CHAPTER 5

TRANSPORTATION ELEMENT

TRANSPORTATION VISION

The City will develop and contribute to a well-designed transportation system through reasonable, planned, economically feasible transportation improvements for motorists, pedestrians, bicyclists, transit riders and commercial vehicles that support adopted land use plans, protect and improve business access, and protect and enhance the City's neighborhoods.

INTRODUCTION

The purpose of the Transportation Element is to ensure that the City's transportation infrastructure is managed to provide safe, efficient, and cost effective transportation routes within and through the City.

Roads for motorists can be the first thing that comes to mind when transportation facilities are mentioned. However, in addition to motorists the City has historically, and continues to, emphasize transportation facilities for pedestrians, bicyclists, and transit riders.

The City's projected growth, aging infrastructure, changes in certain demographics, and reductions in transportation funding from Federal and State sources present key challenges that the City will face in the coming years. The City recognizes that its approach to these challenges must be multi-modal and system-wide.

This document inventories the City's existing transportation networks, evaluates what improvements will be needed, and how these improvements will be paid for, as new homes and jobs are created in the City over the next 20 years.

1.0 OVERVIEW OF TRANSPORTATION PLANNING

The purpose of the Transportation Element is to establish goals and policies that will guide the development of the transportation system in the City of Mount Vernon…

The transportation system is the backbone of Mount Vernon's economy and a key component to economic competitiveness.

The City's transportation system serves its residents and visitors traveling to their jobs, schools, social and recreational activities. The transportation system is the backbone of Mount Vernon's economy and a key component to economic competitiveness. The transportation system includes highways, arterials, local roads, sidewalks, bike routes, pathways, transit, and rail systems.

Transportation planning is the process of assessing and inventorying existing transportation networks and predicting the routes that future traffic will take through the City.

Existing condition traffic information combined with future travel routes provides the City with information to determine where new road, trail, transit, and other improvements are needed to ensure that all of these modes of transportation are safe, comfortable, convenient, economical, and reasonably quick.

The State Growth Management Act (GMA) requires that all Comprehensive Plans include a Transportation Element.

The Transportation Element is required to establish goals and policies that will guide the development of transportation systems.

In essence, this plan operates as a decision making tool, providing a framework for making decisions about Mount Vernon's transportation systems.

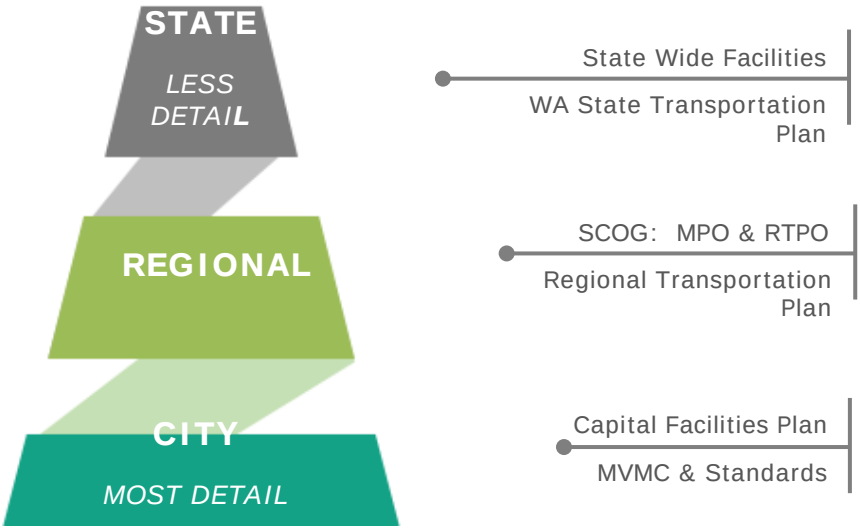
1.0 OVERVIEW OF TRANSPORTATION PLANNING

This Element of the Comprehensive Plan is just one part of the overall planning that the City engages in with regard to its transportation systems.

The City coordinates with the Washington State Department of Transportation (WSDOT) and is actively involved in regional planning with Skagit Council of Governments (SCOG) who is the Metropolitan Planning Organization (MPO) and the Regional Transportation Planning Organization (RTPO) in Skagit County.

At the local level, implementation of this Element is through the City's Capital Improvement Plan (CIP) along with the City's development regulations found in the following Mount Vernon Municipal Code Chapters:

- Chapter 16.16 (Design Standards for Non-arterial Streets)
- Title 12 (Streets, Sidewalks and Public Works)
- Chapter 14.10 (Concurrency Management)
- Chapter 3.40 (Impact Fees for Public Streets, Roads, Parks, Open Space and Recreation Facilities and Fire Protection)
- Engineering Standards



2.0
FUTURE GROWTH

Mount Vernon is the fasting growing city, and will accommodate more homes and jobs, than any other incorporated jurisdiction in Skagit County.

The City has been tasked to accommodate 12,434 new residents and 4,785 new jobs over the next 20 years.

The existing and forecasted residential and commercial growth has, and will continue to, place demands on the City's transportation systems.

The City's historic development patterns and zoning/land use decisions have resulted in the City having far more existing homes and land that will be developed for residential uses than the City has existing jobs and corresponding land to be developed for non-residential uses.

The City is the fastest growing, and will accommodate more homes and jobs, than any other incorporated jurisdiction in Skagit County. The Land Use (Chapter 2), Housing (Chapter 3) and Economic Development (Chapter 5) Elements of the Comprehensive Plan provide further details and analysis of this issue.

TABLE 2.0: EXISTING AND FUTURE GROWTH

	2015 EXISTING (people/jobs) City + UGAs	EXPECTED GROWTH (people/jobs) City + UGAs	2036 TOTALS (people/jobs) City + UGAs
Population:	34,969	12,434	47,400
Jobs:	16,503	4,785	21,288

3.0
TRANSPORTATION NETWORK

TRANSPORTATION ELEMENT: *Inventories and evaluates the City's arterial roadway system - not neighborhood or local streets.*

The City of Mount Vernon is committed to providing a street network that contributes to a well-planned community that encourages non-motorized modes of travel, incorporates streetscapes that fit the planned character of where they are located, and fosters economic vitality.

This chapter provides an overview, inventory, and assessment of the City's *existing* transportation networks including roads, pedestrian facilities, bicycle facilities, and transit services.

The City's existing and proposed street network does the following:

- Grants people more route choices, with minimum travel through residential areas.
- Furnishes points of access.
- Creates shorter distances to travel.
- Facilitates an effective transit system, including school bus service.
- Lessens congestion on arterials.
- Reduces emergency vehicle response times.
- Improves movement between neighborhoods.
- Improves the efficiency of public service utilities by reducing travel time and creating more efficient routes.
- Reduces noise and air pollution.
- Creates non-motorized system.

3.1 REGIONAL SETTING

Mount Vernon's regional location puts demands on its transportation systems. With the Seattle metropolitan area a short distance to the south, Vancouver B.C. to the north, and the San Juan Islands to the west the City is influenced by many regional travelers and trends. In addition, the City is bisected by several State Routes both north/south and east/west.

With this regional setting in mind it is important that the City coordinates its transportation planning in a regional way. To accomplish this, the City is part of, and plays an active role with Skagit Council of Governments (SCOG) who is the Metropolitan Planning Organization (MPO) and the Regional Transportation Planning Organization (RTPO) in Skagit County. RTPOs were authorized by the Growth Management Act in 1990 to make sure, in part, that local and regional coordination of transportation plans occurred.

Because SCOG is the RTPO for Skagit County they develop and maintain the Skagit County Metropolitan and Regional Transportation Plan (RTP) that the City contributes to. The RTP is required to be updated every five (5) years per Federal requirements. The most recent update to the RTP was adopted in March of 2016 which dovetails nicely with this update to the City's Transportation Element.

The City also coordinates with the Washington State Department of Transportation (WSDOT). WSDOT has jurisdiction and maintenance responsibilities on Interstate-5, State Route-536, State Route-538, and State Route-9. The northern extent of I-5 in the City limits includes a four (4) lane bridge (that had a span replaced and trusses modified several years ago after a portion of this bridge fell into the Skagit River) and SR-536 in the City limits includes a two (2) lane bridge over the Skagit River.

Coordinating with a State agency (in this case WSDOT) that is tasked with State wide transportation facilities can be challenging due to the fact that they have to prioritize State-wide projects – not just Mount Vernon's. At the same time, being able to coordinate with WSDOT on projects within the City is also an opportunity because the City is able to rely on WSDOT's expertise in both maintaining existing transportation facilities and designing new facilities that benefit the City.

MAP 3.0: REGIONAL SETTING

3.2 ROADWAY CLASSIFICATIONS

All City streets have a functional classification based on the types of trips that occur, the basic purpose for which the street was designed, and the amount of traffic volume the street carries. The City classifies streets as Principal Arterials, Minor Arterials, Urban Collectors, and Neighborhood Streets, with the following criteria applying to each category of street.

This functional classification system is a uniform method used by the State of Washington and the Federal Highway Administration to describe the street's function. Table 3.0 shows the functional classification of the City's arterial transportation system.

The functional classification of streets does change over time as land is developed and new/different traffic patterns are created. Maps 3.1 and 3.2 identify the location and functional classification of the City's streets at the end-of-year 2015 according to the criteria outlined in Table 3.0.

PRINCIPAL ARTERIALS:

Principal arterials' primary function is to carry traffic to and from major traffic generators within the community. Some local access is provided, but the primary function is for through trips.

MINOR ARTERIALS:

Minor arterials serve as connecting roads between neighborhoods, provide for some through trips, with additional provisions for local access. Minor arterials also provide access to major community-wide traffic generators, such as hospitals and high schools.

URBAN COLLECTOR:

Urban collectors are arterial streets that serve urban traffic and connect to a higher level (i.e., either principal or minor arterials) of the arterial street system.

NEIGHBORHOOD STREETS:

Neighborhood streets provide access to adjacent properties with limited provision for through traffic.

TABLE 3.0: FUNCTIONAL CLASSIFICATION OF ROADS

FUNCTIONAL CLASSIFICATION	ADT	RIGHT-OF-WAY (FEET)	NUMBER OF LANES	SPEED (MPH)
Principal Arterial	> 17,500	60 – 80	2 – 5	35 - 45
Minor Arterial	10,000 – 22,950	60 – 80	2 – 4	25 - 35
Urban Collector	2,500 – 15,870	60	2 - 3	25 - 35
Neighborhood Street	< 2,500	50 – 60	2	20 - 35

3.3 EXISTING ROADWAY INVENTORY

There are four (4) Washington state routes located within the City and its urban growth areas.

INTERSTATE-5 runs north/south through the western portion of the City including a bridge crossing over the Skagit River and is classified as a Highway of Statewide Significance.

STATE ROUTE-538 (College Way) runs east/west through the northern part of the City crossing under Interstate-5 and including on/off ramps to Interstate-5. SR-538 is classified as a Highway of Regional Significance.

STATE ROUTE-536 (Kincaid, South 3rd, and Division Streets and Memorial Highway) runs east/west from Interstate-5 to the western extent of the City including a bridge crossing over the Skagit River. SR-536 is classified as a Highway of Regional Significance.

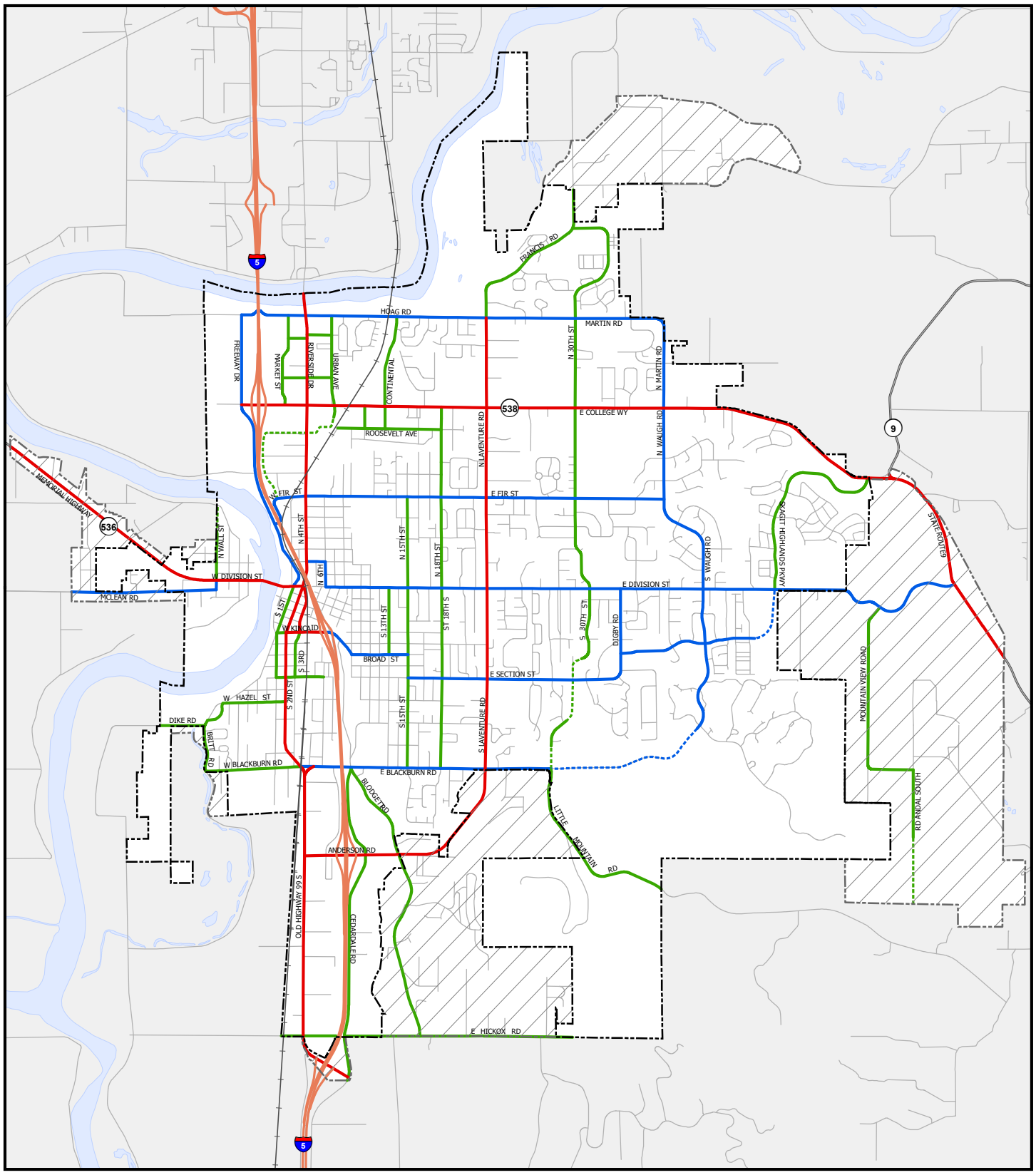
STATE ROUTE-9 extends to the north and south off of the eastern terminus of State Route-538 (College Way) and is located on the outside eastern edge of a portion of the City's east urban growth area. SR-9 is classified as a Highway of Regional Significance.

As discussed in Section 3.1, the City's street system is comprised of a grid of principal and minor arterials, urban collectors and neighborhood streets.

The overall existing centerline miles of each of the different roadway classifications is provided below in Table 3.1.

TABLE 3.1: CENTERLANE MILES

	FUNCTIONAL CLASSIFICATION	EXISTING MILES	% OF TOTAL MILES
ARTERIALS	Interstate-5	12.9	7.9%
	SR 536 & 538	4.8	3%
	Principal Arterials	8.2	5%
	Minor Arterials	16.7	10.3%
	Urban Collector	18.6	11.5%
	Neighborhood Street	81.6	50.3%
	Alley	10.1	6.2%
	Private Street	9.4	5.8%
	Total:	**162.3**	**100%**



Transportation Element - Figure 3.1 Arterial Street Plan

City of MOUNT VERNON

Street Classification, Status

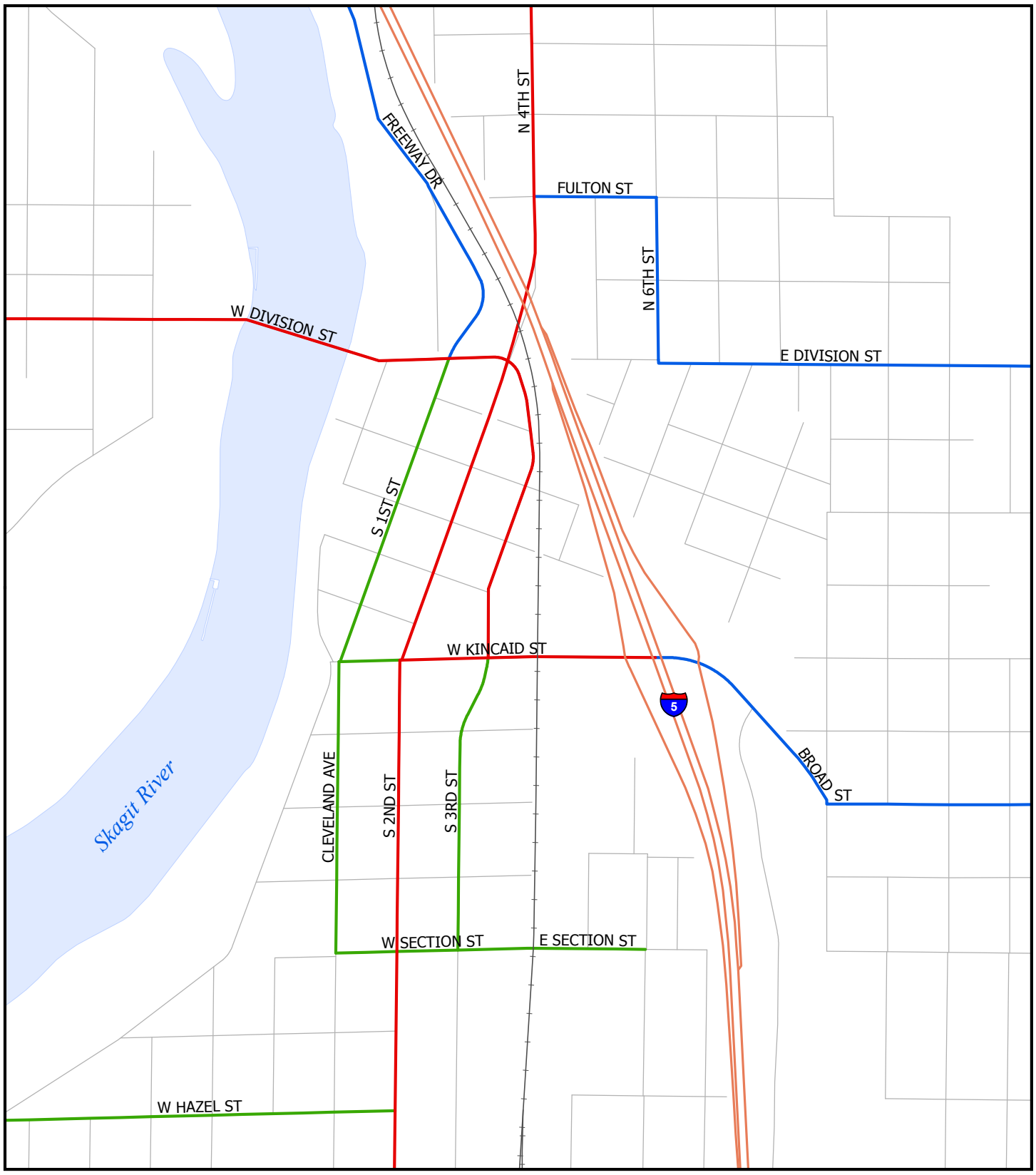
- Principal Arterial, Existing
- Minor Arterial, Existing
- Urban Collector, Existing
- Principal Arterial, Proposed
- Minor Arterial, Proposed
- Urban Collector, Proposed
- Other Street
- Railroad
- City Boundary
- Urban Growth Area
- Water Body

N

0 0.5 1

Miles

Map by MV GIS 3/3/2016



Transportation Element - Figure 3.2 Arterial Street Plan Downtown Area

City of MOUNT VERNON

Principal Arterial, Existing
Minor Arterial, Existing
Urban Collector, Existing
Other Street
Railroad
Water Body

N

0 500
Feet

Map by MV GIS 2/29/2016

3.4
TRAFFIC CONTROL & CALMING DEVICES

Traffic control and traffic calming devices share the same overriding goals of reducing vehicle speeds and improving safety.

TRAFFIC CONTROL

Traffic control at City intersections with higher traffic volumes is provided in large part with traffic signals and stop signs. In total, on arterial streets, the City has:

- 34 signalized intersections;
- Two (2) emergency signals;
- Eight (8) all-way stop controlled intersections; and,
- 54 two-way stop controlled intersections.

In addition to traffic signals and stop signs the City has promoted the use of roundabouts in the recent past. One roundabout has been constructed at the intersection of Anderson and Cedardale Roads, and the City expects to see additional roundabouts designed and built in the coming years. Map 3.3 identifies the location of traffic signals, all-way stops and the roundabout.

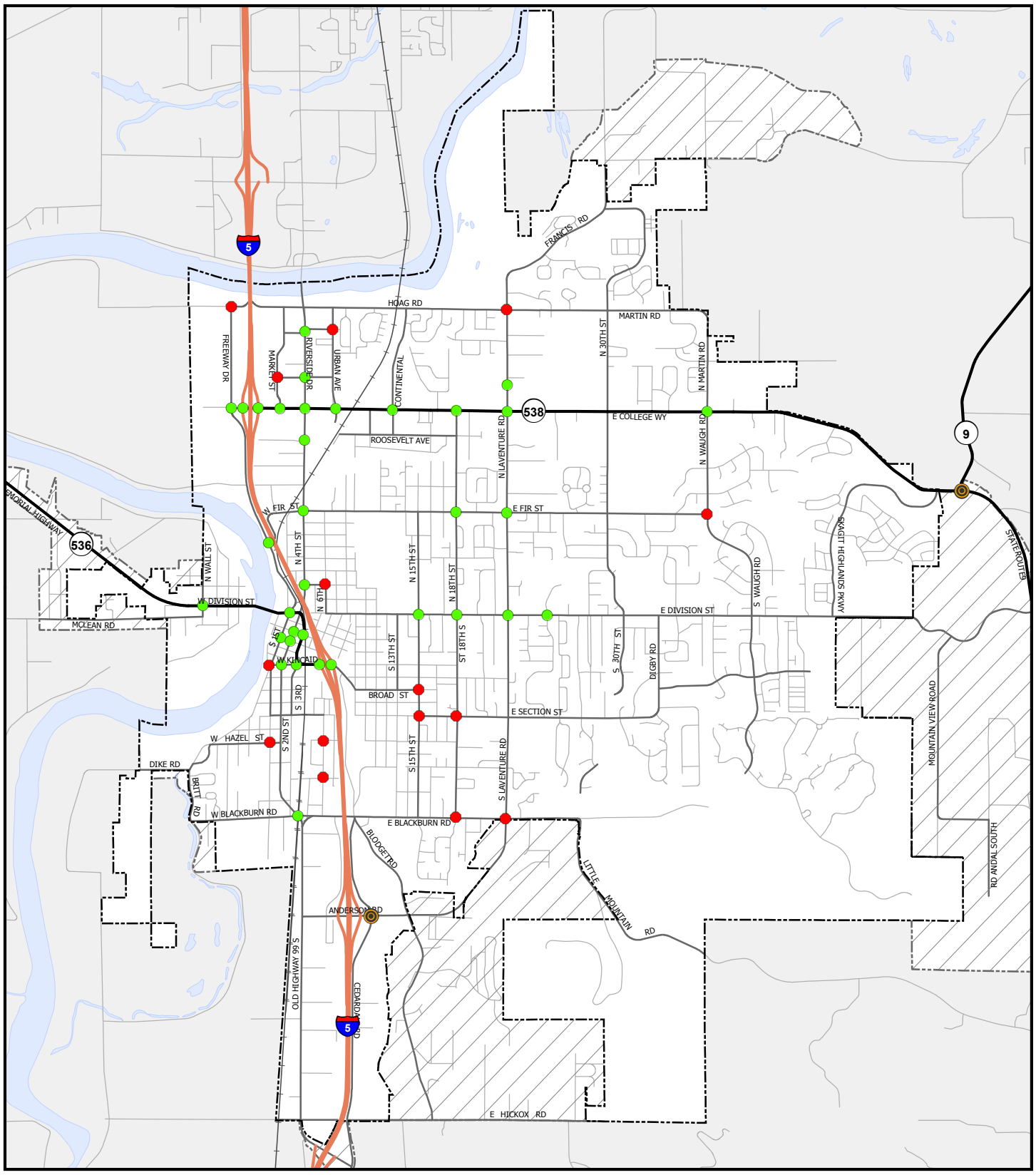
TRAFFIC CALMING

Traffic calming devices are intended to improve safety on neighborhood streets by reducing cut-through traffic and discouraging speeding with physical measures such as a change in street alignments, the installation of different types of features and others.

Appendix A contains additional information on existing and potential traffic calming measures/techniques that are, or could be, used in the City on neighborhood streets.

The following types of traffic calming devices can be found in use throughout different parts of the City.

The top right photo shows the use of street striping with raised pavement markers. Followed by a picture showing the use of bulb-outs. The bottom right picture is of a street that is using center island narrowing.



Transportation Element - Figure 3.3 Traffic Signals, All-Way Stops, Roundabout Locations

City of MOUNT VERNON

- Interstate Highway
- State Highway
- Arterial Street
- Other Street
- Railroad
- City Boundary
- UGA Boundary
- Water Body
- Traffic Signal
- All-Way Stop
- Traffic Roundabout

N

0 0.25 0.5

Miles

Map by MV GIS 2/29/2016

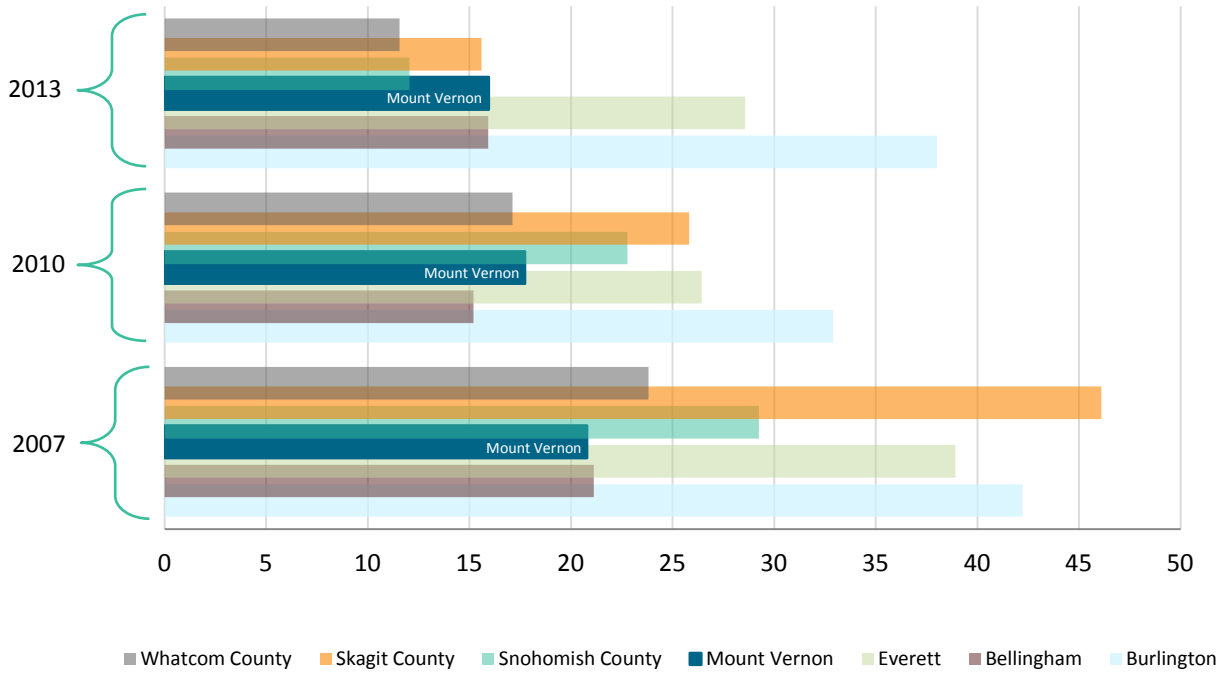
3.5 EXISTING TRAFFIC SAFETY

Compared to nearby jurisdictions, and in a regional context, Mount Vernon has a medium-to-low rate of total traffic-related injuries and a low rate of injuries that resulted in fatalities as shown below. The table and graph below identify the total number and type of collisions in Mount Vernon as compared to nearby cities and counties over three (3) different timeframes (i.e. 2007, 2010, and 2013). The overall accident numbers were converted from total numbers of collisions to a ratio of collisions per 1,000 people within the listed jurisdiction at the given time intervals. This conversion was necessary to allow comparisons between the different jurisdictions that all have very different populations.

The accident data below is from the Annual Collision Summary and covers police officer reported collisions on all public roadways. Continuing to emphasize and implement safety-related projects and programs is currently, and will continue to be, a City priority.

TABLE/GRAPH 3.2: COLLISION RATES

JURISDICTIONS:	2007		2010		2013	
	Total Collisions per 1,000 in population	Total Fatalities	Total Collisions per 1,000 in population	Total Fatalities	Total Collisions per 1,000 in population	Total Fatalities
Burlington	42.23	1	32.9	1	38.01	0
Bellingham	21.12	3	15.21	3	15.92	2
Everett	38.92	4	26.43	5	28.57	5
Mount Vernon	**20.79**	**0**	**17.74**	**0**	**15.96**	**1**
Snohomish County	29.25	30	22.77	25	12.06	15
Skagit County	46.1	9	25.81	8	15.6	8
Whatcom County	23.82	14	17.13	11	11.56	12



3.6 STREET SECTIONS & STANDARDS

The backbone of the City's transportation system is its arterial streets. As such, standard street sections are established to provide continuity for the arterial system and assure that adequate facilities are constructed. This includes not only the roadway, but also pedestrian and bicycle facilities, landscaped areas, parking, and right-of-way width.

The City has adopted development regulations (Mount Vernon Municipal Code (MVMC) Chapter 16.16) and Engineering Standards to regulate the design and construction of new streets. Having standards for new development allows for consistent treatment of areas as they are developed or re-developed, whichever the case may be.

Typical sections for the City's different types of arterial roadways are provided below. Non-arterial street cross-sections are not provided because these types of roads are more prone to having their cross-sections modified on a case-by-case basis (due in large part to the fact that they have fewer traffic trips and more limited access than arterial roads do).

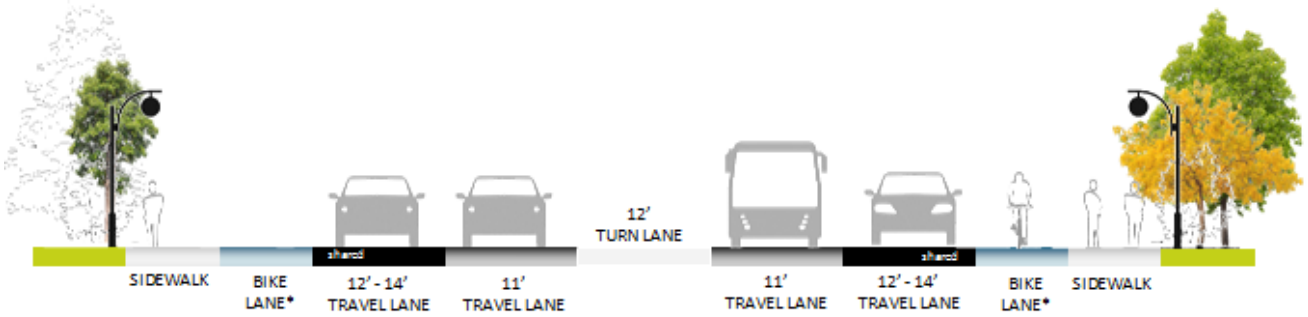
It is recognized that some special circumstances may occur that will require change from the street sections listed in Table 3.3. These deviations are handled on a case-by-case basis and are approved by the Public Works and Economic Development Directors through a modification process that is outlined within MVMC Chapter 16.16.

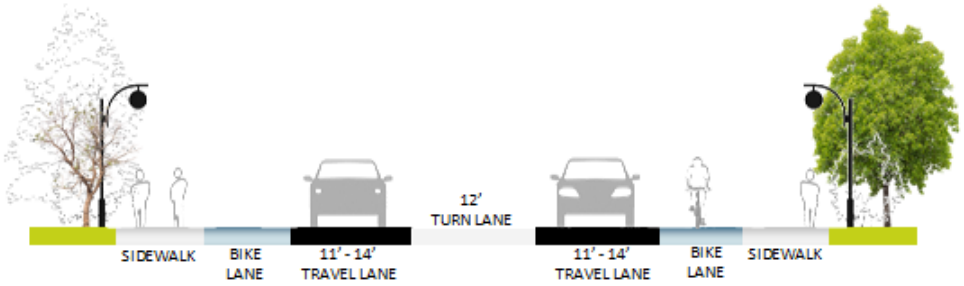
Insert arterial photo here

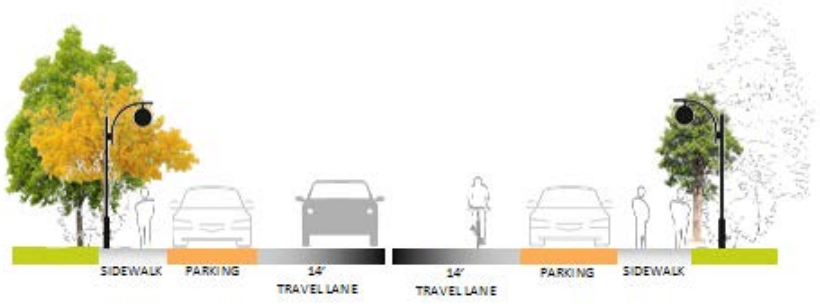
Insert arterial photo here

Insert arterial photo here

TABLE 3.3A: PRINCIPAL ARTERIAL STREET CROSS-SECTIONS/STANDARDS

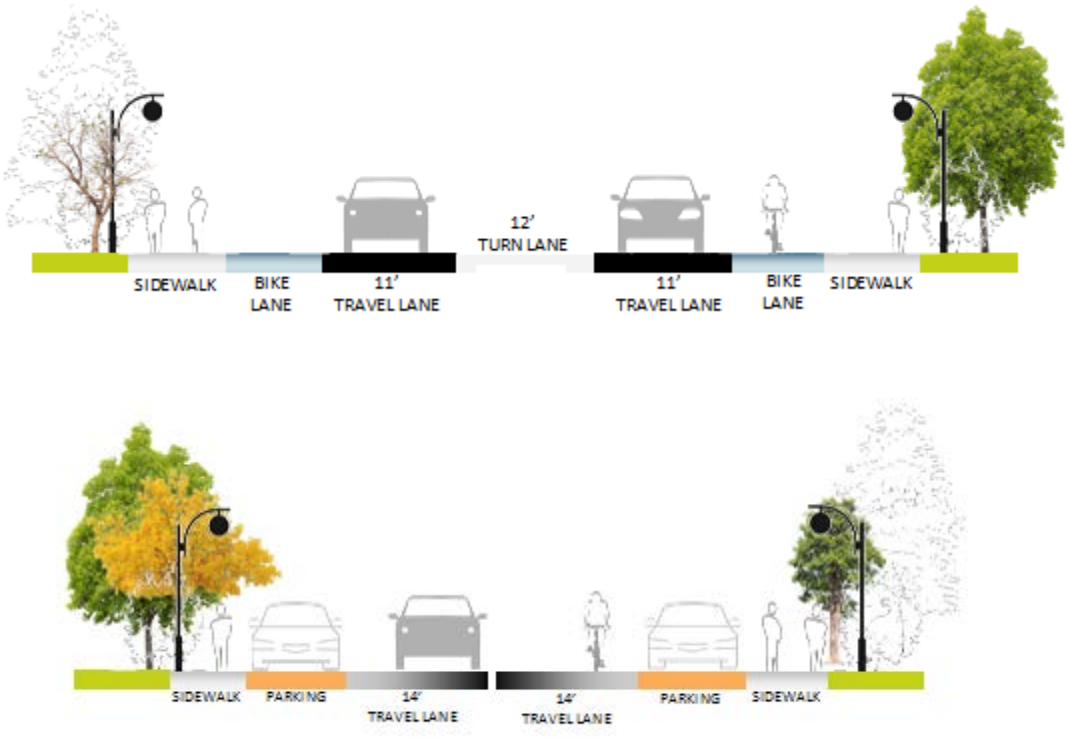






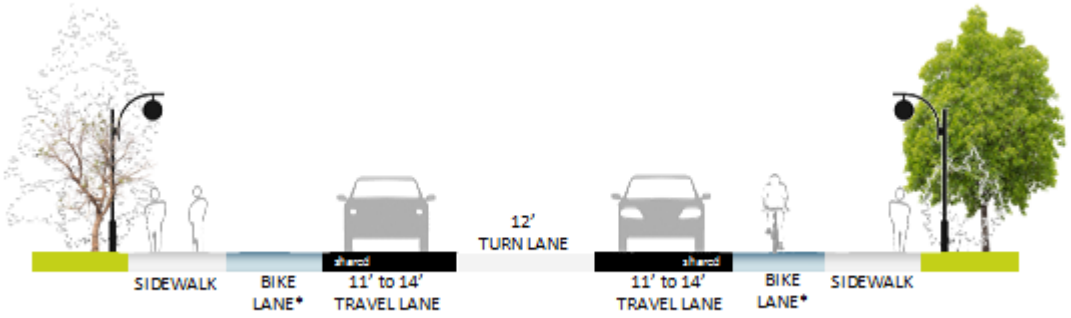
DESCRIPTION	CAPACITY [1]	TRAFFIC LANES	PARKING	BIKE LANE	STREET WIDTH	RIGHT OF WAY
5-Lane	ADT 43,530 Peak Hr 3,480	2-12', 2-11', 1-12'	N/A	5'	68'	80'
5-Lane	ADT 37,040 Peak Hr 2,960	2-14', 2-11', 1-12'	N/A	Shared	62'	80'
3-Lane w/ Bike Lane	ADT 28,050 Peak Hr 2,240	2-14', 1-12' or 2-11', 1-12'	N/A	5'	44' to 50'	60' to 80'
2-Lane w/ Parking	ADT 20,730 Peak Hr 1,660	2-14'	2-8'	Shared	44'	60'

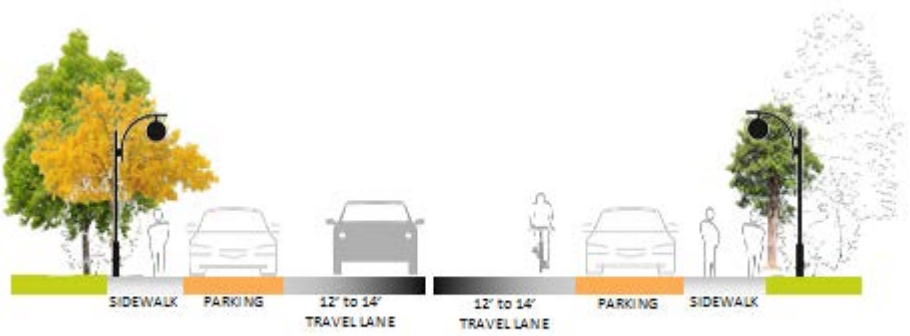
TABLE 3.3B: MINOR ARTERIAL STREET CROSS-SECTIONS/STANDARDS



DESCRIPTION	CAPACITY [1]	TRAFFIC LANES	PARKING	BIKE LANE	STREET WIDTH	RIGHT OF WAY
3-Lane w/ Bike Lane	ADT 22,950 Peak Hr 1,810	1-12', 2-11'	N/A	5'	44'	60'
2-Lane w/ Parking	ADT 20,730 Peak Hr 1,660	2-14'	2-8'	Shared	44'	60'

TABLE 3.3C: URBAN COLLECTORS ARTERIAL STREET CROSS-SECTIONS/STANDARDS





DESCRIPTION	CAPACITY [1]	TRAFFIC LANES	PARKING	BIKE LANE	STREET WIDTH	RIGHT OF WAY
3-Lane w/ Bike Lane	ADT 15,870 Peak Hr 1,270	1-12', 2-11'	N/A	5'	44'	60'
3-Lane	ADT 14,540 Peak Hr 1,160	1-12', 2-14'	N/A	Shared	40'	60'
2-Lane w/ Parking	ADT 14,540 Peak Hr 1,160	2-14'	2-8'	Shared	44'	60'
2-Lane w/ Parking	ADT 12,900 Peak Hr 1,030	2-12'	2-8'	None	40'	60'

1. The capacities shown for each street section shall be used for calculating the volume capacity ratios for concurrency determinations.

3.7
EXISTING NON-MOTORIZED SYSTEM

Non-motorized facilities weave our community together with surrounding areas and provide safe spaces dedicated to people.

Whether bicycling on a regional trail or walking to the neighborhood store, non-motorized facilities enliven our neighborhoods and enrich our lives.

Private automobiles continue to comprise the majority of traffic trips in the City of Mount Vernon. Even so, Mount Vernon desires to evolve towards a community where its residents can easily get around by walking, bicycling and transit. Serving private automobile mobility needs and promoting other modes of transportation will be both an opportunity and challenge for the City over the next 20-years.

Non-motorized transportation systems are important for a number of reasons ranging from encouraging physical activity thereby contributing to the overall well-being of City residents to reducing travel times. The City has been, and continues to be, committed to implementing ways and strategies to reduce the demand for new road construction.

Transportation planners collectively term strategies to reduce the demand on existing roads and for new road construction Transportation Demand Management (TDM). TDM strategies are generally categorized as either: 1) employer-based strategies; or 2) area-wide strategies.

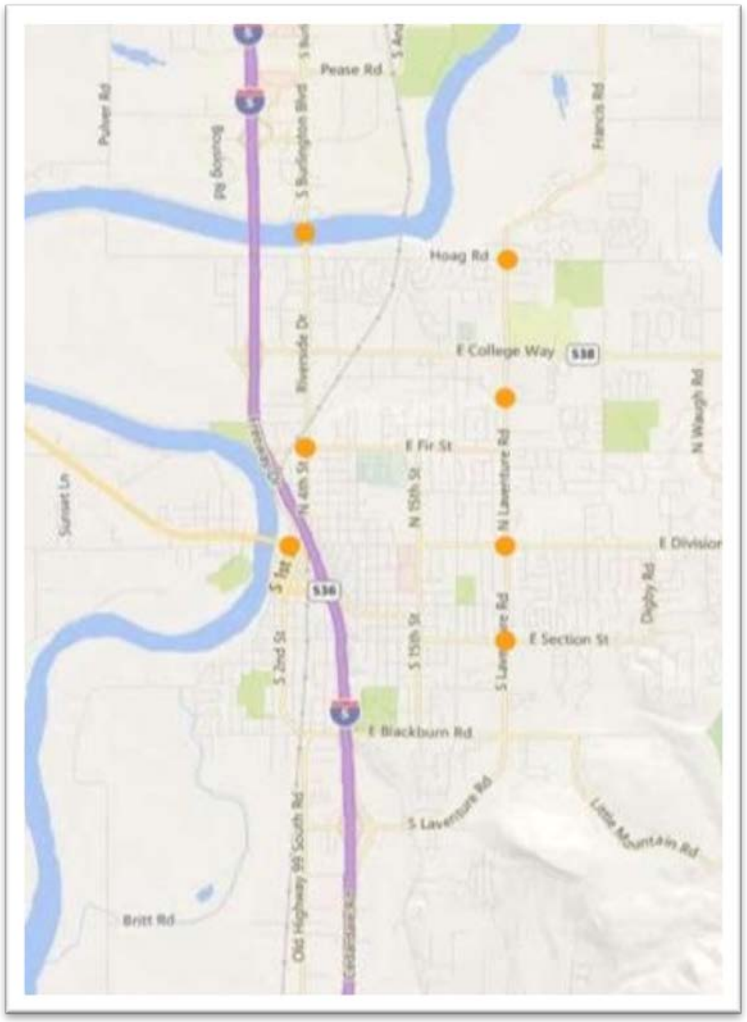
QUANTIFING NON-MOTORIZED MODES

Every year since 2008 the Washington State Department of Transportation (WSDOT) has completed a statewide bicycle and pedestrian count. For the last two (2) years this count included Mount Vernon. This effort is completed by WSDOT in conjunction with the National Bicycle and Pedestrian Documentation Project.

There were seven (7) locations in Mount Vernon where this data was collected in 2014 and 2015. In 2016 an additional data collection spot along the City's downtown riverfront walk will likely be added.

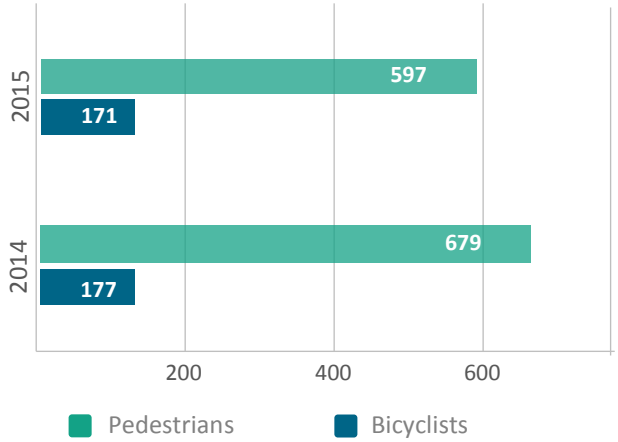
The volunteers who complete these counts are trained in advance to ensure accurate data collection over time. The counts are completed during the same two hour window in the morning and then again in the evening.

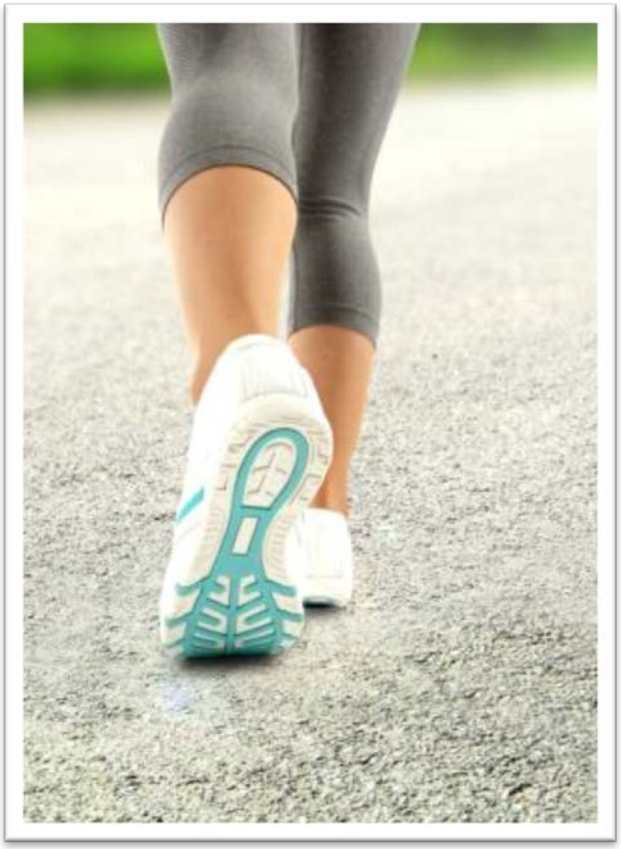
Having just two (2) years of data so far makes it difficult to draw conclusions or identify trends regarding these non-motorized modes of transportation; however, the City will continue to track this information as it should become a useful metric over time.



As shown in the map above, the seven (7) data collection points for the Mount Vernon bicycle and pedestrian count include: approximately the mid-point of the Skagit River bridge, the Hoag/LaVenture/Martin intersection, LaVenture Road where it intersects with the Kulshan trail, the LaVenture/Division intersection, the LaVenture/Section intersection, the Riverside Drive/Fir Street intersection, and the Freeway Drive/1st Street intersection.

TABLE 3.4: WSDOT NON-MOTORIZED COUNTS





AREA WIDE TRANSPORTATION DEMAND MANAGEMENT (TDM) STRATEGIES

Directly or indirectly the City uses all of the area wide TDM strategies listed in Table 3.5.

The City takes the lead on bicycle and pedestrian facilities and TDM-friendly land use policies; and supports the agencies that provide transit, park-and-ride and passenger rail service within the City.

The following sections contain detailed information on these area wide TDM strategies.

TABLE 3.5: TYPES OF TDM STRATEGIES

	AREA WIDE STRATEGIES	EMPLOYER BASED STRATEGIES
DESCRIPTION	Area-wide TDM strategies have significant impact on overall traffic volume levels because they generally impact all travel markets such as commuting, school, shopping, etc.	Employer-based strategies are those that are primarily undertaken by the public and private sector.
EXAMPLE TYPES OF STRATEGIES	• Transit service • Bicycle/pedestrian facilities • TDM-friendly land use policies • Park-and-ride • Commuter rail	• Vanpool program • Telecommuting • Preferential parking for ride share programs • Varied/compressed work hours and weeks • Secure long term bicycle parking • Locker and shower facilities

TRANSIT SERVICE

Skagit County's transit system was established under RCW 36.57A in 1993 by voter approval of 2/10 of 1% local sales tax to support transit service in the Mount Vernon/Burlington area. In November 2008, voters approved an additional 2/10 of 1% to support transit service in the Skagit Public Transit Benefit Area (PTBA). Skagit Transit currently receives a total of 4/10 of 1% local sales tax, and within the PTBA operates 16 fixed routes (includes 2 commuter routes), complimentary paratransit services, two demand response routes and has over 40 vanpool groups in operation.

In Mount Vernon Skagit Transit currently operates seven (7) bus routes, park and ride facilities/programs, and a transportation depot named Skagit Station where travelers can connect with services provided by Skagit, Whatcom and Island Transits along with Amtrak and Greyhound. Commuter service to Everett Station where connections to Sound Transit, Everett Transit and Community Transit are also available.

A map of the transit routes that Skagit Transit currently operates in Mount Vernon follows, labeled as Map 3.4.

Insert SKAT bus stop photo here

Insert park and ride photo here

Insert park and ride photo here

PARK AND RIDE FACILITIES

Park-and-ride lots allow transit users beyond the normal 1/4 mile walking distance from a transit stop to drive and park in the lots. Currently there are two (2) park-and-ride facilities in the City of Mount Vernon.

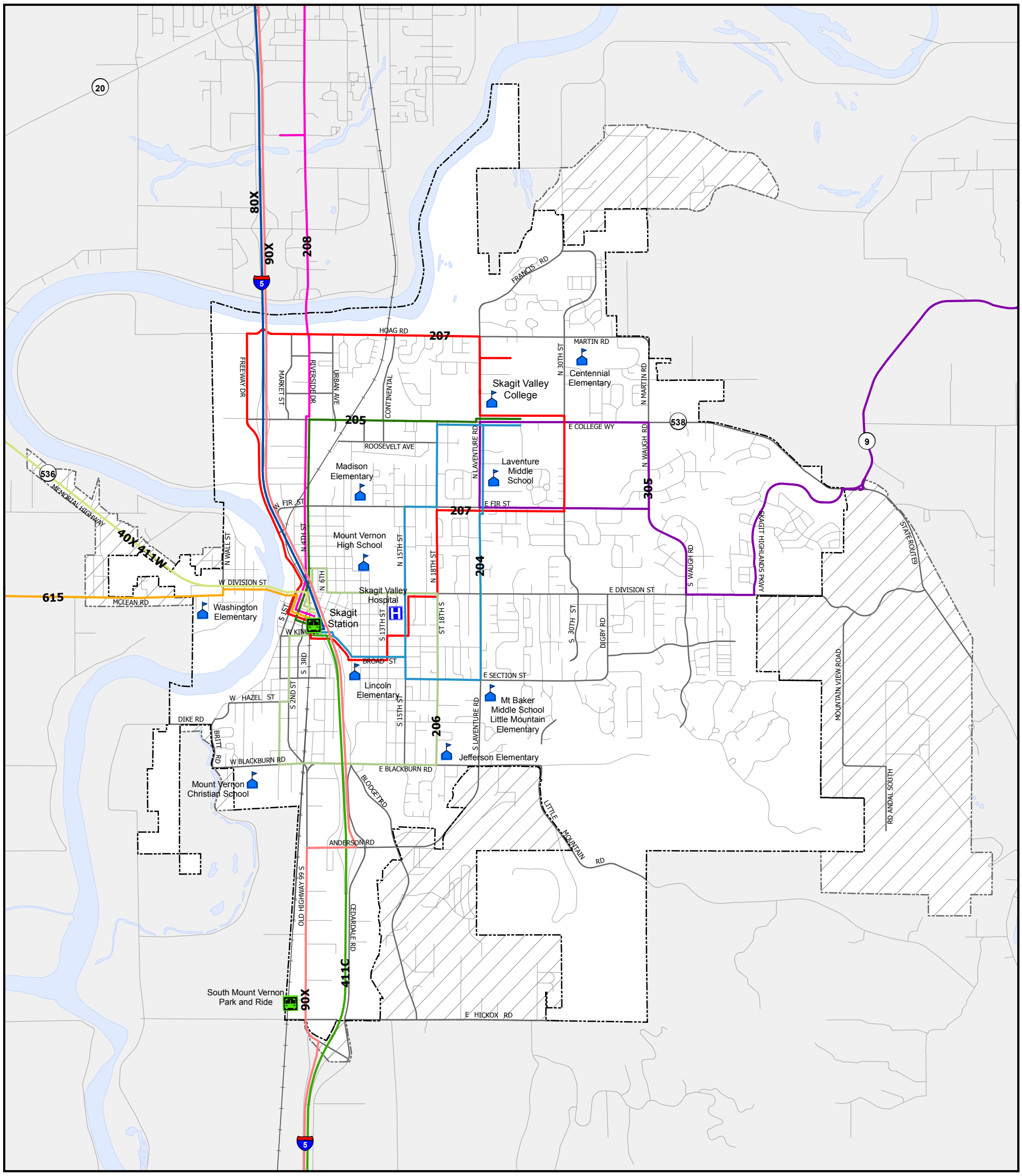
Kincaid Street: this park-and-ride is located on the south side of Kincaid Street, adjacent to Interstate-5 and is operated by WSDOT south of Kincaid Street, adjacent to I-5.

South Mount Vernon: this park-and-ride is located on the west side of Old Highway 99 South and immediately north of Hickox Road, and is operated by SKAT.

PASSENGER RAIL SYSTEM

Skagit Station is an Amtrak rail link between Mount Vernon and Seattle, Portland, and Vancouver, B.C. Four (4) trains a day currently stop at the station; two south bound trains and two north bound trains. Passenger trips to Seattle and Vancouver, B.C. average two (2) hours and Mount Vernon to Portland averages approximately six (6) hours.

Map 3.4 identifies the location of Skagit Station and the park-and-ride facilities in Mount Vernon.



Transportation Element - Figure 3.4 Public Transit Routes, Park and Rides, Skagit Station

City of MOUNT VERNON

Skagit Transit Route Number

- 204
- 205
- 206
- 207
- 208
- 305
- 40X 411W
- 411C
- 615
- 80X
- 90X

- Railroad
- City Boundary
- Urban Growth Area
- Water Body
- Bus Station / Park and Ride
- School

N

0 0.5 1
Miles

Map by MV GIS 2/29/2016

Insert photo here

Insert sidewalk photo here

Insert widened shoulders photo here

Insert trail photo here

PEDESTRIAN FACILITIES

Pedestrian facilities in Mount Vernon are grouped into three (3) general classifications:

- Sidewalks,
- Widened Shoulders, and
- Pathways/Trail Facilities.

There is an estimated 66 miles of sidewalks along arterial roads in Mount Vernon.

Widened shoulders in the City are generally present in commercial and industrial areas where pedestrian traffic is not anticipated to be high. There is an estimated 4.6 miles of widened shoulders in Mount Vernon.

Pathways in the City are shared by pedestrians, bicyclists and others. Pathways/trails, as mapped and described herein, are limited to those facilities that the City maintains, owns, or has easement rights for the public on. There is an estimated 26.8 miles of these facilities in Mount Vernon, including recreational trails such as those at Little Mountain Park.

Map 3.5 identifies the location of the pedestrian facilities in Mount Vernon.

BICYCLE FACILITIES

Insert Striped Bike Lane photo here

Insert Bike Trail photo here

Bicycle facilities in Mount Vernon are grouped into four (4) general classifications:

- Marked;
- Striped;
- Shared Lanes; and,
- Pathways/Trails.

Bicycle Lanes are defined in WSDOT's Design Manual as lanes that are "a portion of a highway or street identified by signs and pavement markings as reserved for bicycle use". The comfort and safety of cyclists can be increased with bicycle lanes because: 1) they provide for more predicable movements of motorists and bicyclists and reduce motorist lane changes when passing bicyclists; 2) they discourage bicyclists using the sidewalk or gutter pan, and 3) they decrease the frequency of drivers encroaching into the adjoining travel lane when passing bicyclists.

For inventory purposes, the City has categorized its bicycle facilities that are most similar to what WSDOT defines as Bicycle Lanes into two categories that include: Marked and Striped.

The City defines **Marked Bicycle Lanes** as those with thermoplastic bicycle symbols, bike lane sign(s) or other similar features. The City has approximately 8 miles of marked bicycle lanes.

Striped Bicycle Lanes are defined by the City as those with a painted lane edge and at least 3 feet of space on the opposite side of the lane edge. There is no parking allowed on the outside edge of these facilities. There are approximately 19 miles of striped bicycle lanes in the City.

In addition to Marked and Striped Bicycle lanes, the City also has approximately 35.6 miles of what are classified as **Shared Bicycle Lanes**. These facilities are identified as roads with a minimum 14-foot travel surface and are distinguished from striped lanes because these shared lanes allow on-street parking.

Bicycle Trails in Mount Vernon are largely multi-use pathways that are planned to provide access for walkers, bicyclists, hikers, and other similar users. In Mount Vernon there is an estimated 19.7 miles of trail facilities that bicyclists are able to use.

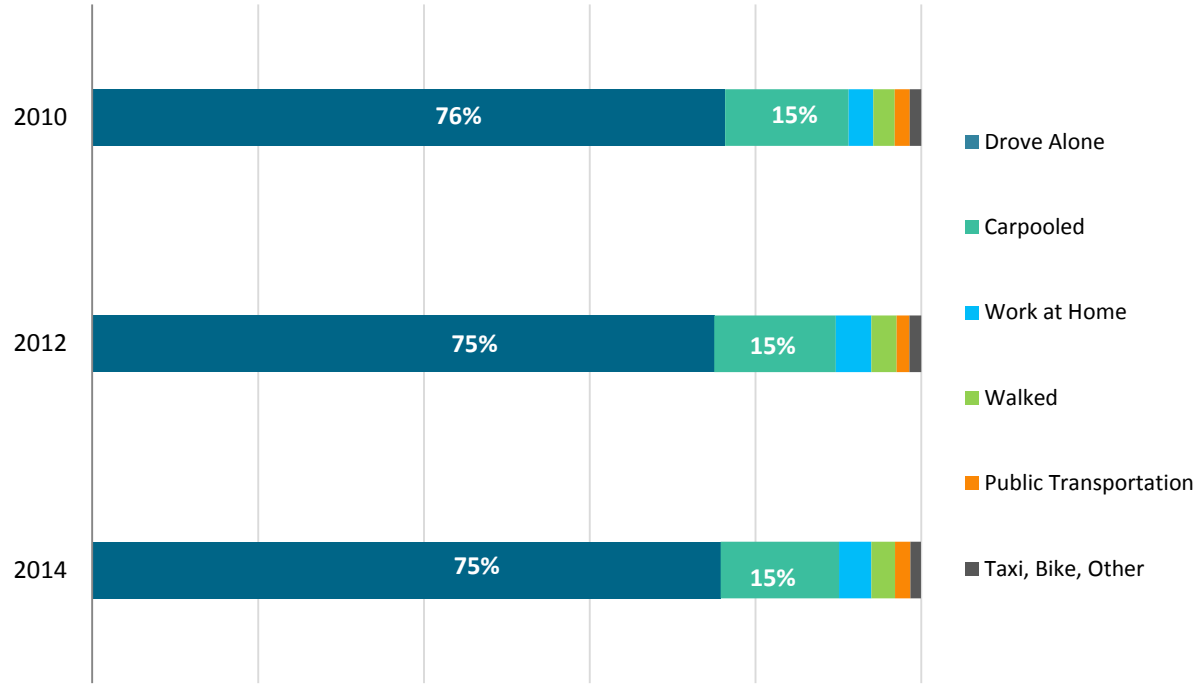
Map 3.6 identifies the location of the bicycle facilities in Mount Vernon.

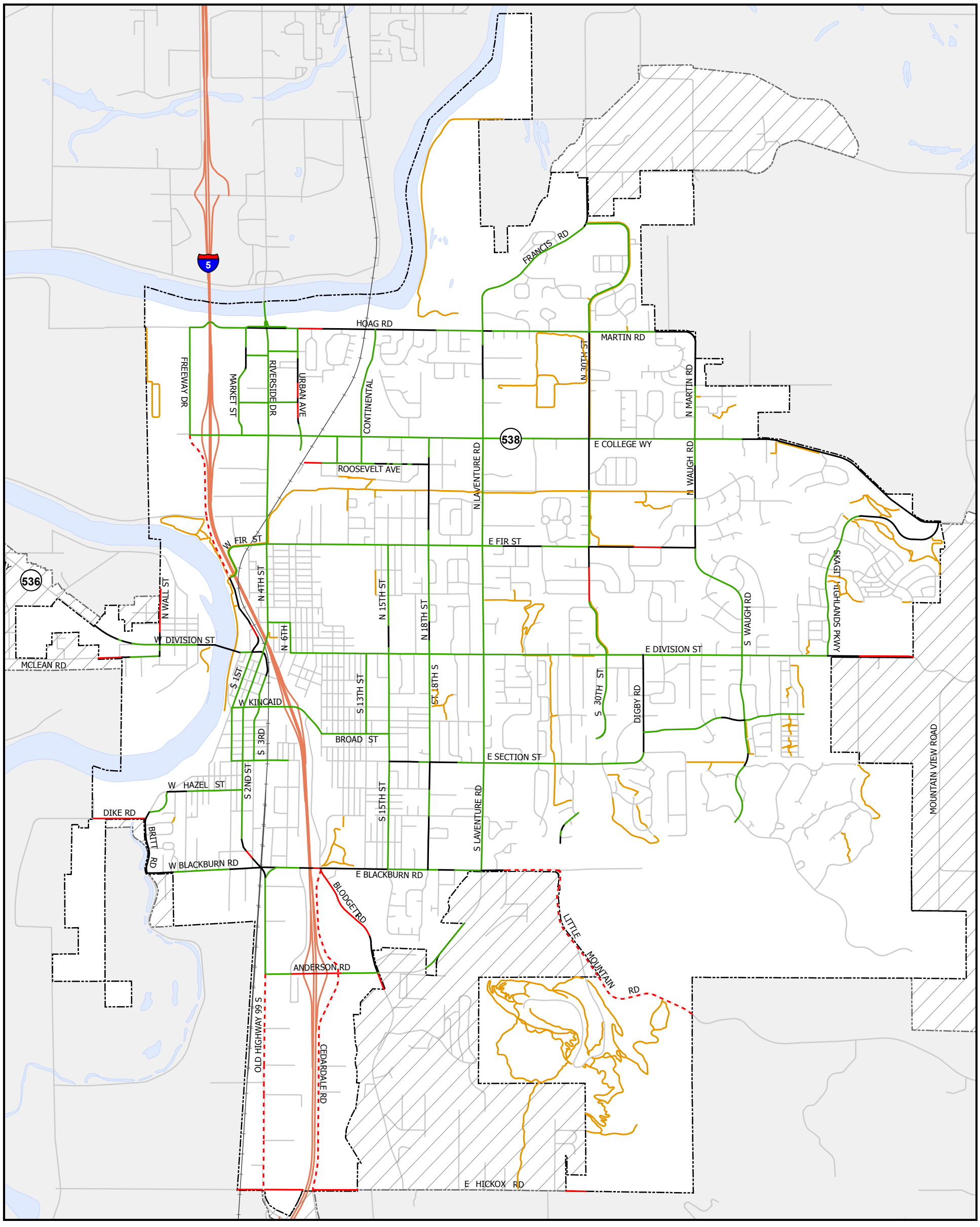
LAND USE POLICIES

Land use is the primary driver of travel. If land use policies allow or are designed to make travel to work, shopping, or other activities convenient with basic trips being short distances, the overall travel in the community will be reduced. As an example, if convenience shopping is close to residential areas, less driving will be required. The most effective TDM-friendly land use policies support bicycle/pedestrian facilities and transit service like Mount Vernon's plan does.

Measuring modes of transportation other than in vehicles is difficult due to data collection gaps and lack of consistent data to compare over time. The U.S. Census does, however, publish information determining how residents over the age of 16 get to work. Below is this data for Mount Vernon for 2010, 2012, and 2014. Evident is that most residents drive alone to work – 75%, close to 15% carpool, 2% use public transportation, 3% walk, with the remaining working at home or utilizing other means such as a bicycle to get to work.

TABLE 3.6: TRANSPORTATION MODES TO WORK





Transportation Element - Figure 3.5 Pedestrian Facilities

City of MOUNT VERNON

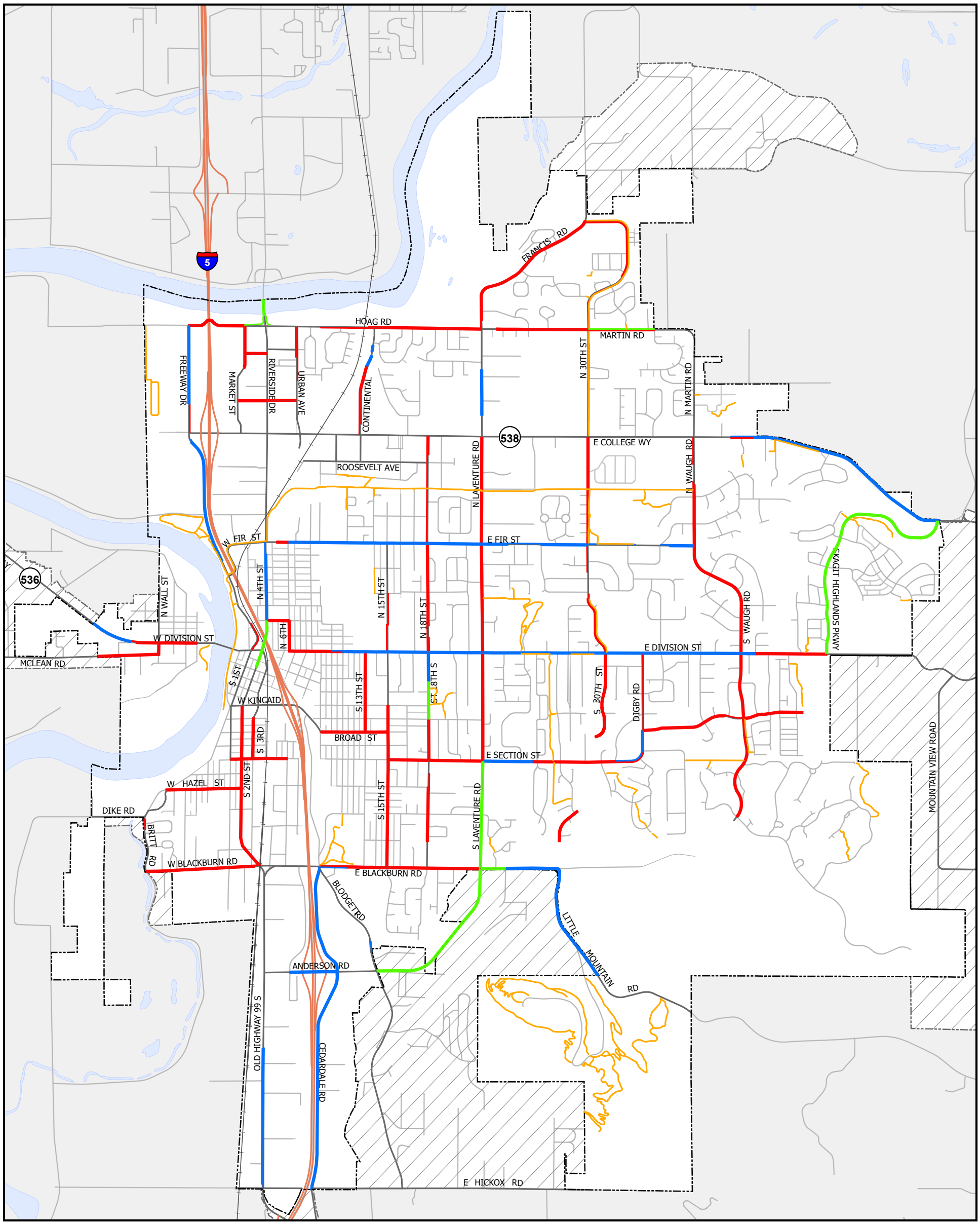
- Pathway / Trail
- Arterial Street, Sidewalk on Both Sides
- Arterial Street, Sidewalk on One Side
- Arterial Street, No Sidewalk
- Arterial Street with Continuous Widened Shoulders
- Other Street
- Railroad
- City Boundary
- Urban Growth Area
- Water Body

N

0 0.5 1
Miles

Map by MV GIS 7/6/2016

Transportation Element - Figure 3.6a Existing Bicycle Facilities



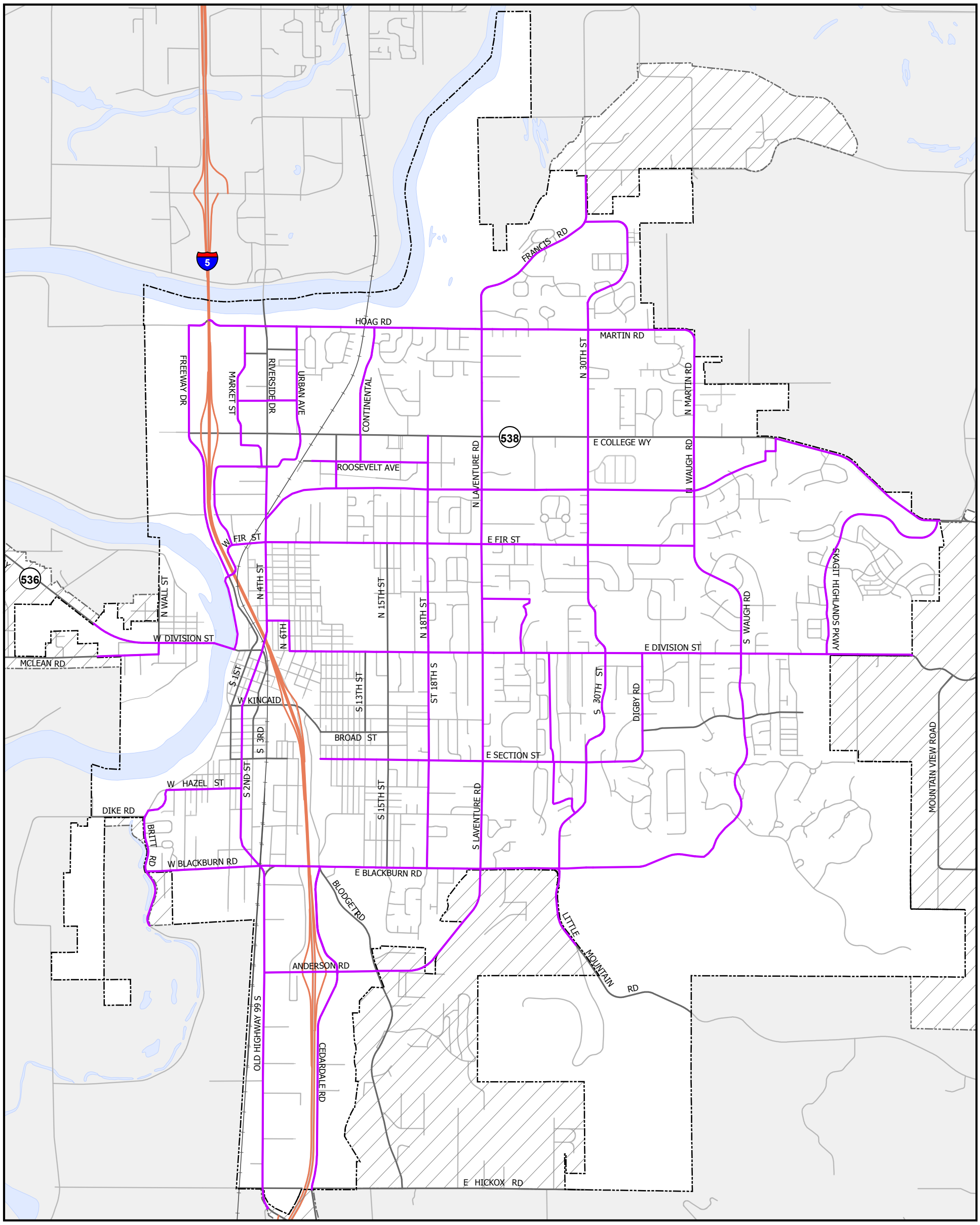
Marked Bike Lane
Striped Shoulder > 3' Wide, No Parking
Shared Roadway > 14' Wide
Multi-use Trail or Pathway
Arterial Street
Other Street
Railroad
City Boundary
Urban Growth Area
Water Body

N

0 0.5 1
Miles

Map by MV GIS 7/5/2016

Transportation Element - Figure 3.6b Planned Bicycle Routes



[redacted]

- Planned Bicycle Route
- Arterial Street
- Other Street
- Railroad
- City Boundary
- Urban Growth Area
- Water Body

N

0 0.5 1

Miles

Map by MV GIS 7/5/2016

4.0

WHAT HAPPENS WITH 20-YEARS OF GROWTH?

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TRANSPORTATION GOAL 1:

Contribute to a well-designed transportation system through reasonable, planned, economically feasible transportation improvements that support adopted land use plans, protect or improve business access, and protect the City's neighborhoods.

Determining what happens to the City's transportation infrastructure over the next 20 years as the City grows, and what improvements need to be made to this system to mitigate this growth, is done with transportation modeling.

As with any type of modeling, it is important to keep in mind that all transportation models are essentially an extrapolation of known and observed trends into the future. Several assumptions are built into these models including future land use, employment and transportation trends.

To make sure that the City's model is as accurate as possible, the City keeps its transportation model current by importing data into the model several times a year as permits are processed by the City. The City also regularly collects vehicle traffic counts within specified areas of the City.

The City's transportation model provides a systematic analytical tool that allows the City to evaluate different alternatives in an iterative and controlled way. There are three (3) major steps of the transportation model, including:

1. Future Traffic Trips, or Trip Generation;
2. Trip Distribution (where trips are going to/from); and,
3. Network Assignment (how trips find a route to/from their origin and destination) – where are trips going to/from.

Each of these steps is elaborated on in the following sections.

Once the transportation model is created the City then establishes criteria to evaluate how the transportation system is serving those traveling into, out of, or through the City. The tools used to determine the operating quality of roadways, intersections, and non-motorized facilities is a system of adopted Level of Service (LOS) designations.

4.1 DETERMINING FUTURE TRAFFIC TRIPS

Determining the number of trips that will occur over the planning horizon (20 years) is the first step in the transportation modeling process. Because the accuracy of a transportation planning model depends largely on the quality of the land use data used in the model, the City has invested heavily in terms of research and staff time in ensuring that the land use data in the model is as accurate as possible.

The land use data described below demonstrates internal consistency with the requirements and assumptions used throughout other chapters of the City's Comprehensive Plan. The growth projections discussed below are based on the City's 2036 growth targets for population and employment which were developed by Skagit Council of Governments (SCOG), BERK Consulting, the City of Mount Vernon, and the other jurisdictions within Skagit County.

Capturing regional growth patterns is an important component in determining future trip generation because travel does not stop at a jurisdiction's boundary. Modeling these regional growth patterns is accomplished with the City's coordination and planning efforts with the Washington State Department of Transportation (WSDOT) and Skagit Council of Governments (SCOG) who is Skagit County's MPO and RPTO.

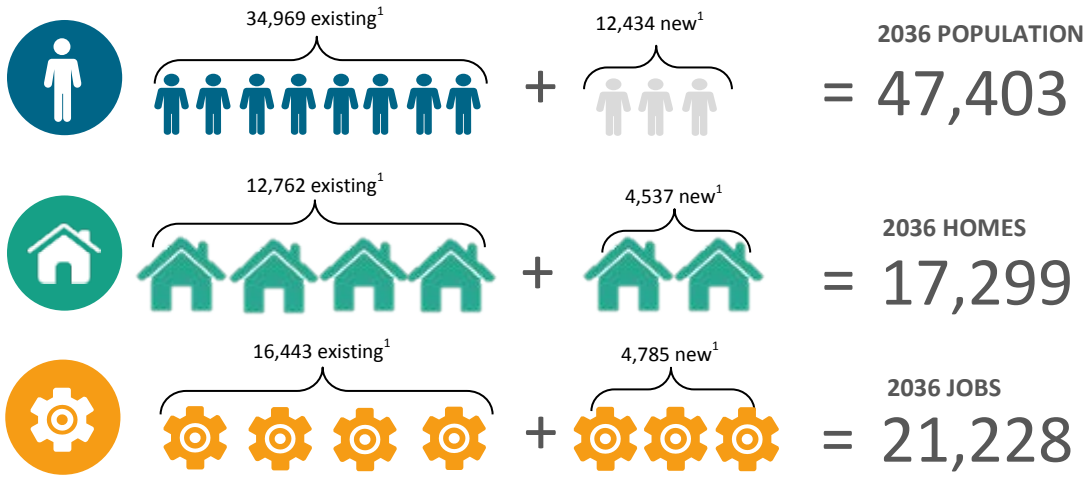
Translating future land uses into traffic trips begins by categorizing land uses into two very general categories: households and employment.

Modeled employment was grouped into different employment categories consistent with those used in the SCOG regional transportation model. Detailed information on the employment sector, employment code associations and distributions can be found in Appendix B.

HOUSEHOLD (POPULATION) GROWTH: Residential land use forecasts are often expressed in terms of population; however, for travel demand modeling population is converted into trip-generating households as shown in Table 4.0 below. The ratio of people per household used below is from the 2010 Census for the City.

EMPLOYMENT (JOB) GROWTH: Existing employment estimates are based on data provided by the Washington State Employment Security Division (ESD). With the information from ESD the City was able to determine City specific employment averages for different job creating land uses within the City. These City specific employment averages, in conjunction with the City's Buildable Lands data, was used to determine how jobs would be distributed throughout the City over the next 20 years.

TABLE 4.0: EXISTING AND FUTURE POPULATION, HOUSING, AND JOBS



4.2 TRIP DISTRIBUTION, MODES AND NETWORK ASSIGNMENTS

After the number of trips that will occur over the planning horizon (20 years) is determined, the next step in the model process is distributing those trips. Spatial units called Transportation Analysis Zones (TAZs) are used to geographically assign land uses in and around Mount Vernon.

The TAZs that are part of the City's traffic model are consistent with the structure developed by SCOG for the regional planning model and are shown on Map 4.0. A total of 91 internal TAZs are used to represent the City and its associated Urban Growth Areas (UGAs).

Each TAZ was assigned a20-year growth estimate, expressed in (total) households and employment (by type). With this information the fundamental task a TAZ performs in the model is to generate vehicle trip ends to and from the TAZ. The land use data relevant to a TAZ determines the number of trips that a TAZ either produces or attracts from all other TAZ's in the model.

Assigning growth to each TAZ was done by City staff based on a City-specific Buildable Lands and Land Capacity Analysis, employment densities by sector calculated from Employment Security Data (ESD) data, adopted plans, local knowledge of pending development and thorough collaboration with the Traffic Engineers assisting the City with this element of the Comprehensive Plan.

In addition to the 91 TAZs that comprise the City and its UGAs, there are an additional 7 external zones surrounding the City-specific modeled areas. These external zones are designed to incorporate trips that are generated to and/or from points outside the network and help to ensure that the City's model takes into account regional traffic that impacts City's transportation networks. Although these are designated as zones, they actually represent links to regions outside the model and do not represent a defined area.

External zones do not reflect any land use assumptions, only vehicle trips. Trips to and from each external zone were determined from actual traffic counts and future trips were forecasted to be consistent with volume forecasts identified in the SCOG regional travel demand model. These external zones play a two-part role in the model; 1) only a certain portion of the trips in an external zone interact with TAZ's within the model, and 2) the remainder of the trips in any external zone interact with other external zones outlying the study area. These trips are commonly called through trips since they have neither an origin nor destination within the study area yet they pass through the study area impacting the network.

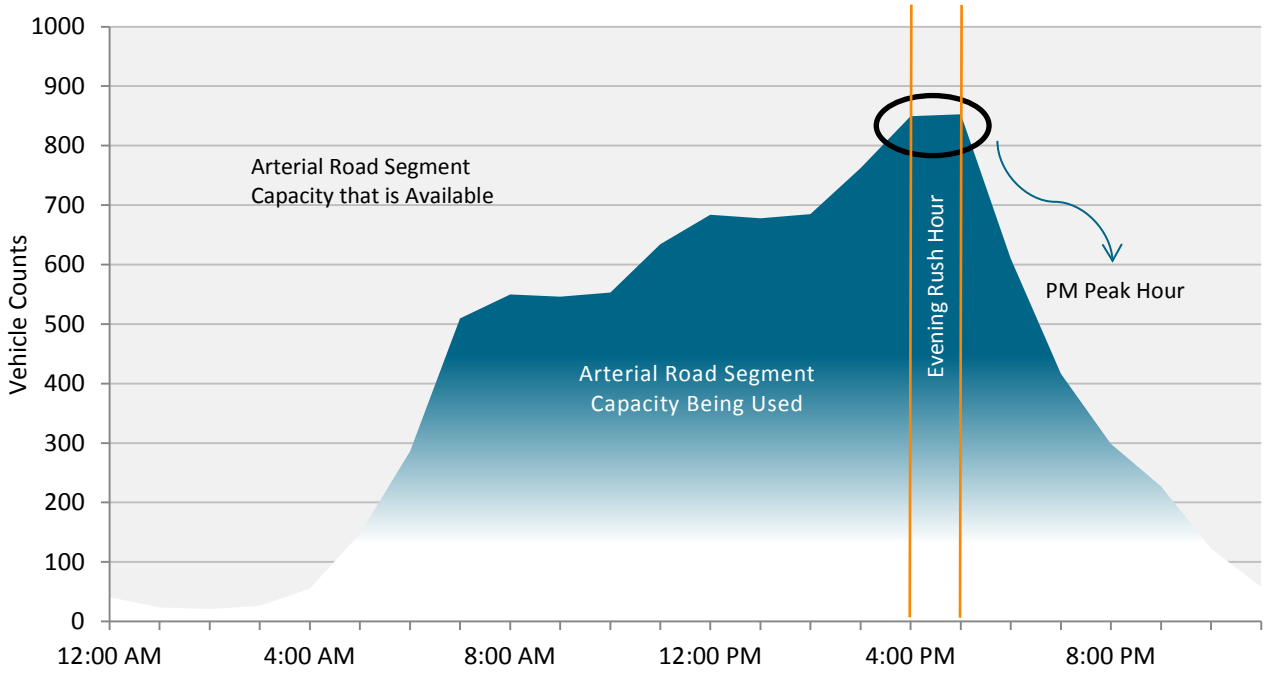
Using established relationships between different land use types and trip generation, the traffic model estimates trips generated from each TAZ. These trips are then assigned to the roadway network to estimate how much traffic would be on each street during the City's evening rush hour, which is generally between 4 p.m. and 6 p.m. This evening rush hour is called the 'PM peak hour'. Below is an illustration of average PM peak hour volumes for an average of several City arterials with heavier travel demand.

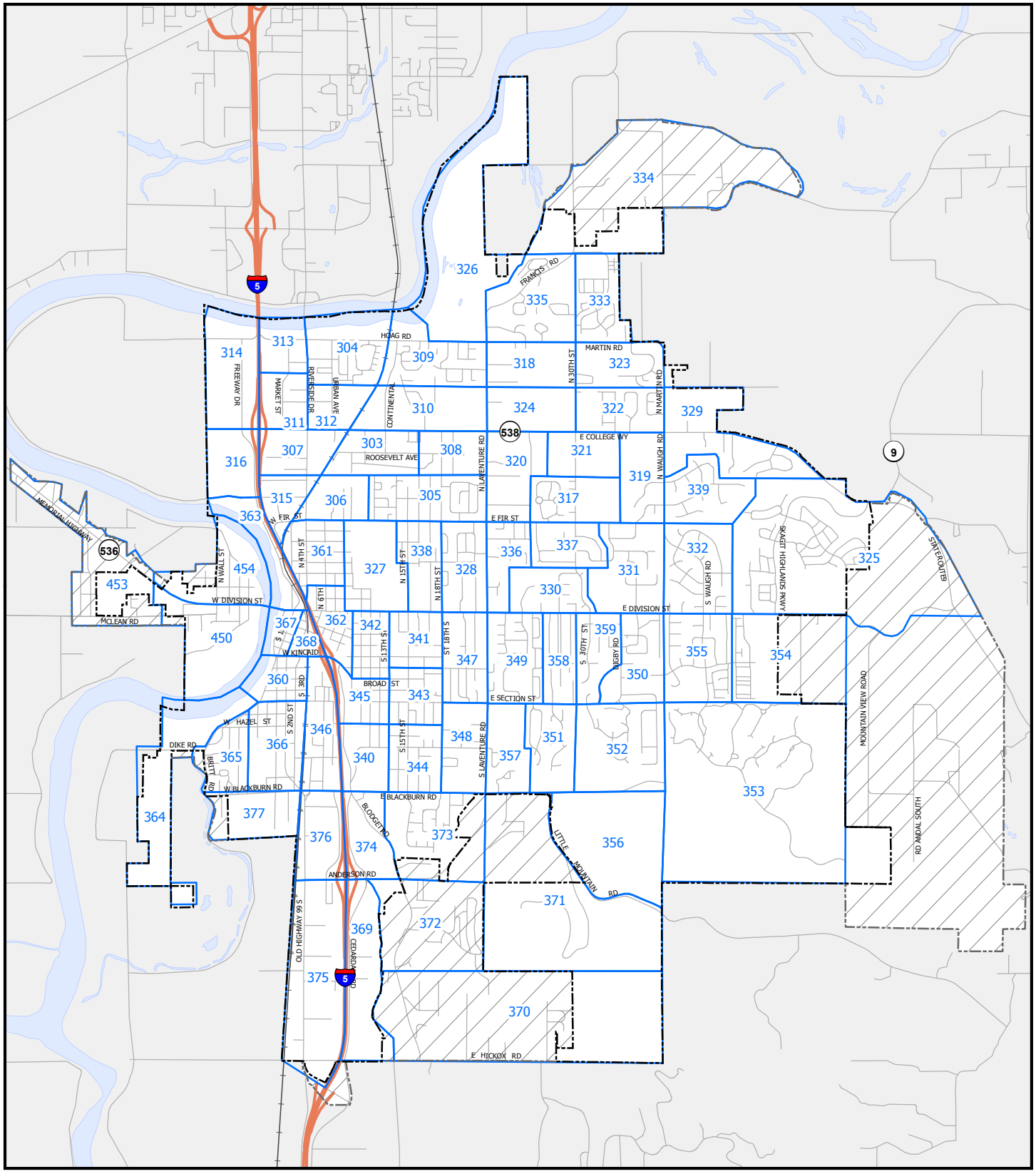
PM PEAK HOUR TRIPS

The PM peak hour discussed above and illustrated in Graph 4.1 is used to measure level-of-service (LOS) because, as it represents the time in which the heaviest travel occurs on City streets and intersections, it is the timeframe when LOS is most likely to deteriorate or fail.

When new development (residential, commercial, public, or other) proposes to locate in the City, a site-specific traffic report measuring, among other things, the new traffic in terms of new PM peak hour trips is generated.

GRAPH 4.1: HOW LOS IS MEASURED





Transportation Element - Figure 4.0 Transportation Analysis Zones

[redacted]

Transportation Analysis Zone (TAZ)
City Boundary
UGA Boundary
Railroad
Street
Water Body

N

0 0.25 0.5
Miles

Map by MV GIS 2/29/2016

4.3 SETTING LEVELS OF SERVICE

Setting LOS standards for the City is an important policy issue. If the City's LOS standards are too high there would be budgetary implications and setting them too low results in unacceptable service levels and reduced livability.

The City has adopted three (3) different types of level of service (LOS) standards. In addition to street segment and intersection LOS – which have been used by decades by many jurisdictions, the City has also adopted a LOS aimed to reduce vehicle miles traveled. Each of these LOS standards is described in greater detail below.

Setting LOS standards for the City is an important policy issue. If the City's LOS standards are too high there would be budgetary implications, however setting them too low results in unacceptable service levels and reduced livability. The City's LOS standards strive to strike a balanced standard that is not too high or too low.

Level of service standards for state facilities that are not Highways of Statewide Significance are cooperatively set by the Washington State Department of Transportation (WSDOT) and Skagit Council of Governments (SCOG) and are not subject to the City's concurrency standards. Even so, the City does monitor these highways and coordinates with WSDOT to address deficiencies that are identified.

STREET SEGMENT LOS

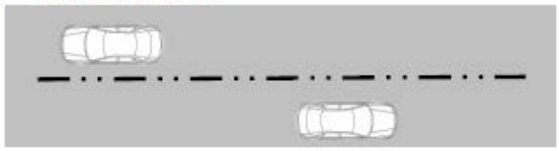
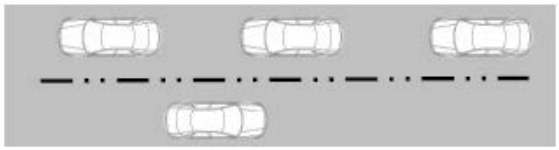
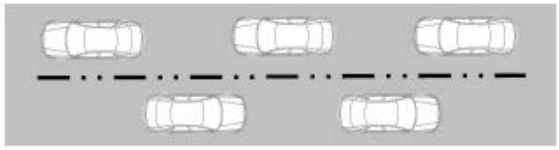
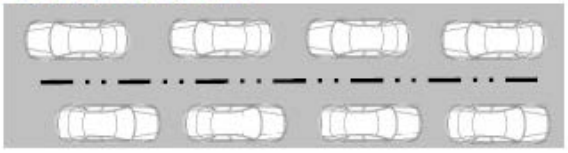
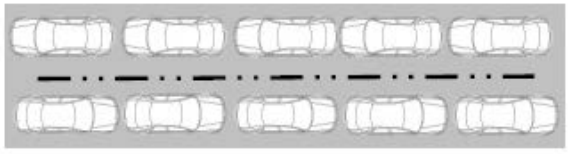
Street segment LOS is a qualitative measure describing operational conditions within a traffic stream along a roadway, based on service measures such as capacity, speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. LOS standards allow the City to evaluate transportation impacts from growth over time.

This LOS is categorized by six (6) different grades, A through F. LOS A represents free flow conditions with minimal delays and LOS F represents breakdown flow with high delays. The LOS thresholds that the City uses are consistent with Highway Capacity Manual 1994 (HCMI 1994) and are used because they are best suited for the type of planning-level analysis necessary for Comprehensive Planning.

TABLE 4.2: ROAD SEGMENT LOS STANDARDS

	MOUNT VERNON STANDARD	WSDOT STANDARD
Principal Arterials	LOS D or better	NA
Minor Arterials	LOS D or better	NA
Urban Collectors	LOS C or better	NA
State Routes (Highways of Statewide or Regional Significance in Urban areas)	Not Subject to City LOS Standards	LOS D or better

TABLE 4.3: LEVEL OF SERVICE DESCRIPTIONS FOR STREET SEGMENTS

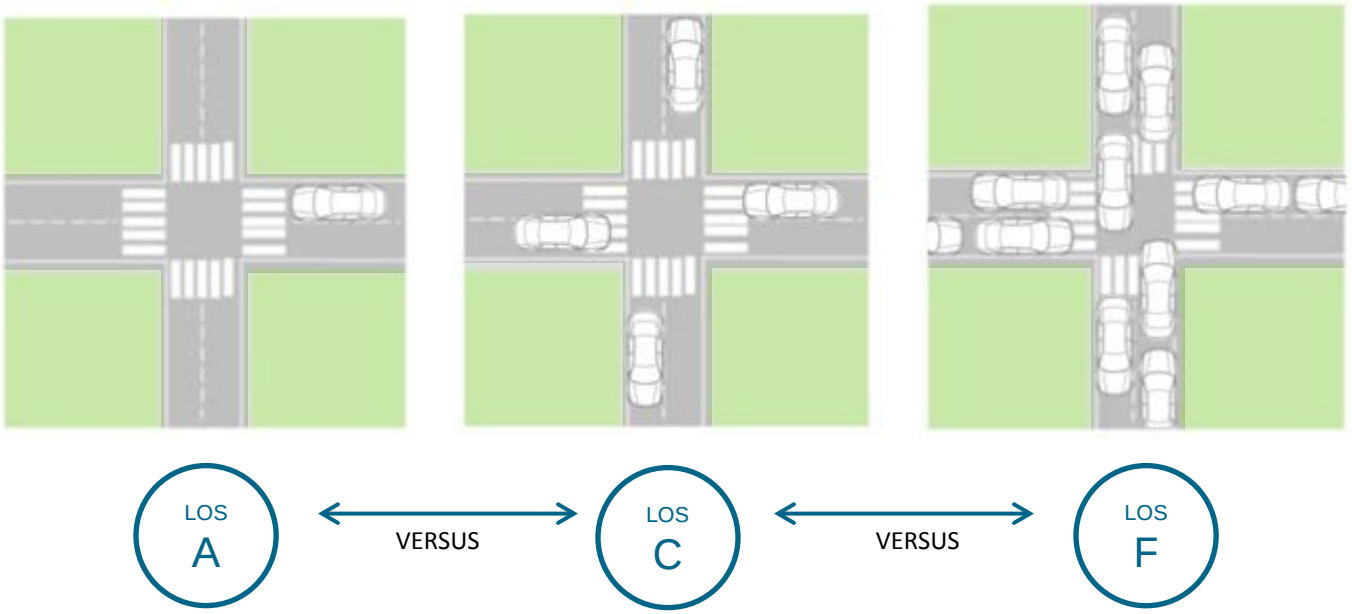
LEVEL OF SERVICE (LOS)	DESCRIPTION (CHARACTERISTICS OF TRAFFIC FLOW)
A – FREE FLOW 	**LOS A** is the highest quality of service a particular class of roadway can provide. It describes primarily free-flow operations at average travel speeds, usually about 90 percent of the free low speed for the given street class. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. The volume to capacity ratio (v/c) ranges from 0.00 to 0.60.
B – STABLE FLOW 	**LOS B** is a zone of stable flow: It describes reasonably unimpeded operations at average travel speeds, usually about 70 percent of the free flow speed for the street class. The ability to maneuver within the traffic stream is only slightly restricted. The v/c ranges from 0.61 to 0.70.
C – STABLE FLOW 	**LOS C** is a zone of stable flow but at this volume and density level most drivers are becoming restricted in their freedom to select speed, to maneuver and change lanes in mid-block locations, and heavier volumes, longer queues, and adverse signal coordination may contribute to lower average travel speeds for the street class. The v/c ranges from 0.71 to 0.80.
D – STABLE FLOW 	**LOS D** borders on a range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D approaches unstable flow. Tolerable average operating speeds are maintained but are subject to a considerable and sudden variation. The v/c ranges from 0.81 to 0.90.
E – UNSTABLE FLOW 	**LOS E** is characterized by unstable flow, high traffic volumes, significant delays and average travel speeds significantly less than the free flow speed. The v/c ranges from 0.91 to 1.00
F – FORCED FLOW 	**LOS F** is characterized by urban street flow at extremely low speeds. This LOS describes forced-flow operations. Speed and rate of flow are below the levels attained in LOS E and may for short time periods drop to zero. The v/c exceeds 1.0 (i.e. the traffic volumes exceed the roadway capacity).

INTERSECTION LOS

LOS for signalized and all-way stop stop-controlled intersections is determined by the average amount of delay that vehicles experience at the intersection, and on the worst approach for one- or two-way stop controlled intersections. Table 4.2 lists the LOS standards for road segments that also apply to intersections. Table 4.4 lists each LOS designation and its associated delay threshold. Following is general characterizations of LOS for intersections.

TABLE 4.4: LEVEL OF SERVICE DESCRIPTIONS FOR INTERSECTIONS

LOS DESIGNATIONS	SIGNALIZED INTERSECTIONS	STOP CONTROLLED INTERSECTIONS
A	≤ 10 seconds	≤ 10 seconds
B	> 10 to 20 seconds	> 10 to 15 seconds
C	> 20 to 35 seconds	> 15 to 25 seconds
D	> 35 to 55 seconds	> 25 to 35 seconds
E	> 55 to 80 seconds	> 35 to 50 seconds
F	> 80 seconds	> 50 seconds


LOS
A
VERSUS
LOS
C
VERSUS
LOS
F

REDUCTION IN VEHICLE MILES TRAVELED LOS

Traffic planners and engineers have used LOS models to analyze motor vehicle travel on roads and through intersections for many decades. These traditional models – that the City also uses - are based on quantitative measures including variables such as average speed, travel time, and intersection delay. However, traditional LOS models don't capture reductions vehicle miles traveled (VMT), or conversely increases in non-motorized travel.

New streets that complete the transportation network create a more efficient transportation system for both motorized and non-motorized travel by reducing travel distance and travel time. They often have the secondary benefit of reducing congestion on routes from which they divert travel demand, as well as reducing vehicle emissions which are associated with increased VMT.

While traditional congestion-based LOS standards can be effective tools for quantifying the operational characteristics of (and identifying necessary improvements to) existing streets and intersections in a transportation network, they are less effective in identifying areas in which a street network fails to serve travelers by nature of its incompleteness, i.e. its inability to connect people efficiently from their desired origin to destination. Put more simply, traditional HCM-based methodologies are not designed to identify LOS failures on roads that do not exist.

Vehicle Miles Traveled (VMT) offers one metric by which the benefit of a new element of a transportation network can be quantified. For example, if a segment of a street is missing and this missing link requires drivers to take a longer path, total travel distance is increased resulting in greater vehicle miles traveled.

Missing street segments create out-of-direction travel, that is, trips that must use routes that that increase the length of a trip when compared to the length of the trip if the missing street segment were in place. Development that results in out-of-direction travel should be conditioned to the provision of the planned street segments necessary to reduce out-of-direction travel.

The creation of this LOS criteria is supported by a 2005 amendment to the Growth Management statute (RCW 36.70A.070) that states that a new 'sub-element' of the transportation element with regard to pedestrian and bicycle travel must be created. This new sub-element is required to include, "collaborative efforts to identify and designate planned improvement for pedestrian and bicycle facilities and corridors that address and encourage enhanced community access and promote healthy lifestyles" (RCW 36.70A.070(6)(a)(vii).

TABLE 4.5: LOS DESCRIPTIONS FOR VEHICLE MILES TRAVELED

LOS DESIGNATIONS	VMT METRICS
PASS	Less than 25% of site generated travel is out-of-direction
FAIL	More than 25% of site generated travel is out-of-direction

4.4 MEASURING FUTURE LOS DEFICIENCIES

As described above, there are three (3) LOS measures that the City uses to determine which road segments and intersections have acceptable or failing LOS. A summary of the point at which each of these LOS measures is not meeting the standards and needs to be mitigated is provided below.

With the LOS standards that are summarized in Table 4.6, the City is able to determine the existing LOS for City arterials and intersections and to model how this LOS will be affected with the next 20 years of growth. Once the existing and future LOS failures are known, appropriate mitigation measures can be proposed that will change the LOS such that a given road or intersection is in compliance with the adopted standard.

TABLE 4.6 SUMARY OF ADOPTED LOS STANDARDS

LOS PRINCIPAL ARTERIALS	LOS MINOR ARTERIALS	LOS URBAN COLLECTORS	LOS INTERSECTIONS	LOS VEHICLE MILES TRAVELED
D	D	C	C or D (dependent on road type at intersection)	PASS

4.5 MITIGATING CITY-WIDE TRANSPORTATION DEFICIENCIES

There are a number of metrics that the City uses to prioritize and fund transportation related projects – with LOS deficiencies being just part of the overall decision making process. Other metrics include completing maintenance activities, non-motorized connections to create safe routes for children and others to schools and other types of land uses, installing safety related infrastructure, enhancing opportunities for new businesses to locate or expand, and others.

Table 4.7 and Maps 4.1, 4.2 and 4.3 list and map projects that the City has identified up to year-end 2015 to mitigate identified transportation deficiencies. These projects comprise the City's Comprehensive Plan Transportation Improvement list.

Current Capital Improvements Plan (CIP) projects, projects that are part of SCOG's Regional Transportation Plan (RTP), and projects that are eligible for impact fees are all identified on Table 4.7.

4.6
ROAD MAINTENANCE

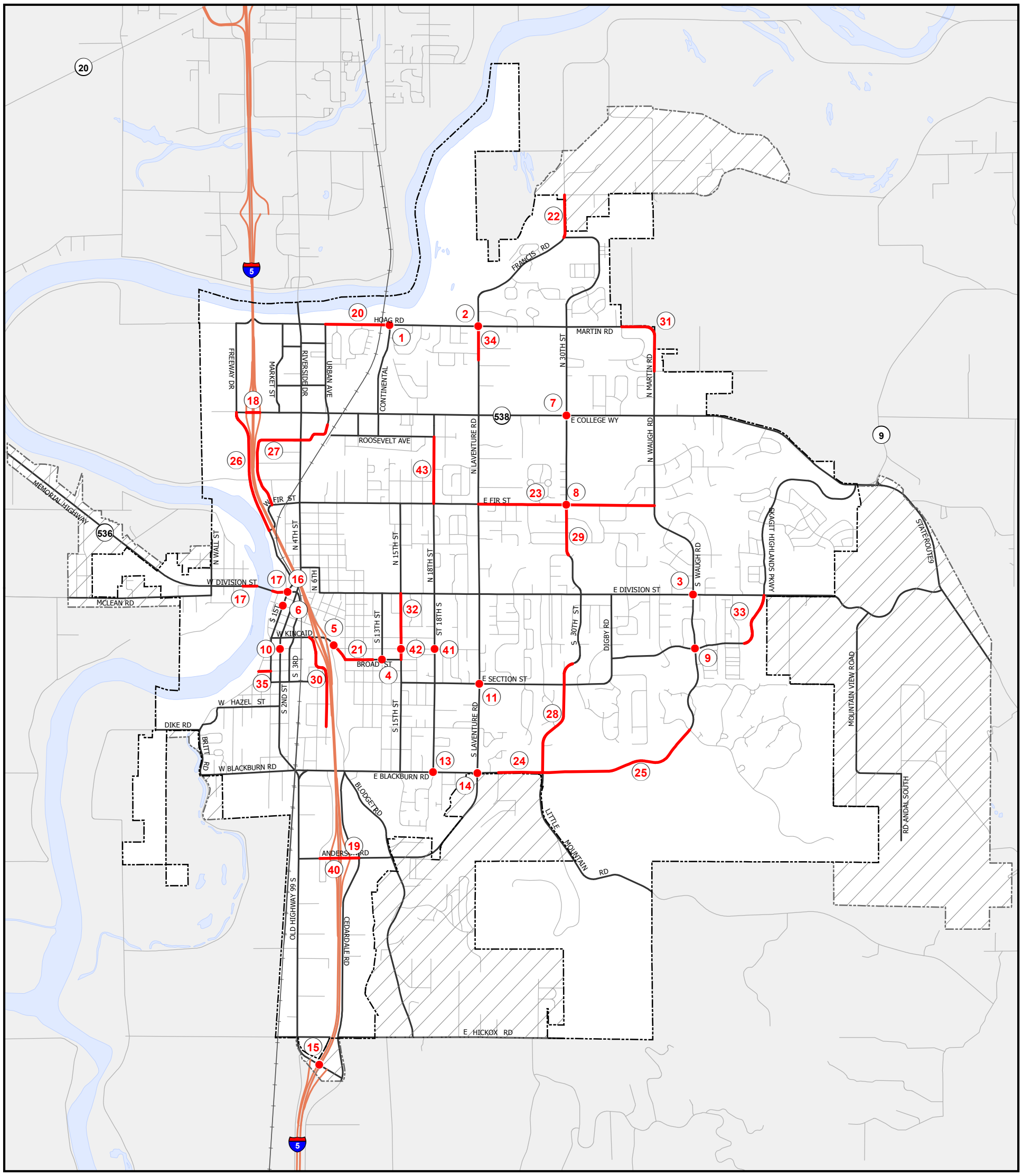
The maintenance and repair of the City's transportation network is a vital function of the Public Works Department. The City has 274 lane miles of streets (including non-arterial streets), 31 traffic signals, 12 bridges, 5,000 traffic signs, 2,500 pavement markings and 150 miles of sidewalks that are maintained.

The City's Public Works Department keeps an inventory of the condition of public streets and has expressed concerns with regard to the long-term effect of deferring maintenance. Table 4.7, the 20-year Transportation Project list, does account for the long term cost of needed road maintenance in the City.

TABLE 4.7

Comp. #	Improvement	Existing Condition or Facility or Project Limits	Details	CIP #	Cost	Transportation Impact Fee Eligible?**	ADD. INFO.
1	Continental Pl & Hoag Rd	Two-Way Stop Controlled Intersection	Add TWLTL to Hoag	NA	$750,000.00	NO	
2	N Laventure Rd & Hoag Rd	All-Way Stop Controlled Intersection	New Roundabout or Signal	T-06-05	$700,000.00	YES	
3	Waugh Rd & E Division St	All-Way Stop Controlled Intersection	New roundabout or Signal	T-07-05	$600,000.00	YES	
4	S 13th St & Broad St	Two-Way Stop Controlled Intersection	Right-in right-out channelization	NA	$300,000.00	NO	
5	Blodgett Rd & Broad St	Two-Way Stop Controlled Intersection	Add 2 lanes and rechannelize to add LTLs	NA	$300,000.00	NO	
6	S 1st St & W Montgomery St	Two-Way Stop Controlled Intersection	New all-way stop	NA	$100,000.00	YES	
7	30th St & E College Way	Two-Way Stop Controlled Intersection	New Signal	T-07-04	$700,000.00	YES	
8	N 30th St & E Fir St	Two-Way Stop Controlled Intersection	Add TWLTL to Fir	NA	$500,000.00	NO	
9	S Waugh Rd & E Broadway	Two-Way Stop Controlled Intersection	New roundabout or Signal	NA	$700,000.00	YES	
10	S 2nd St & Broadway	Two-Way Stop Controlled Intersection	New all-way stop	NA	$100,000.00	YES	
11	LaVenture & Section	All-Way Stop Controlled Intersection	New Roundabout or Signal	T-07-07	$339,000.00	YES	
12	Signal Maintenance Program	Signals	Maintenance on Existing Signals	T-07-02	$891,000.00	NO	6-year CIP $270,000.00 x 3.3 for 20-year projection
13	18th and Blackburn	All-Way Stop Controlled Intersection	New Roundabout or Signal	T-07-06	$700,000.00	NO	
14	LaVenture & Blackburn	All-Way Stop Controlled Intersection	New Roundabout or Signal	T-13-01	$700,000.00	YES	
15	Hickox & I-5	No intersection controls existing	New Interchange	T-05-09	$5,000,000.00	NO	
16	1st & Division & Freeway Drive	All-Way Stop Controlled Intersection	Intersection Realignment	T-09-01	$3,000,000.00	YES	
17	Division Street	Freeway Drive to Ball	Capacity and Rechannilization	NA	$5,000,000.00	NO	
18	College Way	Market to Freeway Drive	Add 2 lanes and rechannelize to add LTLs	T-06-10	$6,233,000.00	YES	
19	Anderson Road	I-5 NB on/off ramp to Cedardale Road	Rechannelize and Add Sidewalks	NA	$1,000,000.00	YES	
20	Hoag Road	Urban to Continental	Add lane width, rechannelize, and add sidewalks on north	NA	$4,000,000.00	YES	
21	Broad Street	Blodgett to 15th	Access Management/right-in right-out	Part T-03-02	$2,550,000.00	YES	
22	Francis Road	30th to Swan	Add lane width, rechannelize, and add sidewalks	NA	$700,000.00	YES	
23	Fir Street	LaVenture to Waugh	Add lane width, rechannelize and add sidewalks	T-94-14	$1,200,000.00	NO	
24	Blackburn Road	Cedar Hills to Little Mountain	Add lane width, rechannelize and add sidewalks	T-94-19	$1,700,000.00	YES	
25	Blackburn Road	Little Mountain to Eaglemont	New Road Connection and lane width, rechannelization and sidewalks on portions	T-94-21	$2,400,000.00	YES	
26	Freeway Drive	Cameron Way to College Way	Rechannelize	T-97-07	$3,000,000.00	NO	
27	Roosevelt Ave	Riverside Drive west to I-5, then south to Fir Street	New Road Connection	T-02-04	$11,100,000.00	NO	
28	30th Street	Blackburn to the plat of East Gate South	New Road Connection	T-02-06	$1,300,000.00	YES	
29	30th Street	Between Fir and the vicinity of the Manito Plat	New Road Connection and lane width, rechannelization and sidewalks on portions	Part of T-02-24	$3,800,000.00	YES	Changed this item to include approx. 1,900 l.f. of new road connection - stream/wetland issues
30	I-5/SR-536	SR-536 to the south	New Frontage Road & I-5 on-ramp Construction	T-06-11	$20,000,000.00	NO	
31	Martin Road	College to 34th Place	Rechannelization & Pedestrian Facilities	T-05-02	$2,000,000.00	NO	
32	15th Street	Broad to Division	Capacity Improvements	T-06-04	$1,500,000.00	YES	
33	Broadway turns into South 48th Street	Dallas Street east, then north to Division	New Road Connection	T-06-06	$1,157,000.00	YES	
34	LaVenture Road	Hoag to 1000' south of Hoag	Rechannelization & Pedestrian Facilities	T-06-07	$550,000.00	NO	
35	Milwaukee	1st 300 feet east	Truck Route Improvements	T-07-03	$50,000.00	NO	
36	Sidewalk Gaps	Citywide	Sidewalk Construciton	T-08-01	$5,000,000.00	NO	Estimated $250,000.00/year x 20
37	ADA Sidewalk Transitions	City wide	Sidewalk Transitions	T-16-01	$5,000,000.00	NO	Estimated $250,000.00/year x 20
38	Street Improvements & Maintenance	Citywide	Currently paid for by MVFT, Reet I and II, & Property Taxes	T-00-02	$13,000,000.00	NO	$500,000.00 for 2016 x $650,000.00 for remaining 19 years
39	LED Street Lights	Citywide	New LED light installation	T-15-01	$1,088,000.00	NO	6-year CIP $544,000.00 x 2 as LEDs need to be replaced approx. 1x every 20 years
40	Anderson Road Bridge and Approaches	Henson Road and Approaches	Interchange improvements including the addition of sidewalks	NA	$20,000,000.00	YES	
41	S 18th Street & East Broadway	Two-Way Stop Controlled Intersection	Add both east and west bound left-turn lanes	NA	$500,000.00	YES	
42	S 15th Street & East Broadway	Two-Way Stop Controlled Intersection	Widen Broadway to a 3-lane section	NA	$500,000.00	YES	
43	18th Street	Between Fir Street and Roosevelt Ave.	Complete bike lane	NA	$250,000.00	YES	
44	Division Street Bridge Replacement Study	Division Street Bridge and Approaches	Study to evaluate the feasibility/cost of replacing the Division Street Bridge and mitigation required to the bridge approaches to imporove the LOS.	NA	$500,000.00	NO	
45	Bike Lane on Old Highway 99 South	Blackburn to just south of East Hickox Road	New Bike Lane Added/Striped	NA	$350,000.00	YES	
2016 to 2036 Projects:					**$130,808,000.00**		
Beyond 2036 Projects:							
60	Hickox Road	Pamela Street NE to Little Mountain Road	New Road Connection	NA	$14,800,000.00	NA	
61	Replacement of the Division Street Bridge	Division Street/SR 536 over the Skagit River	Replacement of WSDOT's existing bridge	NA	$20,000,000.00	NA	
62	College Way Railroad Grade Separation	Urban to Leigh Way	Grade separated crossing over/under BNSF railroad line	NA	$22,700,000.00	NA	
63	East College Way Widening	Waugh to Skagit Highlands Parkway	Widen SR 538 (College Way) from 2 to 4 travel lanes	NA	$6,900,000.00	NA	
Total Beyond 2036 Projects:					**$64,400,000.00**		
Trail Construction Projects within Parks/Rec Plan							
80	Fowler Trail Connection	Blackburn north and west to LaVenture	New Trail Connection	T-02-10	$200,000.00	NA	
81	30th Street Pathway South	Blackburn 750 feet north	New Trail Connection	T-02-13	$150,000.00	NA	
82	River Dike Trail System	West side of the Skagit River	New Trail	T-02-17	$500,000.00	NA	
83	Kulshan Trail Extension	Waugh Road NE to College Way along abandoned RR grade	New Trail Connection	NA	$700,000.00	NA	
Total 2016 to 2036 Trail Projects:					**$1,550,000.00**		
					$130,808,000.00		

** Projects that are necessary to maintain City and State concurrency standards are identified as eligible for transportation impact fee fur



Transportation Element - Figure 4.1
Transportation Improvements to Mitigate Identified Deficiencies 2016-2036

[redacted]

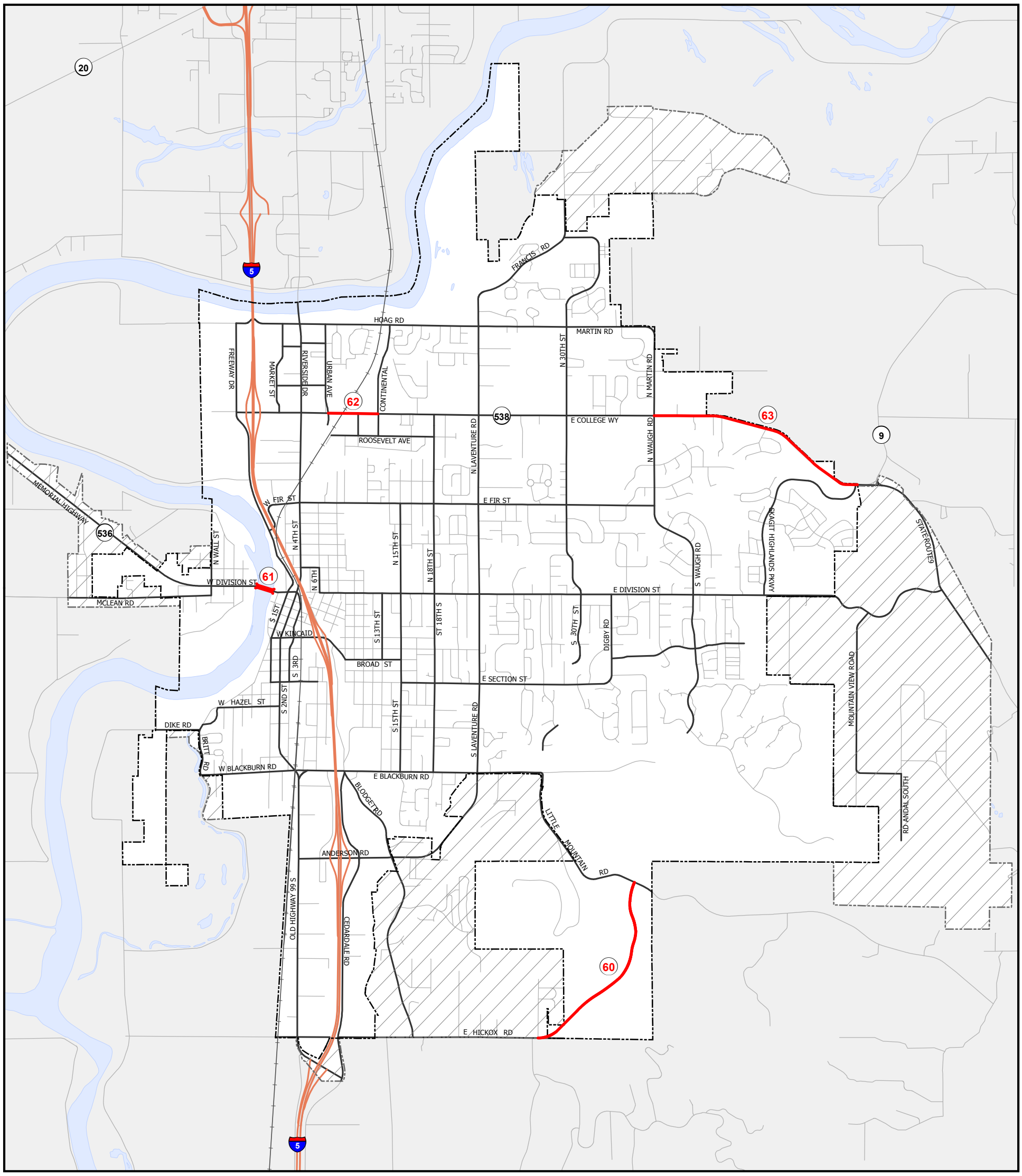
Project Location
Project Location

Arterial Street
Other Street
Railroad
City Boundary
Urban Growth Area
Water Body

N

0 0.5 1
Miles

Map by MV GIS 6/15/2016



Transportation Element - Figure 4.2
Transportation Improvements to Mitigate Identified Deficiencies Beyond 2036

[redacted]

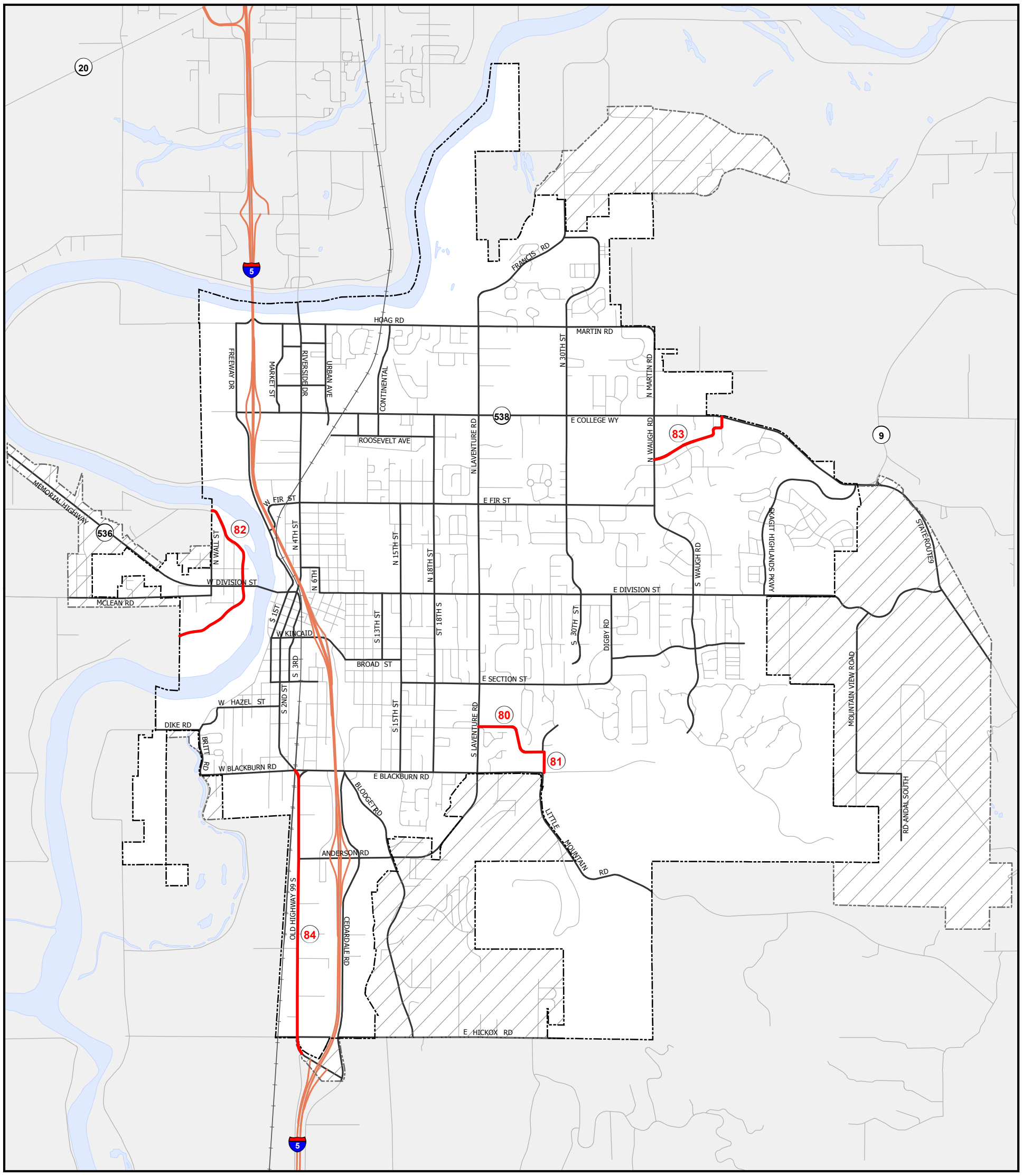
Project Location

Arterial Street
Other Street
Railroad
City Boundary
Urban Growth Area
Water Body

N

0 0.5 1
Miles

Map by MV GIS 6/15/2016



Transportation Element - Figure 4.3
Transportation Improvements to Mitigate Identified Deficiencies 2016-2036, Non-Motorized Improvements

[redacted]

- Project Location
- Arterial Street
- Other Street
- Railroad
- City Boundary
- Urban Growth Area
- Water Body

N

0 0.5 1
Miles

Map by MV GIS 6/15/2016

5.0

FINANCIAL PLAN: MITIGATING IMPACTS OF FUTURE GROWTH

Ensuring that there are funding mechanisms in place to pay for the transportation infrastructure necessary to maintain the City's adopted levels-of-service over the 20-year planning horizon is a key aspect to this element of the Comprehensive Plan.

This financial plan provides the City with assurances that most of the needed arterial roadway infrastructure can be paid for over the 20-year planning horizon.

However, this plan also alerts the City to the fact that contingency measures need to be in-place and vetted should a revenue shortfall become a reality over the next 20 years.

This financial plan includes four (4) main elements:

1. 20-year transportation expenses;
2. 20-year transportation revenues;
3. Comparing transportation expenses and revenues; and,
4. Contingency measures.

5.1 TRANSPORTATION EXPENSES

Table 4.7 is a list of all the transportation projects that have been identified through the transportation modeling process detailed in previous sections of this element with existing or future LOS deficiencies; and through the City's existing 6-year Capital Facilities Plan.

In 2016 dollars the 45 projects identified as being needed over the 20-year planning horizon total a little over **$130 million**.

Cost estimates for the transportation projects listed in Table 4.7 were prepared (1) based on an engineer's estimate (when available); (2) by taking historic costs and projecting them forward; or (3) by taking average costs of both public and private transportation projects from nearby areas and applying these costs to future projects.

Transportation expenses for this financial plan are limited to those that are anticipated within the next 20 years. However, there are several projects that are listed in Table 4.7 that the City expects to be constructed beyond the 20-year planning horizon. These projects, although not required to be listed, are because it is important that policy makers are aware of the significant, very expensive, projects that will be needed beyond 2036.

5.2 TRANSPORTATION REVENUE

The forecast of anticipated revenues is based on the City's past history, ability to obtain state, federal, and local grants, and the amount of local revenue available from the gas tax, sales tax, and other sources; with the major revenue sources generally described below.

TRAFFIC IMPACT FEES – Impact fees are paid by developers to mitigate the impacts on the City's transportation system attributed to their specific project(s).

Of the 44 projects listed in Table 4.7 that are expected to be constructed over the next 20 years over one-half have level-of-service deficiencies directly correlated to trips from new growth expected over the planning horizon. As such, these projects will be the basis of the traffic impact fee calculation.

The City's traffic impact fee program is administered through the provisions of Mount Vernon Municipal Code Chapter 3.40. The City estimates that approximately $30 to 35 million in traffic impact fees will be collected by the City over the 20-year planning horizon.

GRANTS – Federal, State and local grants are obtained by the City through different competitive application processes. Various grant programs fund specific types of projects such as: capacity, congestion relief, safety, mobility, sidewalks and/or bicycle routes. Mount Vernon has been successful in the past in obtaining a variety of different types of grants.

For forecasting purposes, an analysis of transportation projects funded by Federal, State, local, and other sources between 1997 and 2014 was completed.

From this analysis the City estimates that approximately $65 to $70 million in Federal, State, and local grants are anticipated to be received by the City for transportation projects over the 20-year planning horizon.

CITY UTILITY FUNDS – Most transportation projects include underground utility installation and/or upgrades of sanitary and storm sewers. Since these utilities are, for the most part, owned and maintained by the City, funds from these utilities are, when feasible, used to fund this component of a transportation project.

Using the same methodology described above under the 'Grants' sub-section the City estimates that approximately $3 million in utility funds are anticipated to be used for transportation projects over the 20-year planning horizon.

CITY FUNDS - Local taxes are allocated to transportation improvements by the City Council during their annual budget. The three (3) primary sources of these revenues include:

- Motor Vehicle Fuel Tax (MVFT)
- Real Estate Excise Tax (REET)
- City Property/Sales Tax Funds

RCW 82.46.010 and .035 allows cities to collect a 0.25% tax on the first quarter percent of real estate excise tax (REET I) and a second 0.25% on all sales of real estate (REET II). All REET funds are required to be used for capital projects.

The City estimates that approximately $16 million in MVFT, REET and other City funds will be available for transportation projects over the 20-year planning horizon.

At the discretion of the City Council, general tax income can be allocated for transportation improvements. The largest portion of general taxes is from property and sales taxes.

5.3 EXPENSES & REVENUES

The 2016 to 2036 transportation project expenses and revenues are summarized in Table 4.8 below. Noteworthy is that there is an anticipated, almost $6 to $16 million shortfall forecasted over the next 20 years. This shortfall comprises approximately 12% of the overall 20-year forecasted costs. Contingency measures to address this projected shortfall are outlined within Section 5.4.

TABLE 4.8 SUMMARY OF TRANSPORTATION EXPENSES AND REVENUES

EXPENSES

FOR ADDITIONAL DETAILS SEE	DESCRIPTION	AMOUNT
Table 4.7	2016 to 2036 Transportation Project Costs	$130,000,000.00±

REVENUES

FOR ADDITIONAL DETAILS SEE	DESCRIPTION	AMOUNT
Section 5.2 (Federal/State/Other Grants, City Utility Funds, Impact Fees, MVFT, REET)		
		$114,000,000.00 - $124,000,000.00±
Expenses - Revenues		$16,000,000.00 to 6,000,000.00±
Unfunded Transportation Projects		**$6,000,000.00 to 16,000,000.00±**

The transportation expenses and revenues outlined within this financial plan are projections based on past projects and occurrences, historical trends, and current regulations. These projections are intended to provide best possible predictions of likely expenses and revenues and are presented primarily to inform decision makers about policy issues – not to provide project specific cost or revenue estimates for any other purpose.

There are a variety of ways to estimate expenses and revenues over extended timeframes. Instead of inflating both the expenses and revenues by a factor, like the Consumer Price Index (CPI), over the 20-year planning horizon an assumption was made that both the expenses and revenues would inflate over time at a similar rate. To ensure that the Transportation Impact Fees keep pace with inflation, these fees are adjusted each January using The Engineering News Record Construction Cost Index.

5.4 CONTINGENCIES

The City's projected funding shortfall is approximately 5 to 12 percent of the overall estimated project costs; as such, following are several potential contingency measures the City could take to address this funding gap over time should it be necessary.

1. The City's level-of-service (LOS) standards could be modified so that some projects no longer have a failing LOS that requires mitigation in the form of capital project(s).
2. The City could allocate additional general fund dollars to pay for transportation projects.
3. The City could take the steps necessary to form a transportation benefit district to collect revenue earmarked for transportation projects.
4. The City could amend the land use assumptions found in the Land Use Element of the Comprehensive Plan to allow less growth thus minimizing LOS failures and the need for capital projects to correct the LOS failures.

6.0 GOALS, OBJECTIVES & POLICIES

The City has created Goals, Objectives & Policies specific to the Transportation Element. These Goals, Objectives & Policies guide the City's decision making process related to transportation issues. These goals, objectives and policies are as follows.

TRANSPORTATION GOAL 1: CONTRIBUTE TO A WELL-DESIGNED TRANSPORTATION SYSTEM THROUGH REASONABLE, PLANNED, ECONOMICALLY FEASIBLE TRANSPORTATION IMPROVEMENTS THAT SUPPORT ADOPTED LAND USE PLANS, PROTECT OR IMPROVE BUSINESS ACCESS, AND PROTECT THE CITY'S NEIGHBORHOODS.

OBJECTIVE 1.1: Create a comprehensive street system that provides reasonable vehicular circulation throughout the City while enhancing the safety and function of the local transportation system.

Policy 1.1.1 Access management, such as restricting left turns and excessive use of driveways, should be coordinated with design standards and land use plans to enhance public safety and preserve traffic carrying capacity.

Policy 1.1.2 Each street in the City should be assigned a functional classification based on factors including traffic volumes, type of service provided, land use, and preservation of neighborhoods.

Policy 1.1.3 Streets and pedestrian paths in residential neighborhoods should be arranged as an interconnecting network that serves local traffic and facilitates pedestrian circulation.

Policy 1.1.4 Provide a balance between protecting neighborhoods from increased through traffic while maintaining access to neighborhoods.

Policy 1.1.5 Phase implementation of transportation plans concurrently with growth to allow adequate transportation facilities and services to be in place concurrent with development; or, if the transportation network cannot be feasibly expanded to accommodate the adopted land use plan and the adopted level-of-service, for financial, geographic, or other reasons, re-examine land use, level-of-service, and economic inputs to establish a balance.

OBJECTIVE 1.2: Coordinate land use and transportation planning to meet the needs of the City.

Policy 1.2.1 Land use and transportation plans should be consistent so that land use and adjacent transportation facilities are compatible with each other.

Policy 1.2.2 Manage access along all principal and minor arterial corridors, and access points to residential, commercial, and industrial development. Utilize adopted Access Management techniques to preserve the flow of traffic on the road system while providing adequate access to adjacent land uses. These could include: limit the number of driveways (usually one per parcel); locate driveways away from intersections; and connect parking lots and consolidate driveways to create more pedestrian-oriented street design and encourage efficiency of both land uses and the adjacent transportation system.

OBJECTIVE 1.3: Strive to reduce traffic congestion that degrades the safety and reasonable functioning of the local transportation system.

Policy 1.3.1 Develop a system of level-of-service standards which promote growth where appropriate while preserving and maintaining the existing transportation system.

OBJECTIVE 1.4: Design transportation facilities to preserve and to be consistent with the natural and built environments.

Policy 1.4.1 Landscape transportation facilities to complement neighborhood character and amenities. Where appropriate, incorporate street trees in planting strips to improve air quality and visual aesthetics, and implement traffic calming effects.

Policy 1.4.2 Arrange streets and pedestrian paths in residential neighborhoods to form a grid or flexible grid network where feasible.

Policy 1.4.3 Foster connectivity of new development with the surrounding neighborhood, allowing cul-de-sacs only where it can be clearly demonstrated that a future connection will not be necessary.

OBJECTIVE 1.5: Implement demand management techniques.

Policy 1.5.1 Promote employer strategies and educational efforts that help shift travel demand to off-peak travel periods.

Policy 1.5.2 Coordinate with public agencies, utilities and developers to minimize activities that impact principal roads during peak traffic hours.

Policy 1.5.3 Continue to apply mitigation strategies to reduce the traffic impact of new development.

TRANSPORTATION GOAL 2: COORDINATE EFFORTS WITH SKAGIT TRANSIT TO PROMOTE TRANSIT IMPROVEMENTS AND SERVICES TO THE CITY'S RESIDENTS AND BUSINESSES.

OBJECTIVE 2.1: Work with Skagit Transit and other jurisdictions to increase the efficiency and convenience of inter-modal transportation connections within the regional transportation network.

Policy 2.1.1 Land use patterns should support transit and non-motorized modes of travel by encouraging higher density in selected residential and employment areas.

Policy 2.1.2 Consultation with Skagit Transit is encouraged in order to evaluate the need for and location of new transit stops in large scale developments.

Policy 2.1.3 The City should take an active role in working with the regional transit agencies in planning and locating public transit facilities.

TRANSPORTATION GOAL 3: MAINTAIN, ENHANCE, AND INCREASE PEDESTRIAN AND BICYCLE TRAVEL BY PROVIDING SAFE AND CONVENIENT ROUTES FOR THE COMMUTING AND RECREATING PUBLIC.

OBJECTIVE 3.1: Provide a non-motorized transportation system that effectively serves the needs of pedestrian and bicycle users and encourages non-motorized travel and provides a continuous network of attractive sidewalks, footpaths, bike routes, pathways, and trails throughout the City.

Policy 3.1.1 Encourage pedestrian and bicycle connections between residential developments, neighborhood commercial centers, recreation areas. Use incentives or regulations to encourage new construction to promote pedestrian and bicycle connections to schools, parks, community centers, public transit services and facilities, neighborhoods and other services.

Policy T-3.1.2 Establish a network of bicycle routes within the City to connect those land uses likely to produce significant concentrations of bicycle usage. Work with interested parties in the planning of such a network.

Policy T-3.1.3 Improve the safety of crossings for pedestrians and bicycles where streets intersect with rail facilities, trails, paths and all areas where pedestrians and/or bicycle movements are encouraged.

Policy T-3.1.4 Whenever practical, provide safe access for pedestrians and bicyclists to transit stops.

Policy T-3.1.5 Seek to develop a comprehensive pedestrian and bicycle signage program that provides directional information, identification of on/off street routes, and a printed non-motorized facilities map.

Policy T-3.1.6 Implement policies and procedures regarding design standards for bike routes, pathways, and trails. ADA standards will be considered, where appropriate.

TRANSPORTATION GOAL 4: MAINTAIN AND IMPROVE TRUCK AND FREIGHT RAIL ACCESS TO INDUSTRIAL AREAS.

OBJECTIVE 4.1: Provide adequate infrastructure to facilitate the movement of freight to and from designated commercial and industrial areas.

Policy 4.1.1 Promote freight mobility projects in and around the Mount Vernon UGA that facilitate the development of economically viable and environmentally sustainable commercial and industrial areas.

TRANSPORTATION GOAL 5: DEVELOP A FUNDING AND IMPLEMENTATION PROGRAM FOR NEEDED TRANSPORTATION IMPROVEMENTS THAT SUPPORTS ADOPTED LAND USE POLICIES AND APPROPRIATELY DISTRIBUTES TRANSPORTATION COSTS BETWEEN PUBLIC AGENCIES AND PRIVATE DEVELOPMENT.

OBJECTIVE 5.1: Effectively pursue adequate funding for transportation improvements from all potential sources.

OBJECTIVE 5.2: Prepare a transportation financing plan that optimizes the use of City funds and leverages other funding sources.

Policy 5.2.1 Aggressively seek available Federal, State and local government funding opportunities for projects that meet the City's transportation objectives.

Policy 5.2.2 When appropriate, require new and expanded developments to construct, or participate in the funding to upgrade, roadways to City standards.

Policy 5.2.3 Allow for funding of growth-related traffic improvements proportionately by impact fees or other mechanisms that apportion costs in relation to impact charged to new development.

TRANSPORTATION GOAL 6: DEVELOP AND MAINTAIN RELATIONSHIPS BETWEEN THE CITY AND OTHER AGENCIES AND LOCAL JURISDICTIONS FOR COOPERATIVE PLANNING OF COMMON TRANSPORTATION IMPROVEMENTS AND DISCUSSION OF TRANSPORTATION-RELATED INTERESTS.

OBJECTIVE 6.1 Proactively work with the state and neighboring jurisdictions to provide capacity on regional transportation systems and to reduce regional traffic on local streets.

Policy 6.1.1 Establish a mechanism to provide multi-jurisdictional cooperation to fund transportation improvements, participate in joint ventures and promote improvement of inter-jurisdictional transportation systems to mitigate transportation impacts that occur beyond the permitting jurisdiction.

Policy 6.1.2 Continue active participation and leadership in the Regional Transportation Planning Organization (RTPO) and the Metropolitan Planning Organization (MPO).

TRANSPORTATION GOAL 7: DEVELOP A MOUNT VERNON SPECIFIC COMPLETE STREETS POLICY.

OBJECTIVE 7.1: Commence a process by which a Complete Streets Policy can be developed by the City. This Complete Streets Policy should accommodate (to the extent possible) all street users with the creation and enhancement of street networks to meet the needs of pedestrians, bicyclists, transit riders, motorists, commercial vehicles, and emergency response vehicles for people of all ages and all abilities.

City of MOUNT VERNON

APPENDIX A

Transportation Element
2016 to 2036

TRAFFIC CALMING MEASURES/TECHNIQUES

TRANSPORTATION SYSTEM MANAGEMENT

Transportation system management (TSM) actions are intended to improve the operating efficiency of the existing transportation system (facilities, services, and modes). TSM actions may consist of traffic engineering improvements such as channelization, turn lanes, one-way streets, intersection widening, and traffic control improvements such as traffic signal coordination, and optimization of signal timing.

Coordinated Traffic Signal System

The coordination of signal operation between adjacent intersections offers an opportunity for significant benefits to motorists in the City of Mount Vernon. On open highways, traffic flow is characterized as being random in that it is not normally influenced by upstream interruptions. Its arrival point is generally uniform throughout a selected time interval. In contrast, traffic flow on urban streets is generally less uniform because of interruptions and it tends to flow in pulsed groups of vehicles or platoons. Signal coordination simply attempts to recognize this flow characteristic and coordinate signal operation to accommodate platoons with minimal stops. In addition, safety can be enhanced through progressive movement because of reduced stops and delays and increased driver comfort and satisfaction. In fact, a layperson's view of good signal timing is where progression permits continuous movement with no random stops. Individual motorists understand and are able to observe route continuity, but not optimize system-wide measures of effectiveness.

In Mount Vernon, the following arterials are recommended for complete traffic signal coordination:

- College Way between Laventure Road and Freeway Drive
- Laventure Road between Blackburn Road and College Way
- Riverside Drive between Hoag Road and Fulton Street

In the downtown area, all signalized intersections bounded by I-5, Cameron Way, South 1st Street, and Blackburn Road must have a centralized traffic control center and should be operated as a network. As these streets are improved, provisions should be made for the future interconnection of these systems. Currently the City has provided conduit and fiber optic cable along College Way, and Riverside Drive. This cable can be used to interconnect traffic lights as well as operate a video camera surveillance system.

Intersection Improvements

As part of the TSM action in Mount Vernon, capacity improvements are recommended using signalized lane additions or channelization as identified by localized intersection capacity studies conducted by the City. Individual signal analyses will need to be performed for each proposed signal to ensure that the appropriate warrants are met. The City will regularly monitor the impact of cumulative development at the intersections of classified arterial streets within the City street network to ensure that they meet concurrency code requirements.

Traffic Calming for Neighborhood Traffic Control

Traffic calming generally refers to techniques that can be used to reduce speed or use on neighborhood streets and make the street a friendlier environment for pedestrians and bicyclists. Excessive speeds and / or cut-through traffic compromises neighborhood livability, creating noise and air pollution, causing difficulties for pedestrians and bicyclists, and more importantly jeopardizing the safety of children. When conditions are appropriate, special measures may be taken to control both the volume and speed of traffic in neighborhoods. These are frequently referred to as traffic calming methods. Typical techniques are outlined in Table A below.

TABLE A: Typical Traffic Calming Techniques

Speed/ Volume Reduction	Pedestrian Safety	Reduce Traffic Volume	Local Neighbor-hood Involve-ment	Other
Police Enforcement	Pedestrian Refuges/ Slow Points	Vehicle Exclusion Lanes	Creative Approaches to Slowing Down Speeders	Round-abouts
Traffic Circles	Curb Extensions	Diagonal Diverters	Speed Watch	Stop Signs
Chicanes	Raised Crosswalks	Median Barriers		
Entrance Treatments	**Lane Narrowing**	Cul-de-sacs		
Lane Narrowing		Semi-Diverters		
		Choke Points		

The City can be a supporting partner in designing creative and workable ways to restore and preserve safe and peaceful streets. However, in order not to create unnecessary inconvenience to those using a street appropriately, or potential safety hazards, careful evaluation of the method(s) proposed, including a detailed engineering study, must be done before more permanent restrictive actions are taken.

SPEED REDUCTION

Police Enforcement - Residents and businesses alert police officers to speeding problems in their neighborhoods, by contacting the Police Department. These calls usually bring extra patrols to the trouble spot. In the long run, police observations may lead to traffic engineering solutions to slow traffic. When police enforcement alone isn't solving the problem, the police may recommend that the Transportation Department consider traffic calming solutions.

Traffic Circles - Traffic circles are raised islands placed in an intersection. They are landscaped with ground cover and street trees. Traffic circles require drivers to slow to a speed that allows them to comfortably maneuver around them. The primary benefit of traffic circles is that they reduce the number of angle and turning collisions. An additional benefit is that they slow high-speed traffic. Traffic circles are most effective when constructed in a series on a local service street. However, they can restrict emergency or transit vehicle movement if vehicles are parked illegally near the circle. If well maintained, traffic circles can be very attractive. However, there are also a lot of traffic control signs and pavement markings associated with circles that are not so attractive. Traffic circles are less effective at T-intersections and difficult to design for offset intersections.

Chicanes - A chicane is intended to reduce vehicle speeds with less impact on emergency vehicles. A chicane changes a street's path from straight to serpentine. It may be constructed to give the illusion, from a distance that a street no longer continues.

Lane Narrowing - A lane narrowing removes excess width from existing traffic lanes without changing the number of lanes. This technique can have powerful traffic calming benefits. Lane narrowing reduces opportunities for speeding and aggressive driving and organizes the roadway to give clearer instruction to drivers, pedestrians and others.

Entrance Treatments - Entrance treatments create visual and occasionally audible cues that tell drivers they are entering a local residential area or that the surrounding land uses are changing. The intent is a reduction in speed. Entrance treatments consist of physical and textural changes to streets and are located at key entryways into a neighborhood. Entrance treatments have minimal influence on drivers' routine behavior. Overall speeds and total volumes are not influenced, but it is believed that drivers are made more aware of the environment in which they are driving and are more considerate of pedestrians.

PEDESTRIAN SAFETY

Pedestrian Refuges/Slow Points - Pedestrian refuges or slow points are small islands in the middle of the street. They serve to narrow the vehicle travel lanes. They can be installed either at intersections or midblock. Slow points are used to enhance pedestrian crossing points and provide a visual narrowing along the roadway. Depending on their location, they may also result in small to moderate traffic speed reductions.

Curb Extensions - Curb extensions narrow the street by widening the sidewalk or the landscaped parking strip. These devices are employed to make pedestrian crossings easier and to narrow the roadway. Curb extensions effectively improve pedestrian safety by reducing the street crossing distance and improving sight distance. They may also slightly influence driver behavior by changing the appearance of the street. They can be installed either at intersections or mid block.

Raised Crosswalks - Raised cross walks are cross walks constructed 3-4 inches above the elevation of the street. They typically have a profile similar to large speed hump. Raised crosswalks are intended to reduce vehicle speeds specifically where pedestrians will be crossing a street. Raised crosswalks are very effective at reducing vehicle speeds, however, they may generate noise from vehicles decelerating and accelerating. Raised cross walks selected for a street must take into consideration whether or not it is used as an emergency response route. Consideration for visually impaired persons dictates not placing the raised crosswalk at the same elevation as the sidewalk. Though the cross walk is raised from the street surface, a pedestrian should also be able to tell when they are entering an area shared with automobiles.

TRAFFIC VOLUME REDUCTION

Diagonal Diverters - Diagonal diverters place a barrier diagonally across an intersection, disconnecting the legs of the intersection. Strategically located diagonal diverters reduce traffic volumes on a street. Diagonal diverters prevent through moves at an intersection.

Semi-Diverters - Semi-diverters are curb extensions or islands that block one lane of the street. They prevent drivers from entering or exiting certain legs of an intersection. Strategically located, semi-diverters can effectively reduce traffic volumes on a street.

Median Barriers - A median barrier is a concrete curb or island that is located on the centerline of a street and continues through the street's intersection with a given cross street. Strategically located median barriers reduce traffic volumes on a street by preventing left turns from the through street and left turns and through movements from the cross street.

Cul-de-Sacs - Cul-de-Sacs close one end of a street. Cul-de-sacs are intended to change traffic patterns. Cul-de-sacs will terminate cut-through and significantly reduce general traffic volume. However, the diverted traffic may have an undesirable impact on other facilities.

Vehicle Exclusion Lanes - Exclusion lanes are lanes for a particular class of vehicle, excluding all others. The most common examples are the bus-only, bicycle and car pool/diamond lanes. The effectiveness of exclusion lanes varies with the location of their placement. Their effectiveness is greatest when there are clear alternatives that are easier to use than violating the lane restriction.

Choke Points - Choke points are curb extensions placed mid-block to narrow the roadway to approximately the equivalent of one travel lane. Choke points are intended to reduce traffic volumes by making the roadway narrow so that only one car at a time can pass through it.

OTHER

Roundabouts - Modern roundabouts differ from traffic circles and have benefits that traditional signalization cannot provide. Roundabouts are especially useful at reducing the number of angle collisions. These types of collisions are usually the most costly in terms of property damage, injury and death. The modern roundabout can offer effective intersection traffic control at a reduced life-cycle cost.

Stop Signs - The City does not generally install stop signs as a way to slow traffic. The city installs stop signs where there might be a question about who should have the right-of-way to prevent crashes. When stop signs are installed to slow down speeders, drivers may, in fact, increase their speed between signs to compensate for lost time. This creates an even more dangerous situation. Stop signs in inappropriate places could result in more drivers running stop signs and speeding through neighboring streets.

LOCAL NEIGHBORHOOD INVOLVEMENT

Speed Watch - A Speed Watch Program can train residents to use radar in their neighborhoods and would provide free equipment for a week. (This program does not issue speeding tickets.)

CREATIVE APPROACHES TO SLOWING DOWN NEIGHBORHOOD SPEEDERS

Banners- In most cases, speeding results from habit, not from an intentional decision to break the law. Thus, short-term reminders to slow down are effective in getting people to change their driving behavior. Banners alert motorist to check driving speeds.

Plant trees- Street trees offer a beautiful alternative to the wide-open speedway feeling of a treeless neighborhood street.

Leave your car at home- Encouraging your family and friends to ride their bicycle, walk, or take the bus/light rail, this will reduce the traffic volume and speeding in your neighborhood.

Neighborhood activities- Residents and businesses can be creative and enthusiastic about traffic safety. Community members are encouraged to create their own ways to remind people to observe speed limits. Any action that reminds people to watch their speed will affect potential speeders. Some residents walked their neighborhoods to place door hangers on nearby homes. A block party around the theme, "Slow Down'" gets people thinking and talking about their driving habits.

City of MOUNT VERNON

APPENDIX B

Transportation Element
2016 to 2036

TSI MEMOS TRANSPORTATION MODELING

December 8, 2015

Rebecca Bradley-Lowell, Senior Planner
Community & Economic Development Department
City of Mount Vernon
910 Cleveland Ave / PO Box 809
Mount Vernon, WA 98273

SUBJECT: LAND USE FORECAST TECHNICAL MEMORANDUM

Ms. Bradley-Lowell:

The purpose of this memo is to summarize the existing and forecasted land use data which were used to develop the Mount Vernon citywide transportation planning model.

Introduction

The accuracy of a transportation planning model depends largely on the quality of the land use data used in the model. The location, quantity, and type of land use, both now and in the future, form the backbone of the citywide planning model which is used for the City's Transportation Element update.

As a component of the City's Comprehensive Plan, the Transportation Element is required to be internally consistent with the requirements and assumptions used throughout the Comprehensive Plan. Most important is the use of consistent future land use assumptions. The land use data described here provides that consistency: it is based on the City's 2036 growth targets for population and employment which were developed by Skagit Council of Governments (SCOG), BERK Consulting, and the City of Mount Vernon.

Existing Land Use

For the purposes of transportation planning, land use can be stratified into two general categories: households and employment. Residential land use forecasts are often expressed in terms of population, however for travel demand modeling it is helpful to convert population into trip-generating households.

Current population and household estimates are summarized in **Table 1.** Population represents the current SCOG estimate while average household size was provided by the City and is based on 2010 Census data.

Table 1. Existing Population Estimate

Jurisdiction	2015 Population	Average Household Size (persons / HH)	2015 Households
Mount Vernon UGA	34,969	2.74	12,762

Source: SCOG 2014, BERK Consulting 2014

Existing employment estimates were provided by the City and based on data provided by the Washington State Employment Security Division (ESD). Employment estimates were gathered for employment type and number of employees. Modeled employment type was stratified into eight different employment categories, which are consistent with the categories used in the SCOG regional transportation model. **Table 2** summarizes the

employment categories, including their corresponding North American Industry Classification System (NAICS) code(s), number of employees, and share of total citywide employment.

Table 2. Existing Employment Estimates

NAICS Code	Employment Sector	Employees	Percent
44, 45	Retail	3,418	20.7%
51-56, 61, 71, 72, 81	Finance, Insurance, Real Estate, and Services	2,758	16.7%
Public sector, excluding education	Government	1,265	7.7%
61	Education	1,995	12.1%
22, 42, 48, 49	Wholesale Trade, Transportation, and Utilities	940	5.7%
31-33	Manufacturing	890	5.4%
11, 21, 23	Construction and Resources	1,144	6.9%
62	Health	4,093	2.5%
	Total	16,503	100.0%

Source: ESD 2015, City of Mount Vernon 2015

Land Use Growth Forecast

To ensure internal consistency with the other elements of the Comprehensive Plan Update, the citywide planning model used land use forecasts which are consistent with SCOG growth allocations. These forecasts include total population growth of 12,434 and employment growth of 4,785. **Tables 3** and **4** summarize SCOG population growth allocations and estimated household growth using average household size.

Table 3. Mount Vernon 2015-2036 Population Allocation

Jurisdiction	2015 Population	Population Allocation	2036 Population	Compound Annual Growth Rate
Mount Vernon UGA	34,969	12,434	47,403	1.46%

Source: SCOG 2014, BERK Consulting 2014

Table 4. Mount Vernon 2015-2036 Household Growth

Jurisdiction	Population Allocation	Average Household Size (persons / HH)	Household Growth
Mount Vernon UGA	12,434	2.74	4,537

Source: SCOG 2014, BERK Consulting 2014

Citywide SCOG employment growth allocations are summarized in **Table 5**. The SCOG employment forecast describes growth in a total of five employment categories. For demand modeling purposes, growth allocations were disaggregated to the eight categories described in Table 2 using NAICS code associations and distributing proportionately to the existing employment within each category.

Table 5. Mount Vernon 2036 Employment Growth Forecast

NAICS Code	Employment Sector	Net Growth, 2015-2036
44, 45, 72	Retail	201
51-56, 62, 71, 81	Services	1,936
61, 92	Government/Education	1,774
22, 23, 31-33, 42, 48, 49	Industrial	874
11, 21	Resources	0
	Total	4,785

Source: SCOG 2014, BERK Consulting 2014

Land Use Growth Location

The geographic units or Transportation Analysis Zones (TAZs) used to geographically assign land use in and around Mount Vernon are consistent with the structure developed by SCOG for the regional planning model. A total of 91 internal TAZs were used to represent the City and UGA. Residential land use is represented in the traffic model in terms of households while employment is modeled using the categories defined in Table 2. The existing household and employment totals described above were checked against TAZ-based GIS data provided by SCOG and minor revisions were made to reconcile the latest land use estimates with SCOG geospatial data.

City staff distributed citywide population and employment growth forecasts to the modeled TAZs based on an internal buildable lands analysis and through collaboration with TSI. Each TAZ was assigned an estimated 20-year growth capacity, expressed in (total) households and employment (by type).

The transportation model uses a household cross-classification scheme which represents households by number of occupants and number of vehicles, based on SCOG's analysis of 2010 census data. To prepare the total household growth forecast for input to the model, TAZ-based household growth was cross-classified using the existing (SCOG) cross-classification shares. The citywide traffic forecasting model will be described in greater detail in a subsequent memo.

Conclusion

The land use data described in this memo is consistent with the latest available residential and employment data as well as the most recent SCOG growth forecasts which will be incorporated to the City's Comprehensive Plan update.

I trust this provides you with an understanding of the existing and future land use information which forms the backbone of the travel demand component of the Mount Vernon citywide planning model. If you have any questions or need clarification related to the approach described here, please contact me at your convenience.

Regards,

Transportation Solutions, Inc.

Andrew L. Bratlien, PE
Senior Transportation Engineer

December 14, 2015

Rebecca Bradley-Lowell, Senior Planner
Community & Economic Development Department
City of Mount Vernon
910 Cleveland Ave / PO Box 809
Mount Vernon, WA 98273

SUBJECT: TRAFFIC FORECASTING TECHNICAL MEMORANDUM

Introduction

The purpose of this memo is to summarize the Mount Vernon citywide travel demand model (Model), which was developed by TSI with support from Skagit Council of Governments (SCOG) and the City of Mount Vernon.

This memo describes the major components of the Mount Vernon TDM, including street network development, trip generation, trip distribution, and traffic assignment. It also summarizes model calibration and the process by which the calibrated model forecasts future travel demand.

Background

The Mount Vernon TDM was developed in PTV Visum 14.00-17 software and is based on SCOG's regional travel demand model. Travel demand is represented in terms of PM peak hour vehicle trips. The base year model has been calibrated to match intersection turning movement counts collected at 101 locations throughout the city in November of 2013.

The accuracy of a travel demand model depends on the underlying land use data, i.e. the location, quantity, and nature of housing and employment. The development of the existing and forecasted land use data which are used in the citywide TDM are described in the Land Use Forecast Technical Memo dated December 8, 2015.

Network Development

Existing transportation facilities were inventoried as described in the Existing Level of Service Technical Memo dated December 8, 2015. The network inventory was used to verify and expand the SCOG regional model street network in order to ensure that the citywide model accurately represented (1) the City's arterial street system, (2) local streets which are outside the scope of the regional model, and (3) regionally significant routes including state highways and I-5.

Link and node capacities and volume-delay functions were kept consistent with the SCOG regional model.

Traffic Analysis Zone Structure

The function of a Traffic Analysis Zone (TAZ) in a travel demand model is to generate vehicle trips to and from the roadway network. In general internal TAZs are specific geographic areas that are associated with specific land use data. The land use data associated with a TAZ determines the number of trips that the TAZ produces to or attracts from the other TAZs in the model. This model's traffic analysis zone (TAZ) structure consists of 98 zones, of which 91 are internal to the Mount Vernon area.

There are 7 external zones surrounding the modeled study area. These zones are designed to incorporate trips that are generated to and/or from points outside the network. Although these are labeled zones, they actually represent links to regions outside the model and do not represent a defined area. These zones do not reflect any land use assumptions; only vehicle trips. Trips to and from each external zone are determined from actual traffic counts and future trips are based on historical growth records. These external zones play a two-part role in the model: (1) only a certain portion of the trips in an external zone interact with TAZ's within the model, and (2) the remained of the trips in any external zone interact with other external zones outlying the study area. These trips are called through trips since they have neither an origin nor destination within the study area yet they pass through the study area, impacting the network.

Trip Generation

Trips are generated by land uses and are assigned a trip type. In general, three basic trip types are represented in the travel demand model:

- Home-Based Work (HBW): Trips with one end at the traveler's home and the other end at the traveler's place of employment
- Home-Based Other (HBO): Trips with one end at the traveler's home and the other end at somewhere other than the traveler's place of employment, e.g. shopping trips
- Non-Home-Based (NHB): Trips without an end at the traveler's home

Trip generation rates used in the Mount Vernon model are based on SCOG and ITE trip generation rates and are representative of PM peak hour vehicle trips. **Table 1** displays the trip generation rates used in the model.

Residential land use is quantified in households and cross-classified for trip generation purposes. The household cross-classification scheme follows the format HH(a)_(b), where (a) represents the number of people in the household and (b) represents the number of workers in the household. Employment land uses are defined in the Land Use Forecast Technical Memo.

Trip generation for external TAZs is based on current and historical traffic volumes which were provided by SCOG or WSDOT.

Table 1. Trip Generation Rates

Land Use Code	Units	Total	Origins			Destinations		
			HBW	HBO	NHB	HBW	HBO	NHB
HH1_0	Households	0.24	0	0.0870	0.0242	0	0.1063	0.0242
HH1_1	Households	0.32	0.0268	0.0502	0.0367	0.1072	0.0614	0.0367
HH2_0	Households	0.37	0	0.1340	0.0372	0	0.1637	0.0372
HH2_1	Households	0.49	0.0248	0.1271	0.0528	0.0990	0.1554	0.0528
HH2_2	Households	0.75	0.0632	0.1184	0.0865	0.2526	0.1447	0.0865
HH3_0	Households	0.51	0	0.1826	0.0507	0	0.2231	0.0507
HH3_1	Households	0.67	0.0225	0.1868	0.0710	0.0900	0.2283	0.0710
HH3_2	Households	1.02	0.0668	0.2028	0.1147	0.2754	0.2479	0.1147
HH3_3	Households	1.44	0.1210	0.2268	0.1656	0.4838	0.2772	0.1656
HH4_0	Households	0.78	0	0.2805	0.0779	0	0.3428	0.0779
HH4_1	Households	1.03	0.0259	0.3078	0.1075	0.1037	0.3761	0.1075
HH4_2	Households	1.57	0.0793	0.3753	0.1716	0.3173	0.4588	0.1716
HH4_3	Households	2.21	0.1673	0.3933	0.2511	0.6690	0.4807	0.2511
RETAIL	Employees	1.80	0.2304	0.4158	0.3780	0.0576	0.3402	0.3780
FIRES	Employees	0.70	0.1680	0.1579	0.1015	0.0420	0.1292	0.1015
GOV	Employees	0.70	0.2352	0.1386	0.0770	0.0588	0.1134	0.0770
EDU	Employees	1.56	0.6240	0.4118	0.0156	0.1560	0.3370	0.0156
WTCU	Employees	0.59	0.3634	0.0097	0.0590	0.0909	0.0080	0.0590
MANU	Employees	0.37	0.1243	0.0122	0.0962	0.0311	0.0100	0.0962
RESOURCE	Employees	0.35	0.2240	0	0.0350	0.0560	0	0.0350
HEALTH	Employees	1.06	0.2544	0.2390	0.1537	0.0636	0.1956	0.1537

Source: SCOG 2015

Trip Distribution

Trips are distributed between TAZs using a gravity model, which is based on the theory that the attraction between two bodies is directly proportional to the bodies' masses and inversely proportional to the distance between the bodies. For the purposes of transportation modeling, a TAZ's "mass" is represented by the number of trips generated (produced by or attracted to) the TAZ while the distance factor is represented by route travel time.

The gravity model calculates the attractiveness between any two TAZs using the following utility function:

$$f(U) = a * (U^b) * (e^{cU})$$

In the utility function, U is defined as travel time between zones. The parameters a, b, and c are calibration factors which influence the weight of travel time in the gravity model. The gravity parameters used in the Mount Vernon model are shown in **Table 2** and are based on the values used in the SCOG regional model as well as guidance from *NCHRP Report 716* (TRB 2012).

Table 2. Trip Distribution Gravity Model Parameters

Trip Purpose	Model Parameter		
	a	b	c
Home-Based Work (HBW)	100	-0.02	-0.125
Home-Based Other (HBO)	100	-0.90	-0.10
Non-Home Based (NHB)	100	-0.30	-0.10

Traffic Assignment

Trips are assigned to the street network uses an equilibrium assignment process which assigns vehicle trips from origin to destination along the calculated shortest travel time route, iteratively updating travel time as vehicle demand induces congestion throughout the network. As travel time is updated, shortest paths are recalculated and traffic re-assigned. The process continues until the model finds an equilibrium condition.

Calibration

The base year model was calibrated based on guidance from FHWA's *Travel Model Validation and Reasonableness Checking Manual Second Edition* (FHWA 2010). Assigned link volume was measured against link volume counts which were derived from the 2013 PM peak hour intersection turning movement counts. Calibration statistics and a scatterplot of assigned vs. counted volume are provided in Appendix B.

Forecasting Future Travel Demand

For the 20-year planning horizon (2035), the travel demand model assumes that the land use forecast developed by SCOG and the City are consistent with the City's updated Land Use Element and that growth rates are primarily based on historical trends for all roadways that function as connections between Mount Vernon and the surrounding region.

An initial traffic forecast scenario assumed that the existing street network will be maintained with no improvements in the next 20 years. This "no build" condition is used to identify locations where improvements will be necessary to maintain minimum LOS standards. A proposed street network improvement list was then developed and each project tested in the model to identify growth-driven improvement projects. The forecasted failures and identified improvement projects will be outlined in a subsequent memo.

The forecasting model can be updated and refined in the future to maintain consistency with any revisions to the City's land use forecast or transportation improvement project list, or to accommodate other feedback from the City.

Conclusion

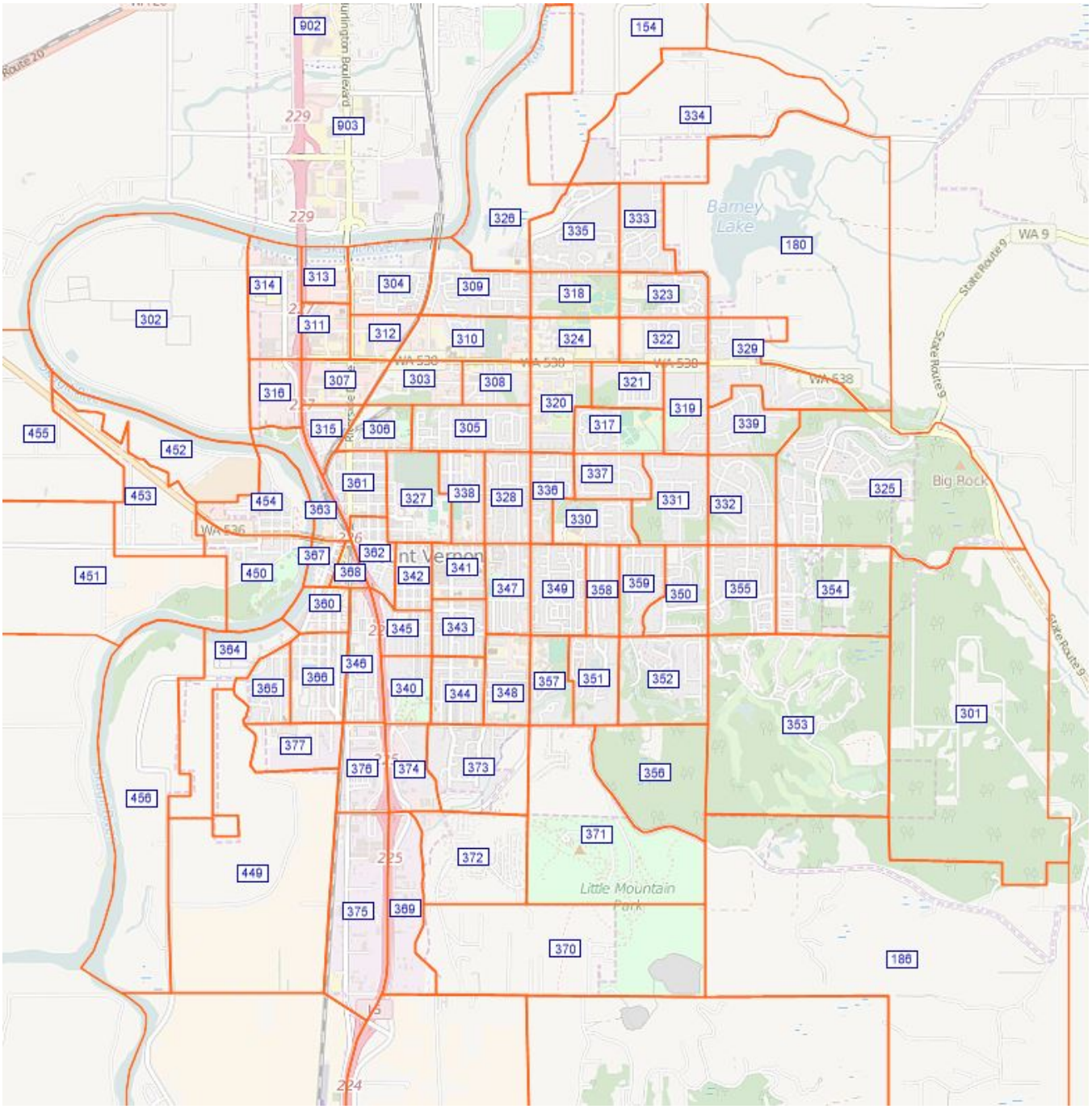
I trust this provides you with an understanding of the development of the Mount Vernon traffic forecasting model. If you have any questions or need clarification related to any part of the methodology described above, please contact me at your convenience.

Regards,

Transportation Solutions, Inc.

Andrew L. Bratlien, PE
Senior Transportation Engineer

APPENDIX A. TRAFFIC ANALYSIS ZONE STRUCTURE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Little Mountain Park
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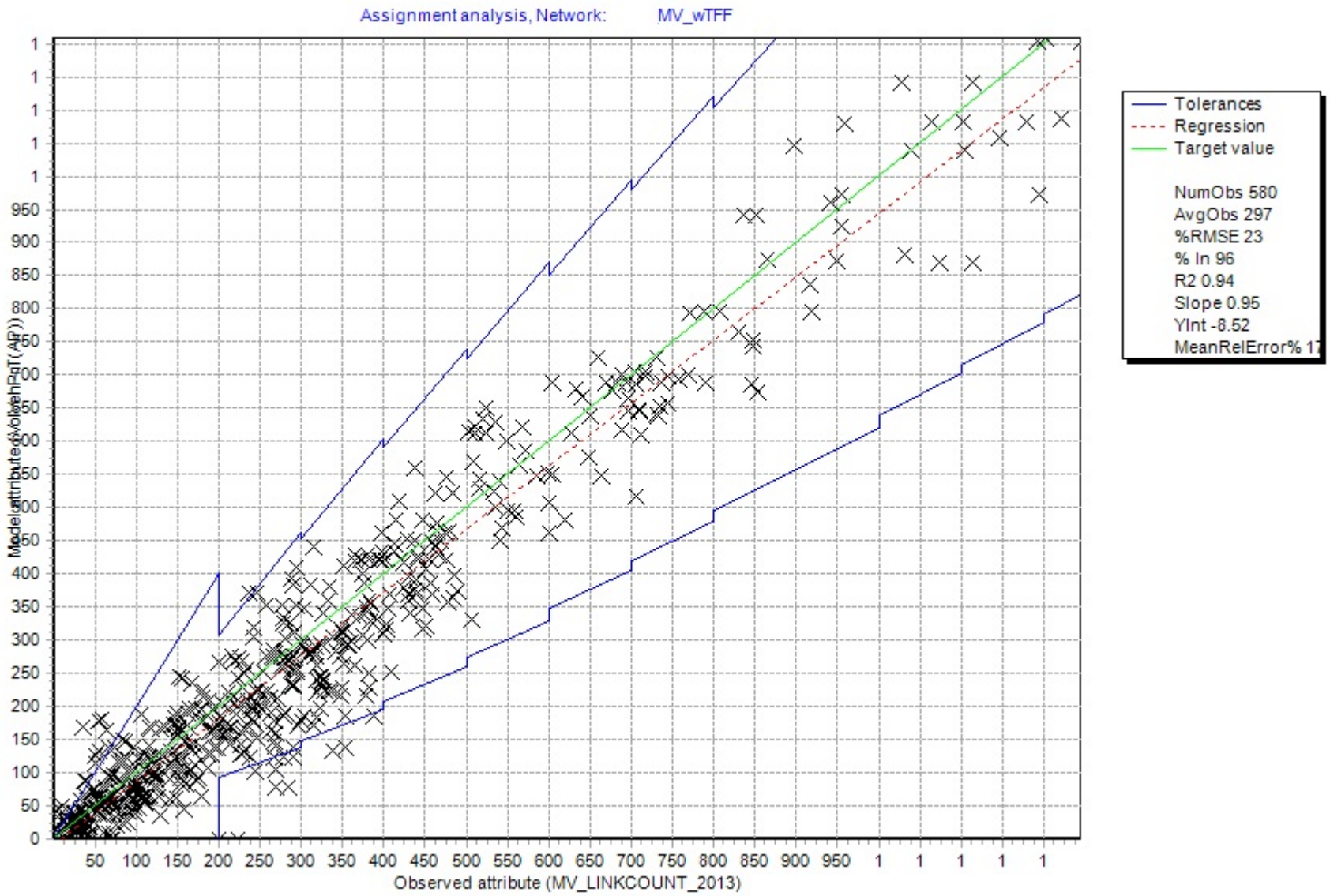
APPENDIX B. MODEL CALIBRATION PLOT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Regression
Target value
NumObs 580
AvgObs 297
%RMSE 23
% In 96
R2 0.94
Slope 0.95
YInt -8.52
MeanRelError% 17
Observed attribute (MV_LINKCOUNT_2013)

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June 13, 2016

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SUBJECT: TRAFFIC FORECAST AND 20-YEAR NEEDS UPDATE

Introduction

TSI has updated the citywide traffic forecasting model to address comments from Skagit Council of Governements (SCOG) staff during the Comprehensive Plan review process. The purpose of this memo is to document the changes to the citywide traffic forecast and to identify the effects of those changes in terms of Level of Service (LOS) failures and necessary improvement projects in the 20-year planning horizon

Traffic Forecasting Model Update and Regional Model Coordination

SCOG staff identified a desire for closer coordination between the Mount Vernon citywide planning model and the SCOG regional planning model, specifically with regard to trips entering and exiting the study area. The Mount Vernon citywide planning model includes seven external zones which represent travel demand at major access routes to and from the City and UGA. These include:

- I-5 at Skagit River Bridge
- I-5 at SR 534
- Riverside Drive (Old Highway 99) at Skagit River
- SR 9 northeast of Mount Vernon
- SR 9 southeast of Mount Vernon
- SR 536 east of Avon Allen Road
- McLean Road east of Avon Allen Road

To improve consistency between the regional and citywide travel demand forecasts, TSI reviewed the latest regional planning model provided by SCOG and identified forecasted 2040 traffic volumes at the links which represent the citywide model external TAZ loading points. The citywide model external trip generation calculations were updated to reflect these updated regional volume forecasts.

The updated regional volume forecasts were generally slightly higher than the initial citywide external trip forecasts. A significant portion of the increased travel demand represent “through” (external-to-external) trips, particularly on the I-5 corridor, which will not have a significant impact on the Mount Vernon street network. This memo will focus primarily on the operational impacts of the external trips

which impact the local street network, most of which have at least one trip end in the Mount Vernon study area.

Forecasted Level of Service Deficiencies

The citywide operational model was updated with the volume forecasts generated by the updated citywide planning model. The updated operational model was used to identify forecasted LOS deficiencies. A total of 16 intersections and 12 segments in the study area are forecasted to fail by 2035 assuming no network improvements, as shown in Table 1 and Table 2.

The updated travel demand forecast results in several new intersection and segment LOS failures which are identified as highlighted facilities in Tables 1 and 2.

Table 1. 2035 Intersection Level of Service Deficiencies - Without Improvement

Node ID	Intersection	Existing Intersection Control[1]	LOS Standard	2035 Delay (s/veh)	2035 LOS
723	Continental Pl & Hoag Rd	TWSC	D	57.0	F
724	N Laventure Rd & Hoag Rd	AWSC	D	56.1	F
789	S 1st St/Freeway Dr & W Division St	Signal	D	140.4	F
801	Waugh Rd & E Division St	AWSC	D	49.2	E
828	S 13th St & Broad St	TWSC	D	50.4	F
833	S Laventure Rd & E Section St	AWSC	D	45.0	E
871	I-5 SB Ramp & Anderson Rd	TWSC	D	49.4	E
1058	Blodgett Rd & Broad St	TWSC	D	135.1	F
1072	S 18th St & E Broadway	TWSC	C	44.0	E
1085	S 1st St & W Montgomery St	TWSC	C	36.3	E
1100	30th St & E College Way	TWSC	D	999[2]	F
1101	N 30th St & E Fir St	TWSC	D	86.7	F
1346	S Waugh Rd & E Broadway	TWSC	D	48.6	E
1715	S 15th St & E Broadway	TWSC	C	26.8	D
1895	S 2nd St & Broadway	TWSC	D	71.8	F
6614	Laventure Rd & Blackburn Rd	AWSC	D	36.3	E

[1]TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized
[2]Delay exceeds limits of HCM methodology
Note: Deficiencies which have been newly identified using the updated traffic forecast are highlighted

Table 2. 2035 Segment Level of Service Deficiencies - Without Improvement

Segment ID	Name	Cross Street A	Cross Street B	Functional Classification	V/C	LOS
1002	I-5 NB	Mt Vernon Rd	Anderson Rd	Freeway	0.90	E
1003	I-5 NB	Anderson Rd	Kincaid St	Freeway	0.90	D
1004	I-5 NB	Kincaid St	College Way	Freeway	0.91	E
1005	I-5 NB	College Way	George Hopper	Freeway	0.98	E
1006	I-5 SB	George Hopper	College Way	Freeway	0.88	D
2001	Division St	Freeway Dr	Ball St	Principal Arterial	1.04	F
3022	College Way	I-5 SB ramps	I-5 NB ramps	Principal Arterial	0.91	E
3044	Anderson Rd	I-5 NB ramps	Cedardale Rd	Principal Arterial	0.93	E
4009	Hoag Rd	Urban Ave	Continental Pl	Minor Arterial	1.03	F
4059	Broad St	Blodgett	9th St	Minor Arterial	1.06	F
5044	18th St	Fir St	Roosevelt Ave	Urban Collector	1.04	F
5053	Francis Rd	30th St	Swan Rd	Urban Collector	0.83	D

Note: Deficiencies which have been newly identified using the updated traffic forecast are highlighted

Recommended Transportation Network Improvements

The projects identified in Table 3 are necessary to maintain acceptable LOS in 2035 with forecasted traffic growth. Project numbers are included for projects which are included in the transportation component of the City's draft Comprehensive Plan and the 2016-2021 Capital Improvement Plan (CIP).

The model update adds six projects to the recommended improvement list. Four of these projects were previously identified in the Mount Vernon CIP and Comprehensive Plan update. Two additional projects have been identified on 18th Street, including a nonmotorized completion project north of Fir Street and an intersection improvement project at Broadway.

Table 3. Projects Necessary to Mitigate Growth-Related LOS Deficiencies

Comp. Plan #	CIP #	Project Name	From/To	Est.Cost ($$$)	Description
T-150	T-94-14	Fir St Widening	Laventure / Waugh	1,200	Widen to 3 lanes
T-240	T-06-04	15th St Improvements	Broad / Division	1,500	Widen to 3 lanes
T-040	T-06-05	Hoag/Laventure Intersection Improvements		700	Capacity improvements
T-070	T-06-10	College Way @ I-5 Improvements	I-5 NB / I-5 SB	6,233	Add 2 lanes and rechannelize
T-090	T-07-04	College Way / 30th Intersection Improvements		700	Capacity improvements
T-210	T-07-05	Division / Waugh Intersection Improvements		600	Capacity improvements
T-310	T-07-07	Laventure / Section Intersection Improvements		339	Capacity improvements
T-200	T-09-01	First St / Division Intersection Realignment		3,000	Capacity improvements
T-370	T-13-01	Laventure / Blackburn Intersection Improvements		700	Capacity improvements
T-420	n/a	Anderson Rd	Henson / Cedardale	TBD	Complete sidewalks
T-020	n/a	Hoag Rd	Urban / Laventure	TBD	Widen to 3 lanes
T-290	n/a	Broad St	Blodgett / 13th St	TBD	Access management / RIRO

Comp. Plan #	CIP #	Project Name	From/To	Est.Cost ($$$)	Description
T-010	n/a	Francis Rd	30th St / Swan Rd	TBD	Complete sidewalks
n/a	n/a	18th St	Fir St / Roosevelt Ave	TBD	Complete sidewalk/bike ln
T-330	n/a	Waugh/Broadway Intersection Improvements		TBD	New roundabout
T-260	n/a	Broadway/2nd St Intersection Improvements		TBD	New all-way stop
T-230	n/a	S 1st St/Montgomery Intersection Improvements		TBD	New all-way stop
n/a	n/a	Broadway / 18th St Intersection Improvements		TBD	Left-turn bays on Broadway

Note: Deficiencies which have been newly identified using the updated traffic forecast are highlighted

Tables 4 and 5 identify all of the facilities that are deficient in the 2035 no action scenario and describe how they meet standards after the recommended improvements. The Division St (SR 536) Skagit River Bridge is forecasted to operate at LOS F by 2035 but is exempt from LOS standards per MVMC 14.10.060(C).

Table 4. 2035 Intersection Level of Service Deficiencies - With Improvement

Node ID	Intersection	Proposed Intersection Control[1]	2035 No Improvement		2035 With Improvement		Improvement Description
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	
723	Continental Pl & Hoag Rd	TWSC	57.0	F	19.2	C	Add TWLTL
724	N Laventure Rd & Hoag Rd	Signal	56.1	F	27.6	C	Signalize
789	S 1st St/Freeway Dr & W Division St	Signal	140.4	F	27.7	C	Improve left-turn phasing
801	Waugh Rd & E Division St	RAB	49.2	E	15.3	B	New roundabout
828	S 13th St & Broad St	TWSC	50.4	F	16.9	C	Right-in right-out
833	S Laventure Rd & E Section St	Signal	45.0	E	21.3	C	Signalize
871	I-5 SB Ramp & Anderson Rd	RAB	49.4	E	7.1	A	New roundabout
1058	Blodgett Rd & Broad St	TWSC	135.1	F	15.7	C	Right-in right-out
1072	S 18th St & E Broadway	TWSC	44.0	E	22.0	C	EB/WB left-turn lanes
1085	S 1st St & W Montgomery St	AWSC	36.3	E	20.1	C	New all-way stop
1100	30th St & E College Way	Signal	999.0	F	23.0	C	Signalize
1101	N 30th St & E Fir St	TWSC	86.7	F	32.0	D	Add TWLTL
1346	S Waugh Rd & E Broadway	RAB	48.6	E	7.2	A	New roundabout
1715	S 15th St & E Broadway	TWSC	26.8	D	23.2	C	Widen Broadway to 3-lane section
1895	S 2nd St & Broadway	AWSC	71.8	F	19.9	C	New all-way stop
6614	Laventure Rd & Blackburn Rd	Signal	36.3	E	21.6	C	Signalize

[1]TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized

Table 5. 2035 Segment Level of Service Deficiencies - With Improvement

Segment ID	Name	From/To	Functional Classification	No Improvement		With Improvement		Improvement Description
				V/C	LOS	V/C	LOS	
2001	Division St	Freeway / Ball	Principal Arterial	0.90	E	1.04	F	LOS exempt per MVMC 14.10.060
2002	Division St	Ball / Wall	Principal Arterial	0.90	D	0.91	E	LOS exempt per MVMC 14.10.060
3022	College Way	I-5 SB ramp / I-5 NB ramp	Principal Arterial	0.91	E	0.58	A	Add lanes and rechannelize
3044	Anderson Rd	I-5 NB ramp / Cedardale	Principal Arterial	0.98	E	0.83	D	Complete sidewalks
4009	Hoag Rd	Urban / Continental	Minor Arterial	0.88	D	0.74	C	Widen to 3 lanes
4059	Broad St	Blodgett / 9th	Minor Arterial	1.04	F	0.75	C	Right-in right-out channelization
5044	18th St	Fir / Roosevelt	Urban Collector	0.91	E	0.76	C	Complete bike lane
5053	Francis Rd	30th / Swan	Urban Collector	0.93	E	0.76	C	Complete sidewalks

Future Improvements Identified in TIP

A complete list of projects contained in the City's 2016-2021 TIP is provided in Table 6. Projects which are necessary to maintain LOS concurrency standards for the next 20 years are highlighted. While the highlighted projects will be necessary to maintain concurrency standards, the other projects in Table 6 may serve other transportation needs (e.g. transportation network completion, expanding non-motorized access) identified by the City.

Table 6. City of Mount Vernon TIP 2016 – 2021

ID	CIP #	Project Name	From/To	Est.Cost ($$$)	Description
1	T-94-14	Fir St Widening	Laventure / Waugh	1,200	Widen to 3 lanes
2	T-94-19	Blackburn Rd Widening	Cedar Hills Dr / Little Mtn Rd	1,700	Widen to current street standards
3	T-94-21	Blackburn Rd Extension	Little Mtn Rd / Eaglemont	2,400	Widen to current street standards
4	T-97-07	Freeway Dr Widening	Cameron / College	3,000	Widen to 3 lanes & add sidewalks
5	T-00-02	Local Improvements	Various	3,000	Maintain existing street network
6	T-02-04	Roosevelt Ave Extension	Urban / Cameron	11,100	Extend Roosevelt Ave
7	T-02-06	30th St Extension	Blackburn / Section	1,300	Extend 30th Street
8	T-02-10	Fowler Trail Conection	Laventure / 30th St	200	Connect pedestrian path from Laventure to 30th St along the extension of Fowler St
9	T-02-13	30th St Pathway	Blackburn / Fowler	150	Pathway parallel to 30th St
10	T-02-17	River Dike Trails	Various	500	Utilize existing dike top as ped pathways
11	T-02-24	30th St Improvements	Fir St / Manito Dr	900	Street widening, complete sidewalks
12	T-03-02	Broad St Improvement	Blodgett / 12th St	2,550	Pedestrian safety improvements
13	T-05-02	Martin Rd Improvements	Trumpeter / McLaughlin	2,000	Realignment & reconstruction
14	T-05-09	Hickox Rd / I-5 interchange	Hickox Rd / I-5	5,000	Interchange completion
15	T-06-04	15th St Improvements	Broad / Division	1,500	Widen to 3 lanes
16	T-06-05	Hoag/Laventure Intersection Improvements		700	Capacity improvements
17	T-06-06	Broadway Extension	Dallas / Burlingame	1,157	Extend Broadway
18	T-06-07	Laventure Rd Impr.	Hoag / south of Hoag	550	Widen to current street standards
19	T-06-10	College Way @ I-5 Improvements	I-5 NB ramp / I-5 SB ramp	6,233	Add 2 lanes and rechannelize
20	T-06-11	I-5/SR 536 interchange	SW of existing I-5 interchange @ Kincaid	20,000	Construct new frontage rd, new SB on-ramp at Section, and new park & ride facility.
21	T-07-02	Signal maintenance	Various	270	Signal controller replacement
22	T-07-03	Truck rt improvement	Main St / Cleveland	50	Raise road grade along Milwaukee

ID	CIP #	Project Name	From/To	Est.Cost ($$$)	Description
23	T-07-04	College Way / 30th Intersection Improvements		700	Capacity improvements
24	T-07-05	Division / Waugh Intersection Improvements		600	Capacity improvements
25	T-07-06	18th / Blackburn Intersection Improvements		700	Capacity improvements
26	T-07-07	Laventure / Section Intersection Improvements		339	Capacity improvements
27	T-08-01	Sidewalk Gap Prgrm	Various	50	Construct new sidewalks
28	T-09-01	First St / Division Intersection Realignment		3,000	Capacity improvements
29	T-13-01	Laventure / Blackburn Intersection Improvements		700	Capacity improvements
30	T-15-01	LED Street Lights	Various	544	Street lighting improvements
31	T-16-01	ADA Sidewalk Transition Program	Various	120	Sidewalk improvements
Total Estimated Cost, 2016-2021				72,213	

Note: Projects necessary to maintain LOS concurrency standards are highlighted

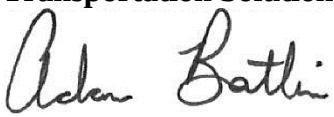
Conclusion

This memo describes the results of the Mount Vernon citywide planning and operational model updates, level of service forecasts, and recommended transportation improvement projects. This information will update the technical component of the Transportation Element of the 2016 Comprehensive Plan update.

If you have any questions or need clarification related to any of the existing conditions described above, please contact me at your convenience.

Regards,

Transportation Solutions, Inc.



Andrew L. Bratlien, PE
Senior Transportation Engineer

City of MOUNT VERNON

APPENDIX C

EXISTING, FUTURE, AND FUTURE WITH MITIGATION LOS FOR STREET SEGMENTS & INTERSECTIONS

Node ID	INTERSECTION	Control Type	Street A Functional Classification	Street B Functional Classification	LOS Standard	EXISTING 2015 CONDITIONS			2036 W/O IMPROVEMENT			2036 W/IMPROVEMENT			
						Delay (s/veh)	LOS	LOS Pass/Fail	Delay (s/veh)	LOS	LOS Pass/Fail	Delay (s/veh)	LOS	LOS Pass/Fail	PROPOSED IMPROVEMENT
221	30th St & Francis Rd	TWSC	Urban Collector	Urban Collector	C	10.9	B	PASS	12.5	B	PASS	12.6	B	PASS	
717	Freeway Dr & Stewart Rd	TWSC	Minor Arterial	Minor Arterial	D	13.5	B	PASS	19.9	C	PASS	18.7	C	PASS	
720	Market St & Steward Rd	TWSC	State Highway	Urban Collector	D	16.8	C	PASS	28.8	D	PASS	28.5	D	PASS	
721	Riverside Dr & Pacific Pl (S)	Signal	Principal Arterial	Urban Collector	D	21.0	C	PASS	38.1	D	PASS	36.9	D	PASS	
723	Continental Pl & Hoag Rd	TWSC	Urban Collector	Minor Arterial	D	25.5	D	PASS	57.0	F	FAIL	19.2	C	PASS	Add TWLTL to Hoag
724	N Laventure Rd & Hoag Rd	AWSC	Principal Arterial	Minor Arterial	D	16.9	C	PASS	56.1	F	FAIL	27.6	C	PASS	New roundabout or signal
733	Freeway Dr & College Way	Signal	Minor Arterial	Principal Arterial	D	31.3	C	PASS	31.8	C	PASS	30.0	C	PASS	
734	I-5 SB Ramp & E College Way	Signal	Ramp	Principal Arterial	D	17.0	B	PASS	30.3	C	PASS	26.8	C	PASS	
735	I-5 NB Ramp & E College Way	Signal	State Highway	Ramp	D	4.1	A	PASS	3.8	A	PASS	4.4	A	PASS	
736	Riverside Dr & Roosevelt Ave	Signal	Principal Arterial	Local Street	D	5.1	A	PASS	5.2	A	PASS	5.6	A	PASS	
737	Riverside Dr & E College Way	Signal	Principal Arterial	State Highway	D	37.8	D	PASS	46.1	D	PASS	49.9	D	PASS	
738	Urban Ave & E College Way	Signal	Urban Collector	State Highway	D	18.0	B	PASS	18.7	B	PASS	17.1	B	PASS	
740	N 18th St & E College Way	Signal	Urban Collector	State Highway	D	14.3	B	PASS	22.6	C	PASS	21.1	C	PASS	
741	N Laventure Rd & E College Way	Signal	Principal Arterial	State Highway	D	23.1	C	PASS	32.3	C	PASS	33.7	C	PASS	
742	N Waugh Rd/Martin Rd & E College Way	Signal	Minor Arterial	State Highway	D	9.8	A	PASS	14.8	B	PASS	15.7	B	PASS	
760	N 4th St & Riverside Dr & E Fir St	Signal	Principal Arterial	Minor Arterial	D	24.9	C	PASS	36.0	D	PASS	35.8	D	PASS	
761	N 15th St & E Fir St	TWSC	Urban Collector	Minor Arterial	D	16.1	C	PASS	27.5	D	PASS	28.5	D	PASS	
762	E Fir St & N 18th St	Signal	Urban Collector	Minor Arterial	D	11.5	B	PASS	23.1	C	PASS	23.0	C	PASS	
763	N Laventure Rd & E Fir St	Signal	Principal Arterial	Minor Arterial	D	9.5	A	PASS	12.4	B	PASS	12.4	B	PASS	
764	N Waugh Rd & E Fir St	AWSC	Minor Arterial	Minor Arterial	D	8.7	A	PASS	13.8	B	PASS	15.6	C	PASS	
772	4th St & E Fulton St	Signal	Principal Arterial	Minor Arterial	D	7.4	A	PASS	9.9	A	PASS	9.6	A	PASS	
773	N 6th St & E Fulton St	AWSC	Minor Arterial	Minor Arterial	D	10.4	B	PASS	12.9	B	PASS	12.6	B	PASS	
787	W Division St & Wall St	Signal	State Highway	Minor Arterial	D	13.2	B	PASS	18.7	B	PASS	19.0	B	PASS	
789	S 1st St/Freeway Dr & W Division St	Signal	Minor Arterial	State Highway	D	51.7	D	PASS	140.4	F	FAIL	27.7	C	PASS	Modify left-turn phasing
790	S 2nd St & W Montgomery St	Signal	Minor Arterial	Local Street	D	8.4	A	PASS	10.7	B	PASS	10.7	B	PASS	
797	15th St & E Division St	Signal	Urban Collector	Minor Arterial	D	9.9	A	PASS	13.6	B	PASS	13.3	B	PASS	
798	18th St & E Division St	Signal	Urban Collector	Minor Arterial	D	10.0	B	PASS	22.6	C	PASS	19.5	B	PASS	
799	Laventure Rd & E Division St	Signal	Principal Arterial	Minor Arterial	D	12.7	B	PASS	20.4	C	PASS	21.0	C	PASS	
801	Waugh Rd & E Division St	AWSC	Minor Arterial	Minor Arterial	D	12.3	B	PASS	49.2	E	FAIL	15.3	B	PASS	New roundabout or signal
806	Cleveland St/S 1st St & Kincaid St	AWSC	Urban Collector	Urban Collector	C	14.6	B	PASS	23.3	C	PASS	23.3	C	PASS	
807	S 1st St & Myrtle St	TWSC	Urban Collector	Local Street	C	10.4	B	PASS	15.4	C	PASS	14.6	B	PASS	
808	S 2nd St & W Kincaid St	Signal	Principal Arterial	Principal Arterial	D	9.5	A	PASS	10.8	B	PASS	10.5	B	PASS	
809	S 2nd St & Myrtle St	TWSC	Principal Arterial	Local Street	D	11.9	B	PASS	12.1	B	PASS	12.2	B	PASS	
810	S 3rd St & W Kincaid St	Signal	State Highway	State Highway	D	30.9	C	PASS	38.8	D	PASS	37.8	D	PASS	
811	I-5 SB Ramp & W Kincaid St	Signal	Ramp	State Highway	D	9.8	A	PASS	11.9	B	PASS	16.6	B	PASS	
812	I-5 NB Ramp & W Kincaid St/Broad St	Signal	Ramp	State Highway	D	12.7	B	PASS	11.9	B	PASS	13.2	B	PASS	
813	S Laventure Rd & E Broadway	TWSC	Principal Arterial	Local Street	D	14.4	B	PASS	16.2	C	PASS	15.7	C	PASS	
821	S 2nd St & Section St	TWSC	Principal Arterial	Urban Collector	D	17.5	C	PASS	23.2	C	PASS	22.8	C	PASS	
828	S 13th St & Broad St	TWSC	Urban Collector	Minor Arterial	D	52.3	F	FAIL	50.4	F	FAIL	16.9	C	PASS	Right-in-right-out access
829	Section St & S 15th St	AWSC	Minor Arterial	Urban Collector	D	10.7	B	PASS	14.2	B	PASS	21.6	C	PASS	

Node ID	INTERSECTION	Control Type	Street A Functional Classification	Street B Functional Classification	LOS Standard	EXISTING 2015 CONDITIONS			2036 W/O IMPROVEMENT			2036 W/IMPROVEMENT			
						Delay (s/veh)	LOS	LOS Pass/Fail	Delay (s/veh)	LOS	LOS Pass/Fail	Delay (s/veh)	LOS	LOS Pass/Fail	PROPOSED IMPROVEMENT
832	S 18th St & E Section St	AWSC	Urban Collector	Minor Arterial	D	11.2	B	PASS	27.8	D	PASS	25.8	D	PASS	
833	S Laventure Rd & E Section St	AWSC	Principal Arterial	Minor Arterial	D	25.7	D	PASS	45.0	E	FAIL	21.3	C	PASS	New signal
839	Britt Rd & Dike Rd	TWSC	Urban Collector	Urban Collector	C	9.5	A	PASS	9.6	A	PASS	9.7	A	PASS	
848	Britt Rd & Blackburn Rd	TWSC	Urban Collector	Urban Collector	C	8.7	A	PASS	8.8	A	PASS	8.8	A	PASS	
850	Old Hwy 99/S 2nd St & Blackburn Rd	Signal	Principal Arterial	Minor Arterial	D	7.3	A	PASS	8.2	A	PASS	8.2	A	PASS	
852	Railroad Ave & Blackburn Rd	TWSC	Principal Arterial	Minor Arterial	D	12.1	B	PASS	14.5	B	PASS	13.7	B	PASS	
855	Blodgett Rd & Blackburn Rd	TWSC	Urban Collector	Minor Arterial	D	18.3	C	PASS	23.1	C	PASS	20.4	C	PASS	
857	S 15th St & Blackburn Rd	TWSC	Urban Collector	Minor Arterial	D	14.0	B	PASS	26.3	D	PASS	25.3	D	PASS	
858	Little Mountain Rd & Blackburn Rd	TWSC	Urban Collector	Minor Arterial	D	9.7	A	PASS	20.3	C	PASS	23.2	C	PASS	
870	Old Hwy 99 & Anderson Rd	TWSC	Principal Arterial	Principal Arterial	D	16.1	C	PASS	26.0	D	PASS	31.2	D	PASS	
871	I-5 SB Ramp & Anderson Rd	TWSC	Ramp	Principal Arterial	D	21.9	C	PASS	49.4	E	FAIL	7.1	A	PASS	New roundabout
872	I-5 NB Ramp & Anderson Rd	TWSC	Ramp	Principal Arterial	D	13.9	B	PASS	22.3	C	PASS	27.3	D	PASS	
873	Cedardale Rd & Anderson Rd	RAB	Urban Collector	Principal Arterial	D	6.6	A	PASS	11.9	B	PASS	19.4	B	PASS	
874	Blodgett Rd & Anderson Rd	TWSC	Urban Collector	Principal Arterial	D	15.5	C	PASS	20.1	C	PASS	21.8	C	PASS	
903	Cedardale Rd & E Hickox Rd	TWSC	Urban Collector	Urban Collector	C	9.5	A	PASS	10.0	B	PASS	9.9	A	PASS	
911	Old Hwy 99 & Hickox Rd	TWSC	Principal Arterial	Urban Collector	D	10.7	B	PASS	13.1	B	PASS	12.6	B	PASS	
1050	Riverside Dr & Commercial St	Signal	Principal Arterial	Urban Collector	D	10.0	B	PASS	11.4	B	PASS	12.3	B	PASS	
1052	Market St & E College Way	Signal	Urban Collector	State Highway	D	16.6	B	PASS	15.5	B	PASS	16.0	B	PASS	
1056	S 3rd St & W Montgomery St	Signal	State Highway	Local Street	D	6.4	A	PASS	11.1	B	PASS	11.4	B	PASS	
1057	S 1st St & W Gates St	Signal	Urban Collector	Local Street	C	5.3	A	PASS	6.5	A	PASS	6.3	A	PASS	
1058	Blodgett Rd & Broad St	TWSC	Local Street	Minor Arterial	D	43.2	E	FAIL	135.1	F	FAIL	15.7	C	PASS	Right-in-right-out access
1072	S 18th St & E Broadway	TWSC	Urban Collector	Local Street	C	13.2	B	PASS	44.0	E	FAIL	22.0	C	PASS	Left-turn lanes on Broadway
1073	S 3rd St & Myrtle St	TWSC	State Highway	Local Street	D	13.7	B	PASS	15.5	C	PASS	13.9	B	PASS	
1074	S 2nd St & W Gates St	Signal	Principal Arterial	Local Street	D	4.7	A	PASS	5.8	A	PASS	5.2	A	PASS	
1075	S 18th St & Blackburn Rd	AWSC	Urban Collector	Minor Arterial	D	9.3	A	PASS	9.9	A	PASS	10.3	B	PASS	
1085	S 1st St & W Montgomery St	TWSC	Urban Collector	Local Street	C	16.0	C	PASS	36.3	E	FAIL	20.1	C	PASS	New all-way stop
1089	S 3rd St & Section St	TWSC	Urban Collector	Urban Collector	C	13.6	B	PASS	20.4	C	PASS	23.5	C	PASS	
1091	Freeway Dr & Cameron Way	Signal	Minor Arterial	Minor Arterial	D	12.3	B	PASS	15.6	B	PASS	13.8	B	PASS	
1100	30th St & E College Way	TWSC	Urban Collector	State Highway	D	217.2	F	FAIL	999.0	F	FAIL	23.0	C	PASS	New signal
1101	N 30th St & E Fir St	TWSC	Urban Collector	Minor Arterial	D	19.9	C	PASS	86.7	F	FAIL	32.0	D	PASS	Add TWLTL to Fir
1105	W Kincaid St & Skagit Station Lot	TWSC	State Highway	Other	D	12.0	B	PASS	16.6	C	PASS	16.8	C	PASS	
1111	Riverside Dr & Pacific Pl (N)	Signal	Principal Arterial	Urban Collector	D	18.9	B	PASS	29.6	C	PASS	29.9	C	PASS	
1114	Continental Pl & E College Way	Signal	Urban Collector	State Highway	D	15.2	B	PASS	18.2	B	PASS	18.8	B	PASS	
1339	S 25th St & E Division St	Signal	Local Street	Minor Arterial	D	5.6	A	PASS	6.5	A	PASS	6.1	A	PASS	
1344	10th St & E Division St	TWSC	Local Street	Minor Arterial	D	16.9	C	PASS	21.8	C	PASS	20.9	C	PASS	
1346	S Waugh Rd & E Broadway	TWSC	Minor Arterial	Minor Arterial	D	11.5	B	PASS	48.6	E	FAIL	7.2	A	PASS	New mini-roundabout
1502	Blackburn Rd & Cleveland St	TWSC	Urban Collector	Local Street	C	11.5	B	PASS	12.3	B	PASS	12.3	B	PASS	
1509	E Section St & S 27th St	TWSC	Minor Arterial	Local Street	D	15.9	C	PASS	22.8	C	PASS	19.0	C	PASS	
1510	N 30th St & Martin Rd	TWSC	Urban Collector	Minor Arterial	D	12.9	B	PASS	22.5	C	PASS	28.9	D	PASS	
1643	S 2nd St & W Hazel St	TWSC	Principal Arterial	Urban Collector	D	14.3	B	PASS	19.4	C	PASS	18.5	C	PASS	
1702	N 18th St & E Highland Ave	TWSC	Urban Collector	Local Street	C	15.2	C	PASS	20.2	C	PASS	19.6	C	PASS	

Node ID	INTERSECTION	Control Type	Street A Functional Classification	Street B Functional Classification	LOS Standard	EXISTING 2015 CONDITIONS			2036 W/O IMPROVEMENT			2036 W/IMPROVEMENT			
						Delay (s/veh)	LOS	LOS Pass/Fail	Delay (s/veh)	LOS	LOS Pass/Fail	Delay (s/veh)	LOS	LOS Pass/Fail	PROPOSED IMPROVEMENT
1715	S 15th St & E Broadway	TWSC	Urban Collector	Local Street	C	15.7	C	PASS	26.8	D	FAIL	23.2	C	PASS	Add TWLTL
1721	S 18th St & Fowler St	TWSC	Urban Collector	Local Street	C	10.9	B	PASS	13.9	B	PASS	13.1	B	PASS	
1895	S 2nd St & Broadway	TWSC	Principal Arterial	Local Street	D	18.0	C	PASS	71.8	F	FAIL	19.9	C	PASS	New AWSC
1896	Douglas St & W Hazel St	TWSC	Local Street	Urban Collector	C	8.8	A	PASS	9.0	A	PASS	9.0	A	PASS	
1932	Main St & Myrtle St	TWSC	Local Street	Local Street	C	9.5	A	PASS	9.6	A	PASS	9.6	A	PASS	
1933	Urban Ave & Hoag Rd	TWSC	Urban Collector	Minor Arterial	D	16.4	C	PASS	23.7	C	PASS	25.6	D	PASS	
1942	30th St & E Division St	TWSC	Urban Collector	Minor Arterial	D	13.9	B	PASS	21.6	C	PASS	19.2	C	PASS	
2025	Main St & Kincaid St	TWSC	Local Street	Local Street	C	8.7	A	PASS	8.6	A	PASS	8.6	A	PASS	
2543	N 8th St & E Fir St	TWSC	Minor Arterial	Local Street	D	18.1	C	PASS	25.6	D	PASS	24.6	C	PASS	
2623	Main St & W Gates St	TWSC	Local Street	Local Street	C	9.7	A	PASS	9.0	A	PASS	9.0	A	PASS	
2641	Cleveland St & Broadway	TWSC	Urban Collector	Local Street	C	17.3	C	PASS	22.8	C	PASS	23.3	C	PASS	
4987	Henson Rd & Anderson Rd	TWSC	Local Street	Principal Arterial	D	17.3	C	PASS	25.7	D	PASS	25.3	D	PASS	
5387	S 13th St & Fowler St	TWSC	Local Street	Local Street	C	8.7	A	PASS	8.7	A	PASS	8.8	A	PASS	
5435	S 3rd St & Snoqualmie St	TWSC	Urban Collector	Local Street	C	11.8	B	PASS	13.4	B	PASS	13.4	B	PASS	
6432	SR 9 & SR 538	RAB	State Highway	State Highway	D	8.2	A	PASS	11.1	B	PASS	9.3	A	PASS	
6601	Cleveland St & Milwaukee St	TWSC	Urban Collector	Local Street	C	14.5	B	PASS	16.2	C	PASS	16.0	C	PASS	
6613	S Laventure Rd & Fowler St	TWSC	Principal Arterial	Local Street	D	14.1	B	PASS	17.7	C	PASS	15.3	C	PASS	
6614	Laventure Rd & Blackburn Rd	AWSC	Principal Arterial	Minor Arterial	D	13.0	B	PASS	36.3	E	FAIL	21.6	C	PASS	New roundabout or signal
6702	E Division St & Skagit Highlands Pkwy	TWSC	Minor Arterial	Urban Collector	D	9.2	A	PASS	10.9	B	PASS	12.6	B	PASS	
6704	Skagit Highlands Pkwy & E College Way	TWSC	Urban Collector	State Highway	D	12.5	B	PASS	19.6	C	PASS	18.7	C	PASS	

Segment ID	Name	Cross Street A	Cross Street B	Roadway Classification	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	IMPROVEMENT
					EXISTING 2015 CONDITIONS					2036 W/O IMPROVEMENTS					2036 W/ IMPROVEMENTS					
1001	I-5 NB	SR 530/534	Mt Vernon Rd/Old SR 99	Freeway	2831	6000	0.47	A	PASS	3837	6000	0.64	B	PASS	3778	6000	0.63	B	PASS	
1002	I-5 NB	Mt Vernon Rd	Anderson Rd	Freeway	2766	4000	0.69	B	PASS	3615	4000	0.90	E	FAIL	3589	4000	0.90	D	PASS	WSDOT facility
1003	I-5 NB	Anderson Rd	Kincaid St	Freeway	2936	4000	0.73	C	PASS	3587	4000	0.90	D	PASS	3526	4000	0.88	D	PASS	WSDOT facility
1004	I-5 NB	Kincaid St	College Way	Freeway	3101	4000	0.78	C	PASS	3625	4000	0.91	E	FAIL	3566	4000	0.89	D	PASS	WSDOT facility
1005	I-5 NB	College Way	George Hopper	Freeway	3442	4000	0.86	D	PASS	3918	4000	0.98	E	FAIL	3828	4000	0.96	E	FAIL	WSDOT facility
1006	I-5 SB	George Hopper	College Way	Freeway	2413	4000	0.60	B	PASS	3530	4000	0.88	D	PASS	3610	4000	0.90	E	FAIL	WSDOT facility
1007	I-5 SB	College Way	Kincaid St	Freeway	2237	4000	0.56	A	PASS	3033	4000	0.76	C	PASS	3079	4000	0.77	C	PASS	
1008	I-5 SB	Kincaid St	Anderson Rd	Freeway	0	4000	0.00	A	PASS	0	4000	0.00	A	PASS	2873	4000	0.72	C	PASS	
1009	I-5 SB	Anderson Rd	Mt Vernon Rd/Old SR 99	Freeway	2203	4000	0.55	A	PASS	2678	4000	0.67	B	PASS	2737	4000	0.68	B	PASS	
1010	I-5 SB	Mt Vernon Rd/Old SR 99	SR 530/534	Freeway	2256	6000	0.38	A	PASS	2759	6000	0.46	A	PASS	2817	6000	0.47	A	PASS	
2001	Division St	Freeway Dr	Ball St	Principal Arterial	1912	2080	0.92	E	FAIL	2156	2080	1.04	F	FAIL	2162	2080	1.04	F	FAIL	LOS exempt
2002	Division St	Ball St	Wall St	Principal Arterial	1668	2070	0.81	D	PASS	1885	2070	0.91	E	FAIL	1891	2070	0.91	E	FAIL	LOS exempt
2003	Division St	Wall St	Moores Garden	Principal Arterial	880	1540	0.57	A	PASS	886	1540	0.58	A	PASS	893	1540	0.58	A	PASS	
2004	Division St	Moores Garden	West model boundary	Principal Arterial	670	1200	0.56	A	PASS	743	1200	0.62	B	PASS	747	1200	0.62	B	PASS	
2005	SR 9	SR 538	Mt Vernon Big Lake Rd	Principal Arterial	428	1200	0.36	A	PASS	660	1200	0.55	A	PASS	711	1200	0.59	A	PASS	
2006	SR 9	Mt Vernon Big Lake Rd	Lakeview Dr	Principal Arterial	489	1200	0.41	A	PASS	782	1200	0.65	B	PASS	844	1200	0.70	C	PASS	
3001	Mt Vernon Rd	Cedardale Rd	I-5 NB off ramp	Principal Arterial	116	1200	0.10	A	PASS	155	1200	0.13	A	PASS	157	1200	0.13	A	PASS	
3002	Mt Vernon Rd	I-5 NB off ramp	I-5 SB on ramp	Principal Arterial	59	1200	0.05	A	PASS	200	1200	0.17	A	PASS	171	1200	0.14	A	PASS	
3003	Mt Vernon Rd	I-5 SB on ramp	Old SR 99/Hickox Rd	Principal Arterial	7	1200	0.01	A	PASS	158	1200	0.13	A	PASS	128	1200	0.11	A	PASS	
3004	Old SR 99	Hickox Rd	Anderson Rd	Principal Arterial	454	1710	0.27	A	PASS	802	1710	0.47	A	PASS	777	1710	0.45	A	PASS	
3005	Old SR 99	Anderson Rd	Blackburn Rd	Principal Arterial	505	2070	0.24	A	PASS	693	2070	0.33	A	PASS	686	2070	0.33	A	PASS	
3006	2nd St	Blackburn Rd	3rd St	Principal Arterial	619	2070	0.30	A	PASS	785	2070	0.38	A	PASS	772	2070	0.37	A	PASS	
3007	2nd St	3rd St	Hazel St	Principal Arterial	496	1540	0.32	A	PASS	666	1540	0.43	A	PASS	650	1540	0.42	A	PASS	
3008	2nd St	Hazel St	Section St	Principal Arterial	543	1540	0.35	A	PASS	725	1540	0.47	A	PASS	703	1540	0.46	A	PASS	
3009	2nd St	Section St	Kincaid St	Principal Arterial	608	1540	0.39	A	PASS	737	1540	0.48	A	PASS	716	1540	0.47	A	PASS	
3010	2nd St	Kincaid St	Myrtle	Principal Arterial	646	2070	0.31	A	PASS	699	2070	0.34	A	PASS	702	2070	0.34	A	PASS	
3011	2nd St	Myrtle	Gates	Principal Arterial	640	2070	0.31	A	PASS	667	2070	0.32	A	PASS	669	2070	0.32	A	PASS	
3012	2nd St	Gates	Montgomery	Principal Arterial	705	2070	0.34	A	PASS	864	2070	0.42	A	PASS	872	2070	0.42	A	PASS	
3013	2nd St	Montgomery	Fulton St	Principal Arterial	844	2250	0.38	A	PASS	1114	2250	0.50	A	PASS	1125	2250	0.50	A	PASS	
3014	4th St	Fulton St	Fir St	Principal Arterial	921	2250	0.41	A	PASS	1422	2250	0.63	B	PASS	1413	2250	0.63	B	PASS	
3015	Riverside Dr	Fir St	Roosevelt Ave	Principal Arterial	1383	3690	0.37	A	PASS	1843	3690	0.50	A	PASS	1825	3690	0.49	A	PASS	
3016	Riverside Dr	Roosevelt Ave	College Way	Principal Arterial	1523	3690	0.41	A	PASS	1925	3690	0.52	A	PASS	1962	3690	0.53	A	PASS	
3017	Riverside Dr	College Way	Commercial St	Principal Arterial	1500	3690	0.41	A	PASS	2085	3690	0.56	A	PASS	2127	3690	0.58	A	PASS	
3018	Riverside Dr	Commercial St	Pacific Pl	Principal Arterial	1438	3690	0.39	A	PASS	2173	3690	0.59	A	PASS	2173	3690	0.59	A	PASS	
3019	Riverside Dr	Pacific Pl	Hoag Rd over-xing	Principal Arterial	916	3690	0.25	A	PASS	1388	3690	0.38	A	PASS	1388	3690	0.38	A	PASS	
3020	Riverside Dr	Hoag Rd over-xing	Whitmarsh Rd	Principal Arterial	1137	3690	0.31	A	PASS	1796	3690	0.49	A	PASS	1830	3690	0.50	A	PASS	

Segment ID	Name	Cross Street A	Cross Street B	Roadway Classification	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	IMPROVEMENT
					EXISTING 2015 CONDITIONS					2036 W/O IMPROVEMENTS					2036 W/ IMPROVEMENTS					
3021	College Way	Freeway Dr	I-5 SB on/off ramp	Principal Arterial	1331	2070	0.64	B	PASS	1617	2070	0.78	C	PASS	1733	2070	0.84	D	PASS	
3022	College Way	I-5 SB on/off ramp	I-5 NB on/off ramp	Principal Arterial	1672	2070	0.81	D	PASS	1929	2070	0.93	E	FAIL	2148	3690	0.58	A	PASS	Add lane EB and WB
3023	College Way	I-5 NB on/off ramp	Market St	Principal Arterial	2216	3690	0.60	B	PASS	2590	3690	0.70	C	PASS	2754	3690	0.75	C	PASS	
3024	College Way	Market St	Riverside Dr	Principal Arterial	1769	3690	0.48	A	PASS	2311	3690	0.63	B	PASS	2400	3690	0.65	B	PASS	
3025	College Way	Riverside Dr	Urban Ave	Principal Arterial	2178	4050	0.54	A	PASS	2791	4050	0.69	B	PASS	2792	4050	0.69	B	PASS	
3026	College Way	Urban Ave	Leigh Way	Principal Arterial	2441	4050	0.60	B	PASS	3018	4050	0.75	C	PASS	2939	4050	0.73	C	PASS	
3027	College Way	Leigh Way	Continental Pl	Principal Arterial	2148	4050	0.53	A	PASS	2705	4050	0.67	B	PASS	2646	4050	0.65	B	PASS	
3028	College Way	Continental Pl	18th St	Principal Arterial	2152	4050	0.53	A	PASS	2735	4050	0.68	B	PASS	2604	4050	0.64	B	PASS	
3029	College Way	18th St	Laventure Rd	Principal Arterial	1859	4050	0.46	A	PASS	2423	4050	0.60	A	PASS	2413	4050	0.60	A	PASS	
3030	College Way	Laventure Rd	30th St	Principal Arterial	1466	4050	0.36	A	PASS	1998	4050	0.49	A	PASS	1877	4050	0.46	A	PASS	
3031	College Way	30th St	Waugh Rd	Principal Arterial	1089	4050	0.27	A	PASS	1542	4050	0.38	A	PASS	1450	4050	0.36	A	PASS	
3032	College Way	Waugh Rd	Skagit Highlands Pkwy	Principal Arterial	708	1710	0.41	A	PASS	1042	1710	0.61	B	PASS	1013	1710	0.59	A	PASS	
3033	College Way	Skagit Highlands Pkwy	SR 9	Principal Arterial	697	2070	0.34	A	PASS	951	2070	0.46	A	PASS	963	2070	0.47	A	PASS	
3034	Kincaid St	2nd St	3rd St	Principal Arterial	578	3240	0.18	A	PASS	765	3240	0.24	A	PASS	714	3240	0.22	A	PASS	
3035	Kincaid St	3rd St	I-5 SB on/off ramp	Principal Arterial	1390	3690	0.38	A	PASS	1654	3690	0.45	A	PASS	1653	3690	0.45	A	PASS	
3036	Kincaid St	I-5 SB on/off ramp	I-5 NB on/off ramp	Principal Arterial	1386	3690	0.38	A	PASS	1652	3690	0.45	A	PASS	1685	3690	0.46	A	PASS	
3037	3rd St	Kincaid St	Myrtle	Principal Arterial	869	2070	0.42	A	PASS	943	2070	0.46	A	PASS	933	2070	0.45	A	PASS	
3038	3rd St	Myrtle	Gates	Principal Arterial	840	1540	0.55	A	PASS	940	1540	0.61	B	PASS	931	1540	0.60	B	PASS	
3039	3rd St	Gates	Montgomery	Principal Arterial	724	1200	0.60	B	PASS	787	1200	0.66	B	PASS	784	1200	0.65	B	PASS	
3040	3rd St	Montgomery	Freeway Dr	Principal Arterial	830	2070	0.40	A	PASS	948	2070	0.46	A	PASS	961	2070	0.46	A	PASS	
3041	Anderson Rd	Old SR 99	Henson Rd	Principal Arterial	442	2070	0.21	A	PASS	545	2070	0.26	A	PASS	589	2070	0.28	A	PASS	
3042	Anderson Rd	Henson Rd	I-5 SB on/off ramp	Principal Arterial	581	1200	0.48	A	PASS	608	1200	0.51	A	PASS	715	1200	0.60	A	PASS	
3043	Anderson Rd	I-5 SB on/off ramp	I-5 NB on/off ramp	Principal Arterial	656	1200	0.55	A	PASS	724	1200	0.60	B	PASS	775	1200	0.65	B	PASS	
3044	Anderson Rd	I-5 NB on/off ramp	Cedardale Rd	Principal Arterial	845	1200	0.70	C	PASS	1233	1200	1.03	F	FAIL	1274	1540	0.83	D	PASS	Complete nonmotorized facilities
3045	Anderson Rd	Cedardale Rd	Blodgett	Principal Arterial	573	3690	0.16	A	PASS	899	3690	0.24	A	PASS	905	3690	0.25	A	PASS	
3046	Anderson Rd	Blodgett	Laventure Rd	Principal Arterial	465	2250	0.21	A	PASS	846	2250	0.38	A	PASS	858	2250	0.38	A	PASS	
3047	Laventure Rd	Laventure Rd	Blackburn Rd	Principal Arterial	503	2250	0.22	A	PASS	884	2250	0.39	A	PASS	896	2250	0.40	A	PASS	
3048	Laventure Rd	Blackburn Rd	Section St	Principal Arterial	611	2250	0.27	A	PASS	1014	2250	0.45	A	PASS	907	2250	0.40	A	PASS	
3049	Laventure Rd	Section St	E Division St	Principal Arterial	707	1710	0.41	A	PASS	862	1710	0.50	A	PASS	811	1710	0.47	A	PASS	
3050	Laventure Rd	E Division St	Fir St	Principal Arterial	878	1200	0.73	C	PASS	978	1200	0.81	D	PASS	989	1200	0.82	D	PASS	
3051	Laventure Rd	Fir St	Roosevelt Ave	Principal Arterial	924	1200	0.77	C	PASS	1042	1200	0.87	D	PASS	1072	1200	0.89	D	PASS	
3052	Laventure Rd	Roosevelt Ave	College Way	Principal Arterial	950	1200	0.79	C	PASS	1091	1540	0.71	C	PASS	1122	1540	0.73	C	PASS	
3053	Laventure Rd	College Way	Hoag Rd	Principal Arterial	813	2250	0.36	A	PASS	1151	2250	0.51	A	PASS	1253	2250	0.56	A	PASS	
3054	[reserved]	[reserved]	[reserved]	[reserved]	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
4001	Freeway Dr	SR 536/Division St	Cameron Way	Minor Arterial	1336	1760	0.76	C	PASS	1511	1760	0.86	D	PASS	1495	1760	0.85	D	PASS	
4002	Freeway Dr	Cameron Way	College Way	Minor Arterial	934	1290	0.72	C	PASS	1146	1290	0.89	D	PASS	1084	1440	0.75	C	PASS	
4003	Freeway Dr	College Way	Commercial St	Minor Arterial	1116	2000	0.56	A	PASS	1327	2000	0.66	B	PASS	1321	2000	0.66	B	PASS	

Segment ID	Name	Cross Street A	Cross Street B	Roadway Classification	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	IMPROVEMENT
					EXISTING 2015 CONDITIONS					2036 W/O IMPROVEMENTS					2036 W/ IMPROVEMENTS					
4004	Freeway Dr	Commercial St	Stewart Rd	Minor Arterial	498	2000	0.25	A	PASS	597	2000	0.30	A	PASS	564	2000	0.28	A	PASS	
4005	Stewart Rd	Freeway Dr	Market St	Minor Arterial	663	1440	0.46	A	PASS	872	1440	0.61	B	PASS	837	1440	0.58	A	PASS	
4006	Stewart Rd	Market St	Riverside off	Minor Arterial	700	1440	0.49	A	PASS	911	1440	0.63	B	PASS	896	1440	0.62	B	PASS	
4007	Stewart Rd	Riverside off	Riverside on	Minor Arterial	316	1440	0.22	A	PASS	424	1440	0.29	A	PASS	406	1440	0.28	A	PASS	
4008	Hoag Rd	Riverside on	Urban Ave	Minor Arterial	880	1920	0.46	A	PASS	1136	1920	0.59	A	PASS	1213	1920	0.63	B	PASS	
4009	Hoag Rd	Urban Ave	Continental Pl	Minor Arterial	1020	1290	0.79	C	PASS	1373	1290	1.06	F	FAIL	1414	1920	0.74	C	PASS	Complete nonmotorized facilities
4010	Hoag Rd	Continental Pl	Laventure Rd	Minor Arterial	958	1440	0.67	B	PASS	1282	1440	0.89	D	PASS	1343	1920	0.70	B	PASS	
4011	E Martin Rd	Laventure Rd	30th St	Minor Arterial	344	1440	0.24	A	PASS	645	1440	0.45	A	PASS	747	1440	0.52	A	PASS	
4012	E Martin Rd	30th St	E Martin Rd	Minor Arterial	233	1290	0.18	A	PASS	511	1290	0.40	A	PASS	565	1440	0.39	A	PASS	
4013	Cameron Way	Freeway Dr	Rail crossing	Minor Arterial	711	2000	0.36	A	PASS	844	2000	0.42	A	PASS	753	2000	0.38	A	PASS	
4014	Fir St	Rail crossing	N 4th St	Minor Arterial	740	2000	0.37	A	PASS	838	2000	0.42	A	PASS	779	2000	0.39	A	PASS	
4015	Fir St	N 4th St	6th St	Minor Arterial	818	2000	0.41	A	PASS	1072	2000	0.54	A	PASS	1045	2000	0.52	A	PASS	
4016	Fir St	6th St	15th St	Minor Arterial	847	2000	0.42	A	PASS	1096	2000	0.55	A	PASS	1065	2000	0.53	A	PASS	
4017	Fir St	15th St	18th St	Minor Arterial	746	2000	0.37	A	PASS	1034	2000	0.52	A	PASS	965	2000	0.48	A	PASS	
4018	Fir St	18th St	Laventure Rd	Minor Arterial	685	2000	0.34	A	PASS	968	2000	0.48	A	PASS	911	2000	0.46	A	PASS	
4019	Fir St	Laventure Rd	30th St	Minor Arterial	499	1520	0.33	A	PASS	688	1520	0.45	A	PASS	712	1520	0.47	A	PASS	
4020	Fir St	30th St	Waugh Rd	Minor Arterial	221	1520	0.15	A	PASS	421	1520	0.28	A	PASS	447	1520	0.29	A	PASS	
4021	Fulton St	N 4th St	6th St	Minor Arterial	544	1440	0.38	A	PASS	628	1440	0.44	A	PASS	616	1440	0.43	A	PASS	
4022	6th St	Fulton St	E Division St	Minor Arterial	574	1440	0.40	A	PASS	734	1440	0.51	A	PASS	718	1440	0.50	A	PASS	
4023	E Division St	6th St	15th St	Minor Arterial	784	1920	0.41	A	PASS	893	1920	0.47	A	PASS	940	1920	0.49	A	PASS	
4024	E Division St	15th St	18th St	Minor Arterial	968	1920	0.50	A	PASS	1068	1920	0.56	A	PASS	1046	1920	0.54	A	PASS	
4025	E Division St	18th St	Laventure Rd	Minor Arterial	1072	2000	0.54	A	PASS	1203	2000	0.60	B	PASS	1190	2000	0.60	A	PASS	
4026	E Division St	Laventure Rd	30th St	Minor Arterial	914	2000	0.46	A	PASS	1182	2000	0.59	A	PASS	1105	2000	0.55	A	PASS	
4027	E Division St	30th St	Digby Rd	Minor Arterial	606	2000	0.30	A	PASS	908	2000	0.45	A	PASS	828	2000	0.41	A	PASS	
4028	E Division St	Digby Rd	Waugh Rd	Minor Arterial	564	2000	0.28	A	PASS	858	2000	0.43	A	PASS	854	2000	0.43	A	PASS	
4029	E Division St	Waugh Rd	Burlingame Rd	Minor Arterial	512	1440	0.36	A	PASS	952	1440	0.66	B	PASS	1068	1440	0.74	C	PASS	
4030	Mt Vernon Big Lake Rd	Burlingame Rd	Mountain View Rd	Minor Arterial	0	1290	0.00	A	PASS	0	1290	0.00	A	PASS	351	1290	0.27	A	PASS	
4031	Mt Vernon Big Lake Rd	Mountain View Rd	SR 9	Minor Arterial	185	1290	0.14	A	PASS	314	1290	0.24	A	PASS	353	1290	0.27	A	PASS	
4032	Broad St	I-5 NB on/off ramp	Blodgett	Minor Arterial	1364	3040	0.45	A	PASS	1557	3040	0.51	A	PASS	1499	3040	0.49	A	PASS	
4033	Broad St	9th St	15th St	Minor Arterial	1094	1440	0.76	C	PASS	1260	1440	0.88	D	PASS	1205	1440	0.84	D	PASS	
4034	Section St	15th St	18th St	Minor Arterial	441	1440	0.31	A	PASS	588	1440	0.41	A	PASS	572	1440	0.40	A	PASS	
4035	Section St	18th St	Laventure Rd	Minor Arterial	510	1440	0.35	A	PASS	667	1440	0.46	A	PASS	639	1440	0.44	A	PASS	
4036	Section St	Laventure Rd	30th St	Minor Arterial	653	1440	0.45	A	PASS	936	1440	0.65	B	PASS	807	1520	0.53	A	PASS	
4037	Section St	30th St	Digby Rd	Minor Arterial	432	1440	0.30	A	PASS	672	1440	0.47	A	PASS	561	1440	0.39	A	PASS	
4038	Blackburn Rd	Old SR 99	Henson Rd	Minor Arterial	409	1290	0.32	A	PASS	543	1290	0.42	A	PASS	498	1290	0.39	A	PASS	
4039	Blackburn Rd	Henson Rd	Cedardale Rd	Minor Arterial	449	1290	0.35	A	PASS	679	1290	0.53	A	PASS	630	1290	0.49	A	PASS	
4040	Blackburn Rd	Cedardale Rd	15th St	Minor Arterial	545	1440	0.38	A	PASS	782	1440	0.54	A	PASS	788	1440	0.55	A	PASS	
4041	Blackburn Rd	15th St	18th St	Minor Arterial	433	1440	0.30	A	PASS	473	1440	0.33*	A	PASS*	514	1440	0.36	A	PASS	
4042	Blackburn Rd	18th St	Laventure Rd	Minor Arterial	288	1440	0.20	A	PASS	379	1440	0.26*	A	PASS*	401	1440	0.28	A	PASS	

Segment ID	Name	Cross Street A	Cross Street B	Roadway Classification	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	IMPROVEMENT
					EXISTING 2015 CONDITIONS					2036 W/O IMPROVEMENTS					2036 W/ IMPROVEMENTS					
4043	Blackburn Rd	Laventure Rd	Little Mtn Rd/30th St	Minor Arterial	213	1290	0.17	A	PASS	621	1290	0.48*	A	PASS*	752	1520	0.49	A	PASS	
4044	[reserved]	[reserved]	[reserved]	[reserved]	0	#N/A	#N/A	#N/A	#N/A	0	#N/A	#N/A	#N/A	#N/A	343	1440	0.24	A	PASS	
4045	Waugh Rd	Division St	Broadway	Minor Arterial	182	1440	0.13	A	PASS	587	1440	0.41	A	PASS	686	1440	0.48	A	PASS	
4046	Waugh Rd	Division St	Fir St	Minor Arterial	295	1440	0.20	A	PASS	673	1440	0.47	A	PASS	710	1440	0.49	A	PASS	
4047	Waugh Rd	Fir St	College Way	Minor Arterial	351	1440	0.24	A	PASS	705	1440	0.49	A	PASS	763	1440	0.53	A	PASS	
4048	E Martin Rd (N-S section)	College Way	E Martin Rd (E-W)	Minor Arterial	195	1440	0.14	A	PASS	466	1440	0.32	A	PASS	516	1440	0.36	A	PASS	
4049	Wall St	Division St	McLean Rd	Minor Arterial	572	1290	0.44	A	PASS	717	1290	0.56	A	PASS	715	1290	0.55	A	PASS	
4050	Conway Rd	Hickox Rd/Old SR 99	West Stackpole	Minor Arterial	0	1290	0.00	A	PASS	0	1290	0.00	A	PASS	0	1290	0.00	A	PASS	
4051	Conway Rd	West Stackpole	Peter Johnson	Minor Arterial	0	1290	0.00	A	PASS	0	1290	0.00	A	PASS	0	1290	0.00	A	PASS	
4052	Conway Rd	Peter Johnson	Fir Island Rd	Minor Arterial	0	1290	0.00	A	PASS	0	1290	0.00	A	PASS	0	1290	0.00	A	PASS	
4059	Broad St	Blodgett	9th St	Minor Arterial	1314	1440	0.91	E	FAIL	1495	1440	1.04	F	FAIL	1438	1920	0.75	C	PASS	Access restrictions, RIRO
4060	McLean Rd	Wall St	West growth boundary	Minor Arterial	580	1290	0.45	A	PASS	725	1290	0.56	A	PASS	723	1290	0.56	A	PASS	
4061	Broadway	Digby Rd	Waugh Rd	Minor Arterial	139	1440	0.10	A	PASS	357	1440	0.25	A	PASS	235	1440	0.16	A	PASS	
4062	Digby Rd	Section St	Division St	Minor Arterial	231	1290	0.18	A	PASS	301	1290	0.23	A	PASS	323	1290	0.25	A	PASS	
4063	Waugh Rd	Broadway	Eaglemont Dr	Minor Arterial	166	1920	0.09	A	PASS	628	1920	0.33	A	PASS	676	1920	0.35	A	PASS	
5001	Blackburn Rd	Old SR 99	Britt Rd	Urban Collector	160	1170	0.14	A	PASS	231	1170	0.20	A	PASS	231	1170	0.20	A	PASS	
5002	Britt Rd	Blackburn Rd	Hazel Rd	Urban Collector	63	1050	0.06	A	PASS	86	1050	0.08	A	PASS	87	1050	0.08	A	PASS	
5003	Hazel St / 1st St	Britt Rd	2nd St	Urban Collector	222	1050	0.21	A	PASS	274	1050	0.26	A	PASS	276	1050	0.26	A	PASS	
5005	Section St	Cleveland	2nd St	Urban Collector	103	1170	0.09	A	PASS	113	1170	0.10	A	PASS	105	1170	0.09	A	PASS	
5006	Section St	2nd St	3rd St	Urban Collector	89	1170	0.08	A	PASS	146	1170	0.13	A	PASS	145	1170	0.12	A	PASS	
5007	Section St	3rd St	6th St	Urban Collector	143	1170	0.12	A	PASS	143	1170	0.12	A	PASS	400	1170	0.34	A	PASS	
5008	3rd St	Section St	Kincaid St	Urban Collector	414	1170	0.35	A	PASS	559	1170	0.48	A	PASS	563	1170	0.48	A	PASS	
5009	Cleveland	Section St	Kincaid St	Urban Collector	569	1170	0.49	A	PASS	692	1170	0.59	A	PASS	698	1170	0.60	A	PASS	
5010	Kincaid St	Celeveland	2nd St	Urban Collector	444	1550	0.29	A	PASS	608	1550	0.39	A	PASS	572	1550	0.37	A	PASS	
5011	1st St	Kincaid St	Myrtle	Urban Collector	610	1170	0.52	A	PASS	745	1170	0.64	B	PASS	726	1170	0.62	B	PASS	
5012	1st St	Myrtle	Gates	Urban Collector	599	1170	0.51	A	PASS	668	1170	0.57	A	PASS	678	1170	0.58	A	PASS	
5013	1st St	Gates	Montgomery	Urban Collector	672	1170	0.57	A	PASS	790	1170	0.68	B	PASS	797	1170	0.68	B	PASS	
5014	1st St	Montgomery	SR 536/Division	Urban Collector	729	1550	0.47	A	PASS	839	1550	0.54	A	PASS	861	1550	0.56	A	PASS	
5015	N Wall St	SR 536/Division St	Lincoln St	Urban Collector	109	1050	0.10	A	PASS	240	1050	0.23	A	PASS	277	1050	0.26	A	PASS	
5016	Market St	College Way	Commercial St	Urban Collector	789	1550	0.51	A	PASS	878	1550	0.57	A	PASS	842	1550	0.54	A	PASS	
5017	Market St	Commercial St	Pacific Pl	Urban Collector	335	1170	0.29	A	PASS	355	1170	0.30	A	PASS	354	1170	0.30	A	PASS	
5018	Market St	Pacific Pl	Stewart Rd	Urban Collector	429	1170	0.37	A	PASS	524	1170	0.45	A	PASS	526	1170	0.45	A	PASS	
5019	Pacific Pl	Market St	Riverside Dr	Urban Collector	292	1170	0.25	A	PASS	408	1170	0.35	A	PASS	391	1170	0.33	A	PASS	
5020	Pacific Pl	Riverside Dr	Urban Ave	Urban Collector	500	1550	0.32	A	PASS	573	1550	0.37	A	PASS	568	1550	0.37	A	PASS	
5021	Commercial St	Market St	Riverside Dr	Urban Collector	248	1550	0.16	A	PASS	218	1550	0.14	A	PASS	260	1550	0.17	A	PASS	
5022	Commercial St	Riverside Dr	Urban Ave	Urban Collector	282	1550	0.18	A	PASS	366	1550	0.24	A	PASS	408	1550	0.26	A	PASS	
5023	[reserved]	[reserved]	[reserved]	[reserved]	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
5024	[reserved]	[reserved]	[reserved]	[reserved]	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
5025	Urban Ave	College Way	Commercial St	Urban Collector	569	1050	0.54	A	PASS	793	1050	0.75	C	PASS	832	1050	0.79	C	PASS	

Segment ID	Name	Cross Street A	Cross Street B	Roadway Classification	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	IMPROVEMENT
					EXISTING 2015 CONDITIONS					2036 W/O IMPROVEMENTS					2036 W/ IMPROVEMENTS					
5026	Urban Ave	Commercial St	Pacific Pl	Urban Collector	245	1050	0.23	A	PASS	319	1050	0.30	A	PASS	297	1050	0.28	A	PASS	
5027	Urban Ave	Pacific Pl	Hoag Rd	Urban Collector	392	1550	0.25	A	PASS	449	1550	0.29	A	PASS	418	1550	0.27	A	PASS	
5028	Leigh Way	Roosevelt Ave	College Way	Urban Collector	0	1550	0.00	A	PASS	20	1550	0.01	A	PASS	0	1550	0.00	A	PASS	
5029	Continental Pl	Roosevelt Ave	College Way	Urban Collector	285	1550	0.18	A	PASS	304	1550	0.20	A	PASS	307	1550	0.20	A	PASS	
5030	Continental Pl	College Way	Hoag Rd	Urban Collector	192	1170	0.16	A	PASS	215	1170	0.18	A	PASS	178	1170	0.15	A	PASS	
5032	[reserved]	[reserved]	[reserved]	[reserved]	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
5033	[reserved]	[reserved]	[reserved]	[reserved]	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
5034	Roosevelt Ave	Leigh Way	Continental Pl	Urban Collector	0	1550	0.00	A	PASS	20	1550	0.01	A	PASS	181	1550	0.12	A	PASS	
5035	Roosevelt Ave	Continental Pl	18th St	Urban Collector	290	1550	0.19	A	PASS	392	1550	0.25	A	PASS	478	1550	0.31	A	PASS	
5036	[reserved]	[reserved]	[reserved]	[reserved]	0	#N/A	#N/A	#N/A	#N/A	0	#N/A	#N/A	#N/A	#N/A	0	1550	0.00	A	PASS	
5037	15th St	Blackburn Rd	Section St	Urban Collector	96	1170	0.08	A	PASS	317	1170	0.27	A	PASS	299	1170	0.26	A	PASS	
5038	15th St	Section St	Broad St	Urban Collector	512	1170	0.44	A	PASS	603	1170	0.52	A	PASS	677	1170	0.58	A	PASS	
5039	15th St	Broad St	E Division St	Urban Collector	510	1170	0.44	A	PASS	650	1170	0.56	A	PASS	730	1170	0.62	B	PASS	
5040	15th St	E Division St	Fir St	Urban Collector	225	1170	0.19	A	PASS	279	1170	0.24	A	PASS	258	1170	0.22	A	PASS	
5041	18th St	Blackburn Rd	Section St	Urban Collector	281	1170	0.24	A	PASS	499	1170	0.43	A	PASS	457	1170	0.39	A	PASS	
5042	18th St	Section St	E Division St	Urban Collector	343	1240	0.28	A	PASS	673	1240	0.54	A	PASS	635	1240	0.51	A	PASS	
5043	18th St	E Division St	Fir St	Urban Collector	570	1170	0.49	A	PASS	798	1170	0.68	B	PASS	766	1170	0.66	B	PASS	
5044	18th St	Fir St	Roosevelt Ave	Urban Collector	709	1170	0.61	B	PASS	967	1170	0.83	D	FAIL	948	1240	0.76	C	PASS	Complete nonmotorized facilities
5045	18th St	Roosevelt Ave	College Way	Urban Collector	629	1550	0.41	A	PASS	801	1550	0.52	A	PASS	695	1550	0.45	A	PASS	
5046	N Laventure Rd	Hoag Rd	30th St	Urban Collector	625	1550	0.40	A	PASS	956	1550	0.62	B	PASS	955	1550	0.62	B	PASS	
5047	[reserved]	[reserved]	[reserved]	[reserved]	0	#N/A	#N/A	#N/A	#N/A	0	#N/A	#N/A	#N/A	#N/A	0	1240	0.00	A	PASS	
5048	30th St	Dakota Dr	Division St	Urban Collector	71	1170	0.06	A	PASS	108	1170	0.09	A	PASS	108	1170	0.09	A	PASS	
5049	30th St	Division St	Fir St	Urban Collector	429	1050	0.41	A	PASS	488	1050	0.46	A	PASS	480	1170	0.41	A	PASS	
5050	30th St	Fir St	College Way	Urban Collector	368	1170	0.31	A	PASS	491	1170	0.42	A	PASS	492	1170	0.42	A	PASS	
5051	30th St	College Way	Martin Rd	Urban Collector	163	1240	0.13	A	PASS	238	1240	0.19	A	PASS	205	1240	0.16	A	PASS	
5052	30th St	Martin Rd	Francis Rd	Urban Collector	180	1240	0.15	A	PASS	399	1240	0.32	A	PASS	401	1240	0.32	A	PASS	
5053	Francis Rd	30th St	Swan Rd	Urban Collector	551	1050	0.52	A	PASS	891	1050	0.85	D	FAIL	889	1170	0.76	C	PASS	Complete nonmotorized facilities
5054	Little Mtn Rd	West Big Lk Rd	Ervine Lane	Urban Collector	0	1050	0.00	A	PASS	0	1050	0.00	A	PASS	0	1050	0.00	A	PASS	
5055	[reserved]	[reserved]	[reserved]	[reserved]	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
5056	Little Mtn Rd	Ervine Lane	Blackburn Rd	Urban Collector	123	1050	0.12	A	PASS	183	1050	0.17	A	PASS	184	1050	0.18	A	PASS	
5057	[reserved]	[reserved]	[reserved]	[reserved]	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
5058	Cedardale Rd	Mt Vernon Rd	Hickox Rd	Urban Collector	171	1050	0.16	A	PASS	210	1050	0.20	A	PASS	208	1050	0.20	A	PASS	
5059	Cedardale Rd	Hickox Rd	Anderson Rd	Urban Collector	209	1050	0.20	A	PASS	260	1050	0.25	A	PASS	258	1050	0.25	A	PASS	
5060	Cedardale Rd	Anderson Rd	Blodgett	Urban Collector	177	1050	0.17	A	PASS	235	1050	0.22	A	PASS	266	1050	0.25	A	PASS	
5061	E Hickox Rd	Cedardale Rd	Burkland Rd	Urban Collector	130	1050	0.12	A	PASS	172	1050	0.16	A	PASS	170	1050	0.16	A	PASS	
5062	E Hickox Rd	Burkland Rd	Blodgett	Urban Collector	58	1050	0.06	A	PASS	115	1050	0.11	A	PASS	117	1050	0.11	A	PASS	
5063	E Hickox Rd	Blodgett	East Stackpole	Urban Collector	149	1050	0.14	A	PASS	153	1050	0.15	A	PASS	153	1050	0.15	A	PASS	
5064	[reserved]	[reserved]	[reserved]	[reserved]	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
5065	Blodgett	E Hickox Rd	Anderson Rd	Urban Collector	155	1050	0.15	A	PASS	111	1050	0.11	A	PASS	110	1050	0.10	A	PASS	
5066	Blodgett	Anderson Rd	Cedardale Rd	Urban Collector	39	1050	0.04	A	PASS	39	1050	0.04	A	PASS	39	1050	0.04	A	PASS	

Segment ID	Name	Cross Street A	Cross Street B	Roadway Classification	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	Volume	Capacity	V/C	LOS	LOS Pass/Fail	IMPROVEMENT
					EXISTING 2015 CONDITIONS					2036 W/O IMPROVEMENTS					2036 W/ IMPROVEMENTS					
5067	Hickox Rd	Dike Rd	Old SR 99	Urban Collector	19	1050	0.02	A	PASS	17	1050	0.02	A	PASS	17	1050	0.02	A	PASS	
5078	Blodgett	Cedardale Rd	Blackburn Rd	Urban Collector	205	1390	0.15	A	PASS	271	1390	0.20	A	PASS	289	1390	0.21	A	PASS	
5082	Skagit Highlands Pkwy	Division St	College Way	Urban Collector	214	1630	0.13	A	PASS	339	1630	0.21	A	PASS	296	1630	0.18	A	PASS	
5083	Broadway St	Waugh Rd	Burlingame Rd	Minor Arterial	2831	6000	0.47	A	PASS	3837	6000	0.64	B	PASS	0	1440	0.00	A	PASS	
5084	I-5 Frontage Rd	Kincaid St	Section St	Urban Collector	2766	4000	0.69	B	PASS	3615	4000	0.90	E	FAIL	0	1170	0.00	A	PASS	

- See page 40 of the Transportation Element that describes the VMT LOS determinations that the City has. These projects fail with new growth traffic with the VMT LOS.