified transportation routes listed in the City’s comprehensive planning documents.

*Traffic Mitigation Fees* – Traffic mitigation fees paid in accordance with applicable City and County policies, including WSDOT pro-rata programs for identified highway corridor improvements. If a developer-funded improvement is contained within the project list, it is eligible for a credit from the mitigation fee.

*Developer Proportionate-Share Contributions* – Voluntary contributions made to specific City, County or WSDOT improvements that are needed to maintain an acceptable LOS and operational conditions. These contributions will be considered if one of the following conditions occurs:

- The percentage of site traffic is less than 3 percent of total traffic at the intersection or roadway link. This level of traffic increase is not considered a significant impact of the project, but the development has a proportional responsibility to pay its share of planned improvements.
- Project improvements are required to accommodate future development phases, but not at the time of the current project application.
- Projects are listed in the agency’s *Capital Facilities Plan* (CFP).

The following mitigation measures have been identified as necessary to accommodate traffic resulting from the proposed Thurston Highlands Master Planned Community. Mitigation is organized according to the types described above. Mitigation has been segregated by project phase, and is most specific for Phase 1.

### **3.17.7.1 Phase 1 Development: 2012**

#### **City of Yelm**

##### *Developer-Funded Off-site Infrastructure Improvements*

1. Longmire/SR 510 Intersection
  - Install fully-actuated 8-phase traffic signal system
  - Install signal interconnect system to link the Killion Road and First Street intersections
  - Install left-turn lanes on Longmire Street or northbound right-turn lane (based on signal performance, WSDOT input).
2. Cullens/SR 510 (Yelm Ave) Intersection
  - Install northbound right-turn lane on Cullens (Berry Valley Road).
3. 93rd Avenue SE/SR 510 (Yelm Ave) Intersection
  - Install northbound right-turn lane on 93rd Avenue SE.

4. Mosman Road/SR 507 (First Street)
  - Install signal or roundabout.
  - Realign intersection, provide channelization for signal system.

This improvement is a mitigation requirement for other projects; however, if it is not completed prior to Thurston Highlands Phase 1 development, the Thurston Highlands applicant will be required to construct the improvement.

5. Mosman Road
  - Realign and upgrade Mosman Road to Collector street standards between SR 507 and Longmire.

As with Improvement #4, above, this improvement is a mitigation requirement for other projects; however, if it is not completed prior to Thurston Highlands Phase 1 development, the Thurston Highlands applicant will be required to construct the improvement.

#### *Traffic Mitigation Fees*

The applicant shall pay the City of Yelm Transportation Facility Charge adopted at the time of Building Permit issuance, per Section 15.40.030 YMC. The Yelm City Council establishes the transportation facility charge (TFC) annually as part of the adoption of the most current six-year Transportation Improvement Program (STIP). The TFC is applicable City-wide.

6. Yelm Traffic Facility Charge
  - Pay TFC for Phase 1 development.
7. SR 510 North Loop (Y3) Mitigation Fee
  - Pay mitigation fee for future SR 510 North Loop based on future adoption by the City Council of a City-wide fee for the corridor.

#### **Thurston County/WSDOT**

##### *Developer-Funded Off-Site Infrastructure Improvements*

8. SR 510/Reservation Road Intersection
  - Install southbound right-turn lane on Reservation Road (existing through-lane will become left-turn lane onto SR 510).
9. SR 510/Yelm Highway Intersection
  - Install traffic signal system.

##### *Developer Proportionate-Share Contributions*

10. SR 507/Vail Road
  - Pay proportionate-share cost for northbound right-turn lane on Vail Road.
11. SR 702/Harts Lake Road Intersection
  - Pay proportionate-share cost for eastbound right-turn lane on SR 702.

12. Old Pacific Hwy/Reservation Road
  - Pay proportionate-share cost for westbound right-turn lane on Reservation Road.
13. SR 507/Manke Road
  - Pay proportionate-share cost toward eastbound left-turn lane and westbound right-turn lane on Manke Road; left-turn channelization on SR 507; and southbound right-turn lane on SR 507.
14. Old Pacific Hwy/Kuhlman Road Intersection
  - Pay proportionate-share cost towards northbound left-turn lane and eastbound right-turn lane channelization.

### **3.17.7.2 Phase 2 Development: 2015**

Mitigation measures listed below for Thurston Highlands Phase 2 will be verified upon the analysis provided by the developer in an updated TIA and SEPA/land-use approval at the time of Phase 2 development applications.

#### **City of Yelm**

##### *Developer-Funded Off-Site Infrastructure Improvements*

1. Longmire/SR 510 Intersection
  - Install dual westbound left-turn lane and rebuild traffic signal.
2. Cullens/SR 510 (Yelm Ave) Intersection
  - Install eastbound right-turn lane on SR 510.
3. SR 510 North Loop (Y3)/Killion Road
  - Install left-turn lane on Killion Road .

This improvement is a mitigation requirement for other projects; however, if it is not in-place by Phase 2 of the Thurston Highlands development, the Thurston Highlands applicant will be required to construct it.

##### *Traffic Mitigation Fees*

The applicant shall pay the City of Yelm Transportation Facility Charge adopted at the time of Building Permit issuance, per Section 15.40.030 YMC.

4. SR 507/Tahoma Blvd Access
  - Extend Tahoma Blvd to SR 507 with 2-lane connection.
  - Install northbound left-turn channelization on SR 507.
  - Provide separate eastbound left- and right-turn lanes for site ingress/egress.
5. Yelm Traffic Facility Charge
  - Pay TFC for Phase 2 development.
6. SR 510 North Loop (Y3) Mitigation Fee

- Pay mitigation fee for future SR 510 North Loop based on future adoption by the City Council of a City-wide fee for the corridor.

**Thurston County/WSDOT**

*Developer-Funded Off-Site Infrastructure Improvements*

Proportionate-share contributions required for Phase 1 mitigation listed above would be applied to the following projects not already constructed.

7. SR 510/Old Pacific Hwy
  - Install fully-actuated traffic signal system and required channelization.
8. SR 507/Manke Road
  - Install eastbound left-turn lane and westbound right-turn lane on Manke Road
  - Install left-turn channelization on SR 507
  - Install southbound right-turn lane on SR 507.
9. SR 510/Reservation Road Intersection
  - Install fully-actuated traffic signal system and channelization upgrades.
10. SR 507/Vail Road
  - Install fully-actuated traffic signal system and channelization if not already installed following Phase 1.
11. SR 510/Yelm Highway Intersection
  - Install dual westbound left-turn lane and rebuild traffic signal system.
12. SR 702/Harts Lake Road Intersection
  - Install eastbound right-turn lane on SR 507.
13. Old Pacific Hwy/Reservation Road
  - Install westbound right-turn lane on Reservation Road.
14. Old Pacific Hwy/Kuhlman Road Intersection
  - Install northbound left-turn lane and eastbound right-turn lane channelization.

*Developer Proportionate-Share Contributions*

15. Manke Road
  - Pay proportionate-share costs toward roadway upgrades to rural collector including structural upgrades to pavement section.
16. SR 702/SR 7 Intersection
  - Pay proportionate share for roundabout or fully-actuated traffic signal, including necessary channelization improvements.

Tables 3.17.7-1 and 3.17.7-2 summarize Thurston Highlands mitigation measures for conceptual 2012 Phase 1 and 2015 Phase 2 development.

Table 3.17.7-1. Thurston Highlands Phase 1 mitigation: 2012 (Shea Carr & Jewel 2008).

Improvement	Agency	Mitigation Funding Type	% Site Traffic of Total/ Entering Traffic	Mitigation Strategy
<b>Longmire/SR 510 Intersection</b>	City of Yelm	Developer Funded	10.34%	<ul style="list-style-type: none"> <li>• Install fully-actuated 8-phase traffic signal system.</li> <li>• Install signal interconnect system to link the Killion Road and First Street intersections.</li> <li>• Install left-turn lanes on Longmire Street or northbound right-turn lane (based on signal performance, WSDOT input).</li> </ul>
<b>Cullens/SR 510 Intersection</b>	City of Yelm	Developer Funded	1.64%	<ul style="list-style-type: none"> <li>• Install northbound right-turn lane on Cullens Road (Berry Valley Road).</li> </ul>
<b>93rd Avenue SE/ SR 510 intersection</b>	City of Yelm	Developer Funded	16.88%	<ul style="list-style-type: none"> <li>• Install northbound right-turn lane on 93rd Avenue SE.</li> </ul>
<b>Mosman Road/SR 507 (First Street)</b>	City of Yelm	Developer Funded	11.15%	<ul style="list-style-type: none"> <li>• Install signal or roundabout.</li> <li>• Realign intersection, provide channelization for signal system.</li> </ul>
<b>Mosman Road</b>	City of Yelm	Developer Funded	17.28%	<ul style="list-style-type: none"> <li>• Realign and upgrade Mosman Road to Collector street standards between SR 507 and Longmire.</li> </ul>
<b>SR 507/Tahoma Blvd access</b>	City of Yelm	Site Access & Circulation	100%	<ul style="list-style-type: none"> <li>• Complete site access connection by extending Tahoma Blvd. to SR 507</li> <li>• Install northbound left-turn channelization on SR 507.</li> <li>• Provide separate eastbound left and right-turn lanes for site ingress/egress.</li> <li>• Install southbound right-turn lane on Reservation Road (existing through lane will become left-turn lane onto SR 510).</li> </ul>
<b>SR 510/Reservation Road intersection</b>	Thurston County /WSDOT	Developer Funded	7.16%	<ul style="list-style-type: none"> <li>• Install traffic signal system.</li> </ul>
<b>SR 510/Yelm Highway intersection</b>	Thurston County /WSDOT	Developer Funded	3.53%	
<b>SR 507/Vail Road</b>	Thurston County /WSDOT	Proportionate Share Contribution	3.05%	<ul style="list-style-type: none"> <li>• Pay proportionate-share cost for northbound right-turn lane on Vail Road.</li> </ul>
<b>SR 702/Harts Lake Road intersection</b>	Thurston County /WSDOT	Proportionate Share Contribution	6.67%	<ul style="list-style-type: none"> <li>• Pay proportionate-share cost for eastbound right-turn lane on SR 702.</li> </ul>
<b>Old Pacific Hwy/Reservation Road</b>	Thurston County	Proportionate Share Contribution	5.71%	<ul style="list-style-type: none"> <li>• Pay proportionate-share cost for westbound right-turn lane on Reservation Road.</li> </ul>
<b>SR 507/Manke Road</b>	Thurston County /WSDOT	Proportionate Share Contribution	11.74%	<ul style="list-style-type: none"> <li>• Pay proportionate-share cost towards eastbound left-turn lane and westbound right-turn lane on Manke Road; left-turn channelization on SR 507, and southbound right-turn lane on SR 507.</li> </ul>
<b>Old Pacific Highway/Kuhlman Road intersection</b>	Thurston County	Proportionate Share Contribution	4.98%	<ul style="list-style-type: none"> <li>• Pay proportionate-share cost towards northbound left-turn lane and eastbound right-turn lane channelization .</li> </ul>

Table 3.17.7-2. Thurston Highlands Phase 2 mitigation: 2015 (Shea Carr & Jewell 2008).

Improvement	Agency	Mitigation Funding Type	% Site Traffic of Total/ Entering Traffic	Mitigation Strategy
Longmire/SR 510 intersection	City of Yelm	Developer Funded	36.84%	<ul style="list-style-type: none"> <li>Install dual westbound left-turn lane and rebuild traffic signal.</li> </ul>
Cullens/SR 510 intersection	City of Yelm	Developer Funded	8.61%	<ul style="list-style-type: none"> <li>Install eastbound right-turn lane on SR 510.</li> </ul>
SR 510 Loop (THE SR 510 NORTH LOOP)/Killion Road	City of Yelm	Developer Funded	29.68%	<ul style="list-style-type: none"> <li>Install left-turn lane on Killion Road.</li> </ul>
SR 510/Old Pacific Highway	Thurston County /WSDOT	Developer Funded	17.18%	<ul style="list-style-type: none"> <li>Install fully-actuated traffic signal system and required channelization.</li> </ul>
SR 507/Manke Road	Thurston County /WSDOT	Developer Funded	42.01%	<ul style="list-style-type: none"> <li>Install eastbound left-turn lane and westbound right-turn lane on Manke Road</li> <li>Install left-turn channelization on SR 507</li> <li>Install southbound right-turn lane on SR 507.</li> </ul>
SR 510/Reservation Road	Thurston County /WSDOT	Developer Funded	20.76%	<ul style="list-style-type: none"> <li>Install fully-actuated traffic signal system and channelization upgrades.</li> </ul>
SR 507/Vail Road	Thurston County /WSDOT	Developer Funded	9.40%	<ul style="list-style-type: none"> <li>Install fully-actuated traffic signal system and channelization if not already installed following Phase 1.</li> </ul>
SR 510/Yelm Highway intersection	Thurston County /WSDOT	Developer Funded	18.76%	<ul style="list-style-type: none"> <li>Install dual westbound left-turn lane and rebuild traffic signal system.</li> </ul>
SR 702/Harts Lake Road intersection	Thurston County /WSDOT	Developer Funded	18.97%	<ul style="list-style-type: none"> <li>Install eastbound right-turn lane on SR 507.</li> </ul>
Old Pacific Hwy/Reservation Road	Thurston County	Developer Funded	20.76%	<ul style="list-style-type: none"> <li>Install westbound right-turn lane on Reservation Road.</li> </ul>
Old Pacific Hwy/Kuhlman Road	Thurston County	Developer Funded	18.35%	<ul style="list-style-type: none"> <li>Install northbound left-turn lane and eastbound right-turn lane channelization.</li> </ul>
Manke Road	Thurston County	Proportionate Share Contribution	55.93%	<ul style="list-style-type: none"> <li>Pay proportionate-share costs towards roadway upgrades to rural collector including structural upgrades to pavement section.</li> </ul>
SR 702/SR 7 Intersection	Pierce County /WSDOT	Proportionate Share Contribution		<ul style="list-style-type: none"> <li>Pay proportionate-share for roundabout or fully-actuated traffic signal, including necessary channelization improvements.</li> </ul>

### 3.17.7.3 Full Build-Out: 2025

Specific mitigation measures to be required for full build-out of the Thurston Highlands Master Planned Community will be verified upon receipt and review of an updated *Transportation Impact Analysis* and SEPA/land use approval at the time of application for phases of development beyond the year 2015.

### 3.17.8 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

The Thurston Highlands Master Planned Community will construct transportation improvements as conditions of its approval in order to mitigate impacts to transportation facilities and operations. After each major phase of project development, a separate Transportation Impact Analysis (TIA) will be prepared to reassess project impacts in the context of actual traffic conditions at that time – including traffic generated by regional growth, regional land use patterns, and the effect of transportation demand strategy policies on the regional level. Each updated TIA will be used to identify appropriate mitigation measures and network strategies required to support proposed uses and the trip generation potential of the planned community.

These intermediate traffic reviews and assessments will ensure that no significant unavoidable adverse impacts will result from the project that cannot be adequately mitigated.

