DRAFT REPORT

City of Centralia Comprehensive Plan Transportation Element Update

Prepared for

City of Centralia

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JACOBS ch2m

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SECTION 1

Introduction

The City of Centralia was settled in 1852 along the junction of the Chehalis and Skookumchuck Rivers. Once known as a "Hub City," or midway point, between Seattle and Portland, major rail routes transferred in Centralia to transport goods across the state. Rail industry and passenger trains spurred local economic activity. The Port of Centralia's industrial parks continue to drive economic and freight activity between Portland and Seattle. Recreational open spaces and attractions, such as Borst Park, the Factory Outlets, and Downtown, continue to draw visitors throughout the region. Population and employment are anticipated to increase placing an increasing demand for quality transportation infrastructure. The purpose of the Transportation Element Update of the Comprehensive Plan is to document the conditions of transportation system(s) in the City of Centralia while planning for preservation of an efficient and functional transportation network. The Transportation Element Update updates the transportation solutions list from 2007, identifies new improvements, and prioritizes amongst all project solutions.

The Transportation Element is compliant with existing federal, state and local policies. It is compliant with the elements of the Growth Management Act (GMA) and it is consistent with safety design standards implemented by the Washington State Department of Transportation (WSDOT). The Transportation Element is also consistent with Lewis County Planning and Development goals, the Lewis County Arterial Analysis Study, Parks and Open Space Plan, and the WSDOT Master Transportation Plan.

The study area for the Centralia Transportation Element update includes the area within the city limits of Centralia as well as the designated Urban Growth Area (UGA). The city of Centralia is located approximately 25 miles south of Olympia and 42 miles North of Kelso along Interstate 5 (I-5) in Washington. All roadway facilities in the study area fall under the jurisdiction of the City of Centralia, Lewis County or the Washington State Department of Transportation (WSDOT). I-5 and SR 507 are state highway facilities located within the study area. The study area is primarily level terrain with some rising elevations in the eastern portion of the study area. The confluence of the Chehalis and Skookumchuck Rivers are located within the study area as well as Borst, Hayes and Plumber lakes. Centralia contains some significant floodplain areas. Existing land uses include: commercial, industrial, low and medium density residential, public facilities and parks and open space.

Commercial development is mostly concentrated in three areas: near the Harrison and Mellen interchanges, in the Central Business District (CBD), and in the southeast portion of the city near Gold Street and Kresky Avenue. Industrial land is primarily located along Harrison Avenue, west of I-5 in the northeastern portion of the city. Other industrial areas are located south and outside the city limits within the UGA along Old Highway 99.

Residential is the primary land use when measured by acreage within the city. Significant residential concentrations are located in the southwest portion of the city, west of the Chehalis River, surrounding the CBD, and to the east of the CBD and rail lines. Public facilities are dispersed throughout the city with only Centralia High School located outside the city limits, but within the designated UGA.

SECTION 2

Goals and Policies

The goals and policies are consistent with the mandatory elements of the GMA while meeting the corresponding transportation element policy requirements. The GMA requires that comprehensive plans include a transportation element which is consistent with relevant Countywide Planning Policies (CCWPs) and the Revised Code of Washington (RCW) 36.70A.070(6).

2.1 General

Goal T-1 Provide a safe, convenient and economical circulation system for all modes of transportation.

Policy T-1.1 Provide arterial streets which are of sufficient width and number to handle anticipated traffic loads.

Policy T-1.2 Circulation system improvement on arterials should be designed to promote maximum traffic flow efficiency and safety.

Policy T-1.3 Ensure that all streets and sidewalks meet City standards in newly developed areas, and encourage the construction of sidewalks in newly developed areas.

Policy T-1.4 Upgrade existing City streets and walkways which do not meet adopted standards, consistent with available funding.

Policy T-1.5 Design arterials and local access streets to meet functional requirements and be consistent with the character of the surrounding area.

Policy T-1.6 Require all street and transportation related design and construction to follow adopted Development Guidelines and Public Works Standards.

Policy T-1.7 Require dedication of adequate right-of-way to accommodate future traffic volumes, when development occurs adjacent to arterials, and require construction of new local access streets and/or widening of existing rights-of-way as may be warranted in conjunction with land use or development decisions.

Policy T-1.8 Encourage street improvements to City standards when utility mainline extensions or improvements are made.

Policy T-1.9 Discourage private road development within the City except as may be incorporated in planned unit developments provided the structural road section meets minimum City street design standards.

Policy T-1.10 Establish and amend, as appropriate, uniform and fair administrative policies, procedures and directives to deal with the operation and administration of street and transportation systems.

Policy T-1.11 Require the installation or development of sidewalks, curbs, gutters, street lighting, bicycle paths or other such improvements when new development occurs.

Policy T-1.12 Require developers to contribute their fair share of necessary off-site transportation improvements. Require developers to pay all costs for on-site, contiguous or frontage improvements, as well as other new traffic improvements that may be necessary, or required by, or as a result of, the development.

Policy T-1.13 Within the constraints of funding sources and grants, fund road improvements according to the following priority: 1) maintain the existing arterial and collector road network; 2) make spot improvements to existing streets that enhance safety and capacity; 3) construct new roads and streets, and 4) make necessary storm drainage improvements.

2.2 Street Classification

Goal T-2 Maintain street classification standards compliant with the federal and state agencies.

Policy T-2.1 Classify all City streets as Principal Arterials, Minor Arterials, Major Collectors, Minor Collectors or local roads, consistent with federal/regional/state classification systems, as follows:

Policy T-2.2

a. Locate and design Principal Arterials to handle large traffic volumes and freight passing through the City or traveling for considerable distances (generally in excess of two miles) within the City;

b. Locate and design Minor Arterials to handle moderate traffic volumes traveling over relatively short distances within the City, or to Principal Arterial streets as part of longer trips;

c. Locate and design Principal Arterials and Minor Arterials to pass around rather than through cohesive residential areas wherever possible;

d. Locate and design Major and Minor Collectors to pick up traffic from within cohesive residential areas and feed it to the Principal Arterial and Minor Arterial street system, and not to carry through traffic.

e. Design local roads in such a manner as to provide convenient access to adjacent properties and to discourage through traffic movements.

The City's adopted functional classification system shall be as shown on the Washington State Functional Classification Map Application.

2.3 Circulation System – Residential

Goal T-3 Provide an adequate residential circulation system.

Policy T-3.1 Establish a street system that promotes and maintains the integrity of neighborhoods and discourages industrial and commercial traffic from passing through residential areas.

Policy T-3.2 Identify traffic problems and facilitate their improvement.

Policy T-3.3 Coordinate transportation improvements and plans with emergency services, such as fire and police services.

2.4 Circulation System – Non-Residential

Goal T-4 Encourage provision of terminal facilities for inter-City rail and truck lines which are adequate to assure that the goods distribution needs of local industries, businesses and residences are fully met in a fashion compatible with other City goals and policies.

Policy T-4.1 Provide local vehicular access to arterials while minimizing the number of curb cuts and conflicts with through traffic.

Policy T-4.2 Design and maintain designated truck routes to accommodate freight truck traffic.

2.5 Barrier Free

Goal T-5 Provide adequate barrier free transportation facilities.

T-5.1 Design and construct transportation facilities to be barrier-free and easily accessible to all citizens, consistent with the American with Disabilities Act.

2.6 Level of Service and Concurrency

Goal T-6 Provide a transportation system at level of service (LOS) which will accommodate planned future growth within the City and their adopted UGAs.

Goal T-7 Maintain and monitor transportation Level of Service (LOS) standards for Centralia roadways and intersections. LOS will be measured by volume/capacity on roadways and delay at intersections.

Goal T-8 The City adopts LOS standard D for Centralia roadways and intersections.

Goal T-9 As mandated by state law, the City of Centralia adopts LOS standard D for all state highways (including highways of statewide significance), or whichever LOS is currently adopted by the Washington State Department of Transportation, consistent with the regional transportation plan. In Centralia, state routes include I-5 and SR 507.

Goal T-10 Consider mobility options (transit use, demand management, walking and bicycling) in relation to LOS standards and to relieve congestion where appropriate.

Goal T-11 The City will coordinate with Lewis County and other jurisdictions regarding designation and adoption of regional LOS standards for identified regional roadway facilities.

Goal T-12 If transportation improvements needed to maintain adopted LOS standards are not able to be funded, the City shall:

- Phase development consistent with the land use plan until such time that adequate resources can be identified to provide adequate transportation improvements; or
- Reassess the City's land use plan to reduce the travel demand placed on the system to the degree necessary to meet adopted transportation LOS standards; or
- Reassess the City's adopted LOS standards to reflect service levels that can be maintained given known financial resources.

Goal T-13 Projects shall be considered funded pursuant to Goal TG-3.6 when:

- Incorporated into the adopted City budget, or
- Upon grant agreement, or
- Upon developer agreement, or
- Upon a legally enforceable mechanism, such as a local improvement district, or
- Some combination of the above.

Goal T-14 Require that new development shall be allowed only if (1) all transportation facilities are adequate at the time of development and transportation impacts will not negatively impact or reduce LOS elsewhere or (2) a financial commitment is in place to complete the necessary improvements or strategies to accommodate transportation impacts within six years, in order to protect investment in and the efficiency of existing transportation facilities and services and promote compact growth.

Goal T-15 Require developers if needed to conduct traffic studies or analyses, as decided at pre-application meeting(s) or per the City Engineer, to determine development impacts on the transportation system.

Goal T-16 Consider establishment of a system for collecting traffic mitigation fees and require developers to mitigate development impact through improvements or strategies such as walking and bicycling, transit, ridesharing or transportation demand management, where practicable.

2.7 Pedestrian and Bicycle Travel

Goal T-17 Provide a sufficient walking and bicycling transportation system.

Policy T-17.1 Incorporate planned new sidewalks and bicycle facilities, and provide for such facilities with street improvement projects.

Policy T-17.2 Design streets with features that encourage walking and bicycling.

Policy T-17.3 Provide sidewalks and pedestrian crossings where arterial or collector streets bisect residential areas (in order to retain neighborhood cohesion).

2.8 Parking

Goal T-18 Encourage parking patterns from impacting circulation near corridors.

Policy T-18.1 Reduce congestion and enhance circulation by development of off- street parking in high traffic corridors.

2.9 Regional Transportation and Intergovernmental Coordination

Goal T-19 Encourage coordination with regional and intergovernmental agencies.

Policy T-19.1 Work with Lewis County, Twin Transit, Thurston County and other regional transit agencies and Chehalis in any regional transportation or transit program to coordinate efforts in the provision of regional transportation improvements, including an assessment of impacts of the transportation plan and land use assumptions on the transportation systems of adjacent jurisdictions.

Policy T-19.2 The City should coordinate with local jurisdictions, Lewis County, Thurston County, the City of Chehalis and the State to program and construct improvements that will maintain LOS standards on Centralia roadways and state routes within Centralia.

Policy T-19.3 Coordinate with Lewis County, other jurisdictions and other government agencies to improve or replace deficient bridges and other highway components, including construction of an additional freeway interchange north of the City with an access road to route commercial and industrial traffic onto Reynolds Road and/or to industrial/commercial development.

Policy T-19.4 Work with Lewis County and Chehalis and be involved in the multi- county regional transportation planning organization to coordinate efforts to provide for multi-jurisdictional or regional transportation improvements.

Policy T-19.5 Coordinate with Lewis County to maintain the Countywide transportation model.

Policy T-19.6 Coordinate with Lewis County and other jurisdictions to identify hazardous locations on regional road systems and allocate resources toward improvements, when available.

Goal TG-20 Encourage provision of terminal facilities for inter-City and intermodal transportation providers adequate to meet needs for movement of passengers and goods to and from Centralia.

Policy T-20.1 Facilitate circulation via all modes of transportation between Centralia and Chehalis and other regional jurisdictions.

2.10 Airport

Goal T-21 Encourage air transportation activities that support industrial and commercial health.

Policy T-21.1 Support expansion of the Chehalis/Centralia regional airport to have a positive impact on the industrial and commercial activities in the City.

2.11 Public Transit

Goal T-22 Support a public transit system to provide low-cost service to a variety of persons in the Centralia/Chehalis area in order to assure mobility for those who do not or cannot drive and to reduce, to some degree, dependence on the private automobile for movement of people.

Policy T-22.1 Encourage the use and expansion of public transportation throughout the area.

Policy T-22.2 Support, in appropriate ways, the operation of public transportation in the Centralia/Chehalis area, including both fixed route and demand response transit.

Policy T-22.3 Promote routes within Centralia to areas with concentrations of elderly or handicapped persons.

Policy T-22.4 Promote routes, where appropriate, that provide transportation for employees to the hospital, clinics, schools, downtown and other generators of usage.

Policy T-22.5 Promote scheduling of service, including bus headways, for maximum usage for those persons who do not or cannot use an automobile for transportation.

Policy T-22.6 Encourage, in appropriate ways, programs and development of facilities that encourage reduction of single occupant vehicle trips.

Goal TG-23 Support a local and regional public transit system which contributes to the relief of traffic congestion, promotes energy conservation, and enhances mobility for the community.

Policy T-23.1 Coordinate decisions regarding transportation improvements with planned land uses.

Policy T-23.2 Cooperate with Twin Transit when appropriate in providing bus pull- outs along arterials where:

a. sufficient ridership exists;

b. there is sufficient existing right-of-way;

c. the pull-out would not adversely affect pedestrian movement;

d. storm drainage is not adversely affected;

e. there is a sharing of the improvement costs between the developer, the City and Twin Transit; and

f. the City has sufficient funding to assist in the financing of the improvement.

Policy T-23.3 Support Twin Transit in expansion of their transportation service to include all areas of the County.

Policy T-23.4 Encourage ridesharing, vanpool programs and other TDM measures where possible to reduce demand for roadway space and reduce peak-hour auto traffic.

2.12 Rail

Goal T-24 Encourage an efficient and safe rail transportation network.

Policy T-24.1 Encourage the use and expansion of both passenger and freight railroad services.

Policy T-24.2 Improve the quality and safety of railroad crossings to facilitate traffic circulation, including grade separations where feasible.

Policy T-24.3 Work with the railroads serving Centralia to assure that facilities and schedules remain adequate to serve efficiently local industry, businesses and residents.

Policy T-24.4 Work with the railroads and federal regulatory agencies to assure the rail operations create the minimum possible disruption to vehicular and pedestrian traffic.

Policy T-24.5 Encourage the use of the depot site as a major component in the revitalization of the downtown area.

2.13 Utility

Goal T-25 Provide effective service delivery and maintenance of utilities.

Policy T-25.1 Promote joint planning and coordination through timely and effective notice to all affected utilities (private or public) of all road construction, including maintenance and repair of existing roads.

Access

Goal 26 Provide adequate access for transportation networks within the city.

Policy T-26.1 Maintain the State access management standards on state facilities that are consistent with the State's design manual.

Policy T-26.2 Ensure adequate road access to scenic and recreational areas to accommodate local and tourist traffic.

SECTION 3

Improvement Project Criteria

The prioritization of improvement projects is based upon a criterion that reflects the goals and policies in the Transportation Element. The criterion qualitatively evaluates how well the proposed project improves, promotes, or maximizes each transportation benefit. The criteria are consistent with the requirements of the Growth Management Act and Lewis County planning policies. Performance from the evaluation criterion, level of complexity, cost, and availability of funding all help determine the prioritization of projects for the transportation improvement program (TIP).

3.1 Transportation Element Project/Strategy Criteria

1. Vehicle Mobility

   The project/strategy improves existing and future vehicular mobility (including grade separation of rail crossings).

2. Safety

   The project/strategy removes existing identified safety issues.

3. Multi-modalism

   The project/strategy promotes transit, pedestrian or bicycle modes of transportation?

4. Coordination and Regional Transportation

   The project/strategy promotes coordination among jurisdictions or the advancement of regional transportation projects/priorities (e.g. those identified in the Lewis County Arterial Analysis Study)?

5. Freight Mobility

   The project/strategy promotes freight mobility?

6. Funding

   The project/strategy is positioned to receive non-local funding.

7. Cost

   The project/strategy maximizes benefit in comparison to expense.

8. Economic Development

   The project/strategy promotes economic health.

9. Neighborhood Integrity

   The project/strategy promotes neighborhood communities.

10. Connectivity

    The project/strategy improves connections between trip generators, such as schools, parks, downtown, freight centers, employment centers and higher density residential areas.

11. Environment

    The project minimizes environmental impacts.

12. Emergency Access

    The project enhances or provides for emergency access routes.

SECTION 4

Existing Transportation Conditions and Deficiencies

The condition and characteristics of several modes of transportation were inventoried to provide a baseline of analysis for transportation needs and improvements throughout the City of Centralia. The transportation system is comprised of vehicular roadway, rail, freight and truck, transit, and bicycle and pedestrian trails and facilities. An inventory of vehicular and non-motorized networks along classified arterial streets is included in Table 2. Traffic operations at major intersections were evaluated for existing deficiencies and travel demand forecasting was completed to determine future deficiencies. Gap analysis was conducted for the non-motorized network to determine segments where pedestrian and bicycle infrastructure is absent. This section summarizes existing conditions and deficiencies. A complete analysis of existing conditions is included in Attachment 1.

4.1 Jurisdictional and Functional Classification of Roadways

Most of the classified roadways in Centralia are in the City of Centralia's jurisdiction. Interstate 5 and State Route 507 are maintained by WSDOT. Lewis County also has jurisdiction over several roadways within Centralia's UGA. The City's roadways are primarily classified as local roadways with some classified as arterials or collectors. Functional roadway classifications are shown on Map 1. Six types of roadway functional classifications exist in the City of Centralia:

- **Interstate Highways—**Interstate Highways have the highest roadway classification and serve larger volumes of interstate and regional traffic at higher speeds when traffic permits. Access is controlled and connections are generally made to other Interstate Highways, Principal Arterials and Minor Arterials.
- **Principal Arterials—**Principal Arterials provide a high level of mobility with limited access and signal control. High volumes of traffic and freight travel at a range of speeds. Trips on Principal Arterials are generally for longer distances within the city (generally in excess of 2 miles), or through the city. Connections are made to Interstate Highways, other Principal Arterials, Minor Arterials, Major Collectors and Minor Collectors.
- **Minor Arterials** –Minor Arterials provide a high level of mobility with greater access and increased signal control compared to Principal Arterials. High traffic volumes travel at a range of speeds. Trips are generally shorter than those on Principal Arterial and often remain within the city. Connections are made to Interstate Highways, Principal Arterials, other Minor Arterials, Major Collectors, and Minor Collectors.
- **Major Collectors—**Major Collectors provide a moderate level of mobility with a moderate level of access and control. A range of volumes are present on Major Collectors, and speeds are limited when compared to some arterials. Through-trips are not generally carried by Major Collectors. Connections are made to Principal Arterials, Minor Arterials, other Major Collectors, Minor Collectors and Local Roadways.
- **Minor Collectors** – Minor Collectors provide moderate to low levels of mobility with a high level of access. Low volumes of vehicles use Minor Collectors and travel at low speeds. Through-trips are not carried by Minor Collectors, and connections are made to Principal Arterials, Minor Arterials, Major Collectors, other Minor Collectors, and Local Roadways.

- **Local Roadways—**Local Roadways provide the highest level of access while limited to a low level of speed. Through-trips are not carried on Local Roadways. Trips on local roadways are short and connections are usually made to Minor or Major Collectors.

Table 1 lists jurisdiction (ownership) and functional classification information for the interstate, arterial and collector roadways located within the Centralia study area.

Table 1. Roadway Functional Classification and Ownership

	Roadway	Jurisdiction	Functional Classification
1	Interstate 5 (I-5)	WSDOT	Interstate Highway
2	SR 507/Pearl Street (Main St to Viaduct)	Centralia	Principal Arterial
3	SR 507/Tower Avenue (Main St to Viaduct)	Centralia	Principal Arterial
4	Harrison Avenue (I-5 to Yew St)	Centralia	Principal Arterial
5	Main Street (Yew St to Tower Ave)	Centralia	Principal Arterial
6	Kresky Avenue (Viaduct to south city limit)	Centralia	Principal Arterial
7	Gold Street (Viaduct to south city limit)	Centralia	Principal Arterial
8	SR 507/Pearl Street (Main St to Howard Ave)	Centralia	Minor Arterial
9	SR 507/Tower Avenue (Main St to West 6th St)	Centralia	Minor Arterial
10	SR 507/Mellen Street (I-5 to Alder St)	Centralia	Minor Arterial
11	SR 507/Alder Street (Mellen St to Cherry St)	Centralia	Minor Arterial
12	SR 507/Cherry Street (Alder St to Tower Ave)	Centralia	Minor Arterial
13	Harrison Avenue (I-5 to north city limit)	Centralia	Minor Arterial
14	Reynolds Avenue	Centralia	Minor Arterial
15	Galvin Road	Lewis County	Minor Arterial
16	Oakland Avenue	Centralia	Minor Arterial
17	Scheuber Road	Lewis County	Minor Arterial
18	West 1st Street	Centralia	Major Collector
19	Yew Street	Centralia	Major Collector
20	Washington Avenue	Centralia	Major Collector
21	Summa Street	Centralia	Major Collector
22	Tower Avenue (Floral St to Chestnut St)	Centralia	Major Collector
23	Pearl Street (Summa St to Chestnut St)	Centralia	Major Collector
24	Airport Road	Lewis County	Major Collector
25	Cooks Hill Road	Lewis County/Centralia	Major Collector
26	Locust Street (Centralia College Boulevard)	Centralia	Major Collector
27	Johnson Road	Centralia	Major Collector
28	Eshom Road	Centralia	Major Collector
29	Woodland Avenue	Centralia	Major Collector

Table 1. Roadway Functional Classification and Ownership

	Roadway	Jurisdiction	Functional Classification
30	Borst Avenue	Centralia	Major Collector
31	West 4th Street	Centralia	Major Collector
32	West 1st Street	Centralia	Major Collector
33	Maple Street	Centralia	Major Collector
34	Floral Avenue	Centralia	Major Collector
35	Salzer Valley Road	Lewis County/Centralia	Minor Collector
36	Seminary Hill Road	Lewis County/Centralia	Minor Collector
37	Little Hanaford Road	Lewis County	Minor Collector

Sources: Lewis County (2017), Washington State Department of Transportation Functional Classification Map

SECTION 5

Existing Roadway Characteristics

An inventory of roadway facilities and characteristics sets a baseline of information for future improvement of the transportation system. The roadway network for the City of Centralia is a grid pattern with many parallel roads and intersecting cross-streets.

Historically the grid pattern paralleled the north-south railroad and this pattern exists today in the downtown area.

Physical roadway characteristics help to define potential roadway issues or problem areas. Most roadways within Centralia are two lane facilities, although some arterials have shared (two-way) left turn lanes or other turn pockets. Harrison Avenue is the only facility with more than three lanes. Roads within Centralia generally are posted with speeds of 25 or 30 miles per hour (mph) with some roadways characterized by speeds of 35 or 40 mph. Speed limits are shown on Map 2.

Many intersections on arterial roadways have signal control (table 2). Other intersections in the city are controlled with stop signs on two or four of the intersection approaches. The twenty-three signalized intersections within the study area are displayed on Map 2. Most of the signalized intersections are concentrated in the downtown area and along the roads adjacent to I-5 that serve Centralia retail and commercial areas.

Table 2. Intersection Control Type (Traffic Study Update Intersections Only)

	Intersection Name	Intersection Control Type	Jurisdiction
1	West Reynolds Ave & Harrison Avenue	Signal	Centralia
2	West Reynolds Ave & Pearl Street	Signal	Lewis Co/Centralia
3	Harrison Ave & I-5 Southbound Ramps	Signal	WSDOT/Centralia
4	Harrison Ave & I-5 Northbound Ramps	Signal	WSDOT/Centralia
5	West Main Street & Pearl Street	Signal	Lewis Co/Centralia
6	West Main Street & Tower Avenue	Signal	Lewis Co/Centralia
7	Mellen Street & I-5 Southbound Ramps	Signal	WSDOT/Centralia
8	Mellen Street & I-5 Northbound Ramps	Signal	WSDOT/Centralia
9	Mellen Street & Yew Street	Signal	Lewis Co/Centralia
10	Cherry Street & Pearl Street	Signal	Lewis County
11	Cherry Street & Tower Avenue	Signal	Lewis County
12	West Main Street & Yew Street	Signal	Centralia
13	West 1st Street & Harrison Avenue	OWSC	Centralia
14	Summa Street & Gold Street	TWSC	Centralia
15	Summa Street & Kresky Avenue	TWSC	Centralia

OWSC – One-way stop controlled
TWSC – Two-way stop controlled

Key roadway facilities include Interstate 5, Pearl Street and Tower Avenue (SR 507), Harrison Avenue, Main Street and Mellen Street. Interstate 5 is a limited access Highway, classified as part of the National Highway System (NHS). I-5 is also a designated freight route and a federal North America Free Trade Agreement (NAFTA) route. I-5 is the primary north-south interstate roadway facility for the pacific coast states (Washington, Oregon and California). North of the Harrison Avenue interchange, I-5 is a six-lane facility (three general purpose lanes in each direction). South of the Harrison Avenue interchange, I-5 is a four-lane facility with two general purpose lanes in each direction.

WSDOT recently completed a system of collector-distributor (C-D) lanes parallel to I-5 between the Harrison Avenue and Mellen Street interchanges. Two barrier-separated C-D lanes run north and south, outside of the I-5 mainline lanes, providing local access for vehicles traveling between the interchanges without having to merge onto I-5.

A more detailed description of the principal arterials, minor arterials and major collectors are included in the Technical Memorandum – Existing Conditions (Attachment 2).

SECTION 6

Existing Traffic Conditions and Deficiencies

Operational analysis was conducted at fifteen intersections to assess the level of delay and potential safety deficiencies. Vehicle counts were collected at the fifteen study intersections during a typical weekday afternoon in summer. Twelve of the intersection are signalized, two intersections are two-way stop controlled, and one is one-way stop controlled (table 3).

6.1 Safety

The crash history from 2012 – 2016 for the fifteen study intersections within the City of Centralia are profiled below (Tables 3 and 5). Table 4 summarizes all crashes within the City of Centralia from 2012-2016 by crash type and the percent of total crashes. Over a quarter of all crashes were rear end crashes. This type of crash is common for areas with relatively congested conditions. Just under one-third of crashes were angle crashes. This type of crash is common where closely spaced accesses/driveways are present or other unprotected left-turns occur.

Table 3. Crashes by Type, Citywide

Crash Type	Count	Percent of Total
Rear End	393	26%
Angle	454	30%
Fixed Object	209	14%
Sideswipe Same Direction	158	11%
Pedestrian/Bike	64	4%
Head On/Sideswipe Opposite Direction	27	2%
Noncollision	12	1%
Other	186	12%
Total	1,503	100%

Table 5 lists crashes by severity. Crashes are classified as property damage only (PDO), injury, fatal, or pedestrian/bicycle related. Overall, there was a total of 1,503 crashes within Centralia between 2012 and 2016, with less than one perfect resulting in a fatality and approximately 4% involving a pedestrian or bicycle.

Table 4. Crashes by Severity, Citywide

Years of Crashes	PDO Crash	Injury Crash	Fatal Crash	Pedestrian/Bicycle Crash	Total
2012-2016	1,054 (70%)	382 (25%)	3 (<1%)	64 (4%)	1,503 (100%)

Notes: PDO = Property Damage Only

One of the fatal crashes recorded excessive speed as the contributing factor, one was alcohol-related, and one was due to driver illness. The majority of crashes (70%) were property damage only crashes with no injuries reported. Four percent of crashes were pedestrian- or bicycle-related crashes. Table 6 summarizes the crashes at the study area intersections by year.

Table 5. Average Yearly Crashes by Study Intersection

		Crashes by Year					
	Intersection Name	**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
1	West Reynolds Avenue & Harrison Avenue	0	1	2	1	1	**5**
2	West Reynolds Avenue & Pearl Street	1	2	1	2	4	**10**
3	Harrison Avenue & I-5 Southbound Ramps	4	8	10	21	10	**53**
4	Harrison Avenue & I-5 Northbound Ramps	10	5	3	5	5	**28**
5	West Main Street & Pearl Street	2	3	2	2	1	**10**
6	West Main Street & Tower Avenue	1	2	4	0	3	**10**
7	Mellen Street & I-5 Southbound Ramps	0	2	0	7	1	**10**
8	Mellen Street & I-5 Northbound Ramps	1	4	1	2	6	**14**
9	Mellen Street & Yew Street	8	3	2	1	1	**15**
10	Cherry Street & Pearl Street	1	3	0	2	4	**10**
11	Cherry Street & Tower Avenue	2	1	2	2	0	**7**
12	West Main Street & Yew Street	1	2	3	0	1	**7**
13	West 1st Street & Harrison Avenue	1	1	2	2	4	**10**
14	Summa Street & Gold Street	0	3	1	6	3	**13**
15	Summa Street & Kresky Avenue	5	3	2	2	2	**14**
	Total	**37**	**43**	**35**	**55**	**46**	**216**

The intersection of Harrison Avenue and the I-5 Southbound Ramps had the highest number of crashes (53) and the intersection of Harrison Avenue and the I-5 Northbound Ramps had the second highest number of crashes (28) over the five-year study period. Both of these intersections are signalized I-5 ramp terminals, which are characterized by higher vehicle volumes and a higher percentage of drivers that are unfamiliar with the area when compared with other intersections within the study area. These intersections also underwent major construction projects during the analysis period. The changes in traffic operations or signage may have contributed to higher rates of crashes during the construction period.

6.1.1 Existing Traffic Deficiencies

The project team conducted traffic operational analyses at key intersections within the study area to assess the existing operational conditions and identify deficiencies. This section summarizes the existing traffic conditions and the resulting operational level of service (LOS) at each study intersection. Level of services measures delay during the peak travel hour when traffic volumes are heaviest.

6.1.1.1 Mobility Standards

State Highway Mobility Standards

State highway mobility standards are included in the WSDOT Highway System Plan (HSP) as a method to gauge reasonable and consistent standards for traffic flow along state highways. These mobility standards consider the significance (statewide, regional) and location (rural, urban) of each state highway. Mobility standards are based on the Highway Capacity Manual definitions of level of service at an intersection, and are defined by the jurisdiction under which the intersection is maintained. Four of the study intersections are governed by WSDOT HSP standards. These are the I-5 northbound and southbound ramp terminals at the Harrison Avenue and Mellen Street interchanges. The WSDOT HSP sets the standard mobility for statewide significant urban highways at LOS D.

Lewis County Mobility Standards

Lewis County standards are used to evaluate intersections under Lewis County jurisdiction. The Lewis County operational standard is LOS D for urban intersections, which include the following six locations: West Reynolds Avenue at Pearl Street, West Main Street at Pearl Street, West Main Street at Tower Avenue, Cherry Street at Pearl Street, Cherry Street at Tower Avenue, and Mellen Street at Yew Street.

City of Centralia Mobility Standards

City of Centralia mobility standards are used to evaluate intersections under City of Centralia jurisdiction. The City of Centralia operational standard is LOS D, and applies to the following five intersections: West Reynolds Avenue at Harrison Avenue, West Main Street at Yew Street, West 1st Street at Harrison Avenue, Summa Street at Gold Street, and Summa Street at Kresky Avenue.

6.1.1.2 Intersection Operations

Today, thirteen of fifteen intersections meet level of services standards. In most cases, the average level of delay for a vehicle during peak travel period remains around 30 seconds or less at the studied intersections. Table 6 presents the existing intersection delays and the resulting LOS for the study intersections. Intersection delays higher than the mobility standards may indicate areas of congestion. Intersection delays lower than the mobility standards likely indicate the intersection operates at acceptable levels of mobility per its jurisdiction. All but three intersections operate better than the WSDOT, Lewis County and City of Centralia LOS thresholds (Table 6). One intersection currently operates at the LOS D threshold, and two of the study intersections exceed the LOS threshold.

The westbound stop-controlled approach on West 1st Street at Harrison Avenue operates at LOS D, with average delays of approximately 30 seconds per vehicle. Although this location meets the standard, the intersection may experience increased delays in the future and could exceed its LOS D threshold.

Both intersections exceeding the LOS D standard are two-way stop controlled locations on Summa Street, where east-west traffic must stop. The intersection with Gold Street operates at LOS E, with vehicles experiencing approximately 36 seconds of delay on average. Summa Street at Kresky Avenue operates at LOS F, with vehicles experiencing over 100 seconds of delay on average at the stop controlled approaches.

Both intersections are located at the south end of the viaduct between Pearl Street/Tower Avenue and Gold Street/Kresky Avenue, where north-south traffic is not required to stop. East-west traffic on Summa Street must stop, and vehicles observe noticeable delays as they attempt to find acceptable gaps in traffic before turning onto or crossing the major street traffic stream.

Gold Street and Kresky Avenue are both principal arterials with relatively high volumes in the p.m. peak hour as they provide a parallel to I-5 between Centralia and Chehalis. Map 3 compares the LOS standards with the observed LOS results for the study intersections.

Table 6. Existing 2017 PM Peak Hour Intersection Operations Summary

	Intersection Name	Intersection Control Type	Jurisdiction	LOS Standard	Existing 2017	
					LOS	Delay
1	West Reynolds Ave & Harrison Avenue	Signal	Centralia	D	C	30.5
2	West Reynolds Avenue & Pearl Street	Signal	Lewis Co/Centralia	D	C	29.3
3	Harrison Avenue & I-5 Southbound Ramps	Signal	WSDOT/Centralia	D	C	27.7
4	Harrison Avenue & I-5 Northbound Ramps	Signal	WSDOT/Centralia	D	C	24.8
5	West Main Street & Pearl Street	Signal	Lewis Co/Centralia	D	B	12.5
6	West Main Street & Tower Avenue	Signal	Lewis Co/Centralia	D	B	13.0
7	Mellen Street & I-5 Southbound Ramps	Signal	WSDOT/Centralia	D	A	9.9
8	Mellen Street & I-5 Northbound Ramps	Signal	WSDOT/Centralia	D	B	11.2
9	Mellen Street & Yew Street	Signal	Lewis Co/Centralia	D	B	14.4
10	Cherry Street & Pearl Street	Signal	Lewis County	D	B	10.8
11	Cherry Street & Tower Avenue	Signal	Lewis County	D	B	17.5
12	West Main Street & Yew Street	Signal	Centralia	D	B	10.2
13	West 1st Street & Harrison Avenue	OWSC	Centralia	D	D	31.1
14	Summa Street & Gold Street	TWSC	Centralia	D	**E**	**35.5**
15	Summa Street & Kresky Avenue	TWSC	Centralia	D	**F**	**113.0**

OWSC – One-way stop controlled
TWSC – Two-way stop controlled
LOS – Level of service
Delay is reported in average seconds per vehicle.
Bold text/shaded cells indicate the intersection exceeds the capacity standard of LOS D; i.e. it operates LOS E or F.
Stop controlled intersection results are reported for the worst minor street approach only.

6.2 Transit Services and Facilities

Twin Transit operates the local bus service in the Centralia-Chehalis area. Twin Transit provides accessible fixed-route, deviated route and paratransit service. Paratransit service provides door-to-door accommodations for qualified individuals between any locations within ¾-mile of a Twin Transit fixed route. This service is reservation-based and may be combined with fixed-route deviations to meet demand. Qualified paratransit clients can request fixed-route deviation service which involves a fixed-route bus traveling 'off-route' for a few blocks to pick up and drop off the passenger, then traveling back to its fixed route.

Twin Transit buses provide seating for two wheelchairs per bus. Twin Transit buses also provide bike racks with a capacity of two bikes per bus. Paratransit buses provide seating for three wheelchairs. Twin Transit operates eight buses on four fixed routes on weekdays and Saturdays. No Sunday service is provided.

Route 12 – Chehalis – serves the South Chehalis area on an hourly basis between approximately 5:00 a.m. and 7:00 p.m. on weekdays, and between 8:00 a.m. and 1:00 p.m. on Saturdays. This route

serves the Lewis County courthouse, W.F. West High School, the Port of Chehalis, and downtown Chehalis.

Route 21 – Centralia – serves downtown Centralia in the northeast via Pearl Street, and areas to the west via Cooks Hill Road. Routes run on half hourly headways between 6:00 a.m. and 7:00 p.m. on weekdays and between 8:00 a.m. and 1:00 p.m. on Saturdays. This route provides access to Centralia College and the Amtrak Centralia Station.

Route 22 – West Centralia – provides service between downtown Centralia and Hoss Road (near the Lewis County line) via primarily Harrison Avenue and Main Street. This route serves the Centralia Factory Outlets retail/shopping district, as well as Centralia Middle and High schools. Busses run between 5:00 a.m. and 7:00 p.m. on weekdays and between 8:00 a.m. and 1:00 p.m. on Saturdays on hourly headways.

Route 30 – Intercity Express – connects downtown Centralia to downtown Chehalis via the SR 507 Viaduct, Gold Street and Kresky Avenue, and National Avenue. This route stops at the Centralia Amtrak Station, retail destinations, and the Lewis County Museum. Weekday departures occur roughly every half hour between 6:00 a.m. and 7:00 p.m. Saturday service also operates on half-hour headways and runs between 8:00 a.m. and 6:00 p.m.

The White Pass Community Services Coalition operates the LEWIS Mountain Highway Transit (MHT) which provides fixed-route transit service between Centralia/Chehalis and Packwood via Morton. This service is available to residents of Lewis County Monday through Friday with three daily roundtrip runs. Westbound service from Packwood departs at approximately 6:00 a.m., 10:00 a.m. and 3:00 p.m., while eastbound service from Chehalis departs at approximately 7:45 a.m., 12:45 p.m., and 5:45 p.m. The fare for each trip is $3 per person per boarding, and discounts are available for multi-trip weekly or month passes.

Twin Transit and the Centralia Train Depot are located adjacent one another near the intersection of Railroad Avenue and Pine Street. The Twin Transit operating facilities consist of 900 square feet of space for administration, 6,800 square feet of space for maintenance, and 12,200 square feet for bus storage. The Centralia Train Depot serves as a transfer point between bus routes.

Twin Transit serves a park-and-ride facility at Mellen Street and I-5 (Centralia). Another park-and-ride facility is located at Main Street and I-5 (Chehalis), but is not served by Twin Transit fixed routes. Both park-and-ride lots are maintained by WSDOT.

The Greyhound Bus Station is on Twin Transit Centralia Route 21 and shares operating space with a local gas station near the intersection of Mellen Street and Marsh Avenue. This station primarily functions as a passenger loading and unloading point for three north-south routes. Routes 1420, 1440, and 1436 provide service between Seattle and Portland with local stops in Tacoma, Olympia, Centralia, Kelso and Vancouver. Greyhound busses arrive and depart Centralia three times daily.

Thirteen bus shelters are located on or near principal and major arterials within the study area. Shelter locations on principal or minor arterials are listed below. Map 4 shows Twin Transit stop locations and routes.

Amtrak Cascades serves the Centralia/Chehalis area with a depot in downtown Centralia. It operates along the Burlington Northern Santa Fe rail lines. Annual average ridership at the Centralia depot is roughly 19,000 boardings and alightings per year. Currently there are five passenger trains daily in each direction. Additional rail information is discussed in the Freight (Rail and Truck) section.

The Lewis County Convention & Visitors Bureau (CVB) provides free local trolley service between downtown and the Centralia Outlet Mall during designated seasonal events. The trolley route originates at the Rail Depot in downtown and travels to Harrison Avenue where it terminates at the Outlet Mall.

Private transportation is available in Centralia through multiple taxi services or on-demand ride sharing services. Taxis providing door-to-door service can be pre-arranged with multiple companies serving the Centralia and Chehalis area. Uber, a private ride service that connects drivers and riders through an online application, is available in Centralia and can provide services in town and to regional or statewide destinations. Lyft, a similar on-demand private rideshare service, is not available in Centralia.

6.3 Pedestrian and Bicycle Facilities

Pedestrian connections exist as sidewalk facilities along the major arterials, such as Harrison Avenue and 1st Street, and in the Central Business District. Pedestrian access in the West City neighborhood is less available, especially adjacent to public schools. In the Cooks Hill neighborhood, piecemeal portions of sidewalk facilities are present along Harrison Avenue and Cooks Hill Road. Providing appropriate and comprehensive pedestrian connections that link neighborhoods to commercial nodes and services will allow the City to close modal gaps within the City.

Designated bicycle paths and routes help those traveling by bike to locate safe, direct connections to areas they want to access. There are bicycle lanes along portions of Harrison Avenue and on segments within the Central Business District. Most of the existing bicycle network is located in the City Center neighborhood. Some roadways are signed as bicycle routes but do not have specific bicycle facilities such as painted lanes or adjacent paths. There are few bicycle facilities on streets that connect schools and parks to neighborhoods or commercial areas. Future street improvement and development projects should address gaps in the non-motorized network as reconstruction, resurfacing or striping occurs.

Recreational trails provide linkages to open spaces, natural corridor areas, and commercial areas. Existing recreational trails include the Seminary Hill Natural Area and the Chehalis Discovery Trail located outside of the city limits near the sewage treatment facility. These trails allow for connection to Centralia's natural features.

The purpose of establishing a system of bicycle and pedestrian facilities that connect neighborhoods to commercial nodes is to provide transportation options and choices for Centralia's residents and workers, including those unable or who choose not to drive. Expansion of the existing non-motorized network will complete a comprehensive system of nodes and connections while providing safe, economical access.

6.3.1 Conditions and Deficiencies

Sidewalk facilities along arterials, collectors, and adjacent to schools within the study area are primarily in good condition. Sidewalks in good condition are defined as five (5) feet wide or more with only minor signs of damage and cracking, but are still easily navigable. A few sidewalks along major roadways in substandard condition. Substandard conditions is defined as less than five (5) feet wide, showed significant damage and cracking or presented a barrier for people with disabilities or using mobility devices.

Sidewalks along both sides of arterials and collectors in downtown Centralia are in good condition. They are easily navigable for persons with disabilities or using mobility devices. There are no sidewalks on Reynolds Avenue, Scammon Creek Road, Pearl Street north of Fifth Street. Sidewalks are missing along portions of Harrison Avenue between Caveness Drive and Russell Road. A small section of Galvin Road west of Oakland Road has sidewalks on one side, but otherwise lacks sidewalks. Sidewalks are on both sides of Cooks Hill Road from Military Road west to Scheuber Road and one side from Scheuber Road to just west of Landing Way. Sidewalks on East Magnolia Street are sufficient between North Gold and Wilding Streets. There are no sidewalks along Seminary Hill Road, notably between the Seminary Hill Natural Area and downtown (Table 8).

Within city limits there is a pedestrian trail network in the Seminary Hill Natural Area. The approximately 3-mile network is comprised of nine designated trails with trailhead access located at the parking lot entrance near the intersection of Locust Street and Barner Drive. The Chehalis River Discovery Trail opened in September 2006 and travels south from the Centralia treatment plant along the Chehalis River for about 1.5 miles. It is located on city-owned property outside of the city limits. Marked trail access and interpretive signage is located at the terminus of Goodrich Road.

All public schools within the study area are served by sidewalks along a portion of their perimeter with the exception of Centralia High School which has no sidewalks along its perimeter. Centralia Middle School lacks sidewalks on the western edge of the parcel. The two schools are adjacent to Borst Avenue which does not have a sidewalk. All other public schools have sidewalks where the school abuts a local road. Schools where the property is adjacent to residential land generally do not have sidewalks along that boundary.

There are two types of bicycle facilities in Centralia: signed bicycle routes and bicycle lanes. Streets with signed bicycle routes are listed in Table 7. Bicycle lanes are provided on Harrison Avenue from First Street to Lowe Street and Harrison Avenue from Belmont Avenue to Johnson Road. Most of the existing bicycle network is located in the eastern part of the city. There are approximately 6.45 miles of bicycle facilities east of I-5. There are less than 0.25 miles of bicycle facilities in the western part of the city. Three public schools on the west side of I-5 do not have access to existing bicycle facilities. Bicycle facilities are generally absent on streets that connect schools and parks to neighborhoods or commercial areas. Future arterial sections of the West Connector and other urban arterial routes will include adequate shoulder widths that allow for the designation of future bike routes.

Table 7. Existing Bicycle and Pedestrian Facilities

Roadway	Bicycle Route/Lane	Sidewalk	Comment
Tower Avenue	1st Street to 5th Street	Entire corridor	Floral Street to Fair Street Poor Sidewalks
Pearl Street	Entire corridor	Summa Street to 6th Street	Bike Route Sidewalks both sides
Mellen Street	Pearl Street to Lakeshore Drive	Pearl Street to Scheuber Road	Bike Route Sidewalks both sides
Cooks Hill Road	None	Military Road to Landing Way	Sidewalk on south side – Scheuber Road to Landing Way
Locust Street (Centralia College Boulevard)	Pearl Street to Yew Street	Yew Street to Rail Line	Bike Route Sidewalks both sides
Yew Street	Mellen Street to Main Street	Mellen Street to Main Street	Bike Route Sidewalks both sides
1st Street	Main Street to M Street	Tower Avenue to Lowe Street	Bike Route Sidewalks both sides
Harrison Avenue	1st Street to Lowe Street	None	Bike Lane
Harrison Avenue	Belmont Avenue to Johnson Road	None	Bike Route Sidewalk on one side
4th Street	None	Tower Avenue to Oak Street	Sidewalks both sides
Main Street	Oak Street to 1st Street	Tower Avenue to 1st Street	Bike Route Sidewalks both sides
Gold Street	None	Entire corridor	Sidewalks both sides

Table 7. Existing Bicycle and Pedestrian Facilities

Roadway	Bicycle Route/Lane	Sidewalk	Comment
May Street	None	Pearl Street to Marion Street	Sidewalk on one side
Reynolds Avenue	None	None	None
Marion Street	None	North Tower Avenue to Rhobina Street	Sidewalk on one side
East Magnolia Street	None	North Gold Street to Wilding Street	Sidewalk on both sides
Seminary Hill Road	None	Wilding Street to City Limits	None
Woodland Avenue	None	Mellen Street to Summa Street	Sidewalks both sides

6.4 Freight (Rail and Truck)

In addition to Amtrak passenger service, there is freight rail service to and from Centralia along the Burlington Northern Santa Fe (BNSF) Railroad, Union Pacific Railroad, and Tacoma Railroad. Freight trains switch cars and transfer loads at the Blakeslee Junction. The Burlington Northern Santa Fe (BNSF) line crosses streets at three grade-separated crossings: East 6th Street, North Pearl Ave and North Tower Avenue. The Tacoma Rail's Mountain Division line interconnects and interchanges rail cars at a switchyard near the intersection of East Maple Street and North Gold Street. Transferring loads and interconnecting freight cars causes congestion and delays among freight cars. WSDOT recently implemented new rail connections at Blakeslee Junction to reduce congestion at crossing streets by increasing passing speed among rail cars. The Union Pacific Railroad provides rail freight connection between the Port of Centralia and the Blakeslee Junction switchyard.

Truck route locations are important for understanding the flow of freight movement through the city. I-5 is a significant freight route and carries interstate and international freight. The City of Centralia has signed, designated truck routes, including the following:

- West 1st Street from Harrison Avenue to Pearl Street
- South Viaduct and Gold Street from Floral Street to Chestnut Street
- Mellen Street/Alder Street/Cherry Street from I-5 to Tower Avenue
- Harrison Avenue from Johnson Road to the County line/city limits

Other streets in the city are designated truck routes, but may not be signed, including the following:

- Galvin Road/Reynolds Avenue from the west city limits to Pearl Street
- Johnson Road from Reynolds Avenue to Harrison Avenue
- Scheuber Road/Oakland Avenue
- Harrison Avenue/Main Street from I-5 to Tower Avenue
- Yew Street from Mellen Street to Main Street
- Cooks Hill Road/Mellen Street from Scheuber Road to I-5
- Pearl Street/Tower Avenue
- Gold Street and Kresky Avenue from Summa Street to south city limits

On West 1st Street and on Johnson Road, trucks are restricted from 6:00 AM to 7:00 PM with truck speeds limited to 20 mph. The Harrison Avenue and Galvin Road/Reynolds Avenue truck routes provide freight connections between the Port of Centralia and I-5. These routes, along with Scheuber Road/Oakland Avenue, are the only truck routes located west of I-5. The truck routes on Gold Street and

Cherry Street provide some connectivity between the rail freight routes and I-5. Freight routing is absent on Central Boulevard although it is a common route for freight vehicles that transfer and pick up loads at a local switchyard. There are County designated routes on Cooks Hill Road and Reynolds Avenue. They are not signed at this time.

While some routes have been designated, there are also routes regularly used by large trucks that do not follow these designated streets. While the roadways have sufficient capacity, the geometry at intersections does not always permit larger tractor-trailer trucks to use these routes to access their destinations. Future arterial sections of the West Connector will allow for freight route designations.

6.5 Public Air Facilities

The nearest public air transportation services are at the Centralia-Chehalis Airport, located approximately 3 miles southwest of the city of Centralia. Historically, average air traffic consists of approximately 130 aircraft operations per day comprised of nearly 50% local general aviation, roughly 40% transient general aviation, approximately 10% air taxi and 1% military. The airport has two (2) concrete runways and both are in good condition. Runway 16/34 is 5,000 feet long and 150-feet wide and has weight limits of 85,000 pounds for double tandem, and 30,000 pounds for single wheel and double wheel aircraft. Access to the airport is via Northwest Airport Road or Northwest Louisiana Avenue.

6.5.1 Private Air Facilities

There are six (6) private airports within ten miles of Centralia.

- Skyqueen Airport is located 2 miles east of Centralia at Seminary Hill.
- Hartly Airport is located 6.7 miles south of Centralia at Chehalis.
- Skatter Creek Airport is located 8.4 miles northwest of Centralia at Rochester.
- Wissler's Airport is located 8.7 miles northeast of Centralia at Tenino.
- Dwight Field Airport is located 9.1 miles southeast of Centralia at Chehalis.
- Sorrel Airport is located 9.3 miles northwest of Centralia at Tenino.

6.6 Water Transportation

There are two rivers in the study area – the Chehalis River and Skookumchuck River. The Chehalis River flows into Grays Harbor in Aberdeen and is navigable. Within the study area, the Chehalis River flows parallel and west of I-5, while the Skookumchuck River flows east-west into the Chehalis River and is crossed by I-5.

SECTION 7

Future Conditions and Deficiencies

This section summarizes and identifies future travel demand conditions through the year 2037, compliant with the GMA. This long range time frame represents the standard 20-year horizon for long-range planning documents.

The identification of future deficiencies was based on a travel demand model that considered future land uses and growth to occur within designated traffic analysis zones. Existing deficiencies were also included in identifying future deficiencies to account for the occurrence of a no build scenario.

Future travel conditions were based on existing and projected land uses, traffic volumes, and projected employment and household growth. Specific growth is anticipated to occur in a targeted residential area located in the southeast UGA area. Socio-economic and land use conditions used in the travel demand modeling and analysis were consistent with the remaining elements in the Draft Comprehensive Plan. Existing and "no-build" conditions were included in the analysis and travel demand forecasting in determining future roadway operations deficiencies. Refer to Attachment 2 for details about the forecasting process.

Future planned land use and development, employment, and population growth is anticipated to impact existing roadways by stressing the capacity at certain locations and intersections. Travel forecast modeling showed that increased traffic volumes will exceed lead three intersections to performance at LOS F in 2037. They include: Summa Street & Gold Street, Summa Street & Kresky Avenue, and West 1st Street & Harrison Avenue.

Table 8. Future Baseline 2037 PM Peak Hour Intersection Operations Summary

	Intersection Name	Intersection Control Type	Jurisdiction	Existing 2017		Baseline 2037	
				LOS	Delay	LOS	Delay
1	West Reynolds Ave & Harrison Avenue	Signal	Centralia	C	30.5	D	36.4
2	West Reynolds Ave & Pearl Street	Signal	Lewis Co/Centralia	C	29.3	D	53.0
3	Harrison Ave & I-5 Southbound Ramps	Signal	WSDOT/Centralia	C	27.7	C	34.6
4	Harrison Ave & I-5 Northbound Ramps	Signal	WSDOT/Centralia	C	24.8	C	28.5
5	West Main Street & Pearl Street	Signal	Lewis Co/Centralia	B	12.5	B	15.6
6	West Main Street & Tower Avenue	Signal	Lewis Co/Centralia	B	13.0	B	12.9
7	Mellen Street & I-5 Southbound Ramps	Signal	WSDOT/Centralia	A	9.9	B	15.1
8	Mellen Street & I-5 Northbound Ramps	Signal	WSDOT/Centralia	B	11.2	B	11.1
9	Mellen Street & Yew Street	Signal	Lewis Co/Centralia	B	14.4	B	16.7
10	Cherry Street & Pearl Street	Signal	Lewis County	B	10.8	B	14.6
11	Cherry Street & Tower Avenue	Signal	Lewis County	B	17.5	C	23.9
12	West Main Street & Yew Street	Signal	Centralia	B	10.2	B	12.3
13	West 1st Street & Harrison Avenue	OWSC	Centralia	D	31.1	**F**	**81.2**
14	Summa Street & Gold Street	TWSC	Centralia	**E**	**35.5**	**F**	**> 180**
15	Summa Street & Kresky Avenue	TWSC	Centralia	**F**	**113.0**	**F**	**> 180**

Table 8. Future Baseline 2037 PM Peak Hour Intersection Operations Summary

Intersection Name	Intersection Control Type	Jurisdiction	Existing 2017		Baseline 2037	
			LOS	Delay	LOS	Delay

OWSC – One-way stop controlled
TWSC – Two-way stop controlled
LOS – Level of service
Delay is reported in average seconds per vehicle.
Bold text/shaded cells indicate the intersection exceeds the capacity standard of LOS D; i.e. it operates LOS E or F
Stop controlled intersection results are reported for the worst minor street approach only.

During this transportation element update roadway segments were not analyzed. Four roadway segments in the 2007 transportation element were identified to exceed level of service standards in model year 2030. They are included in Table 10.

Table 9. Future Roadway Segment Operations Deficiencies (in 2030, as identified in the 2007 City of Centralia Comprehensive Plan: Transportation Element)

Intersection/Segment	Jurisdiction	LOS	Signalized/Future (2030	LOS	Delay[1] (v/c)
Harrison Avenue (from Galvin Road to Caveness Drive)	Centralia	D	n/a	F	(1.04)
Harrison Avenue (from Johnson Road to I-5)	Centralia	D	n/a	F	(1.18)
Salzar Valley Road (from Gold Street to Centralia Alpha Road)	Centralia	D	n/a	F	(.94)
North County Interchange at Interstate 5 (at future Downing Rd arterial and I-5)	Centralia	D	n/a	F	(1.4)

[1] Delay reported in average seconds per vehicle.

Unsignalized intersection results are reported for the worst minor street approach only.

Future worsened conditions on Harrison Avenue can be related to the location of closely spaced intersections and driveway approaches. In addition, when industrial, employment and population growth were factored in, the travel demand model showed stressed capacity in the future at existing interchanges. Expanded transportation options such as increased transit service and expanded bicycle or pedestrian facilities, transportation demand management, operational improvements or capacity increases may be necessary to maintain the adopted level of service standards.

SECTION 8

Funding Strategies

The Washington State Growth Management Act (GMA) requires a funding strategy for the transportation element that includes an analysis of funding capability to judge needs against probable funding resources, and a multi-year financing plan based on the needs identified in the comprehensive plan. The funding plan should cover the 6-year Transportation Improvement Plan. If probable funding falls short of meeting identified needs, additional funding will must be raised, land use assumptions or level of service standards must be reassessed to ensure that standards are met.

Transportation capital improvements are typically expensive and funded through a variety sources. All funding sources are affected by changes in the economy, political priorities, and grant program eligibility requirements and scoring criteria. Typical funding sources include local sources, including: real estate excise taxes, the street fund/fuel taxes, transportation benefit districts, and the paths and trails fund.

The City anticipates that that anticipates $22,738,000 will be needed to fund transportation projects from 2017 to 2022. Based on annual revenue averages from the previous four years (2014-2017), the City can anticipate approximately $10.6 million in local funds would be available for TIP projects (Attachment 3). This revenue also funds street preservation and maintenance. To close the funding gap, the City could pursue state and federal grants, increase existing taxes, or leverage projects with intergovernmental interest to share cost burdens with other jurisdictions. Potential sources of revenue include:

- **Transportation Benefit District (TBD):** The City enacted a TBD in 2016 with a 0.2% sales tax levy, providing $450,000 in 2016 and an anticipated $650,000 in 2017 in new revenue (Table 1). The City could consider increasing the tax levy; for every 0.1% increase in the TBD sale tax levy, the City could conservatively expect an additional $250,000 in annual revenue.
- **The Transportation Improvement Board (TIB):** The TIB distributes grant funding, generated by a three cents sales tax, to cities and counties for transportation projects. TIB administers a number of competitive grant programs that City projects would be eligible for. The grant programs range from $3 million to $75 million in available funds. Individual grant awards vary, but generally award between $4 to $5 million. The City has applied for and won TIB grants in the past.
- **Intergovernmental Coordination:** The City could pursue joint funding ventures with adjacent jurisdictions. Transportation projects often cross jurisdictional lines, provide mutual benefit to multiple jurisdictions, or may use another agency's right-of-way, resulting in cost-sharing opportunities that could save all parties money. Additionally, the City could leverage other utility improvement projects and utility funding, such as water or sewer pipe replacement, to augment transportation project funding.
- **Other funding sources could include:**
  - **City General Funds and Bonds.** Many City services compete for general funds, though many jurisdictions do devote some general funds to transportation. The City has also previously floated bonds to pay for capital improvement projects, but bonds must be repaid over time, resulting in an ongoing impact to future transportation funds.
  - **Impact Fees.** State law allows local jurisdictions to assess fees for mitigating the transportation impacts of new development. The revenue from these fees may be used for transportation projects in the City's capital facilities plan; however, the impact fees must be used on projects reasonably related to the impacts of the development, or must reasonably benefit the

development. In practice, impact fee revenue could likely be used for a wide variety of transportation improvement projects.

SECTION 9

Recommended System Improvements and Costs

The purpose of this section is to recommend and describe identified system improvements and their associated planning-level costs. Recommended improvements are based on identified existing and anticipated system deficiencies. Recommended improvements were designed to improve operating performance of the system while allowing for cost-effective maintenance.

Prioritization for completing the identified system improvements were categorized into high-priority (targeted for near-term implementation), medium-priority (targeted for mid-term implementation), and low-priority (targeted for long-term implementation) or as funding opportunities through redevelopment occurs). Prioritization of the projects was determined according to performance evaluation criteria. Cost estimates are provided for the recommended system improvements and detailed cost sheets and assumptions are discussed in Attachment 4.

The recommended improvements are listed in Table 11.

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Table 10. Recommended Capital Improvement Projects

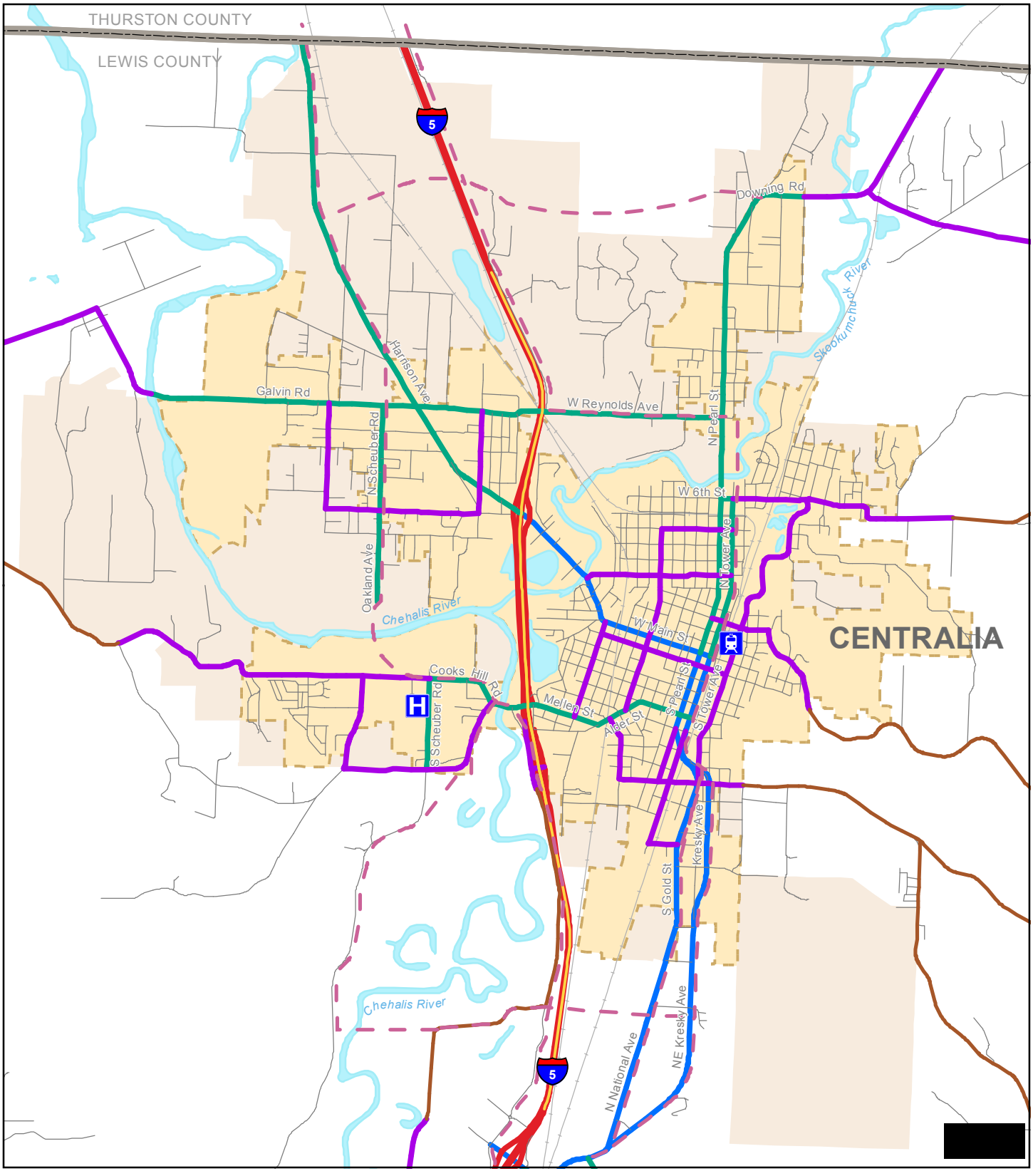
Project Number	Title	From/To	Description	Priority	Project Cost (2017)
		Freight/Truck			
F-1*	Truck route wayfinging	Harrison Ave: Harrison Avenue from Sandra to I-5 N. Pearl: On N. Pearl from northern city limits to Reynolds Scheuber Road: Scheuber Road/Oakland from West Connector (once constructed) to Galvin Yew Street: Yew Street from Mellen to Main Cook Hill Road: S. Scheuber to I- 5 Pearl Street: W. Cherry to W. Reynolds Tower Avenue: W. Cherry to W. 6th Kresky Avenue: southern city limits to S. Tower Avenue	Sign designated truck routes throughout Centralia.	Medium	$11,500
F-2	Galvin Truck Route ext.	On Galvin/Reynolds from N. Pearl to western City limits	Extend Galvin Road truck route designation to city limits and sign	Medium	$13,650
F-3	West Connector truck route	On Forom and new West connection road (const. began 2009) from Harrison to Airport road	Designate truck route on west connector	High	$13,650
F-4	Central truck route	On 6th (from Tower to B sty) on B sty (from 6th to Kearny), on Kearny (from B to Central), On Central to terminus	Designate and provide signage on route to connect truck routes to rail switch yard	Medium	$13,650
F-5	Johnson truck route	On Johnson from Harrison to Galvin	Truck access restricted to 10 pm to 6 am daily (provide signage)	High	$13,650
Roadway Capacity					
C-R1	Downing Road Extension	On Downing from Old Highway 99 to North Pearl	Extend from current terminus to Old Hwy 99, widen and designate to 4 lane major collector	Medium	$19.63 mil
C-R2	Blair Extension	On Blair Road from Old Hwy 99 to Hobson Road	Upgrade to 4/5 lane principal arterial road	Low	$6.5-11.7 mil
C-R3	Salzer Valley Road	On Salzer Valley Road from National to Centralia Alpha	Provide two-way left turn lanes with left turn pockets at intersections	Low	$2.2 mil
C-R4*	Downing/I-5 Interchange	At Downing Road arterial and I-5	Construct new interchange at construction of Downing Road arterial	Medium	$34.9 mil
C-R5	North County Interchange	At future Downing Road arterial extension and I-5	Construct new interchange upon construction of Downing Road arterial extension	Medium	$35.36 mil
C-R6	Harrison Access Management	On Harrison from Galvin to Caveness	Reconstruct driveways and/or close off intersections to remove conflicts	Low	TBD
C-R7*	Schueber & Cooks Hill Rd	At Schueber & Cooks Hill Rd Intersection	Add left turn pockets on all 3 approaches and signalize	Medium	$2.4 mil
C-R8	Mellen Street Gateway Connector	I-5 to Mellen Street	Construct new road from I-5/Mellen Street interchange to Yew Street Extension	Medium	$4.82 mil
C-R9	Mellen Street Gateway Connector Extension	Yew Street Extension to Alder Street	Construct new road to extend from the intersection of Mellen Gateway Connector/Yew Street Extension to Alder Street (aligned with either Long Road or a new road further east of Long Road).	Medium	$2.4 mil
C-R10	Yew Street Extension Improvement	Yew Street from Mellen Street to South Street	Reconstruct Yew Street, and construct new extension south to South Street.	Medium	$5.7 mil
Intersection Capacity					
I-1*	Harrison/1st Intersection	At Harrison and 1st Street	Provide signal or compact roundabout, unsignalized intersection operates at LOS F	Medium	$476,000
I-2*	Pearl/6th Intersection	At Pearl Street and 6th Street	Provide signal, unsignalized intersection operates at LOS F	Medium	$476,000

Project Number	Title	From/To	Description	Priority	Project Cost (2017)
		Freight/Truck			
I-3*	***Summa/Gold Intersection***	***At Summa Street and Gold Street***	***Provide signal or compact roundabout, unsignalized intersection operates at LOS E Medium***		***$1.88 mil***
I-4*	Summa/Kresk y Intersection	At Summa Street and Kresky Avenue	Provide signal or compact roundabout, unsignalized intersection operates at LOS F	Medium	$415,000
Safety					
S-1	Intersection Improvements	Intersections improvements with vehicular capacity deficiencies	Consider adding crosswalks, ADA ramps, and illumination at intersections where reconstruction is warranted.	High	TBD
S-2	Main/Washing ton Intersection	At Main and Washington	Provide protected left signal phase at intersection	High	$325,000
Non-Motorized					
NM-1	Mellen Bike Route	On Mellen from Nick Street to I-5	Provide signage on bike route to indicate connection across I-5	Medium	TBD
NM-2	Eshom Road Sidewalk	On Eshom from Mt Vista to Mayberry	Provide 1,200 feet of sidewalk at schools	Medium	$75 per S.Y.
NM-3	Fords Prairie Sidewalk	On Harrison from Galvin to Caveness Dr	Provide sidewalk at schools	Medium	$2.6 mil
NM-4	Mellen Street Sidewalk	On Mellen from Old Access Treatment Plant to CMRR	Complete pedestrian connection on Mellen linking to trail network (http://www.wsdot.wa.gov/Projects/ I5/MellentoGrandMound/Phase3/)	Medium	$256 mil
NM-5	Mt. Vista Road Bike Lane and Sidewalk	On Mt. Vista from Fort Borst Park to Eshom	Provide non-motorized facilities to connect community facilities	Low	TBD
NM-6	Johnson Bike Lanes	On Johnson from Harrison to Mt. Vista	Provide bike lanes to connect residential to commercial	Medium	$1.3 mil
NM-7	Oakland Bike Lanes	On Oakland from Galvin to city limits	Provide bike route to connect Oakland	Medium	TBD
NM-8	Locust sidewalk	On Locust from Berry to Seminary Hill trail	Provide sidewalk to connect residential to recreational	Low	TBD
NM-9	Galvin Bridge Trail to Borst Park	Trail on Chehalis River from Public Works Facility trail to Fort Borst Park	Designate and develop trail along Chehalis River	Medium	$4.42 mil
NM-10	Washington Elementary Spruce Street sidewalk improvements	Spruce St from Field Ave to S. Gold Street	Build sidewalk in current painted walking zone along Spruce Street to create safe route to school	Medium	$75 per S.Y.
NM-11	Washington Elementary East Chestnut sidewalk improvements	East Chestnut Street from Gold Street to S. Diamond Street	Build pedestrian facility on Chestnut Street to link to Field Street sidewalks and create a safe route to school	Low	$75 per S.Y.
NM-12	Oakview Elementary Oakview Avenue sidewalk extension	E. Oakview Avenue from eastern school perimeter parking lot to Sirkka Street	Continue sidewalk from eastern perimeter/ parking lot of Oakview Elementary to Sirkka Street.	Low	$75 per S.Y.
NM-13	Centralia Middle School Allen Avenue sidewalk improvements	Allen Avenue from Mt. Vista Road to Borst Avenue	Add pedestrian facility on eastern edge of school lot to connect with athletic facilities.	Low	$75 per S.Y.
NM-14	Borst Avenue Improvements	Borst Avenue from Johnson Road to Scheuber Road	Add pedestrian facility for the length of the project and reconstruct existing roadway with new storm system, signage, and lane markings.	Medium	$1.95 mil

Project Number	Title	From/To	Description	Priority	Project Cost (2017)
		Freight/Truck			
NM-15	Central Boulevard Area Transportation Improvements	B Street from 6th Street to Kearney Street, Kearney Street from B Street to Central Boulevard, and Central Boulevard from Kearney Street to north dead end	Add sidewalks, curb and gutters along both sides of the street and reconstruct existing roadway with new storm system, signage, and lane markings.	Medium	$3.38 mil
NM-16	Zenkner Valley Road Improvements	Zenkner Valley Road from Downing Road to North City Limits	Add sidewalks, curb and gutters along one side of the street and reconstruct existing roadway with new storm system, signage, and lane markings.	Medium	$2.6 mil
NM-17	Skookumchuc k Pedestrian/ Bike Ramp	Borst Park to Mellen Street	Construct ramps from existing Borst Park path to the WSDOT CD lane bridge and to access road south of Skookumchuck River.	Medium	$2.67 mil
NM-18	Alder Street Improvements	Alder Street from I-5 CD Lane to Mellen Street	Add sidewalks, curb and gutters along both sides of the street and reconstruct existing roadway with new illumination system.	Medium	$4.34 mil
NM-19	Hayes Lake Train Project	Bridge Street to Borst Park	Construct path from the Hayes Lake public access at Bridge Street along the Skookumchuck River to the existing path adjacent to Borst Lake.	Medium	$857,000
NM-20	Harrison Avenue Reconstruction Project	Harrison Avenue from Johnson Road to Galvin Road	Add sidewalks, curb and gutters along both sides of the street and reconstruct existing roadway with new ADA access ramps, signage, and lane markings.	Medium	$2.21 mil
Transit					
T-1	Designate Public Amenities/ Facilities at Centralia station	At Centralia Station	Supply public benches, posted fares, and other passenger amenities	Medium	TBD
T-2	Designated loading areas and platform	At Centralia Station	Designate passenger loading/parking/baggage checking/ticketing areas with signage at appropriate areas	High	TBD
T-4	Twin Transit Route #21 Ext	Route #21 on Harrison from Russell to Prairie	Extend route #21 on Harrison from Russell to Prairie to connect to Grand Mound	Low	TBD
T-5	LOS Headway Improvements	All Twin Transit Routes	Improve LOS goals by decreasing headway from 60 to 30 minutes on all routes during peak periods	Medium	TBD
T-6	Transition flag bus stops to permanent roadside stops	Determined in partnership with Twin Transit	Replace flag bus stops with conventional roadside stops at higher ridership. Where feasible, add bench, shelter and signage	Low	TBD
Maintenance					
M-1	Galvin Road	Galvin Road from Harrison Avenue to West City Limits	Plane/remove existing asphalt and place new HMA wearing course. Provide new signs and lane markings.	Medium	$989,000
M-2	Gold Street	Gold Street from Summa Street to Marion Street	Plane/remove existing asphalt and place new HMA wearing course. Provide new signs and lane markings.	Medium	$1.573 mil
M-3	Reynolds Avenue	Reynolds Avenue from Harrison Avenue to East City Limits	Place 2-inch overlay on existing roadway. Provide new signs and lane markings.	Medium	$608,000

Project Number	Title	From/To	Description	Priority	Project Cost (2017)
		Freight/Truck			
M-4	***Scheuber Road***	***Scheuber Road from Borst Avenue to Galvin Road***	***Place 2-inch overlay on existing roadway. Provide new signs and lane markings.***	***Medium***	***$485,000***
M-5	Summa Street	Summa Street from Woodland Avenue to East City Limits	Place 2-inch overlay on existing roadway. Provide new signs and lane markings.	Medium	$585,000
M-6	Woodland Avenue	Woodland Avenue from Alder Street to Summa Street	Place 2-inch overlay on existing roadway. Provide new signs and lane markings.	Medium	$300,000
M-7	Kresky Avenue	Kresky Avenue from Viaduct to Scott Johnson Road	Plane/remove existing asphalt and place new HMA wearing course. Provide new signs and lane markings.	Medium	$702,000
M-8	Washington Avenue	Washington Avenue from Alder Street to Pear Street	Plane/remove existing asphalt and place new HMA wearing course. Provide new signs and lane markings.	Medium	$780,000
M-9	Cooks Hill Road	Cooks Hill Road from Schueber Road to West City Limits	Repair existing asphalt with HMA overlay. Provide new signs and lane markings.	Medium	$650,000
M-10	Harrison Avenue Paving Project	Harrison Avenue from the Skookumchuck River Bridge to Johnson Road	Plane/repave wearing course and replace substandard ADA access ramps. Provide new signage, lane markings, and inductive traffic loops.	Medium	$1.43 mil

Maps



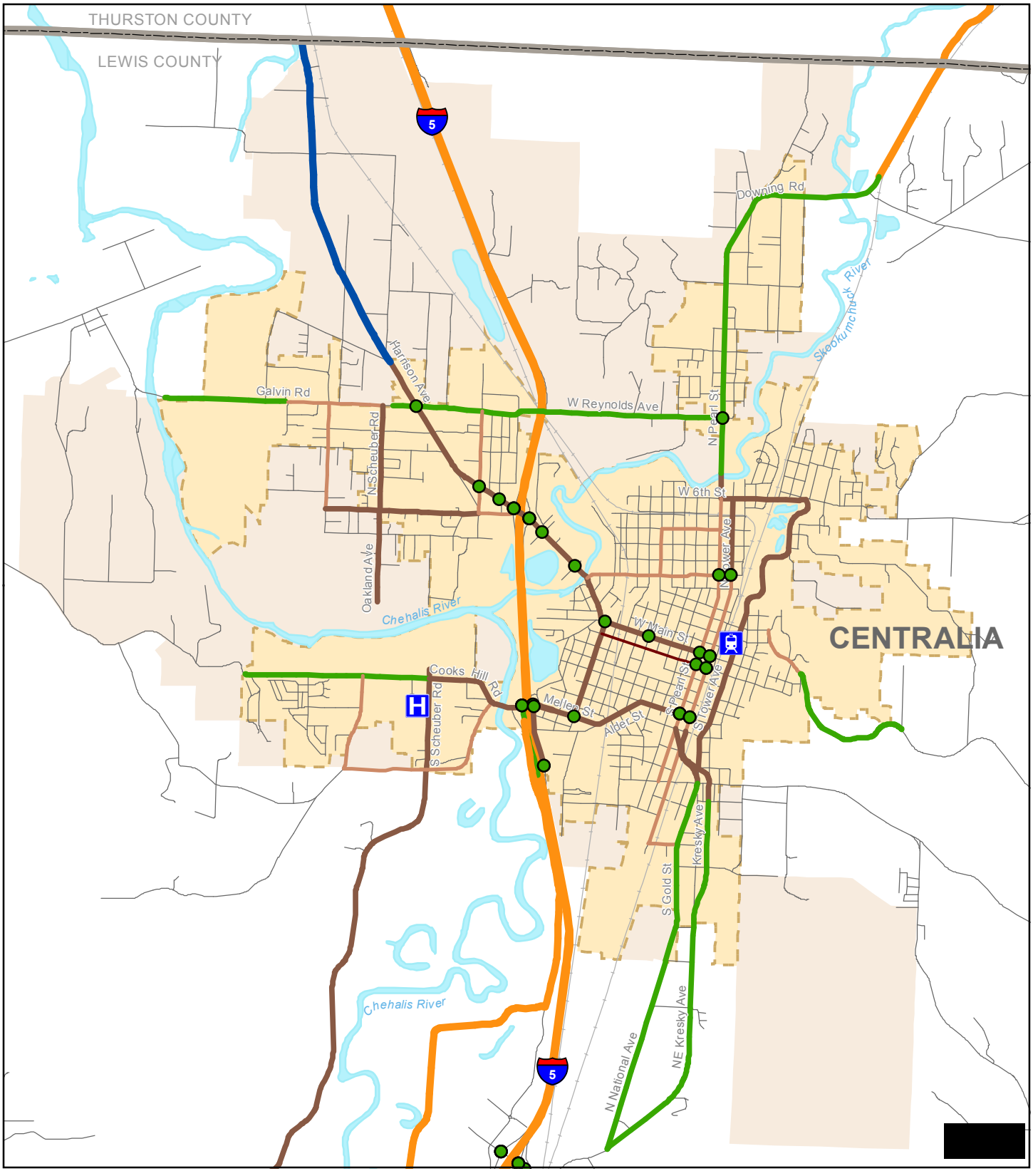
Source: CH2M (2006, Updated 2017), Lewis County (2017), WSDOT

- Local Roadway
- Minor Collector
- Major Collector
- Minor Arterial
- Principal Arterial
- Interstate
- Future County Arterial
- Collector-Distributor (CD) Lane
- Amtrak Station
- Hospital
- Centralia City Limits
- Urban Growth Area

0 0.5 1 Miles

N

Map 1
Functional Roadway Classifications
Centralia, WA



Source: CH2M (2006, Updated 2017), Lewis County (2017), WSDOT

20 MPH
25 MPH
30 MPH
35 MPH
40 MPH
50 MPH+

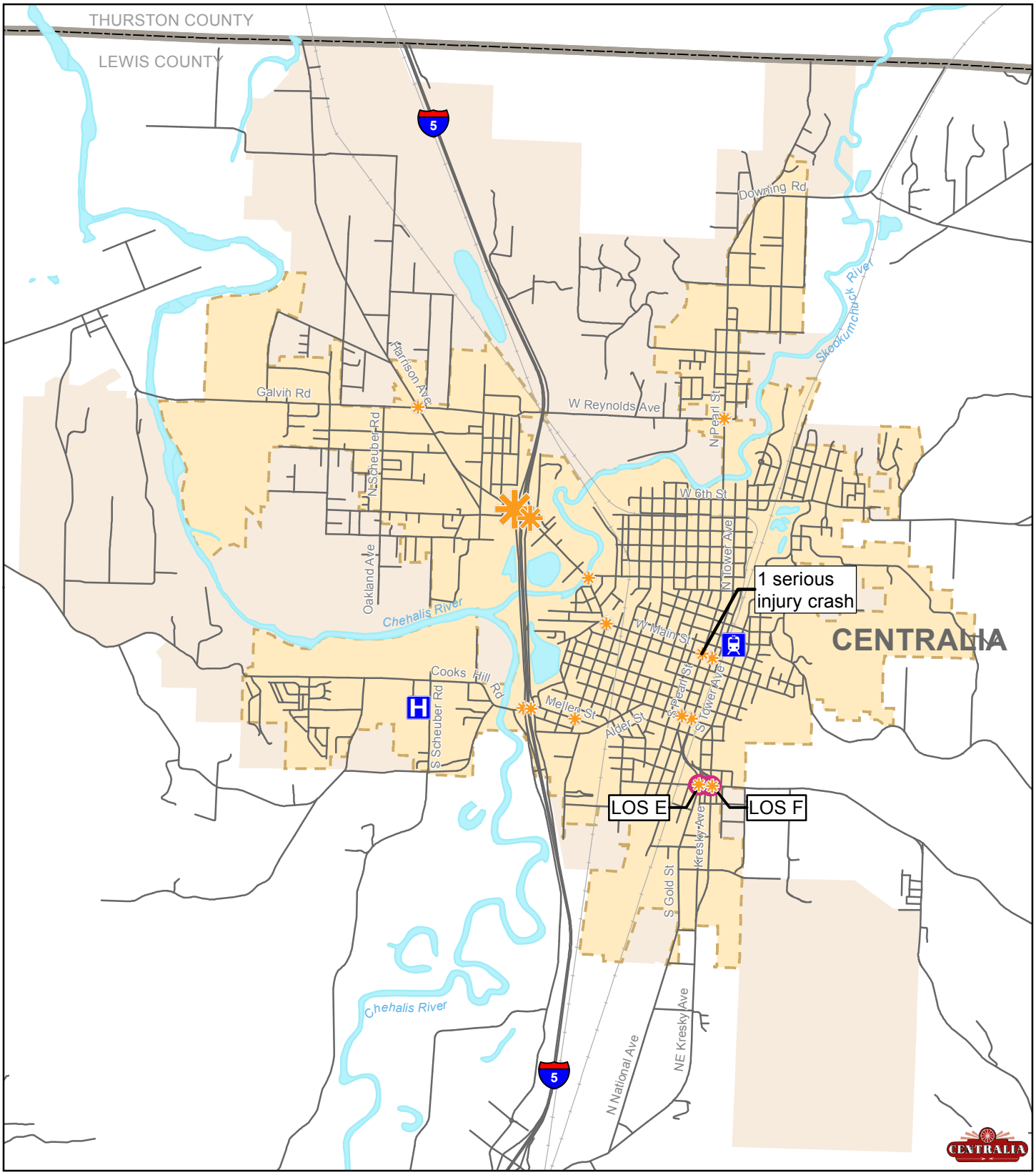
Signalized Intersection
Amtrak Station
Hospital

Centralia City Limits
Urban Growth Area

0 0.5 1 Miles

N

Map 2
Signalized Arterial Intersections and Speed Limits, 2017
Centralia, WA



Crash Resulting in Injury

- 5 - 20 crashes
- 21 - 40 crashes
- 41 - 53 crashes
- Intersection exceeds LOS Standard

LOS = Level of Service

- Amtrak Station
- Hospital
- Centralia City Limits
- Urban Growth Area

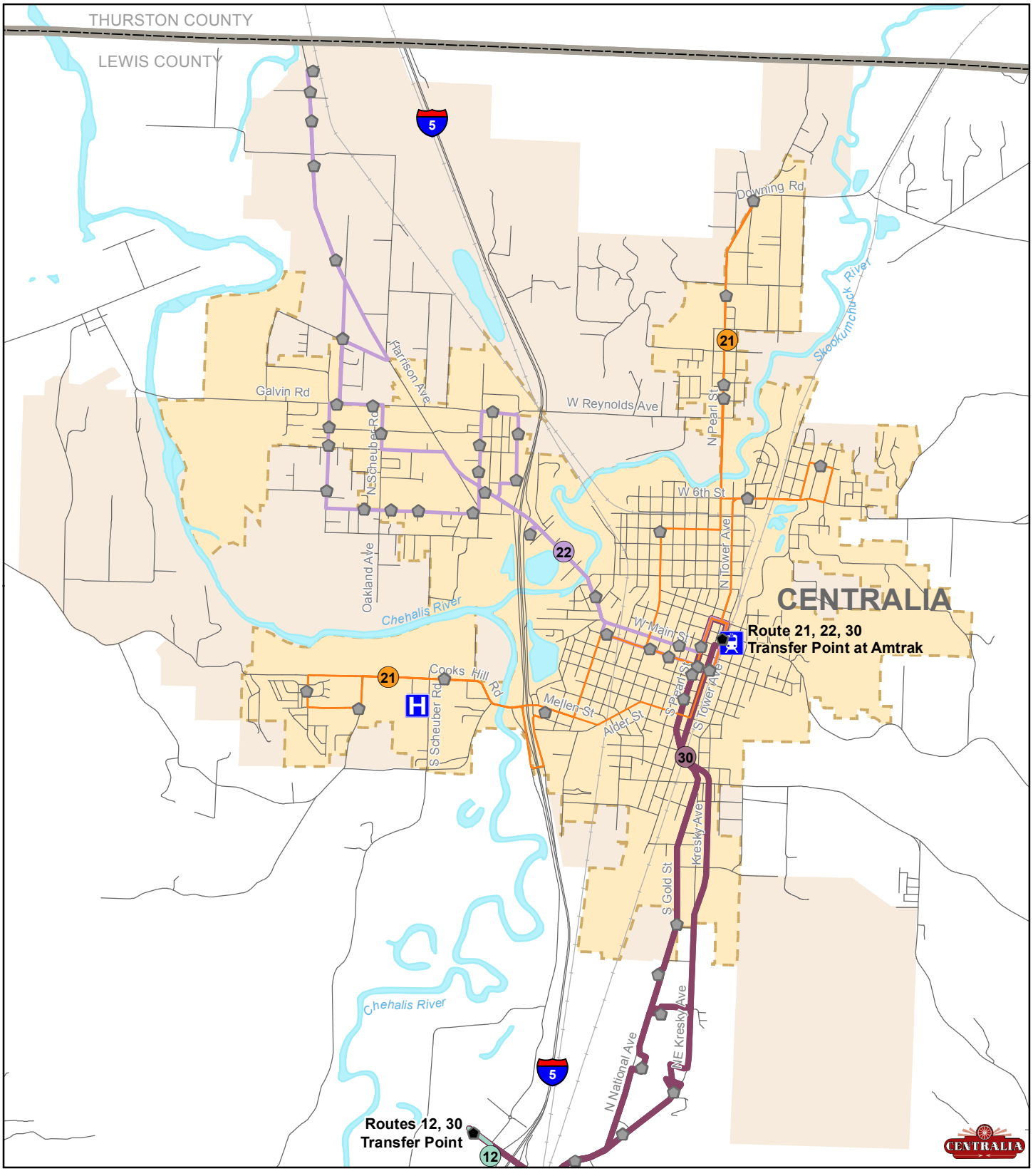
0 0.5 1 Miles

N

Source: CH2M (2006, Updated 2017), Lewis County (2017), WSDOT Crash Dataset (2012 - 2016)

Map 3
Existing Operational Deficiencies and Crash Locations
Centralia, WA

ch2m



Source: CH2M (2006, Updated 2017), Lewis County (2017), Twin Transit (2017), WSDOT

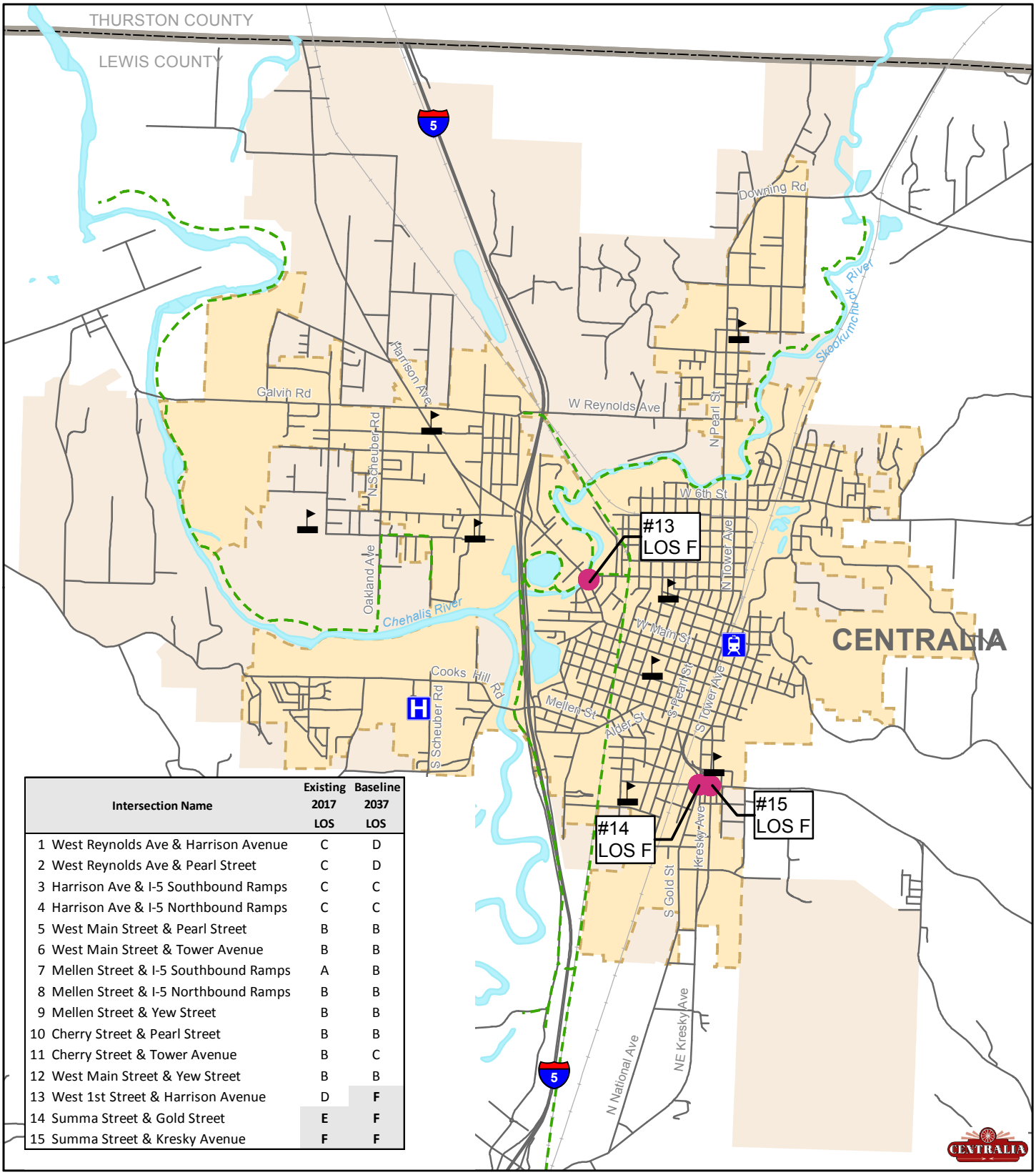
Transit Stop
Transfer Point
Route #12
Route #21
Route #22
Route #30
Amtrak Station
Hospital
Centralia City Limits
Urban Growth Area

0 0.5 1 Miles

N

Map 4
Existing Transit Routes
Centralia, WA

ch2m



Intersection Name	Existing 2017 LOS	Baseline 2037 LOS
1 West Reynolds Ave & Harrison Avenue	C	D
2 West Reynolds Ave & Pearl Street	C	D
3 Harrison Ave & I-5 Southbound Ramps	C	C
4 Harrison Ave & I-5 Northbound Ramps	C	C
5 West Main Street & Pearl Street	B	B
6 West Main Street & Tower Avenue	B	B
7 Mellen Street & I-5 Southbound Ramps	A	B
8 Mellen Street & I-5 Northbound Ramps	B	B
9 Mellen Street & Yew Street	B	B
10 Cherry Street & Pearl Street	B	B
11 Cherry Street & Tower Avenue	B	C
12 West Main Street & Yew Street	B	B
13 West 1st Street & Harrison Avenue	D	**F**
14 Summa Street & Gold Street	**E**	**F**
15 Summa Street & Kresky Avenue	**F**	**F**

Source: CH2M (2006, Updated 2017), Lewis County (2017)

Intersection exceeds LOS Standard
School
Amtrak Station
Hospital
Centralia City Limits
Urban Growth Area
Proposed Trail

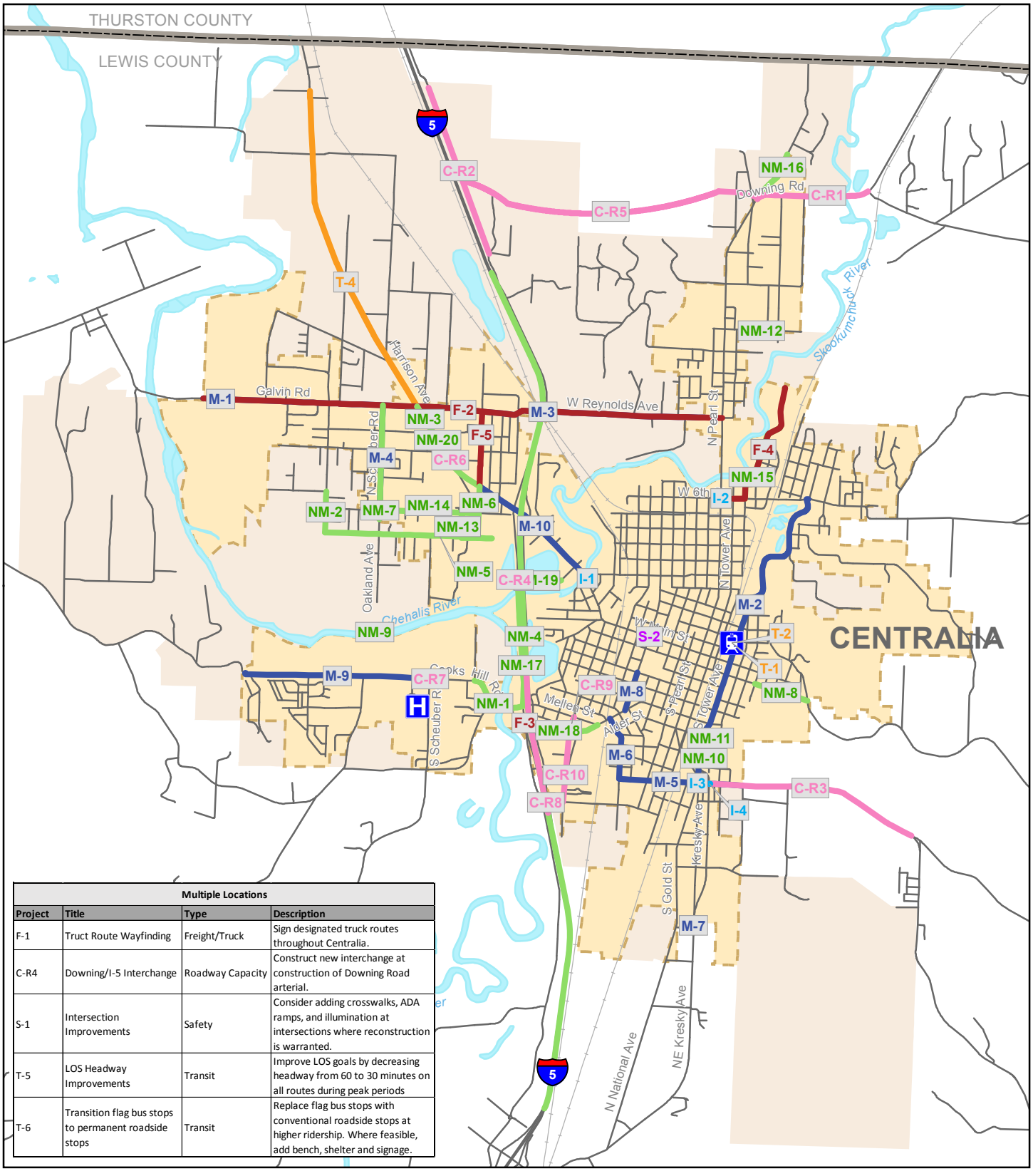
0 0.5 1 Miles

N

LOS = Level of Service

Map 5
Future Transportation Deficiencies (2037)
Centralia, WA

ch2m



Multiple Locations			
Project	**Title**	**Type**	**Description**
F-1	Truct Route Wayfinding	Freight/Truck	Sign designated truck routes throughout Centralia.
C-R4	Downing/I-5 Interchange	Roadway Capacity	Construct new interchange at construction of Downing Road arterial.
S-1	Intersection Improvements	Safety	Consider adding crosswalks, ADA ramps, and illumination at intersections where reconstruction is warranted.
T-5	LOS Headway Improvements	Transit	Improve LOS goals by decreasing headway from 60 to 30 minutes on all routes during peak periods
T-6	Transition flag bus stops to permanent roadside stops	Transit	Replace flag bus stops with conventional roadside stops at higher ridership. Where feasible, add bench, shelter and signage.

Source: CH2M (2006, Updated 2017), Lewis County (2017), WSDOT

Amtrak Station

Hospital

Recommended Solutions

Freight/Truck

Intersection Capacity

Maintenance

Non Motorized

Roadway Capacity

Safety

Transit

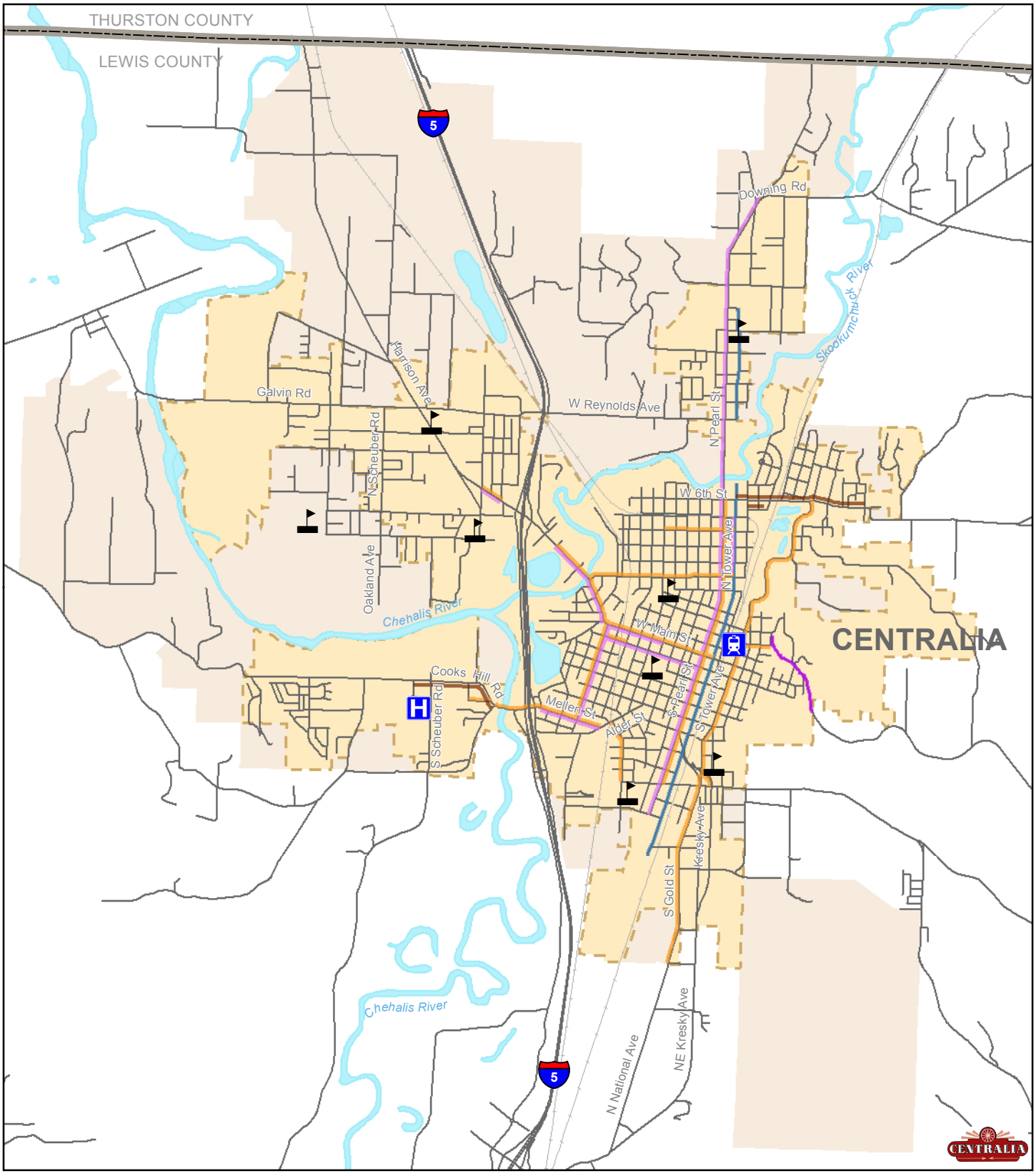
Centralia City Limits

Urban Growth Area

0 0.5 1 Miles

N

Map 6
Recommended Solutions
Centralia, WA



Source: CH2M (2006, Updated 2017), Lewis County (2017), WSDOT

School
Amtrak Station
Hospital

Bike Lane or Route
Sidewalk, both sides
Sidewalk, one side
Poor Sidewalk
No Sidewalk

Centralia City Limits
Urban Growth Area

0 0.5 1 Miles

N

Map 7
Pedestrian and Bicycle Facilities
Centralia, WA

ch2m

Attachment 1
Existing Conditions

Centralia Comprehensive Plan – Transportation Element Update: Existing Conditions

PREPARED FOR:	Jan Stemkoski, City of Centralia Emil Pierson, City of Centralia
COPY TO:	Kirsten Pennington/CH2M HILL Kate Drennan/CH2M HILL
PREPARED BY:	Kate Bradbury/CH2M HILL Terry Yuen/CH2M HILL
DATE:	December 29, 2017

Introduction

This existing transportation conditions (2017) memorandum for the City of Centralia Comprehensive Plan Transportation Element Update includes an inventory of the existing transportation facilities and a summary of the operating conditions at select intersections. The project team identified existing transportation deficiencies within the City of Centralia to set the foundation for shaping identification and prioritization of multimodal projects and strategies to address long-range transportation needs through the year 2037. The project team will integrate portions of this memorandum into the Comprehensive Plan Transportation Element.

The memorandum covers the following topics:

- Study Area
- Existing Land Uses
- Jurisdiction and Functional Classification of Roadways
- Study Area Roadway Facilities
- Safety
- Existing Traffic Conditions
- Transit Facilities
- Pedestrian and Bicycle Transportation
- Air Transportation
- Freight (Rail and Truck)
- Water Transportation
- Summary of Deficiencies and Issues

Study Area

The study area for the Centralia Comprehensive Plan Transportation Element Update includes area within both the City of Centralia limits and the designated Urban Growth Area (UGA) (see Map 1). Centralia is located approximately 25 miles south of Olympia and 45 miles north of Kelso along Interstate 5 (I-5) in Washington. Roadway facilities in the study area are under the jurisdiction of the City of Centralia, Lewis County or the Washington State Department of Transportation (WSDOT). I-5 and State Route 507 (SR 507) are major highway facilities located within the study area. I-5 bisects the city and provides access via two interchanges, and SR 507 provides a northeast connection to Yelm.

The study area includes primarily level terrain with some rising elevations in the eastern portion of the city. The confluence of the Chehalis and Skookumchuck rivers is located within the study area as well as Fort Borst, Hayes, and Plumber lakes. A significant portion of the study area is sensitive to flooding.

Existing Land Uses

In Centralia, the most common land uses are commercial, industrial, and low density residential. Other land uses include rural, very low and medium density residential, public facilities and parks, and open space. (See Centralia Land Use Map, *Centralia Comprehensive Plan, Adopted November 22, 2016)*

Commercial development is primarily clustered along the I-5 corridor on either side of the Harrison Street and Mellen Street interchanges or along the SR 507 corridor and Main Street in the Central Business District (CBD) downtown. Additional commercial development is located in the southeast portion of the city surrounding Gold Street and Kresky Avenue.

Industrial land is largely along Harrison Avenue, west of I-5 in the northeastern portion of the city. Other industrial areas are located outside the city limits within the UGA. The primary land use within the city, as measured by total acreage, is residentially-zoned land. Significant residential concentrations are located in the southwest portion of the city, west of the Chehalis River, surrounding the CBD, and to the east of the CBD and rail lines. Additional rural and very low density residential land uses are located east of I-5 and north of the city limits within the UGA.

Public facilities are dispersed throughout the city. There is a large public area east of I-5 at the south end of the city. Centralia High School is outside the city limits, but within the UGA.

Population and job growth are anticipated within the study area due to increased pressure on already densely populated urban areas in the state (such as Seattle, Tacoma, and Vancouver) and pending industrial development.

Jurisdiction and Functional Classification of Roadways

East of I-5 the roadway network for the City of Centralia is a grid pattern with many parallel roads and intersecting cross-streets. Historically the grid pattern paralleled the north-south railroad and that pattern exists today in the downtown area. The City of Centralia has jurisdiction over most of the roadways within the study area. I-5 and SR 507 are owned and maintained by WSDOT. Lewis County has jurisdiction over several roadways within the Centralia UGA. Most of the City's roadways are classified as local roadways with some classified as arterials or collectors (see Map 1). The City of Centralia has six roadway functional classifications:

- **Interstate Highways—**Interstate highways have the highest roadway classification and serve larger volumes of interstate and regional traffic at higher speeds when traffic permits. Access is controlled and connections are generally to other interstate highways, principal arterials and minor arterials.

- **Principal Arterials—**Principal arterials provide a high level of mobility with limited access and signal control. High volumes of traffic and freight travel at a range of speeds; trips on principal arterials are typically for longer distances within the city (e.g. in excess of 2 miles) or through the city. Connections are made to interstate highways, other principal arterials, minor arterials, major collectors and minor collectors.

- **Minor Arterials** –Minor arterials provide a high level of mobility with more access and signal control as compared to principal arterials. High volumes of traffic travel at a range speeds. Trips are generally shorter than principal arterial trips and often remain within the city. Connections are made to interstate highways, principal arterials, other minor arterials, major collectors, and minor collectors.

- **Major Collectors—**Major collectors provide a slightly lower level of mobility with a higher level of access and control. Speeds will be limited when compared to some arterials. Through-trips are not typical on major collectors. Connections are made to principal arterials, minor arterials, other major collectors, minor collectors and local roadways.
- **Minor Collectors** – Minor collectors provide medium to low levels of mobility with a high level of access. Minor collectors typically have low traffic volumes and travel speeds. Minor collectors do not carry through-trips and connections are made to principal arterials, minor arterials, major collectors, other minor collectors, and local roadways.
- **Local Roadways—**Local roadways provide the highest level of access while limited to a low level of speed. Local roadways do not carry through-traffic. Trips on local roadways are short and connections are usually made to major or minor collectors.

Table 1 lists jurisdiction (ownership) and functional classification information for the interstate, arterial and collector roadways located within the city. Information is relevant for segments within the study area only.

Table 1. Roadway Functional Classification and Ownership

	Roadway	Jurisdiction	Functional Classification
1	Interstate 5 (I-5)	WSDOT	Interstate Highway
2	SR 507/Pearl Street (Main St to Viaduct)	Centralia	Principal Arterial
3	SR 507/Tower Avenue (Main St to Viaduct)	Centralia	Principal Arterial
4	Harrison Avenue (I-5 to Yew St)	Centralia	Principal Arterial
5	Main Street (Yew St to Tower Ave)	Centralia	Principal Arterial
6	Kresky Avenue (Viaduct to south city limit)	Centralia	Principal Arterial
7	Gold Street (Viaduct to south city limit)	Centralia	Principal Arterial
8	SR 507/Pearl Street (Main St to Howard Ave)	Centralia	Minor Arterial
9	SR 507/Tower Avenue (Main St to West 6th St)	Centralia	Minor Arterial
10	SR 507/Mellen Street (I-5 to Alder St)	Centralia	Minor Arterial
11	SR 507/Alder Street (Mellen St to Cherry St)	Centralia	Minor Arterial
12	SR 507/Cherry Street (Alder St to Tower Ave)	Centralia	Minor Arterial
13	Harrison Avenue (I-5 to north city limit)	Centralia	Minor Arterial
14	Reynolds Avenue	Centralia	Minor Arterial
15	Galvin Road	Lewis County	Minor Arterial
16	Oakland Avenue	Centralia	Minor Arterial
17	Scheuber Road	Lewis County	Minor Arterial
18	West 1st Street	Centralia	Major Collector
19	Yew Street	Centralia	Major Collector
20	Washington Avenue	Centralia	Major Collector
21	Summa Street	Centralia	Major Collector
22	Tower Avenue (Floral St to Chestnut St)	Centralia	Major Collector
23	Pearl Street (Summa St to Chestnut St)	Centralia	Major Collector
24	Airport Road	Lewis County	Major Collector
25	Cooks Hill Road	Lewis County/Centralia	Major Collector
26	Locust Street (Centralia College Boulevard)	Centralia	Major Collector
27	Johnson Road	Centralia	Major Collector

Table 1. Roadway Functional Classification and Ownership

	Roadway	Jurisdiction	Functional Classification
28	Eshom Road	Centralia	Major Collector
29	Woodland Avenue	Centralia	Major Collector
30	Borst Avenue	Centralia	Major Collector
31	West 4th Street	Centralia	Major Collector
32	West 1st Street	Centralia	Major Collector
33	Maple Street	Centralia	Major Collector
34	Floral Avenue	Centralia	Major Collector
35	Salzer Valley Road	Lewis County/Centralia	Minor Collector
36	Seminary Hill Road	Lewis County/Centralia	Minor Collector
37	Little Hanaford Road	Lewis County	Minor Collector

Sources: Lewis County (2017), Washington State Department of Transportation Functional Classification Map

Study Area Roadway Facilities

The following sections describes the major roadways within the study area according to the Federal Highway Administration's functional classification designation.

Interstate

Interstate 5 (I-5)

Interstate 5 is a limited access facility that provides access between the United States borders with Canada and Mexico. It is the primary north-south interstate roadway facility for the pacific coast states (Washington, Oregon and California), and is a designated freight route. I-5 is part of the National Highway System (NHS).

North of the Harrison Avenue interchange, I-5 is a six-lane facility (three general purpose lanes in each direction). South of the Harrison Avenue interchange, I-5 is a four-lane facility with two general purpose lanes in each direction.

On-ramp to I-5 northbound from Harrison Avenue

WSDOT recently completed a system of collector-distributor (C-D) lanes parallel to I-5 between the Harrison Avenue and Mellen Street interchanges. Two barrier-separated C-D lanes run north and south, outside of the I-5 mainline lanes, providing local access for vehicles traveling between the interchanges without having to merge onto I-5.

In 2016, the average daily traffic (ADT) volume on I-5 at the Thurston-Lewis county line (milepost 85.57) was approximately 66,000 vehicles. The percentage of heavy vehicles on I-5 at this location, per WSDOT permanent traffic recorder (R019), was approximately 16 percent. Traffic volumes on I-5 within Centralia were slightly lower at approximately 49,000 vehicles per day at the Harrison Avenue overcrossing (milepost 82.73) and approximately 57,000 vehicles per day at the Mellen Street interchange (milepost 81.67). South of Mellen Street, traffic volumes on I-5 in 2016 were approximately 73,000 vehicles per day in both travel directions. WSDOT manages a network of cameras along I-5 that capture real-time

traffic conditions to support incident response and active congestion monitoring. Traffic cameras on I-5 are located near the Galvin Road/Reynolds Avenue crossing and near the Chehalis-Centralia Airport.

Travelers access I-5 within Centralia at either the Harrison Avenue interchange or the Mellen Street interchange, where traffic signals at the ramp terminals intersect with the arterial network.

Principal Arterials

Pearl Street and Tower Avenue (SR 507)
Pearl Street and Tower Avenue serve Centralia's downtown area and form a one-way road couplet. Traffic on Pearl Street travels southbound while traffic on Tower Avenue travels northbound. Both roadways have two lanes, with designated parallel parking on both sides of the street and multiple driveway accesses. There are sidewalks on both sides of the streets. These roadways are principal arterials south of Main Street, while north of Main Street they are designated as minor arterials.

Pearl Street looking south towards Main Street

Gold Street and Kresky Avenue
Gold Street and Kresky Avenue are designated principal arterials and maintain the one-way couplet orientation from Pearl Street and Tower Avenue until the southern Centralia city limits. Traffic on Gold Street travels southbound while traffic on Kresky Avenue travels northbound. Both roads have two travel lanes with multiple driveway accesses to business and residential uses.


Main Street looking east towards Tower Avenue

Harrison Avenue
Harrison Avenue is a principal arterial east of I-5 and a minor arterial west of I-5. East of I-5, Harrison Avenue is the primary east-west roadway that links downtown to the I-5 freeway, and provides access to many commercial and retail businesses and industrial sites. Harrison Avenue varies between two travel lanes in each direction with a center two-way left-turn median, separate turning lanes closer to I-5, and as a dual-direction, single travel lane roadway closer to Main Street. Much of the traffic traveling to and from the city relies on the I-5/Harrison Avenue interchange because it is located adjacent to retail activity and provides a direct route into Centralia's downtown and major residential areas.

Main Street

Main Street looking west from Yew Street

Main Street is an east-west principal arterial connecting Tower Avenue and Pearl Street to Harrison Avenue. The street generally has one travel lane in each direction, sometimes separated by a center two-way left-turn lane, with parallel parking, driveway access, and sidewalks on both sides of the road.

Minor Arterials

Pearl Street and Tower Avenue (SR 507)

North of Main Street, Pearl Street and Tower Avenue are designated as minor arterials. They serve Centralia's downtown area and form a one-way road couplet between Main Street and West 6th Street. Pearl Street operates as the southbound facility with Tower Avenue as the northbound roadway. North of West 6th Street, northbound traffic continues on Pearl Street, a two-way, undivided facility with one travel lane in each direction.

Mellen Street (SR 507)

Mellen Street looking eastbound towards I-5

Mellen Street is a minor arterial running east-west serving the south end of the city. From I-5 it connects with Alder Street west of downtown and extends to Cooks Hill Road east of I-5. The Mellen Street interchange provides access to a concentration of medical facilities on the west side of I-5, and serves as a direct route to the southern portion of downtown, east of I-5.

The Mellen Street undercrossing of I-5 facilitates traffic in the westbound direction only; eastbound traffic on Mellen Street is routed to a new overcrossing approximately 0.30 miles south of Mellen Street via the southbound collector-distributor lanes (parallel to I-5). From this new overcrossing, traffic travels north on Ellsbury Street to Mellen Street eastbound.

Harrison Avenue

Harrison Avenue west of I-5 is designated as a minor arterial. Between I-5 and Caveness Drive, Harrison Avenue has two travel lanes in each direction, separated by a center two-way left-turn lane. Harrison Avenue provides access to many businesses. Further west, the roadway narrows to a single lane in each direction where it intersects with Reynolds Avenue/Galvin Road and continues northwest towards the Thurston-Lewis County line.

Reynolds Avenue and Galvin Road

Reynolds Avenue is an east-west minor arterial located north of the Harrison Avenue interchange stretching from Pearl Street to I-5, where it changes to Galvin Road. Reynolds Avenue is an important connection to SR 507. Galvin Road is an east-west minor arterial that intersects Harrison Avenue stretching from the western city limits to I-5. Galvin Road serves industrial traffic in the northeast of the city.

Oakland Avenue and Scheuber Road

Oakland Avenue is a north-south minor arterial located west of I-5. Oakland Avenue carries primarily residential traffic. This roadway is designated as a link to a potential new north-south connection over the Chehalis River connecting Cooks Hill Road at Scheuber Road.

Alder Street and Cherry Street

Alder Street and Cherry Street are east-west minor arterials that connect Mellen Street to Pearl Street and Tower Avenue. Alder Street and Cherry Street comprise segments of SR 507.

Yew Street facing north towards Mellen Street

Major Collectors

Yew Street

Yew Street is a major collector operating in the north-south direction connecting Mellen Street and Main Street. Traffic signals were installed at the intersections to facilitate turning movements. Yew Street has one travel lane in each direction and primarily provides residential access.

Cooks Hill Road

Cooks Hill Road is a major collector providing east-west access between the I-5/Mellen Street interchange and businesses and residences along the southwest limit of the city's UGA boundary.

Locust Street (Centralia College Boulevard)

Locust Street is a major collector operating in the east-west direction serving Centralia College and connecting Yew Street and Washington Avenue to Pearl Street, Tower Avenue and Gold Street.

Washington Avenue

Washington Avenue is a major collector operating in the north-south direction connecting First Street, Main Street and Alder Street. Washington Avenue serves Edison Elementary School and Centralia College.

Summa Street

Summa Street is a major collector operating in the east-west direction connecting Woodland Avenue to Pearl Street, Tower Avenue and Gold Street. East of Pacific Avenue, Summa Street becomes Salzer Valley Road, a minor collector. This road serves Jefferson-Lincoln Elementary School.

Airport Road

Airport Road provides access to the Chehalis-Centralia Airport and to Northwest Louisiana Avenue in Chehalis further south.

Other Major Collectors

Johnson Road, Eshom Road, and Woodland Avenue are additional north-south major collector streets in Centralia. Borst Avenue, Marion Street, Fourth Street, First Street, Maple Street, and Floral Avenue are additional east-west collector streets in the city.

Minor Collectors

Roads designated as minor collectors are generally on the UGA border or outside of UGA boundaries. Salzer Valley Road, Seminary Hill Road, Little Hanaford Road, and the west end of Cooks Hill Road are minor collectors.

Lanes and Speed Limits

Physical roadway characteristics can contribute to potential roadway issues or problem areas. Most roadways within Centralia are undivided four-lane or two-lane facilities, although some are separated with center two-way left-turn lanes or other forms of medians. Roads within Centralia generally are posted with speeds of 25 or 30 miles per hour (mph) with some roadways characterized by speeds of 35 or 40 mph. Table 2 lists the number of lanes (total of both directions) and speed limits for arterial and collector roadways within the study area.

Table 2. Lanes and Posted Speed Limits – Arterials and Collectors

	Roadway	Number of Lanes	Posted Speed (mph)
1	Harrison Avenue – City Limits to Reynolds Road	2	40
2	Harrison Avenue – Reynolds Road to Caveness Road	3	30
3	Harrison Avenue – Caveness Road to Main Street	5	30
4	Oakland Avenue – Galvin Road to Cooks Hill Road	2	30
5	Main Street – Harrison Avenue to Tower Avenue	2	30
6	Galvin Road – I-5 to Northpark Road	2	30
7	Galvin Road – Northpark Road to Gallagher Road	3	30
8	Galvin Road – Gallagher Road to City Limits	2	30
9	Reynolds Road – I-5 to Pearl Street	2	35
10	Mellen Street – Oakland Avenue to Alder Street	2	30
11	Alder Street – Mellen Street to Cherry Street	2	25
12	Cherry Street – Alder Street to Tower Avenue	2	25
13	Pearl Street – Downing Road to Chestnut Street	2	25
14	South Viaduct Street – Chestnut Street to Summa Street	2	30
15	Gold Street – South Viaduct Street to City Limits	2	35
16	Tower Avenue – Marion Street to Kresky Avenue	2	25
17	Kresky Avenue – Tower Avenue to City Limits	2	35

mph – miles per hour

Note: If the physical characteristics vary on a street segment, this summary table lists the primary characteristic (for example, if a roadway segment is primarily two lanes and is one lane for a short segment, it will be listed in the table as two lanes).

Traffic Control

Traffic control is critical for traffic flow and safety. Most intersections in the city are stop controlled, where vehicles on at least one approach leg of the intersection is controlled by a stop sign. The majority of the signalized intersections are concentrated in the downtown area and along the roads connecting I-5 to the downtown area (Map 2). Of the intersections analyzed for traffic existing and future conditions, 12 intersections are signalized and 3 are stop controlled, as listed in Table 3.

Table 3. Intersection Control Type (Traffic Study Intersections Only)

	Intersection Name	Intersection Control Type	Jurisdiction
1	West Reynolds Ave & Harrison Avenue	Signal	Centralia
2	West Reynolds Ave & Pearl Street	Signal	Lewis Co/Centralia
3	Harrison Ave & I-5 Southbound Ramps	Signal	WSDOT/Centralia
4	Harrison Ave & I-5 Northbound Ramps	Signal	WSDOT/Centralia

Table 3. Intersection Control Type (Traffic Study Intersections Only)

	Intersection Name	Intersection Control Type	Jurisdiction
5	West Main Street & Pearl Street	Signal	Lewis Co/Centralia
6	West Main Street & Tower Avenue	Signal	Lewis Co/Centralia
7	Mellen Street & I-5 Southbound Ramps	Signal	WSDOT/Centralia
8	Mellen Street & I-5 Northbound Ramps	Signal	WSDOT/Centralia
9	Mellen Street & Yew Street	Signal	Lewis Co/Centralia
10	Cherry Street & Pearl Street	Signal	Lewis County
11	Cherry Street & Tower Avenue	Signal	Lewis County
12	West Main Street & Yew Street	Signal	Centralia
13	West 1st Street & Harrison Avenue	OWSC	Centralia
14	Summa Street & Gold Street	TWSC	Centralia
15	Summa Street & Kresky Avenue	TWSC	Centralia

OWSC – One-way stop controlled
TWSC – Two-way stop controlled

Safety

Crash history for the City of Centralia and the specific study intersections within Centralia's UGA are profiled below (Tables 4 and 6). WSDOT provided historical crash data from January 1, 2012 to December 31, 2016. The project team analyzed the data for potential crash patterns that could be a result of existing geometric or operational deficiencies. Table 4 summarizes all crashes within the City of Centralia from 2012-2016 by crash type and the percent of total crashes.

Table 4. Crashes by Type, Citywide

Crash Type	Count	Percent of Total
Rear End	393	26%
Angle	454	30%
Fixed Object	209	14%
Sideswipe Same Direction	158	11%
Pedestrian/Bike	64	4%
Head On/Sideswipe Opposite Direction	27	2%
Noncollision	12	1%
Other	186	12%
Total	1,503	100%

Over a quarter of all crashes were rear end crashes. This type of crash is common for areas with relatively congested conditions. Just under one-third of crashes were angle crashes. This type of crash is common where closely spaced accesses/driveways are present or other unprotected left-turns occur.

Table 5 lists crashes by severity. Crashes are classified as property damage only (PDO), injury, fatal, or pedestrian/bicycle related. Overall, there was a total of 1,503 crashes within Centralia between 2012 and 2016.

Table 5. Crashes by Severity, Citywide

Years of Crashes	PDO Crash	Injury Crash	Fatal Crash	Pedestrian/Bicycle Crash	Total
2012-2016	1,054 (70%)	382 (25%)	3 (<1%)	64 (4%)	1,503 (100%)

Notes: PDO = Property Damage Only

One of the fatal crashes recorded excessive speed as the contributing factor, one was alcohol-related, and one was due to driver illness. The majority of crashes (70%) were property damage only crashes with no injuries reported. Four percent of crashes were pedestrian- or bicycle-related crashes. Table 6 summarizes the crashes at the study area intersections by year.

Table 6. Average Yearly Crashes by Study Intersection

		Crashes by Year					
Intersection Name		**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
1	West Reynolds Avenue & Harrison Avenue	0	1	2	1	1	**5**
2	West Reynolds Avenue & Pearl Street	1	2	1	2	4	**10**
3	Harrison Avenue & I-5 Southbound Ramps	4	8	10	21	10	**53**
4	Harrison Avenue & I-5 Northbound Ramps	10	5	3	5	5	**28**
5	West Main Street & Pearl Street	2	3	2	2	1	**10**
6	West Main Street & Tower Avenue	1	2	4	0	3	**10**
7	Mellen Street & I-5 Southbound Ramps	0	2	0	7	1	**10**
8	Mellen Street & I-5 Northbound Ramps	1	4	1	2	6	**14**
9	Mellen Street & Yew Street	8	3	2	1	1	**15**
10	Cherry Street & Pearl Street	1	3	0	2	4	**10**
11	Cherry Street & Tower Avenue	2	1	2	2	0	**7**
12	West Main Street & Yew Street	1	2	3	0	1	**7**
13	West 1st Street & Harrison Avenue	1	1	2	2	4	**10**
14	Summa Street & Gold Street	0	3	1	6	3	**13**
15	Summa Street & Kresky Avenue	5	3	2	2	2	**14**
	Total	**37**	**43**	**35**	**55**	**46**	**216**

The intersection of Harrison Avenue and the I-5 Southbound Ramps had the highest number of crashes (53) and the intersection of Harrison Avenue and the I-5 Northbound Ramps had the second highest number of crashes (28) over the five-year study period. Both of these intersections are signalized I-5 ramp terminals, which are characterized by higher vehicle volumes and a higher percentage of drivers that are unfamiliar with the area when compared with other intersections within the study area.

Existing Traffic Conditions

The project team conducted traffic operational analyses at key intersections within the study area to assess the existing operational conditions and identify deficiencies. This section summarizes the existing traffic conditions and the resulting operational level of service (LOS) at each study intersection.

Study Intersections and Raw Traffic Counts

The project team collected intersection turning movement counts for the 15 study area intersections listed in Table 3. The team collected intersection data on typical weekday afternoons in June 2017. The team collected vehicle counts in 15-minute intervals for a 2-hour window during the afternoon peak period, which typically occurs between 4:00 p.m. and 6:00 p.m. Appendix A includes the raw traffic count data used in this analysis.

Mobility Standards

State Highway Mobility Standards

State highway mobility standards are included in the WSDOT Highway System Plan (HSP) as a method to gauge reasonable and consistent standards for traffic flow along state highways. These mobility standards consider the significance (statewide, regional) and location (rural, urban) of each state highway. Mobility standards are based on the Highway Capacity Manual definitions of level of service at an intersection, and are defined by the jurisdiction under which the intersection is maintained. Four of the study intersections are governed by WSDOT HSP standards. These are the I-5 northbound and southbound ramp terminals at the Harrison Avenue and Mellen Street interchanges. The WSDOT HSP sets the standard mobility for statewide significant urban highways at LOS D.

Lewis County Mobility Standards

Lewis County standards are used to evaluate intersections under Lewis County jurisdiction. The Lewis County operational standard is LOS D for urban intersections, which include the following six locations: West Reynolds Avenue at Pearl Street, West Main Street at Pearl Street, West Main Street at Tower Avenue, Cherry Street at Pearl Street, Cherry Street at Tower Avenue, and Mellen Street at Yew Street.

City of Centralia Mobility Standards

City of Centralia mobility standards are used to evaluate intersections under City of Centralia jurisdiction. The City of Centralia operational standard is LOS D, and applies to the following five intersections: West Reynolds Avenue at Harrison Avenue, West Main Street at Yew Street, West 1st Street at Harrison Avenue, Summa Street at Gold Street, and Summa Street at Kresky Avenue.

Operational Analysis of Existing Conditions

Table 7 presents the existing intersection delays and LOS for the study intersections. For signalized intersections, the team reported LOS and delay for overall intersection operations. For stop controlled intersections, the stop controlled movement with the worst operating performance of both the major and minor approaches define the LOS. The team used Synchro software package (version 8) to assess intersection operations. Appendix B provides the traffic analysis methodology and intersection LOS descriptions. Appendix C provides the complete report output for each intersection.

Intersection delays higher than the mobility standards may indicate areas of congestion. Intersection delays lower than the mobility standards likely indicate the intersection operates at acceptable levels of mobility per its jurisdiction. All but three intersections operate better than the WSDOT, Lewis County and City of Centralia LOS thresholds (Table 7). One intersection currently operates at the LOS D threshold, and two of the study intersections exceed the LOS threshold.

The westbound stop-controlled approach on West 1st Street at Harrison Avenue operates at LOS D, with average delays of approximately 30 seconds per vehicle. Although this location meets the standard, the intersection may experience increased delays in the future and could exceed its LOS D threshold.

Both intersections exceeding the LOS D standard are two-way stop controlled locations on Summa Street, where east-west traffic must stop. The intersection with Gold Street operates at LOS E, with vehicles experiencing approximately 36 seconds of delay on average. Summa Street at Kresky Avenue operates at LOS F, with vehicles experiencing over 100 seconds of delay on average at the stop controlled approaches.

Both intersections are located at the south end of the viaduct between Pearl Street/Tower Avenue and Gold Street/Kresky Avenue, where north-south traffic is not required to stop. East-west traffic on Summa Street must stop, and vehicles observe noticeable delays as they attempt to find acceptable gaps in traffic before turning onto or crossing the major street traffic stream.

Gold Street and Kresky Avenue are both principal arterials with relatively high volumes in the p.m. peak hour as they provide a parallel to I-5 between Centralia and Chehalis. Map 3 compares the LOS standards with the observed LOS results for the study intersections.

Table 7. Existing 2017 PM Peak Hour Intersection Operations Summary

	Intersection Name	Intersection Control Type	Jurisdiction	LOS Standard	Existing 2017	
					LOS	Delay
1	West Reynolds Ave & Harrison Avenue	Signal	Centralia	D	C	30.5
2	West Reynolds Avenue & Pearl Street	Signal	Lewis Co/Centralia	D	C	29.3
3	Harrison Avenue & I-5 Southbound Ramps	Signal	WSDOT/Centralia	D	C	27.7
4	Harrison Avenue & I-5 Northbound Ramps	Signal	WSDOT/Centralia	D	C	24.8
5	West Main Street & Pearl Street	Signal	Lewis Co/Centralia	D	B	12.5
6	West Main Street & Tower Avenue	Signal	Lewis Co/Centralia	D	B	13.0
7	Mellen Street & I-5 Southbound Ramps	Signal	WSDOT/Centralia	D	A	9.9
8	Mellen Street & I-5 Northbound Ramps	Signal	WSDOT/Centralia	D	B	11.2
9	Mellen Street & Yew Street	Signal	Lewis Co/Centralia	D	B	14.4
10	Cherry Street & Pearl Street	Signal	Lewis County	D	B	10.8
11	Cherry Street & Tower Avenue	Signal	Lewis County	D	B	17.5
12	West Main Street & Yew Street	Signal	Centralia	D	B	10.2
13	West 1st Street & Harrison Avenue	OWSC	Centralia	D	D	31.1
14	Summa Street & Gold Street	TWSC	Centralia	D	**E**	**35.5**
15	Summa Street & Kresky Avenue	TWSC	Centralia	D	**F**	**113.0**

OWSC – One-way stop controlled
TWSC – Two-way stop controlled
LOS – Level of service
Delay is reported in average seconds per vehicle.
Bold text/shaded cells indicate the intersection exceeds the capacity standard of LOS D; i.e. it operates LOS E or F.
Stop controlled intersection results are reported for the worst minor street approach only.

Transit Facilities

Twin Transit operates the local bus service in the Centralia-Chehalis area. Twin Transit provides accessible fixed-route, deviated route and paratransit service. Paratransit service provides door-to-door accommodations for qualified individuals between any locations within ¾-mile of a Twin Transit fixed route. This service is reservation-based and may be combined with fixed-route deviations to meet demand. Qualified paratransit clients can request fixed-route deviation service which involves a fixed-route bus traveling 'off-route' for a few blocks to pick up and drop off the passenger, then traveling back to its fixed route.

Twin Transit buses provide seating for two wheelchairs per bus. Twin Transit buses also provide bike racks with a capacity of two bikes per bus. Paratransit buses provide seating for three wheelchairs. Twin

Transit operates eight buses on four fixed routes on weekdays and Saturdays. No Sunday service is provided. The fixed routes are numbered 12, 21, 22 and 30.

Route 12 – Chehalis – serves the South Chehalis area on an hourly basis between approximately 5:00 a.m. and 7:00 p.m. on weekdays, and between 8:00 a.m. and 1:00 p.m. on Saturdays. This route serves the Lewis County courthouse, W.F. West High School, the Port of Chehalis, and downtown Chehalis.

Route 21 – Centralia – serves downtown Centralia in the northeast via Pearl Street, and areas to the west via Cooks Hill Road. Routes run on half hourly headways between 6:00 a.m. and 7:00 p.m. on weekdays and between 8:00 a.m. and 1:00 p.m. on Saturdays. This route provides access to Centralia College and the Amtrak Centralia Station.

Route 22 – West Centralia – provides service between downtown Centralia and Hoss Road (near the Lewis County line) via primarily Harrison Avenue and Main Street. This route serves the Centralia Factory Outlets retail/shopping district, as well as Centralia Middle and High schools. Busses run between 5:00 a.m. and 7:00 p.m. on weekdays and between 8:00 a.m. and 1:00 p.m. on Saturdays on hourly headways.

Route 30 – Intercity Express – connects downtown Centralia to downtown Chehalis via the SR 507 Viaduct, Gold Street and Kresky Avenue, and National Avenue. This route stops at the Centralia Amtrak Station, retail destinations, and the Lewis County Museum. Weekday departures occur roughly every half hour between 6:00 a.m. and 7:00 p.m. Saturday service also operates on half-hour headways and runs between 8:00 a.m. and 6:00 p.m.

The White Pass Community Services Coalition operates the LEWIS Mountain Highway Transit (MHT) which provides fixed-route transit service between Centralia/Chehalis and Packwood via Morton. This service is available to residents of Lewis County Monday through Friday with three daily roundtrip runs. Westbound service from Packwood departs at approximately 6:00 a.m., 10:00 a.m. and 3:00 p.m., while eastbound service from Chehalis departs at approximately 7:45 a.m., 12:45 p.m., and 5:45 p.m. The fare for each trip is $3 per person per boarding, and discounts are available for multi-trip weekly or month passes.

Twin Transit and the Centralia Train Depot are located adjacent one another near the intersection of Railroad Avenue and Pine Street. The Twin Transit operating facilities consist of 900 square feet of space for administration, 6,800 square feet of space for maintenance, and 12,200 square feet for bus storage. The Centralia Train Depot serves as a transfer point between bus routes.

Twin Transit serves a park-and-ride facility at Mellen Street and I-5 (Centralia). Another park-and-ride facility is located at Main Street and I-5 (Chehalis), but is not served by Twin Transit fixed routes. Both park-and-ride lots are maintained by WSDOT.

The Greyhound Bus Station is on Twin Transit Centralia Route 21 and shares operating space with a local gas station near the intersection of Mellen Street and Marsh Avenue. This station primarily functions as a passenger loading and unloading point for three north-south routes. Routes 1420, 1440, and 1436 provide service between Seattle and Portland with local stops in Tacoma, Olympia, Centralia, Kelso and Vancouver. Greyhound busses arrive and depart Centralia three times daily.

Thirteen bus shelters are located on or near principal and major arterials within the study area. Shelter locations on principal or minor arterials are listed below. Map 4 shows Twin Transit stop locations and routes.

- Oakland Avenue and Borst Avenue
- Borst Avenue and Johnson Road
- View Avenue and Linda Lane
- Belmont Avenue and Earl Street
- Harrison Avenue and View Avenue

- West Bridge Street and Harrison Avenue
- South Rock Street and Locust Street (Centralia College Boulevard)
- Locust Street and Pearl Street
- Tower Avenue and Mellen Street
- Marsh Avenue and Mellen Street
- Ward Street and Marion Street
- Logan Street and Marion Street
- Pearl Street and Virginia Drive

Amtrak Cascades serves the Centralia/Chehalis area with a depot in downtown Centralia. It operates along the Burlington Northern Santa Fe rail lines. Annual average ridership at the Centralia depot is roughly 19,000 boardings and alightings per year. Currently there are five passenger trains daily in each direction. Additional rail information is discussed in the Freight (Rail and Truck) section.

The Lewis County Convention & Visitors Bureau (CVB) provides free local trolley service between downtown and the Centralia Outlet Mall during designated seasonal events. People can rent the motorized trolley busses from the CVB at any time during the year for large group events so route schedules vary. The trolley route originates at the Rail Depot in downtown and travels to Harrison Avenue where it terminates at the Outlet Mall.

Private transportation is available in Centralia through multiple taxi services or on-demand ride sharing services. Taxis providing door-to-door service can be pre-arranged with multiple companies serving the Centralia and Chehalis area. Uber, a private ride service that connects drivers and riders through an online application, is available in Centralia and can provide services in town and to regional or statewide destinations. Lyft, a similar on-demand private rideshare service, is not available in Centralia.

Pedestrian and Bicycle Transportation

Pedestrian Facilities

The team inventoried sidewalk facilities along arterials, collectors, and adjacent to schools within the study area and classified them as good or poor. Sidewalks in good condition were five (5) feet wide or more, and may have shown minor signs of damage and cracking, but were still easily navigable. Sidewalks in substandard condition were less than five (5) feet wide, showed significant damage and cracking or presented a barrier for people with disabilities or using mobility devices.

Sidewalks along both sides of arterials and collectors in downtown Centralia are sufficient, meaning they are in good condition and at least five (5) feet wide with only minor signs of damage and cracking. They are easily navigable for persons with disabilities or using mobility devices. Sidewalks are absent on Reynolds Avenue, Scammon Creek Road, Pearl Street north of Fifth Street. Sidewalks are absent along portions of Harrison Avenue between Caveness Drive and Russell Road. A small section of Galvin Road west of Oakland Road has sidewalks on one side, but otherwise lacks sidewalks. Sidewalks are on both sides of Cooks Hill Road from Military Road west to Scheuber Road and one side from Scheuber Road to just west of Landing Way. Sidewalks on East Magnolia Street are sufficient between North Gold and Wilding Streets. Sidewalks are absent along Seminary Hill Road, notably between the Seminary Hill Natural Area and downtown (Table 8).

Within city limits there is a pedestrian trail network in the Seminary Hill Natural Area. The approximately 3-mile network is comprised of nine designated trails with trailhead access located at the parking lot entrance near the intersection of Locust Street and Barner Drive. The Chehalis River Discovery Trail opened in September 2006 and travels south from the Centralia treatment plant along the Chehalis River for about 1.5 miles. It is located on city-owned property outside of the city limits. Marked trail access and interpretive signage is located at the terminus of Goodrich Road.

Future plans to expand open and recreational space include the development of an impervious trail that follows the Chehalis River and connects the Discovery Trail to Schafer County Park in Lewis County. Sections of this trail plan are located outside of the UGA and will require shared implementation efforts between the County and other agencies. Additional trail plans include the development of a 2.5-mile trail along the former Chicago Milwaukee St. Paul and Pacific Rail rights-of-way. A portion of this planned trail network will cross I-5 at the Skookumchuck River underpass.

All public schools within the study area are served by sidewalks along a portion of their perimeter with the exception of Centralia High School which has no sidewalks along its perimeter. Centralia Middle School lacks sidewalks on the western edge of the parcel. The two schools are adjacent to Borst Avenue which does not have a sidewalk. All other public schools have sidewalks where the school abuts a local road. Schools where the property is adjacent to residential land generally do not have sidewalks along that boundary.

Bicycle Facilities

There are two types of bicycle facilities in Centralia: signed bicycle routes and bicycle lanes. Streets with signed bicycle routes are listed in Table 8. Bicycle lanes are provided on Harrison Avenue from First Street to Lowe Street and Harrison Avenue from Belmont Avenue to Johnson Road. Most of the existing bicycle network is located in the eastern part of the city. There are approximately 6.45 miles of bicycle facilities east of I-5. There are less than 0.25 miles of bicycle facilities in the western part of the city. Three public schools on the west side of I-5 do not have access to existing bicycle facilities. Bicycle facilities are generally absent on streets that connect schools and parks to neighborhoods or commercial areas. Future arterial sections of the West Connector and other urban arterial routes will include adequate shoulder widths that allow for the designation of future bike routes.

Table 8. Existing Bicycle and Pedestrian Facilities

Roadway	Bicycle Route/Lane	Sidewalk	Comment
Tower Avenue	1st Street to 5th Street	Entire corridor	Floral Street to Fair Street Poor Sidewalks
Pearl Street	Entire corridor	Summa Street to 6th Street	Bike Route Sidewalks both sides
Mellen Street	Pearl Street to Lakeshore Drive	Pearl Street to Scheuber Road	Bike Route Sidewalks both sides
Cooks Hill Road	None	Military Road to Landing Way	Sidewalk on south side – Scheuber Road to Landing Way
Locust Street (Centralia College Boulevard)	Pearl Street to Yew Street	Yew Street to Rail Line	Bike Route Sidewalks both sides
Yew Street	Mellen Street to Main Street	Mellen Street to Main Street	Bike Route Sidewalks both sides
1st Street	Main Street to M Street	Tower Avenue to Lowe Street	Bike Route Sidewalks both sides
Harrison Avenue	1st Street to Lowe Street	None	Bike Lane
Harrison Avenue	Belmont Avenue to Johnson Road	None	Bike Route Sidewalk on one side
4th Street	None	Tower Avenue to Oak Street	Sidewalks both sides
Main Street	Oak Street to 1st Street	Tower Avenue to 1st Street	Bike Route Sidewalks both sides
Gold Street	None	Entire corridor	Sidewalks both sides
May Street	None	Pearl Street to Marion Street	Sidewalk on one side
Reynolds Avenue	None	None	None

Table 8. Existing Bicycle and Pedestrian Facilities

Roadway	Bicycle Route/Lane	Sidewalk	Comment
Marion Street	None	North Tower Avenue to Rhobina Street	Sidewalk on one side
East Magnolia Street	None	North Gold Street to Wilding Street	Sidewalk on both sides
Seminary Hill Road	None	Wilding Street to City Limits	None
Woodland Avenue	None	Mellen Street to Summa Street	Sidewalks both sides

Air Transportation

Public Air Facilities

The nearest public air transportation services are at the Centralia-Chehalis Airport, located approximately 3 miles southwest of the city of Centralia. Historically, average air traffic consists of approximately 130 aircraft operations per day comprised of nearly 50% local general aviation, roughly 40% transient general aviation, approximately 10% air taxi and 1% military. The airport has two (2) concrete runways and both are in good condition. Runway 16/34 is 5,000 feet long and 150-feet wide and has weight limits of 85,000 pounds for double tandem, and 30,000 pounds for single wheel and double wheel aircraft. Access to the airport is via Northwest Airport Road or Northwest Louisiana Avenue.

Private Air Facilities

There are six (6) private airports within ten miles of Centralia.

- Skyqueen Airport is located 2 miles east of Centralia at Seminary Hill.
- Hartly Airport is located 6.7 miles south of Centralia at Chehalis.
- Skatter Creek Airport is located 8.4 miles northwest of Centralia at Rochester.
- Wissler's Airport is located 8.7 miles northeast of Centralia at Tenino.
- Dwight Field Airport is located 9.1 miles southeast of Centralia at Chehalis.
- Sorrel Airport is located 9.3 miles northwest of Centralia at Tenino

Freight (Rail and Truck)

In addition to Amtrak passenger services there is freight rail service to and from Centralia along the Burlington Northern Santa Fe (BNSF) Railroad, Union Pacific Railroad, and Tacoma Railroad. Freight trains switch cars and transfer loads at the Blakeslee Junction. The Burlington Northern Santa Fe (BNSF) line crosses streets at three grade-separated crossings: East 6th Street, North Pearl Ave and North Tower Avenue. The Tacoma Rail's Mountain Division line interconnects and interchanges rail cars at a switchyard near the intersection of East Maple Street and North Gold Street. Transferring loads and interconnecting freight cars causes congestion and delays among freight cars. WSDOT recently implemented new rail connections at Blakeslee Junction to reduce congestion at crossing streets by increasing passing speed among rail cars. The Union Pacific Railroad provides rail freight connection between the Port of Centralia and the Blakeslee Junction switchyard.

Truck route locations are important for understanding the flow of freight movement through the city. I-5 is a significant freight route and carries interstate and international freight. The City of Centralia has signed, designated truck routes, including the following:

- West 1st Street from Harrison Avenue to Pearl Street
- South Viaduct and Gold Street from Floral Street to Chestnut Street
- Mellen Street/Alder Street/Cherry Street from I-5 to Tower Avenue
- Harrison Avenue from Johnson Road to the County line/city limits

Other streets in the city are designated truck routes, but may not be signed, including the following:

- Galvin Road/Reynolds Avenue from the west city limits to Pearl Street
- Johnson Road from Reynolds Avenue to Harrison Avenue
- Scheuber Road/Oakland Avenue
- Harrison Avenue/Main Street from I-5 to Tower Avenue
- Yew Street from Mellen Street to Main Street
- Cooks Hill Road/Mellen Street from Scheuber Road to I-5
- Pearl Street/Tower Avenue
- Gold Street and Kresky Avenue from Summa Street to south city limits

On West 1st Street and on Johnson Road, trucks are restricted from 6:00 AM to 7:00 PM with truck speeds limited to 20 mph. The Harrison Avenue and Galvin Road/Reynolds Avenue truck routes provide freight connections between the Port of Centralia and I-5. These routes, along with Scheuber Road/Oakland Avenue, are the only truck routes located west of I-5. The truck routes on Gold Street and Cherry Street provide some connectivity between the rail freight routes and I-5. Freight routing is absent on Central Boulevard although it is a common route for freight vehicles that transfer and pick up loads at a local switchyard. There are County designated routes on Cooks Hill Road and Reynolds Avenue. They are not signed at this time.

While some routes have been designated, there are also routes regularly used by large trucks that do not follow these designated streets. While the roadways have sufficient capacity, the geometry at intersections does not always permit larger tractor-trailer trucks to use these routes to access their destinations. Future arterial sections of the West Connector will allow for freight route designations.

Water Transportation

There are two rivers in the study area – the Chehalis River and Skookumchuck River. The Chehalis River flows into Grays Harbor in Aberdeen and is navigable. Within the study area, the Chehalis River flows parallel and west of I-5, while the Skookumchuck River flows east-west and is crossed by I-5.

Summary of Deficiencies and Issues

Based on the review of existing transportation conditions, the team identified the following deficiencies or issues for the 2017 Centralia Comprehensive Pan Transportation Element update. The order does not reflect a prioritization:

1. Operations at Stop-Controlled Study Intersections – Two key intersections experience significant delays on the stop-controlled minor approaches. The locations are:

   - Summa Street and Gold Street
   - Summa Street and Kresky Avenue

   The poor operations are a result of high volumes along the uncontrolled major approaches. When severely delayed motorists disregard safety in an attempt to overcome the delays, it can contribute to higher rates of crashes.

2. Safety – Two intersections recorded relatively high numbers of crashes compared to other study intersections. The intersection of Harrison Avenue and the I-5 Southbound Ramps had the highest number of crashes (53) and the intersection of Harrison Avenue and the I-5 Northbound Ramps had

the second highest number of crashes (28) over the five-year study period. All other study intersections recorded 15 or fewer crashes.

3. Signed Truck Routes – West of I-5, Harrison Avenue from Johnson Road north to the County line/city limits is a signed truck route. Harrison Avenue east of the I-5 interchange to Main Street is also a truck route but they are not connected and do not present a continuous route from one side of I-5 to the other. Although many truck route options extend east from the I-5/Harrison Avenue interchange, it is common for trucks to deviate from designated truck routes to reach their destination. Signing all truck routes would create an easily identifiable network for trucks to travel on when within city limits and encourage trucks to use designated routes rather than local roads which were not designed structurally and geometrically for large tractor trailer trucks.
4. Enforced Truck Routes—Trucks that deviate from designated truck routes can negatively affect the transportation system for all modes of travel. Most city streets are not designed to accommodate truck traffic, either structurally or geometrically. Trucks also put pedestrians or people on bicycles at risk when they do not use the designated routes.
5. Pedestrian and Bicycle Facility Expansions – There are significant gaps in the pedestrian and bicycle network, and the facilities do not connect seamlessly between west Centralia and the walkable areas of downtown. Sidewalk facilities are sufficient in the downtown area, but portions are missing along Harrison Avenue between Fords Prairie Avenue and Caveness Drive. Bicycle routes are signed primarily in the downtown area but only there are only two segments of bike lane. Many of the signed bike routes coincide with common truck routes. Limited bike lanes discourage bike transportation and may create a safety hazard with different modes using the same space.
6. Pedestrian and Bicycle Facilities near Schools – Two schools show deficient pedestrian facilities. Centralia High School has no pedestrian facilities along its perimeter. Centralia Middle School lacks pedestrian facilities along its western boundary. The designated arterials and collectors in proximity to these schools do not have bicycle facilities.
7. Transit Facilities – Transit service may not be as expansive in terms of route locations and frequency as desired by the community.

Attachment 2
Transportation Element Update
Methods and Assumptions

Centralia Comprehensive Plan – Transportation Element Update: Methods and Assumptions

PREPARED FOR:	Jan Stemkoski, City of Centralia Emil Pierson, City of Centralia
COPY TO:	Kirsten Pennington/CH2M HILL Kate Drennan/CH2M HILL
PREPARED BY:	Kate Bradbury/CH2M HILL Terry Yuen/CH2M HILL
DATE:	December 29, 2017

This memorandum outlines the methods and assumptions that will be used for the City of Centralia Comprehensive Plan Transportation Element update. The goal of this memo is to achieve consensus within the project team to help produce consistent and defensible analysis. This memo identifies the analysis years, study area limits, travel demand forecasting and operational analysis and assumptions.

Study Area Limits

The study area for this project includes the Centralia city limits and portions of the designated Urban Growth Areas (UGAs) of Centralia. Within the study area, 15 existing intersections have been identified for analysis. These study intersections are under various city, county, and state jurisdictions. The selected study locations, control types, and jurisdictions are listed in Table 1.

Table 1. Study Intersection Control Type and Ownership

Intersection Location		Control Type	Jurisdiction
1	W Reynolds Ave & Harrison Ave	Signal	Centralia
2	W Reynolds Ave & Pearl St	Signal	Lewis Co/Centralia
3	Harrison Ave & I-5 Southbound Ramps	Signal	WSDOT/Centralia
4	Harrison Ave & I-5 Northbound Ramps	Signal	WSDOT/Centralia
5	W Main St & Pearl St	Signal	Lewis Co/Centralia
6	W Main St & Tower Ave	Signal	Lewis Co/Centralia
7	Mellen St & I-5 Southbound Ramps	Signal	WSDOT/Centralia
8	Mellen St & I-5 Northbound Ramps	Signal	WSDOT/Centralia
9	Mellen St & Yew St	Signal	Lewis Co/Centralia
10	Cherry St & Pearl St	Signal	Lewis County
11	Cherry St & Tower Ave	Signal	Lewis County
12	W Main St & Yew St	Signal	Centralia
13	W 1st St & Harrison Ave	OWSC	Centralia
14	Summa St & Gold St	TWSC	Centralia
15	Summa St & Kresky Ave	TWSC	Centralia

OWSC – One-way stop-controlled
TWSC – Two-way stop-controlled
WSDOT – Washington State Department of Transportation

Each of the intersections is located on roadways that are identified as part of the City's functionally classified roadway network. The City's classification categories are consistent with the federally classified arterial system. Study area roadway functional classifications are listed in Table 2.

Table 2. Roadway Functional Classification

Functional Classification	Roadway	From	To
Interstate	Interstate 5 (I-5)	Thurston County line	Cowlitz County line
Principal Arterial	Harrison Ave/Main St	I-5	SR 507/Tower Avenue
Principal Arterial	SR 507/Pearl St/Tower Ave/Viaduct	Main St	Summa St
Principal Arterial	Gold St	Summa St	South City limit
Principal Arterial	Kresky Ave	Summa St	South City limit
Minor Arterial	Galvin Rd/Reynolds Ave	River Heights Rd	Pearl St
Minor Arterial	Harrison Ave	Thurston County line	I-5
Minor Arterial	Pearl St/Tower Ave	Howard Ave	Main St
Minor Arterial	SR 507/Mellen St	Scheuber Rd	Tower Ave
Major Collector	W 1st St	Harrison Ave	Tower Ave
Major Collector	Yew St	Main St	Mellen St
Major Collector	Summa St	Woodland Ave	Pacific Ave

Source: Lewis County (2017)

Analysis Years

Intersection analysis for the PM peak hour will be analyzed for the conditions listed below.

- Existing Year (2017)
- Future No Build (2037)
- Future Potential Strategies (2037)

The existing year of 2017 is selected to provide an assessment of the current facilities and intersection operations. The existing analysis will serve as a basis for comparison with future forecasted conditions. The future forecast year of 2037 was selected to capture changes in traffic and growth through a 30-year timeframe horizon.

Data Collection

Traffic counts will be collected at each of the study intersections in June 2017 on a typical weekday (Tuesday, Wednesday, or Thursday) while classes in the Centralia School District are in session. Vehicle turning movement counts, pedestrian counts, and bicycle counts at each intersection will be collected in the afternoon peak period between 4:00 p.m. and 6:00 p.m. This afternoon period captures the end-of-workday commute and typically represents a peak in traffic volumes.

Traffic signal information, including cycle lengths and phase timings, will be collected via a field visit coinciding with traffic count data collection.

Crash data will be collected at all study intersections for the time period between January 1, 2012 and December 31, 2016. This data will include information such as crash type, date and time, weather conditions, and crash severity.

Operational Analysis Methods/Parameters

General Parameters

Existing conditions will represent traffic volume data collected in 2017 and supplemented with historical data if necessary. The study intersections will be analyzed as a system for the same PM peak hour, which will be determined on a study area wide basis. If volume data collection shows that vehicle volumes peak at significantly different times, then analysis peak hours may be selected by area (for example, the I-5 interchange intersections may peak at a different time than the intersections on Reynolds Avenue) to best represent a conservative analysis.

The Lewis County travel demand model will be used to forecast PM peak hour traffic volumes for the future 2037 conditions. Modeling assumptions and methodology are documented in a separate memorandum *Centralia Comprehensive Plan – Transportation Element Update: Forecast Methods and Assumptions*.

Intersection Analysis

Software

All intersection analysis will be performed using the Synchro software package (version 8). This software implements methods from the Highway Capacity Manual (HCM) and will be used to analyze both signalized and unsignalized intersections. The level-of-service (LOS) and intersection delay (average per vehicle) results will be reported using the HCM 2000 methodology, as the HCM 2010 methodology does not support exclusive pedestrian phases.

If roundabouts are considered during the project, the SIDRA software package will be used to analyze roundabout operations.

Synchro and SIDRA analysis parameters for local intersection operations are detailed in Table 3. Operational parameters are based on Synchro and SIDRA operational parameter protocols established by the Washington State Department of Transportation (WSDOT).

Table 3. Synchro and SIDRA Intersection Operations Parameters/Assumptions

Arterial Intersection Parameter	2017 Existing	Future Years
Peak Hour Factor (PHF)	From traffic count and by intersection (the same PHF will be applied to all movements approaching the intersection).	Use 0.85 for intersections with existing PHF $\leq$ 0.85 Use 0.95 for intersections with existing PHF > 0.85 and $\leq$ 0.95 If PHF is greater than 0.95, use existing.
Conflicting Bikes and Pedestrian per Hour	From traffic count, otherwise assume 10 pedestrians/cyclists	Same as existing
Area Type	"Other" for all areas	Same as existing
Ideal Saturation Flow (for all movements)	1,800 passenger cars per hour per lane (pc/hr/ln)	Same as existing
Lane Utilization	Default software assumptions	Same as existing
Lane Width	From as-built plans, otherwise assume 12'	If improvements are proposed, use agency standards/plans, otherwise same as existing.
Percent Heavy Vehicles	From traffic count, by approach, otherwise 2%	Same as existing
Percent Grade	From as-built plans, otherwise 0%	Same as existing
Parking Maneuvers per Hour	One parking maneuver per hour per legal space (on Pearl Street and Tower Avenue only)	Same as existing

Table 3. Synchro and SIDRA Intersection Operations Parameters/Assumptions

Arterial Intersection Parameter	**2017 Existing**	**Future Years**
Bus Blockages	Headway information provided by transit agencies	Same as existing
Intersection signal phasing and coordination	From agency signal phasing sheets, otherwise from field observation	Optimized by Synchro, using engineering judgment, assume coordination where practical.
Intersection signal timing optimization limits	From agency information, otherwise from field observation	Between 60 to max of (150 seconds, existing cycle length)
Minimum Green time	From agency information, otherwise based on MUTCD minimum pedestrian times (minimum of 7 seconds walk time and 3.5 feet per second for flashing don't walk [FDW] clearance). If no crosswalk: 10 seconds Protected left phase: 15 seconds Protected/permissive left phase: 10 seconds	Same as existing
Yellow and all-red time	From agency information, otherwise Yellow (Y) = 4 seconds and Red (R) = 1 second	Same as existing
Right Turn on Red	Allow unless prohibited	Same as existing
SIDRA - Delay and Queue	Uncheck "Exclude Geometric Delay" and "HCM Delay Formula"	Same as existing
SIDRA - Lane Width	Single lane approach – Minimum of 15' Multi-lane approach – Minimum of 14' per lane	Same as existing
SIDRA - Circulating Width	Single lane – Minimum of 18' to 20' Multi-lane – Minimum of 15' per lane	Same as existing
SIDRA - Entry Radius	90' to 110' unless a site specific design is available	Same as existing
SIDRA - Environment Factor	Assume 1.1 for opening year	Assume 1.0 for horizon year
SIDRA - Capacity Model	Assume SIDRA standard	Same as existing
SIDRA - Roundabout LOS Method	Assume same as signalized intersections	Same as existing
SIDRA - Delay Model	Uncheck "Exclude Geometric Delay" and "HCM Delay Formula"	Same as existing

Mobility Standards

Table 4 includes the current mobility standards of WSDOT (for urban areas), Lewis County, and City of Centralia intersections. The mobility standards are based on the Highway Capacity Manual definitions of level of service (LOS), and are applicable to both signalized and unsignalized intersections.

The LOS is a qualitative measurement of traffic operations and can generally be described by six letter grades. Each letter grade, from LOS A to LOS F, categorizes operating conditions at an intersection based on the average vehicle delay time in seconds. LOS A generally represents ideal operating conditions with little to no delay and where movements are not influenced by other vehicles on the roadway. LOS F typically represents poor operating conditions, including high delays and extreme congestion.

For signalized intersections, the reported LOS will be based on the intersection as a whole; for unsignalized intersections, the reported LOS will be based on the worst minor-street approach.

Table 4. Mobility Standards

Roadway Jurisdiction Classification	LOS Mobility Standard
WSDOT (ramp terminals)[1]	LOS D
Lewis County (urban areas and regional arterials)	LOS D
City of Centralia	LOS D

[1] Washington State Department of Transportation 2007. *2007-2026 Washington State Highway System Plan.*

Crash Summary

Crash data will be summarized for all study intersections. This summary will identify the number, type, and severity of crashes that have occurred at each location during the most recent five years of recorded crash data. Serious injuries and fatal injuries at study intersections will be identified.

Potential enhancements that could improve safety at the study intersections will be developed as part of the future strategies package. Assessment of potential future safety deficiencies will not be provided.

Pedestrian and Bicycle

Pedestrian facilities will be identified along each of the federally classified roadways inside the study area noting location (side) and width (greater than or less than five feet). Marked or signed bicycle routes will also be identified within Centralia's urban growth area. Future proposed improvements will be based upon the identified deficiencies.

Transit

Current transit service plans, headways, and transit stop locations within the study area will be identified. Future service plans from Twin Transit will be considered in the future conditions assessment.

Freight and Rail

Existing freight and rail facilities within the study area will be identified. Future planned and programmed projects will be included in the future 2037 conditions. Any identified deficiencies, grade separations or future routes will be proposed for potential improvement strategies.

Attachment 3
Forecast Methods and Assumptions

Centralia Comprehensive Plan – Transportation Element Update: Forecast Methods and Assumptions

PREPARED FOR:	Jan Stemkoski, City of Centralia Emil Pierson, City of Centralia
COPY TO:	Kirsten Pennington/CH2M HILL Kate Drennan/CH2M HILL
PREPARED BY:	Kate Bradbury/CH2M HILL Terry Yuen/CH2M HILL
DATE:	December 29, 2017

This memorandum describes the forecasting process and assumptions used in the development of future year travel demand for the City of Centralia Comprehensive Plan Transportation Element update. This memo identifies the study area limits of forecast modeling, the analysis years, and the travel demand forecasting methodology.

Study Area Limits

The project study area includes 15 existing intersections located within the City of Centralia city limits. Although within city limits, the study intersections are under various city, county, and state jurisdictions. The selected study intersection locations, control types, and jurisdictions are listed in Table 1.

Table 1. Study Intersection Control Type and Ownership

Intersection Location		Control Type	Jurisdiction
1	W Reynolds Ave & Harrison Ave	Signal	Centralia
2	W Reynolds Ave & Pearl St	Signal	Lewis Co/Centralia
3	Harrison Ave & I-5 Southbound Ramps	Signal	WSDOT/Centralia
4	Harrison Ave & I-5 Northbound Ramps	Signal	WSDOT/Centralia
5	W Main St & Pearl St	Signal	Lewis Co/Centralia
6	W Main St & Tower Ave	Signal	Lewis Co/Centralia
7	Mellen St & I-5 Southbound Ramps	Signal	WSDOT/Centralia
8	Mellen St & I-5 Northbound Ramps	Signal	WSDOT/Centralia
9	Mellen St & Yew St	Signal	Lewis Co/Centralia
10	Cherry St & Pearl St	Signal	Lewis County
11	Cherry St & Tower Ave	Signal	Lewis County
12	W Main St & Yew St	Signal	Centralia
13	W 1st St & Harrison Ave	OWSC	Centralia
14	Summa St & Gold St	TWSC	Centralia
15	Summa St & Kresky Ave	TWSC	Centralia

OWSC – One-way stop-controlled
TWSC – Two-way stop-controlled
WSDOT – Washington State Department of Transportation

Analysis Years

Intersection analysis for the PM peak hour will be analyzed for the conditions listed below.

- Existing Year (2017)
- Future No Build (2037)
- Future Potential Strategies (2037)

The existing year of 2017 is selected to provide an assessment of the current facilities and intersection operations. The existing analysis will serve as a basis for comparison with future forecasted conditions. The future forecast year of 2037 was selected to capture changes in traffic and growth through a 30-year timeframe horizon.

Forecasting/Modeling Assumptions

The Lewis County EMME/2 travel demand model, provided by the Thurston Regional Planning Council, will be used to develop forecasts for the future analysis year. This model is updated to reflect 2040 conditions assuming Centralia's current land use projections on the anticipated future roadway network.

Forecasts will be developed from model data using a post-processing spreadsheet tool. This spreadsheet tool adjusts the macro-level modeling forecasts into intersection turning movement volumes using the National Cooperative Highway Research Program (NCHRP) 765 – Analytical Travel Forecasting Approaches for Project – Level Planning and Design methodology, which is suitable for planning and operational studies.

This post-processing methodology compares the predicted change in traffic between the existing and future model years, and distributes that difference amongst intersection turning movements. The existing 2017 intersection turning movement volumes will serve as the basis for future turning movement distribution. Where the model indicates negative growth, future traffic volumes will be kept constant unless justified. After this process is completed for each intersection, the turning movement volumes will be balanced between adjacent intersections, when applicable, and will be rounded to the nearest five vehicles for each intersection movement value.

The current version of the future Lewis County EMME/2 model reflects the No Build (2037) condition, and includes the regional planned and programmed roadway improvement projects listed in Table 2.

Post-processed volumes for the No Build (2037) condition will be used in the intersection operations analysis software to identify any future roadway deficiencies.

Background Projects

The future Lewis County EMME/2 travel demand forecasting model reflects 2040 conditions assuming current land use projections and the planned/programmed future roadway network. The projects listed in Table 2 are assumed to be constructed by year 2040 and are included as part of the No Build (2037) condition. These projects are listed in the Lewis County model documentation and have been confirmed to be in the regional model.

Table 2. Assumed 2040 Transportation Improvements

Improvement Project	Description	Reference
I-5 Mellen Street to Grand Mound	I-5 Blakeslee Junction to Grand Mound (Completed February, 2013). Widened four miles of I-5 from two to three lanes in each direction. Stage 1: I-5 Mellen Street to Blakeslee Junction (Completed August, 2016). Added collector-distributor lanes to connect Mellen Street and Harrison Avenue allowing local traffic to reach in-town destinations without merging into one of two lanes on I-5. Stage 2: I-5 Mellen Street to Blakeslee Junction (Expected completion in late 2017). Additional Mellen Street and Harrison Avenue interchange improvements, bridge repair, and realignment of the highway.	http://www.wsdot.wa.gov/Projects/I5/MellentoGrandMound/
Mellen Street Gateway Connector	This project includes construction of a new roadway from the I-5/Mellen Street interchange to the intersection of Mellen Street and Alder Street. It includes construction of a roundabout at the intersection of this new road with Mellen and Alder streets, and a new roundabout or traffic signal at the intersection of this new road with Alder Street.	City of Centralia Six-Year TIP[1]
Alder Street Improvements	This project includes widening and reconstruction of Alder Street from the I-5 collector-distributor lane to the intersection of Alder Street and Mellen Street. It also includes curb, gutter, sidewalks, and illumination along the length of the project.	City of Centralia Six-Year TIP[1]

[1] City of Centralia Six-Year Transportation Improvement Program (2016-2021), adopted 6/9/2015.

Potential Strategies

Based on any deficiencies identified in the No Build conditions analysis, potential improvement strategies will be developed to address congestion, connectivity, and safety within the study area. One set of potential project strategies will be incorporated into the Lewis County EMME/2 travel demand model, and model forecasts will be post-processed to attain turning movement volumes reflecting the Potential Strategies (2037) condition. These volumes will be analyzed in the intersection operations analysis software to assess the effectiveness of each potential network improvement.

The study intersections will be evaluated against established jurisdictional transportation levels of service standards. From the results of the intersection evaluation (among other evaluation criteria developed), specific projects will be prioritized and documented in the City of Centralia Comprehensive Plan Transportation Element update.

Attachment 4
Funding Strategies

Centralia Comprehensive Plan – Transportation Element Update: Funding Strategies Technical Memorandum

PREPARED FOR:	Jan Stemkoski, City of Centralia Emil Pierson, City of Centralia
COPY TO:	Terry Yuen, CH2M Kate Bradbury, CH2M
PREPARED BY:	Kate Drennan/CH2M
DATE:	December 29, 2017

1. Introduction

This funding strategies memorandum reviews the estimated costs of transportation improvements improvement and potential funding sources for transportation projects in the City of Centralia 6-Year Transportation Improvement Program (TIP). Transportation projects identified in this memorandum address deficiencies and needs identified in the TIP (FY 2017-2022).

The Washington State Growth Management Act (GMA) requires a funding strategy for the transportation element that includes:

a) An analysis of funding capability to judge needs against probable funding resources;
b) A multi-year financing plan based on the needs identified in the comprehensive plan, the appropriate parts of which shall serve as the basis for the six-year street, road, or transit program; and
c) If probable funding falls short of meeting identified needs, a discussion of how additional funding will be raised, or how land use assumptions will be reassessed to ensure that level of service standards will be met.

This funding strategies memorandum addresses GMA requirements by identifying available funding for transportation improvements, evaluating available funding against transportation needs identified in the TIP, quantifying funding gaps, and identifying potential funding sources to meet transportation needs.

2. Current City Funding

Transportation capital improvements are typically expensive and funded through a variety sources. All funding sources are affected by changes in the economy, political priorities, and grant program eligibility requirements and scoring criteria. The following section reviews existing local transportation funding sources.

Local Sources

This section reviews the principal sources of transportation funding for projects in the City's STIP.

Real Estate Excise Tax (REET)

The real estate excise tax (REET) is a 0.50% tax imposed on property sales citywide (in addition to the 1.28% Washington State REET). Revenues from the 0.50% local REET tax may be spent on a variety of

transportation projects (in addition to other capital projects), so long as the project is in the Comprehensive Plan. Transportation capital projects eligible for financing with this portion of the REET include streets, roads, highways, sidewalks, lighting, traffic signals, bridges, and trails.

REETs are collected by the County Treasurer and distributed to the City periodically. Annual City revenues for 2017 are projected to be $200,000. REET revenues are particularly volatile compared to other funding sources.

Street Fund/Fuel Tax Distributions

A portion of the Washington State fuel tax is distributed to the City's Street Fund on a monthly per capita basis. Washington State currently levies taxes totaling $0.375 per gallon on gasoline and diesel. The City receives about 10.7% of the $0.23 per gallon tax and about 8.3% of the $0.03 tax levies. These funds may be used for transportation system maintenance and a wide variety of capital projects. The City's share of the statewide gas tax is projected to be $344,500 for 2017.

The City's Street Fund also receives revenues from franchise fees ($180,000 projected for 2017) and sales tax revenue ($300,000 projected for 2017; these revenues are separate from the sales tax levy described as part of the Transportation Benefit District below).

Transportation Benefit District

The City established a Transportation Benefit District (TBD) in 2015 that levies a 0.20% sales tax within the City, revenues from which are devoted solely to transportation services. The tax expires after 10 years.

Paths and Trails Fund

Revenues allocated under the Paths and Trails Fund are acquired from the Washington State fuel tax described in the Street Fund summary above.

Table 1 below summarizes the City's transportation funds for the most recent four years.

Table 1: Transportation Revenue FY 2014-2017

Sources of revenue			Revenue (dollars)				
			2014	2015	2016	2017	Average
Street Fund Revenue	Funded through sales tax, sanitation franchise fees, federal grants, fuel tax, and miscellaneous other earnings.	Local/ State	1,022,000	1,292,000	1,062,000	1,487,000	1,216,000
		Federal	576,000	496,000	50,000	0	281,000
Transportation Benefit District Fund	Funded through 0.2% local sales tax; may be used on variety of improvement projects	Local/ State	0	0	465,000	650,000	557,000
Path and Trails Fund Revenue	Funded through interest earnings.	Local/ State	1,700	1,800	1,700	1,700	1,700
Total Annual Average							2,056,000

Notes:

Revenues and totals are rounded to the nearest thousandth dollar. Actual funding dollars are used for years 2014-2015 and adopted funding for 2016-2017.

3. Future City Funding

The City anticipates $22,738,000 will be needed to fund transportation projects from 2017 to 2022. Table 2 summarizes the funding needed for transportation improvements outlined in the TIP.

Table 2: Transportation Improvement Program Funding Needs (FY 2017-2022)

Year						Total Funding Needed
2017	2018	2019	2020	2021	2022	
$9,229,000	$2,717,000	$2,602,000	$2,436,000	$4,654,000	$1,100,000	**$22,738,000**

Source: 6-Year Transportation Improvement Program (FY2017-2022)

Notes: Funding is rounded to nearest thousandth dollar.

Approximately $10.6 million in local funds would be available for TIP projects. However, since these local funds are also used for street preservation and maintenance, the actual amount of local funding available for capital improvements is less. Federal funding programs could make up some of the funding gap, as well as other potential sources of revenue discussed below.

Additional Funding Resources

To reduce the funding gap, the City could pursue state and federal grants, increase existing taxes, or leverage projects with intergovernmental interest to share cost burdens with other jurisdictions. Potential sources of revenue are described below.

- **Transportation Benefit District (TBD):** The City enacted a TBD in 2016 with a 0.2% sales tax levy, providing $450,000 in 2016 and an anticipated $650,000 in 2017 in new revenue (Table 1). The City could consider increasing the tax levy; for every 0.1% increase in the TBD sale tax levy, the City could conservatively expect an additional $250,000 in annual revenue.
- **The Transportation Improvement Board (TIB):** The TIB distributes grant funding, generated by a three cents sales tax, to cities and counties for transportation projects. TIB administers a number of competitive grant programs that City projects would be eligible for. The grant programs range from $3 million to $75 million in available funds. Individual grant awards vary, but generally award between $4 to $5 million. The City has applied for and won TIB grants in the past.
- **Intergovernmental Coordination:** The City could pursue joint funding ventures with adjacent jurisdictions. Transportation projects often cross jurisdictional lines, provide mutual benefit to multiple jurisdictions, or may use another agency's right-of-way, resulting in cost-sharing opportunities that could save all parties money. Additionally, the City could leverage other utility improvement projects and utility funding, such as water or sewer pipe replacement, to augment transportation project funding.
- **Other funding sources could include:**
  - **City General Funds and Bonds.** Many City services compete for general funds, though many jurisdictions do devote some general funds to transportation. The City has also previously floated bonds to pay for capital improvement projects, but bonds must be repaid over time, resulting in an ongoing impact to future transportation funds.
  - **Impact Fees.** State law allows local jurisdictions to assess fees for mitigating the transportation impacts of new development. The revenue from these fees may be used for transportation projects in the City's capital facilities plan; however, the impact fees must be used on projects reasonably related to the impacts of the development, or must reasonably benefit the

development. In practice, impact fee revenue could likely be used for a wide variety of transportation improvement projects.

Attachment 5
Cost Estimates – Methods and Assumptions

TECHNICAL MEMORANDUM

Centralia Transportation Element Update Basis of Estimate Memorandum

PREPARED FOR:	Jan Stemkoski, City of Centralia
COPY TO:	
PREPARED BY:	Ben Kamph, CH2M
DATE:	December 29, 2017

This memorandum serves to update multiple Class 4 cost estimates from the 2007 Centralia Transportation Element, and estimate new projects recommended in the 2017 Transportation Element. The scope includes regional arterial projects identified in the Lewis County Arterial Analysis Study. The recommended projects for the Centralia Transportation Element are included in Appendix A.

There are seven specific projects that were estimated using a historical data-based estimating methodology (see table 1.1), some of them are updated from 2007 costs. The remaining projects received a 30% escalation to bring all costs to current 2017 dollars. The seven main projects identified for updates are listed below in Table 1.1, and in further detail in Appendix B. Projects spearheaded and funded with other agencies, such as Twin Transit, are not estimated in this document.

The estimating accuracy for a 0-10% Class 4 cost estimate is -30% to +50% as described on the chart and table attached (Appendix E). Estimator judgement believes this estimate range to be a realistic range a Class 4 estimate, reflecting a slightly higher probability for costs to be conservative, rather than competitive, at this stage in design. Illustrated below are the Construction Total costs each area in current 2017 dollars.

Table 1.1 Centralia TIP Executive Summary

Low Range	ESTIMATE RANGE	High Range
-30%	Downing & I-5 Interchange (C-R9)	+50%
	$34,878,000	
-30%	Schueber & Cooks Hill Road (C-R11)	+50%
	$2,402,000	
-30%	Truck Route Wayfinding (F-1)	+50%
	$11,500	
-30%	Harrison & 1st Intersection (I-1)	+50%
	$476,250	
-30%	Pearl & 6th Intersection (I-2)	+50%
	$476,250	
-30%	Summa Gold Intersection (I-3)	+50%
	$1,880,000	

Low Range	ESTIMATE RANGE	High Range
-30%	Summa & Kresky Intersection (I-4)	+50%
	$415,000	

The project's key inclusions are:

- Project costs are reported in current 4Q2017 dollars.
- Percent based allowances are included for Construction Surveying (0.75%), Traffic Control (8%), Mobilization (10%), Erosion Control (2%), and Contingency (30%).
- Two soft cost allowances also included are Construction Engineering (10%), and Design Engineering (13%)
- Projects escalated from 2007 costs to 2017 costs utilize the Sound Transit CCI (Construction Cost Index) Forecast (August 2017) of 1.30 (30%).

Resources:

- WSDOT Bid Tabulation data
- CH2MHILL Cost Estimating Database
- Estimator Judgement
- Sound Transit CCI Forecast (August 2017) (Appendix D)

Key Exclusions

- Owner Professional Services & Engineering (PS&E), related to lawsuits or cost-to- cure.
- This estimate does not include change order, or construction contingency
- This estimate does not include hazardous material handling and/or disposal.
- Future escalation to midpoint of construction, or to year of expenditure.

Validity

This estimate was prepared based on project scope details available at the time it was produced. As with all estimates it represents a snapshot in time of what is known about the project and expected to occur. The commodities and energy markets are extremely active at this point in time. Changes in either will have dramatic affects to this estimate. Therefore, this estimate should be viewed in that light and if more than 90 days have passed, or there have been significant changes in the commodity markets, this estimate should be updated and reevaluated.

Disclaimer

The opinions of cost (estimates) shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time the opinion was prepared. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. The recent increases or decreases in material pricing may have a significant impact which is not predictable and careful review or consideration must be used in evaluation of material prices. As a result, the final project costs will vary from the opinions of cost presented herein. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

Appendix A
Lewis County Arterial Analysis Study

Project Number	Title	From/To	Description	Project Cost (2007)	Project Cost (2017)
Freight/Truck					
F-1*	Truck route wayfinging	• Harrison Ave: Harrison Avenue from Sandra to I-5 • N. Pearl: On N. Pearl from northern city limits to Reynolds • Scheuber Road: Scheuber Road/Oakland from West Connector (once constructed) to Galvin • Yew Street: Yew Street from Mellen to Main • Cook Hill Road: S. Scheuber to I- 5 • Pearl Street: W. Cherry to W. Reynolds • Tower Avenue: W. Cherry to W. 6th • Kresky Avenue: southern city limits to S. Tower Avenue	Sign designated truck routes throughout Centralia.	New project to 2017 Transportation Element	$11,500
F-2	Galvin Truck Route ext.	On Galvin/Reynolds from N. Pearl to western City limits	Extend Galvin Road truck route designation to city limits and sign	$10500 (package)	$13,650
F-3	West Connector truck route	On Forom and new West connection road (const. began 2009) from Harrison to Airport road	Designate truck route on west connector	$10500 (package)	$13,650
F-4	Central truck route	On 6th (from Tower to B sty) on B sty (from 6th to Kear y), on Kearny (from B to Central), On Central to terminus	Designate and provide signage on route to connect truck routes to rail switch yard	$10500 (package)	$13,650
F-5	Johnson truck route	On Johnson from Harrison to Galvin	Truck access restricted to 10 pm to 6 am daily (provide signage)	$10500 (package)	$13,650
Roadway Capacity					
C-R1	Downing Road Extension	On Downing from Old Highway 99 to North Pearl	Extend from current terminus to Old Hwy 99, widen and designate to 4 lane major collector	$15.1 mil	$19.63 mil
C-R2	Blair Extension	On Blair Road from Old Hwy 99 to Hobson Road	Upgrade to 4/5 lane principal arterial road	$5-9 mil	$6.5-11.7 mil
C-R3	Salzer Valley Road	On Salzer Valley Road from National to Centralia Alpha	Provide two-way left turn lanes with left turn pockets at intersections	$1.7 mil	$2,2 mil
C-R4*	Downing/I-5 Interchange	At Downing Road arterial and I-5	Construct new interchange at construction of Downing Road arterial	$27.2 mil	$34.9 mil

Project Number	Title	From/To	Description	Project Cost (2007)	Project Cost (2017)
C-R5	North County Interchange	At future Downing Road arterial extension and I-5	Construct new interchange upon construction of Downing Road arterial extension	$27.2 mil	$35.36 mil
C-R6	Harrison Access Management	On Harrison from Galvin to Caveness	Reconstruct driveway and/or close off intersections to remove conflicts	TBD	TBD
C-R7*	Schueber & Cooks Hill Rd	At Schueber & Cooks Hill Rd Intersection	Add left turn pockets on all 3 approaches and signalize	$2.5 mil	$2.4 mil
C-R8	Mellen Street Gateway Connector	I-5 to Mellen Street	Construct new road from I-5/Mellen Street interchange to Yew Street Extension	$3.71 million	$4.82 mil
C-R9	Mellen Street Gateway Connector Extension	Yew Street Extension to Alder Street	Construct new road to extend from the intersection of Mellen Gateway Connector/Yew Street Extension to Alder Street (aligned with either Long Road or a new road further east of Long Road).	$1.83 million	$2.4 mil
C-R10	Yew Street Extension Improvement	Yew Street from Mellen Street to South Street	Reconstruct Yew Street, and construct new extension south to South Street.	$4.36 million	$5.7 mil
Intersection Capacity					
I-1*	Harrison/1st Intersection	At Harrison and 1st Street	Provide signal or compact roundabout, unsignalized intersection operates at LOS F	$250,000	$476,000
I-2*	Pearl/6th Intersection	At Pearl Street and 6th Street	Provide signal, unsignalized intersection operates at LOS F	$250,000	$476,000
I-3*	Summa/Gold Intersection	At Summa Street and Gold Street	Provide signal or compact roundabout, unsignalized intersection operates at LOS E	$250,000	$1.88 mil
I-4*	Summa/Kresk y Intersection	At Summa Street and Kresky Avenue	Provide signal or compact roundabout, unsignalized intersection operates at LOS F	$250,000	$415,000
Safety					
S-1	Intersection Improvements	Intersections improvements with vehicular capacity deficiencies	Consider adding crosswalks, ADA ramps, and illumination at intersections where reconstruction is warranted.	New recommendation	TBD
S-2	Main/Washington Intersection	At Main and Washington	Provide protected left signal phase at intersection	$250,000	$325,000
Non Motorized					
NM-1	Mellen Bike Route	On Mellen from Nick Street to I-5	Provide signage on bike route to indicate connection across I-5	TBD	TBD
NM-2	Eshom Road Sidewalk	On Eshom from Mt Vista to Mayberry	Provide 1,200 feet of sidewalk at schools	New project	$75 per S.Y.

Project Number	Title	From/To	Description	Project Cost (2007)	Project Cost (2017)
NM-3	Fords Prairie Sidewalk	On Harrison from Galvin to Caveness Dr	Provide sidewalk at schools	$2.0 mil	$2.6 mil
NM-4	Mellen Street Sidewalk	On Mellen from Old Access Treatment Plant to CMRR	Complete pedestrian connection on Mellen linking to trail network (http://www.wsdot.wa.gov/Projects/I5/MellentoGrandMound/Phase3/)	$197 million (entire corridor from Mellen to Grand Mound)	$256 mil
NM-5	Mt. Vista Road Bike Lane and Sidewalk	On Mt. Vista from Fort Borst Park to Eshom	Provide non-motorized facilities to connect community facilities	TBD	TBD
NM-6	Johnson Bike Lanes	On Johnson from Harrison to Mt. Vista	Provide bike lanes to connect residential to commercial	$1.0 mil	$1,3 mil
NM-7	Oakland Bike Lanes	On Oakland from Galvin to city limits	Provide bike route to connect Oakland	TBD	TBD
NM-8	Locust sidewalk	On Locust from Berry to Seminary Hill trail	Provide sidewalk to connect residential to recreational	TBD	TBD
NM-9	Galvin Bridge Trail to Borst Park	Trail on Chehalis River from Public Works Facility trail to Fort Borst Park	Designate and develop trail along Chehalis River	$3.4 mil (includes NM-12)	$4.42 mil
NM-10	Washington Elementary Spruce Street sidewalk improvements	Spruce St from Field Ave to S. Gold Street	Build sidewalk in current painted walking zone along Spruce Street to create safe route to school	New project	$75 per S.Y.
NM-11	Washington Elementary East Chestnut sidewalk improvements	East Chestnut Street from Gold Street to S. Diamond Street	Build pedestrian facility on Chestnut Street to link to Field Street sidewalks and create a safe route to school	New project	$75 per S.Y.
NM-12	Oakview Elementary Oakview Avenue sidewalk extension	E. Oakview Avenue from eastern school perimeter parking lot to Sirkka Street	Continue sidewalk from eastern perimeter/ parking lot of Oakview Elementary to Sirkka Street.	New project	$75 per S.Y.
NM-13	Centralia Middle School Allen Avenue sidewalk improvements	Allen Avenue from Mt. Vista Road to Borst Avenue	Add pedestrian facility on eastern edge of school lot to connect with athletic facilities.	New project	$75 per S.Y.
NM-14	Borst Avenue Improvements	Borst Avenue from Johnson Road to Scheuber Road	Add pedestrian facility for the length of the project and reconstruct existing roadway with new storm system, signage, and lane markings.	$1.50 million	$1.95 mil
NM-15	Central Boulevard Area Transportation Improvements	B Street from 6th Street to Kearney Street, Kearney Street from B Street to Central Boulevard, and Central	Add sidewalks, curb and gutters along both sides of the street and reconstruct existing roadway with new storm system, signage, and lane markings.	$2.60 million	$3.38 mil

Project Number	Title	From/To	Description	Project Cost (2007)	Project Cost (2017)
		Boulevard from Kearney Street to north dead end			
NM-16	Zenkner Valley Road Improvements	Zenkner Valley Road from Downing Road to North City Limits	Add sidewalks, curb and gutters along one side of the street and reconstruct existing roadway with new storm system, signage, and lane markings.	$2.00 million	$2.6 mil
NM-17	Skookumchuck Pedestrian/Bike Ramp	Borst Park to Mellen Street	Construct ramps from existing Borst Park path to the WSDOT CD lane bridge and to access road south of Skookumchuck River.	$2.05 million	$2.67 mil
NM-18	Alder Street Improvements	Alder Street from I-5 CD Lane to Mellen Street	Add sidewalks, curb and gutters along both sides of the street and reconstruct existing roadway with new illumination system.	$3.34 million	$4.34 mil
NM-19	Hayes Lake Train Project	Bridge Street to Borst Park	Construct path from the Hayes Lake public access at Bridge Street along the Skookumchuck River to the existing path adjacent to Borst Lake.	$659,000	$857,000
NM-20	Harrison Avenue Reconstruction Project	Harrison Avenue from Johnson Road to Galvin Road	Add sidewalks, curb and gutters along both sides of the street and reconstruct existing roadway with new ADA access ramps, signage, and lane markings.	$1.70 million	$2.21 mil
Transit					
T-1	Designate Public Amenities/Facilities at Centralia station	At Centralia Station	Supply public benches, posted fares, and other passenger amenities	TBD	TBD
T-2	Designated loading areas and platform	At Centralia Station	Designate passenger loading/parking/baggage checking/ticketing areas with signage at appropriate areas	TBD	TBD
T-4	Twin Transit Route #21 Ext	Route #21 on Harrison from Russell to Prairie	Extend route #21 on Harrison from Russell to Prairie to connect to Grand Mound	TBD	TBD
T-5	LOS Headway Improvements	All Twin Transit Routes	Improve LOS goals by decreasing headway from 60 to 30 minutes on all routes during peak periods	TBD	TBD
T-6	Transition flag bus stops to permanent roadside stops	Determined in partnership with Twin Transit	Replace flag bus stops with conventional roadside stops at higher ridership. Where feasible, add bench, shelter and signage	TBD	TBD

Project Number	Title	From/To	Description	Project Cost (2007)	Project Cost (2017)
Maintenance					
M-1	Galvin Road	Galvin Road from Harrison Avenue to West City Limits	Plane/remove existing asphalt and place new HMA wearing course. Provide new signs and lane markings.	$761,000	$989,000
M-2	Gold Street	Gold Street from Summa Street to Marion Street	Plane/remove existing asphalt and place new HMA wearing course. Provide new signs and lane markings.	$1.21 million	$1.573 mil
M-3	Reynolds Avenue	Reynolds Avenue from Harrison Avenue to East City Limits	Place 2-inch overlay on existing roadway. Provide new signs and lane markings.	$468,000	$608,000
M-4	Scheuber Road	Scheuber Road from Borst Avenue to Galvin Road	Place 2-inch overlay on existing roadway. Provide new signs and lane markings.	$373,000	$485,000
M-5	Summa Street	Summa Street from Woodland Avenue to East City Limits	Place 2-inch overlay on existing roadway. Provide new signs and lane markings.	$450,000	$585,000
M-6	Woodland Avenue	Woodland Avenue from Alder Street to Summa Street	Place 2-inch overlay on existing roadway. Provide new signs and lane markings.	$231,000	$300,000
M-7	Kresky Avenue	Kresky Avenue from Viaduct to Scott Johnson Road	Plane/remove existing asphalt and place new HMA wearing course. Provide new signs and lane markings.	$540,000	$702,000
M-8	Washington Avenue	Washington Avenue from Alder Street to Pear Street	Plane/remove existing asphalt and place new HMA wearing course. Provide new signs and lane markings.	$600,000	$780,000
M-9	Cooks Hill Road	Cooks Hill Road from Schueber Road to West City Limits	Repair existing asphalt with HMA overlay. Provide new signs and lane markings.	$500,000	$650,000
M-10	Harrison Avenue Paving Project	Harrison Avenue from the Skookumchuck River Bridge to Johnson Road	Plane/repave wearing course and replace substandard ADA access ramps. Provide new signage, lane markings, and inductive traffic loops.	$1.10 million	$1.43 mil

Appendix B
Cost Estimate Details (Select Projects)

Centralia Transportation Element
COST ESTIMATE SUMMARY

PROJECT: Downing Road E-W Connector & North Interchange	**REFERENCE NAME/PHONE**		**SHEET** 1 of 1
DESIGN LEVEL: Conceptual	**LENGTH (MI.):** 3.7	**DATE**	**NAME/CHECKED BY:**
KIND OF WORK: Roadway		11/26/2017	B. Kamph

Construction Cost

NO.	ITEM	UNIT	QUANTITY	COST
1	Drainage	Mi.	2.49	$296,310
2	Curb, Gutter & Sidewalks	Mi.	N/A	N/A
3	New Roadway	Lane-Mi.	3.70	$6,021,750
4	Overlay Existing Roadway	Lane-Mi.	N/A	N/A
5	Reconstruct Existing Roadway	Lane-Mi.	N/A	N/A
6	Intersection Widening	EA	N/A	N/A
7	Restriping Existing Roadway	Lane-Mi.	N/A	N/A
8	Interconnect Signal	LS	N/A	N/A
9	New Signal	EA	2	$563,800
10	Signal Modifications	EA	N/A	N/A
11	Transit Enhancements	EA	N/A	N/A
12	Permanent Signing	LS	1.00	$28,200
13	Illumination	EA	132.00	$863,280
14	Landscaping	Mi.	N/A	N/A
15	Bridges	SF	67,000	$12,261,000
16	Walls	SF	33,000	$0
	SUBTOTAL			***$20,034,340***

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Miscellaneous	15.0-20.0%	0.0%	$0
	Construction Surveying	1.0-2.5%	0.75%	$150,000
	TP & DT	3.0-8.0%	0.0%	$0
	Mobilization	8.0-10.0%	10.0%	$2,003,000
	Erosion Control	0.5-2.0%	2.0%	$401,000
	Contingency	30.0%	30.0%	$6,010,000
	Escalation (per year)	0.5-2.0%	2.0%	
	-Current Year		2017	$0
	Construction Engineering	10.0%	10.0%	$2,003,000
	TOTAL CONSTRUCTION COST			***$30,601,340***

PSE Cost

	ELEMENT	PERCENT	COST
	Design Engineering	13.0%	**$3,978,000**

ROW Cost

	ELEMENT	UNIT	UNIT COST	QUANITY	COST
	Rural ROW	SF	$0.28	$1,066,120.00	$298,514
	Urban ROW	SF	$1.75	0	$0
	ROW TOTAL				**$298,514**

Environmental Cost

	ELEMENT	PERCENT	COST
	Environmental Cost	TBD	**TBD**

Total Cost: $34,877,854

Range of Total Cost

	RANGE	PERCENTAGE	COST
	High Total	50.0%	**$52,316,780**
	Low Total	-30.0%	**$24,414,498**

Range of Total Cost: $24,414,500 TO $52,316,800

Centralia Transportation Element
COST ESTIMATE SUMMARY

PROJECT: Scheuber and Cooks Hill Rd	**REFERENCE NAME/PHONE**		**SHEET**
DESIGN LEVEL: Improvement			1 of 1
KIND OF WORK: Left turn pocket at all approaches and signalize	**LENGTH (MI.):**	**DATE** 12/19/2017	**NAME/CHECKED BY**

Construction Cost

NO.	ITEM	UNIT	QUANTITY	COST
1	Curb, Gutter, Sidewalks	Mi.	N/A	N/A
2	Drainage	Mi.	N/A	N/A
3	New Roadway	Lane-Mi.	N/A	N/A
4	Overlay Existing Roadway	Lane-Mi.	N/A	N/A
5	Reconstruct Existing Roadway	Lane-Mi.	N/A	N/A
6	Intersection Widening	EA	4.00	$1,023,000
7	Restriping Existing Roadway	Lane-Mi.	N/A	N/A
8	Interconnect Signal	LS	N/A	N/A
9	New Signal	EA	1.00	$300,000
10	Signal Modifications	EA	N/A	N/A
11	Transit Enhancements	EA	N/A	N/A
12	Traffic Calming	%	N/A	N/A
13	Illumination	Mi.	N/A	N/A
14	Landscaping	Mi.	N/A	N/A
15	Bridges	SF	0.00	N/A
16	Walls	SF	N/A	N/A
	SUBTOTAL			***$1,323,000***

	ADDITIONAL COSTS		RANGE	PERCENTAGE	COST
	Miscellaneous		15.0-20.0%	0.0%	$0
	Construction Surveying		1.0-2.5%	0.75%	$10,000
	TP & DT		3.0-8.0%	8.0%	$106,000
	Mobilization		8.0-10.0%	10.0%	$132,000
	Erosion Control		0.5-2.0%	2.0%	$26,000
	Contingency		30.0%	30.0%	$397,000
	Escalation (per year)		0.5-2.0%	2.0%	
	-Current Year			2017	$0
	Construction Engineering	10.0%	10.0%	10.0%	$132,000
	TOTAL CONSTRUCTION COST				***$2,126,000***

PSE Cost

	ELEMENT	PERCENTAGE	COST
	Design Engineering	13.0%	**$276,000**

ROW Cost

	ELEMENT	UNIT	UNIT COST	QUANITY	COST
	Rural ROW	SF	$1.10	0.00	$0
	Urban ROW	SF	$2.26	0.00	$0
	TOTAL ROW COST				**$0**

Environmental Cost

	ELEMENT	PERCENTAGE	COST
	Environmental Cost	TBD	**TBD**

Total Cost: $2,402,000

Range of Total Cost

	RANGE	PERCENTAGE	COST
	High Total	50.0%	**$3,603,000**
	Low Total	-30.0%	**$1,681,400**

Range of Total Cost: $1,681,400 TO $3,603,000

Centralia Transportation Element
COST ESTIMATE SUMMARY

PROJECT: Truck Route Sign Package	**REFERENCE NAME/PHONE**		**SHEET** 1 of 1
DESIGN LEVEL: Improvement			
KIND OF WORK: Provide signage on designated routes	**LENGTH (MI.):**	**DATE** 12/19/2017	**NAME/CHECKED BY:**

Construction Cost

NO.	ITEM	UNIT	QUANTITY	COST
1	Curb, Gutter & Sidewalks	Mi.	0.00	$0
2	Drainage	Mi.	0.00	$0
3	New Roadway	Lane-Mi.	0.00	$0
4	Overlay Existing Roadway	Lane-Mi.	N/A	N/A
5	Reconstruct Existing Roadway	Lane-Mi.	0.00	$0
6	Intersection Widening	EA	N/A	N/A
7	Restriping Existing Roadway	Lane-Mi.	0.00	$0
8	Interconnect Signal	LS	N/A	N/A
9	New Signal	EA	0.00	$0
10	Signal Modifications	EA	0.00	$0
11	Transit Enhancements	EA	N/A	N/A
12	Traffic Calming	EA	10.00	$7,500
13	Illumination	Mi.	0.00	$0
14	Landscaping	Mi.	0.00	$0
15	Bridges	LS and SF	0.00	$0
16	Walls	SF	0.00	$0
	SUBTOTAL			*$7,500*

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Miscellaneous	15.0-20.0%	0.0%	$0
	Construction Surveying	1.0-2.5%	0.75%	$0
	TP & DT	3.0-8.0%	8.0%	$1,000
	Mobilization	8.0-10.0%	10.0%	$1,000
	Erosion Control	0.5-2.0%	2.0%	$0
	Contingency	30.0%	30.0%	$0
	Escalation (per year)	0.5-2.0%	2.0%	
	-Current Year		2017	$0
	Construction Engineering	10.0%	10.0%	$1,000
	TOTAL CONSTRUCTION COST			***$10,500***

PSE Cost

	ELEMENT	PERCENTAGE	COST
	Design Engineering	13.0%	**$1,000**

ROW Cost

	ELEMENT	UNIT	UNIT COS	QUANITY	COST
	Rural ROW	SF	1.10	0.00	$0
	Urban ROW	SF	2.26	0.00	$0
	TOTAL ROW COST				***$0***

Environmental Cost

	ELEMENT	PERCENTAGE	COST
	Environmental Cost	TBD	**TBD**

Total Cost: $11,500

Range of Total Cost

	RANGE	PERCENTAGE	COST
	High Total	50.0%	**$17,250**
	Low Total	-30.0%	**$8,050**

Range of Total Cost: $8,100 to $17,300

Centralia Transportation Element
COST ESTIMATE SUMMARY

PROJECT:	W 1st St. and Harrison Ave.	**REFERENCE NAME/PHONE**		**SHEET** 1 of 1
DESIGN LEVEL:	Improvement			
KIND OF WORK:	Signal Improvement	**LENGTH (MI.):**	**DATE** 12/19/2017	**NAME/CHECKED BY:**

Construction Cost

NO.	ITEM	UNIT	QUANTITY	COST
1	Curb, Gutter & Sidewalks	Mi.	0.00	$0
2	Drainage	Mi.	0.00	$0
3	New Roadway	Lane-Mi.	0.00	$0
4	Overlay Existing Roadway	Lane-Mi.	N/A	N/A
5	Reconstruct Existing Roadway	Lane-Mi.	0.00	$0
6	Intersection Widening	EA	N/A	N/A
7	Restriping Existing Roadway	Lane-Mi.	N/A	N/A
8	Interconnect Signal	LS	N/A	N/A
9	New Signal	EA	1.00	$250,000
10	Signal Modifications	EA	0.00	$0
11	Transit Enhancements	EA	N/A	N/A
12	Traffic Calming	%	N/A	N/A
13	Illumination	Mi.	0.00	$0
14	Landscaping	Mi.	0.00	$0
15	Bridges	LS and SF	0.00	$0
16	Walls	SF	0.00	$0
	SUBTOTAL			*$250,000*

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Miscellaneous	15.0-20.0%	20.0%	$50,000
	Construction Surveying	1.0-2.5%	2.0%	$5,000
	TP & DT	3.0-8.0%	5.0%	$12,500
	Mobilization	8.0-10.0%	9.0%	$22,500
	Erosion Control	0.5-2.0%	1.5%	$3,750
	Contingency	30.0%	30.0%	$75,000
	Escalation (per year)	0.5-2.0%	2.0%	
	-Current Year		2006	$0
	Construction Engineering	10.0%	10.0%	$25,000
	TOTAL CONSTRUCTION COST			***$443,750***

PSE Cost

	ELEMENT	PERCENTAGE	COST
	Design Engineering	13.0%	$32,500

ROW Cost

	ELEMENT	UNIT	UNIT COST	QUANITY	COST
	Rural ROW	SF	1.10	0.00	$0
	Urban ROW	SF	2.26	0.00	$0
	TOTAL ROW COST				***$0***

Environmental Cost

	ELEMENT	PERCENTAGE	COST
	Environmental Cost	TBD	**TBD**

Total Cost: $476,250

Range of Total Cost

	RANGE	PERCENTAGE	COST
	High Total	50.0%	**$714,375**
	Low Total	-30.0%	**$333,375**

Range of Total Cost: $333,400 to $714,400

Centralia Transportation Element
COST ESTIMATE SUMMARY

PROJECT: Pearl St. and 6th Street	**REFERENCE NAME/PHONE**		**SHEET** 1 of 1
DESIGN LEVEL: Improvement			
KIND OF WORK: Signal Improvement	**LENGTH (MI.):**	**DATE** 12/19/2017	**NAME/CHECKED BY:** $0

Construction Cost

NO.	ITEM	UNIT	QUANTITY	COST
1	Curb, Gutter & Sidewalks	Mi.	0.00	$0
2	Drainage	Mi.	0.00	$0
3	New Roadway	Lane-Mi.	0.00	$0
4	Overlay Existing Roadway	Lane-Mi.	N/A	N/A
5	Reconstruct Existing Roadway	Lane-Mi.	0.00	$0
6	Intersection Widening	EA	N/A	N/A
7	Restriping Existing Roadway	Lane-Mi.	N/A	N/A
8	Interconnect Signal	LS	N/A	N/A
9	New Signal	EA	0.00	$250,000
10	Signal Modifications	EA	0.00	$0
11	Transit Enhancements	EA	N/A	N/A
12	Traffic Calming	%	N/A	N/A
13	Illumination	Mi.	0.00	$0
14	Landscaping	Mi.	0.00	$0
15	Bridges	LS and SF	0.00	$0
16	Walls	SF	0.00	$0
	SUBTOTAL			*$250,000*

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Miscellaneous	15.0-20.0%	20.0%	$50,000
	Construction Surveying	1.0-2.5%	2.0%	$5,000
	TP & DT	3.0-8.0%	5.0%	$12,500
	Mobilization	8.0-10.0%	9.0%	$22,500
	Erosion Control	0.5-2.0%	1.5%	$3,750
	Contingency	30.0%	30.0%	$75,000
	Escalation (per year)	0.5-2.0%	2.0%	
	-Current Year		2006	$0
	Construction Engineering	10.0%	10.0%	$25,000
	TOTAL CONSTRUCTION COST			***$443,750***

PSE Cost

	ELEMENT	PERCENTAGE	COST
	Design Engineering	13.0%	**$32,500**

ROW Cost

	ELEMENT	UNIT	UNIT COST	QUANITY	COST
	Rural ROW	SF	1.10	0.00	$0
	Urban ROW	SF	2.26	0.00	$0
	TOTAL ROW COST				***$0***

Environmental Cost

	ELEMENT	PERCENTAGE	COST
	Environmental Cost	TBD	**TBD**

Total Cost: $476,250

Range of Total Cost

	RANGE	PERCENTAGE	COST
	High Total	50.0%	**$714,375**
	Low Total	-30.0%	**$333,375**

Range of Total Cost: $333,400 to $714,400

Centralia Transportation Element
COST ESTIMATE SUMMARY

PROJECT:	REFERENCE NAME/PHONE		SHEET
Summa Street and Gold Street			1 of 1
DESIGN LEVEL: Improvement	**LENGTH (MI.):**	**DATE**	**NAME/CHECKED BY**
KIND OF WORK: Left turn pocket at all approaches		12/19/2017	

Construction Cost

NO.	ITEM	UNIT	QUANTITY	COST
1	Curb, Gutter, Sidewalks	Mi.	N/A	N/A
2	Drainage	Mi.	N/A	N/A
3	New Roadway	Lane-Mi.	N/A	N/A
4	Overlay Existing Roadway	Lane-Mi.	N/A	N/A
5	Reconstruct Existing Roadway	Lane-Mi.	N/A	N/A
6	Intersection Widening	EA	4.00	$1,023,000
7	Restriping Existing Roadway	Lane-Mi.	N/A	N/A
8	Interconnect Signal	LS	N/A	N/A
9	New Signal	EA	N/A	N/A
10	Signal Modifications	EA	N/A	N/A
11	Transit Enhancements	EA	N/A	N/A
12	Traffic Calming	%	N/A	N/A
13	Illumination	Mi.	N/A	N/A
14	Landscaping	Mi.	N/A	N/A
15	Bridges	SF	0.00	N/A
16	Walls	SF	N/A	N/A
	SUBTOTAL			***$1,023,000***

	ADDITIONAL COSTS		RANGE	PERCENTAGE	COST
	Miscellaneous		15.0-20.0%	0.0%	$0
	Construction Surveying		1.0-2.5%	0.8%	$8,000
	TP & DT		3.0-8.0%	8.0%	$82,000
	Mobilization		8.0-10.0%	10.0%	$102,000
	Erosion Control		0.5-2.0%	2.0%	$20,000
	Contingency		30.0%	30.0%	$307,000
	Escalation (per year)		0.5-2.0%	2.0%	
	-Current Year			2006	$20,000
	Construction Engineering	10.0%	10.0%	10.0%	$102,000
	TOTAL CONSTRUCTION COST				***$1,664,000***

PSE Cost

	ELEMENT	PERCENTAGE	COST
	Design Engineering	13.0%	**$216,000**

ROW Cost

	ELEMENT	UNIT	UNIT COST	QUANITY	COST
	Rural ROW	SF	$1.10	0.00	$0
	Urban ROW	SF	$2.26	0.00	$0
	TOTAL ROW COST				**$0**

Environmental Cost

	ELEMENT	PERCENTAGE	COST
	Environmental Cost	TBD	**TBD**
		Total Cost:	**$1,880,000**

Range of Total Cost

	RANGE	PERCENTAGE	COST
	High Total	50.0%	**$2,820,000**
	Low Total	-30.0%	**$1,316,000**

Range of Total Cost: $1,316,000 TO $2,820,000

Centralia Transportation Element
COST ESTIMATE SUMMARY

PROJECT:	Summa Street and Kresky Avenue	**REFERENCE NAME/PHONE**		**SHEET** 1 of 1
DESIGN LEVEL:	Improvement			
KIND OF WORK:	Signal Improvement	**LENGTH (MI.):**	**DATE** 12/19/2017	**NAME/CHECKED BY:**

Construction Cost

NO.	ITEM	UNIT	QUANTITY	COST
1	Curb, Gutter & Sidewalks	Mi.	0.00	$0
2	Drainage	Mi.	0.00	$0
3	New Roadway	Lane-Mi.	0.00	$0
4	Overlay Existing Roadway	Lane-Mi.	N/A	N/A
5	Reconstruct Existing Roadway	Lane-Mi.	0.00	$0
6	Intersection Widening	EA	N/A	N/A
7	Restriping Existing Roadway	Lane-Mi.	N/A	N/A
8	Interconnect Signal	LS	N/A	N/A
9	New Signal	EA	1.00	$250,000
10	Signal Modifications	EA	0.00	$0
11	Transit Enhancements	EA	N/A	N/A
12	Traffic Calming	%	N/A	N/A
13	Illumination	Mi.	0.00	$0
14	Landscaping	Mi.	0.00	$0
15	Bridges	LS and SF	0.00	$0
16	Walls	SF	0.00	$0
	SUBTOTAL			*$250,000*

	ADDITIONAL COSTS	RANGE	PERCENTAGE	COST
	Miscellaneous	15.0-20.0%	0.0%	$0
	Construction Surveying	1.0-2.5%	0.8%	$1,875
	TP & DT	3.0-8.0%	8.0%	$20,000
	Mobilization	8.0-10.0%	10.0%	$25,000
	Erosion Control	0.5-2.0%	2.0%	$5,000
	Contingency	30.0%	30.0%	$75,000
	Escalation (per year)	0.5-2.0%	2.0%	
	-Current Year		2017	$0
	Construction Engineering	10.0%	10.0%	$37,688
	TOTAL CONSTRUCTION COST			***$414,563***

PSE Cost

	ELEMENT	PERCENTAGE	COST
	Design Engineering	13.0%	**$0**

ROW Cost

	ELEMENT	UNIT	UNIT COST	QUANITY	COST
	Rural ROW	SF	1.10	0.00	$0
	Urban ROW	SF	2.26	0.00	$0
	TOTAL ROW COST				***$0***

Environmental Cost

	ELEMENT	PERCENTAGE	COST
	Environmental Cost	TBD	**TBD**

Total Cost: $414,563

Range of Total Cost

	RANGE	PERCENTAGE	COST
	High Total	50.0%	**$621,844**
	Low Total	-30.0%	**$290,194**

Range of Total Cost: $290,200 to $621,800

Appendix C
Unit Cost Database

LEWIS COUNTY
ARTERIAL STUDY
Unit Price Descriptions
(2007)

ITEM	DESCRIPTION	UNIT
Curb, Gutter and Sidewalks	~6-ft wide sidewalk (each side of "urban" segments) ~Estimated excavation at depth of 4' (Rural)	Mile
Drainage	~18-inch concrete pipe storm system w/ 2.5-ft of cover ~Storm manhole every 500 LF ~Standard catch basin every 250 LF (each side of the roadway) ~Culverts every 500' (Rural)	Mile
Bike Boulevard	N/A	Mile
New Roadway	~Subgrade preparation, based on LC cross sections ~Clearing/grubbing, excavation/embankment, removal of struct. ~1 Raised Pavement Marker (RPM) per 80 linear feet	Lane-Mile
Overlay Existing Roadway	N/A	Lane-Mile
Reconstruct Existing Roadway	Removal of existing shoulders and roadway that is not to standard and rebuilding a new facility, pavement planing and overlay for roadway area within shoulders. Cost includes: ~Removal cost of 1.3' urban/1.55' rural AC & aggregate base ~"New Roadway" cost (listed above)	Lane-Mile
Intersection Widening	N/A	Each
Restriping Existing Roadway	~Removal of existing striping and restriping of existing facility	Lane-Mile
Interconnect Signal	~Lump sum cost to interconnect signal system	Lump Sum
New Signal	~The signal including signal system and all appurtenances (pole, wiring, detection devices, etc) for one intersection	Each
Signal Modifications	~All evaluations and modifications	Each
Transit Enhancements	N/A	Each
Traffic Calming	N/A	Percentage
Illumination	~luminaire, pole, wiring, and all other appurtenances ~one light pole on each side of the roadway every 200 LF	Mile
Landscaping	~Plantings, topsoil, and irrigation requirements	Mile
Bridges	~Based on estimated square footage of bridge (Except for LC-01 see "Bridge" tab)	Square Foot
Walls	~Cost of Standard Retaining Wall	Square Foot
ROW	~Assumed avg. cost of $0.85/SF rural and $1.75/SF urban. ~Rural/urban boundries defined by city limits ~Property values calculated through average County land values (2004)	Square Foot

Additional Costs

ITEM	DESCRIPTION
General Construction Costs	Insert the desired percentage from the common range for each factor: ~Miscellaneous Costs: 15.0-20.0% ~Construction Surveying: 1.0-2.5% ~Temporary Protection and Direction of Traffic: 3.0-8.0% ~Mobilization: 8.0-10.0% ~Erosion Control: 0.5-2.0%
Contingency Factor	General Contingency for Construction Costs: 30.0%.
Escalation Factor	Given the year and escalation percentage, this estimate can roughly approximate yearly inflation of prices: ~Insert the desired percentage from the common range: 0.5-2.0% ~Insert the current year (must be 2005 or later)
Engineering Costs	Calculated as a percentage of the total Construction Costs: ~Design Engineering: 13.0% ~Construction Engineering: 10.0%

UNIT COST SUMMARY		
ITEM	**Unit**	**Unit Cost**
12 Inch Storm Sewer Pipe	L.F.	$85.00
18 Inch Storm Sewer Pipe	L.F.	$125.00
Aggregate Base (CSTC)	TN.	$42.50
Aggregate Base (Gravel)	TN.	$37.50
Asphalt	TN.	$95.00
Bus Shelter	L.S.	$25,000.00
Planing Bituminous Pavement	S.Y.	$5.00
Demolition of Extg. Curbs and Sidewalks	C.Y.	$18.00
Embankment	C.Y.	$50.00
Excavation	C.Y.	$25.00
Interconnect Signal System	L.S.	$30,000.00
Landscaping	L.S.	$225,000.00
Luminaire and appurtenances	EA.	$7,500.00
Modify Signal	L.S.	$90,000.00
New Signal	L.S.	$300,000.00
Painted Permanent Pavement Striping	L.F.	$0.40
Raised Pavement Markers (RPMs)	Hundred	$550.00
Sidewalk	S.Y.	$75.00
Standard Catch Basin	EA.	$2,000.00
Standard Concrete Curb and Gutter	L.F.	$35.00
Standard Retaining Wall	S.F.	$65.00
Storm Manhole	EA.	$4,500.00
Stripe Removal	L.F.	$1.50
Wheel Chair Ramp	EA.	$3,900.00
Bridge Construction	S.F.	$150.00
Rural ROW Costs	S.F.	$1.10
Urban ROW Costs	S.F.	$2.26

Appendix D
Sound Transit CCI Forecast

Sound Transit 2017 Construction Cost Component Escalation Forecasts

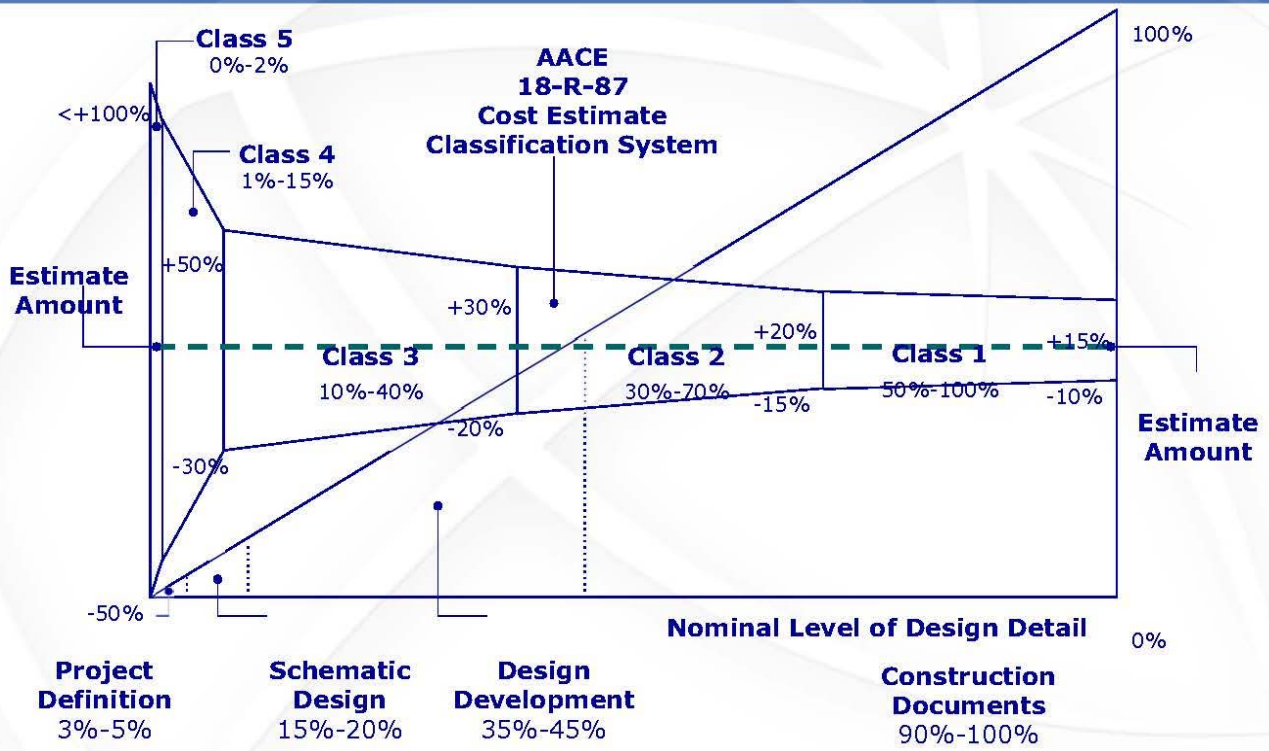
August 2017 Forecast	Historical										10-Year Forecast										20-Year Extrapolation																					
Year >>	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Structural Steel[1]																																								
Structural Steel (Probable — Structural Steel Component	100.0	120.6	90.3	104.8	118.2	113.7	106.6	109.5	96.8	91.7	98.3	102.7	106.4	109.8	113.2	116.7	120.9	124.9	129.1	133.0	136.8	140.7	144.7	148.9	153.1	157.5	162.0	166.7	171.4	176.4	181.4	186.6	192.0	197.5	203.1	208.9	214.9	221.1	227.4	233.9
Structural Steel (High Index)	100.0	120.6	90.3	104.8	118.2	113.7	106.6	109.5	96.8	91.7	99.4	106.3	112.3	117.1	122.1	127.2	132.8	138.3	144.2	150.1	154.7	159.5	164.5	169.6	174.9	180.3	185.9	191.7	197.7	203.8	210.2	216.7	223.5	230.4	237.6	245.0	252.6	260.4	268.5	276.9
Structural Steel (Low Index)	100.0	120.6	90.3	104.8	118.2	113.7	106.6	109.5	96.8	91.7	94.4	96.5	98.1	99.9	101.9	103.8	105.5	107.1	108.7	110.5	113.2	116.1	119.0	122.0	125.1	128.2	131.4	134.7	138.1	141.6	145.1	148.8	152.5	156.4	160.3	164.3	168.5	172.7	177.0	181.5
Structural Steel (Probable — Structural Steel Component	5.0%	20.6%	-25.1%	16.0%	12.8%	-3.8%	-6.3%	2.7%	-11.5%	-5.3%	7.2%	4.4%	3.6%	3.2%	3.1%	3.1%	3.5%	3.3%	3.4%	3.0%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%
Structural Steel (High % Growth)	5.0%	20.6%	-25.1%	16.0%	12.8%	-3.8%	-6.3%	2.7%	-11.5%	-5.3%	8.4%	7.0%	5.6%	4.3%	4.3%	4.2%	4.3%	4.2%	4.3%	4.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
Structural Steel (Low % Growth)	5.0%	20.6%	-25.1%	16.0%	12.8%	-3.8%	-6.3%	2.7%	-11.5%	-5.3%	3.0%	2.2%	1.6%	1.9%	1.9%	1.9%	1.7%	1.5%	1.5%	1.6%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Concrete[2]																																								
Concrete (Probable — Concrete Component Index)	100.0	102.6	105.1	102.6	102.0	104.3	107.5	112.4	117.6	121.9	133.1	141.6	149.6	156.3	162.6	168.7	174.5	180.6	187.3	193.1	200.8	208.8	217.1	225.7	234.7	244.0	253.7	263.8	274.3	285.2	296.5	308.3	320.6	333.3	346.6	360.4	374.7	389.6	405.1	421.2
Concrete (High Index)	100.0	102.6	105.1	102.6	102.0	104.3	107.5	112.4	117.6	121.9	134.4	145.8	156.7	165.4	173.9	182.2	190.2	198.5	207.1	214.8	223.9	233.3	243.1	253.3	264.0	275.1	286.7	298.7	311.3	324.4	338.0	352.3	367.1	382.5	398.6	415.4	432.8	451.1	470.0	489.8
Concrete (Low Index)	100.0	102.6	105.1	102.6	102.0	104.3	107.5	112.4	117.6	121.9	130.0	136.7	142.9	148.0	153.0	157.7	162.4	167.4	172.8	177.7	184.3	191.2	198.3	205.7	213.4	221.4	229.7	238.2	247.1	256.3	265.9	275.8	286.1	296.8	307.9	319.4	331.3	343.7	356.5	369.8
Concrete (Probable — Concrete Component % Growth)	4.3%	2.6%	2.4%	-2.4%	-0.6%	2.3%	3.1%	4.6%	4.6%	3.7%	9.2%	6.4%	5.7%	4.5%	4.0%	3.7%	3.4%	3.5%	3.7%	3.1%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Concrete (High % Growth)	4.3%	2.6%	2.4%	-2.4%	-0.6%	2.3%	3.1%	4.6%	4.6%	3.7%	10.2%	8.5%	7.5%	5.5%	5.2%	4.8%	4.4%	4.3%	4.3%	3.8%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Concrete (Low % Growth)	4.3%	2.6%	2.4%	-2.4%	-0.6%	2.3%	3.1%	4.6%	4.6%	3.7%	6.7%	5.1%	4.5%	3.6%	3.3%	3.1%	3.0%	3.1%	3.2%	2.9%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%
Construction Equipment[3]																																								
Construction Equipment (Probable — Construction Equip	100.0	103.2	106.9	106.6	110.2	113.8	114.3	117.2	118.6	119.5	123.0	126.4	129.8	133.5	137.5	141.4	145.5	149.6	154.1	158.7	162.5	166.4	170.4	174.4	178.6	182.9	187.3	191.8	196.3	201.0	205.9	210.8	215.8	221.0	226.3	231.7	237.2	242.9	248.7	254.7
Construction Equipment (High Index)	100.0	103.2	106.9	106.6	110.2	113.8	114.3	117.2	118.6	119.5	124.5	129.4	134.1	139.2	144.4	149.9	155.3	161.0	167.1	172.9	177.3	181.9	186.5	191.3	196.2	201.2	206.3	211.6	217.0	222.5	228.2	234.0	240.0	246.2	252.4	258.9	265.5	272.3	279.2	286.4
Construction Equipment (Low Index)	100.0	103.2	106.9	106.6	110.2	113.8	114.3	117.2	118.6	119.5	121.7	123.5	125.0	127.4	129.6	131.7	134.1	137.1	140.5	143.3	146.5	149.7	153.0	156.4	159.8	163.4	167.0	170.7	174.4	178.3	182.2	186.2	190.4	194.6	198.9	203.3	207.7	212.3	217.0	221.8
Construction Equipment (Probable — Construction Equip	4.3%	3.2%	3.6%	-0.3%	3.3%	3.3%	0.4%	2.5%	1.2%	0.7%	3.0%	2.8%	2.7%	2.9%	3.0%	2.8%	2.9%	2.8%	3.0%	3.0%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
Construction Equipment (High % Growth)	4.3%	3.2%	3.6%	-0.3%	3.3%	3.3%	0.4%	2.5%	1.2%	0.7%	4.2%	3.9%	3.6%	3.8%	3.7%	3.8%	3.6%	3.7%	3.7%	3.5%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%
Construction Equipment (Low % Growth)	4.3%	3.2%	3.6%	-0.3%	3.3%	3.3%	0.4%	2.5%	1.2%	0.7%	1.8%	1.5%	1.2%	1.9%	1.7%	1.6%	1.8%	2.2%	2.5%	2.0%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Labor[4]																																								
Labor (Probable — Labor Component Index)	100.0	105.0	110.8	115.6	117.1	118.3	120.4	123.0	126.6	130.5	135.9	141.2	146.5	151.9	157.3	162.9	168.7	174.8	181.0	187.5	193.7	200.2	206.9	213.8	220.9	228.3	235.9	243.7	251.9	260.3	269.0	277.9	287.2	296.8	306.7	316.9	327.5	338.4	349.7	361.4
Labor (High Index)	100.0	105.0	110.8	115.6	117.1	118.3	120.4	123.0	126.6	130.5	135.9	141.7	147.8	154.1	160.7	167.5	174.5	181.6	188.8	195.2	201.8	208.7	215.8	223.2	230.8	238.6	246.8	255.2	263.9	272.9	282.2	291.8	301.7	312.0	322.6	333.6	345.0	356.7	368.9	381.5
Labor (Low Index)	100.0	105.0	110.8	115.6	117.1	118.3	120.4	123.0	126.6	130.5	134.6	137.4	140.3	143.2	146.3	149.6	153.1	157.1	161.4	166.8	172.0	177.3	182.8	188.4	194.2	200.2	206.4	212.7	219.3	226.0	233.0	240.2	247.6	255.2	263.1	271.2	279.6	288.2	297.1	306.3
Labor (Probable — Labor Component % Growth)	3.7%	5.0%	5.5%	4.3%	1.3%	1.0%	1.9%	2.1%	3.0%	3.0%	4.2%	3.9%	3.8%	3.7%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
Labor (High % Growth)	3.7%	5.0%	5.5%	4.3%	1.3%	1.0%	1.9%	2.1%	3.0%	3.0%	4.2%	4.3%	4.3%	4.3%	4.3%	4.3%	4.2%	4.1%	4.0%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
Labor (Low % Growth)	3.7%	5.0%	5.5%	4.3%	1.3%	1.0%	1.9%	2.1%	3.0%	3.0%	3.2%	2.1%	2.1%	2.1%	2.2%	2.2%	2.4%	2.6%	2.8%	3.4%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
Other Materials & Services[5]																																								
Other Materials & Services (Probable — Other Materials	100.0	104.2	104.8	105.1	107.9	110.7	112.0	114.1	115.6	118.2	123.3	126.0	128.7	131.5	134.1	136.7	139.5	142.4	145.4	148.9	152.3	155.8	159.3	163.0	166.7	170.5	174.4	178.4	182.5	186.6	190.9	195.2	199.7	204.3	208.9	213.7	218.6	223.6	228.7	233.9
Other Materials & Services (High Index)	100.0	104.2	104.8	105.1	107.9	110.7	112.0	114.1	115.6	118.2	124.4	130.1	135.4	138.8	142.1	145.5	149.0	152.7	156.5	160.3	164.3	168.5	172.7	177.0	181.5	186.1	190.8	195.6	200.5	205.5	210.7	216.0	221.4	227.0	232.7	238.6	244.6	250.8	257.1	263.5
Other Materials & Services (Low Index)	100.0	104.2	104.8	105.1	107.9	110.7	112.0	114.1	115.6	118.2	120.5	122.8	125.0	127.2	129.3	131.4	133.8	136.6	139.7	143.1	146.1	149.2	152.3	155.5	158.8	162.2	165.6	169.1	172.7	176.3	180.0	183.9	187.7	191.7	195.8	199.9	204.1	208.4	212.8	217.3
Other Materials & Services (Probable — Other Materials	0.9%	4.2%	0.6%	0.3%	2.7%	2.5%	1.2%	1.8%	1.4%	2.2%	4.3%	2.2%	2.2%	2.2%	2.0%	2.0%	2.0%	2.1%	2.1%	2.4%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%
Other Materials & Services (High % Growth)	0.9%	4.2%	0.6%	0.3%	2.7%	2.5%	1.2%	1.8%	1.4%	2.2%	5.2%	4.6%	4.1%	2.6%	2.4%	2.4%	2.4%	2.5%	2.5%	2.4%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Other Materials & Services (Low % Growth)	0.9%	4.2%	0.6%	0.3%	2.7%	2.5%	1.2%	1.8%	1.4%	2.2%	2.0%	1.9%	1.8%	1.8%	1.6%	1.6%	1.8%	2.1%	2.3%	2.4%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%
Component-Weighted Forecast[6]																																								
Structural Steel 5%																																								
Concrete 13%																																								
Construction Equipment 9%																																								
Labor 53%																																								
Other Materials & Services 20%																																								
Component-Weighted Index 2007=100 (Probable)	100.0	105.2	107.5	110.5	112.8	114.3	115.8	118.6	121.1	124.0	130.0	135.0	139.9	144.6	149.4	154.2	159.1	164.3	169.7	175.2	180.7	186.4	192.3	198.4	204.6	211.1	217.8	224.7	231.9	239.3	246.9	254.7	262.9	271.2	279.9	288.9	298.1	307.6	317.5	327.7
Component-Weighted Index 2007=100 (High)	100.0	105.2	107.5	110.5	112.8	114.3	115.8	118.6	121.1	124.0	130.6	137.1	143.5	149.3	155.3	161.4	167.6	174.0	180.6	186.5	192.6	199.0	205.5	212.3	219.3	226.6	234.1	241.8	249.8	258.1	266.7	275.5	284.7	294.2	304.0	314.1	324.6	335.4	346.6	358.2
Component-Weighted Index 2007=100 (Low)	100.0	105.2	107.5	110.5	112.8	114.3	115.8	118.6	121.1	124.0	128.0	131.1	134.1	137.0	140.1	143.1	146.4	150.0	154.0	158.6	163.2	167.9	172.8	177.9	183.1	188.4	193.9	199.6	205.5	211.5	217.7	224.1	230.7	237.5	244.5	251.8	259.2	266.9	274.8	282.9
Component-Weighted Index 2014=5477.7 (Probable)	4,618.0	4,856.0	4,964.5	5,102.0	5,206.8	5,278.1	5,348.9	5,477.7	5,590.2	5,725.5	6,003.2	6,232.2	6,458.8	6,679.5	6,898.3	7,120.4	7,349.3	7,587.3	7,835.9	8,089.1	8,344.2	8,607.7	8,879.7	9,160.6	9,450.6	9,750.0	10,059.2	10,378.6	10,708.3	11,048.8	11,400.5	11,763.6	12,138.7	12,526.1	12,926.1	13,339.3	13,766.1	14,206.9	14,662.2	15,132.5
Component-Weighted Index 2014=5477.7 (High)	4,618.0	4,856.0	4,964.5	5,102.0	5,206.8	5,278.1	5,348.9	5,477.7	5,590.2	5,725.5	6,029.6	6,329.2	6,625.0	6,896.0	7,171.9	7,454.9	7,740.9	8,035.6	8,337.8	8,612.6	8,896.1	9,189.0	9,491.9	9,805.1	10,128.8	10,463.5	10,809.6	11,167.4	11,537.3	11,919.8	12,315.3	12,724.3	13,147.2	13,584.5	14,036.8	14,504.5	14,988.1	15,488.3	16,005.6	16,540.6
Component-Weighted Index 2014=5477.7 (Low)	4,618.0	4,856.0	4,964.5	5,102.0	5,206.8	5,278.1	5,348.9	5,477.7	5,590.2	5,725.5	5,912.7	6,054.0	6,191.2	6,328.0	6,468.1	6,608.5	6,759.6	6,927.8	7,113.0	7,322.3	7,535.5	7,755.2	7,981.4	8,214.4	8,454.5	8,701.8	8,956.5	9,219.0	9,489.4	9,768.0	10,055.0	10,350.7	10,655.4	10,969.3	11,292.8	11,626.1	11,969.5	12,323.4	12,688.1	13,063.9
Component-Weighted % Change (Probable)	3.3%	5.2%	2.2%	2.8%	2.1%	1.4%	1.3%	2.4%	2.1%	2.4%	4.8%	3.8%	3.6%	3.4%	3.3%	3.2%	3.2%	3.2%	3.3%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
Component-Weighted % Change (High)	3.3%	5.2%	2.2%	2.8%	2.1%	1.4%	1.3%	2.4%	2.1%	2.4%	5.3%	5.0%	4.7%	4.1%	4.0%	3.9%	3.8%	3.8%	3.8%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
Component-Weighted % Change (Low)	3.3%	5.2%	2.2%	2.8%	2.1%	1.4%	1.3%	2.4%	2.1%	2.4%	3.3%	2.4%	2.3%	2.2%	2.2%	2.2%	2.3%	2.5%	2.7%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	3.0%	3.0%	3.0%	3.0%	3.0%

Notes

1 - Historical data for Structural Steel are Steel Mill Products PPI obtained from the US Bureau of Labor Statistics
2 - Historical data for Concrete are Ready-Mix Concrete PPI obtained from the US Bureau of Labor Statistics
3 - Historical data for Construction Equipment are Construction Machinery and Equipment PPI obtained from the US Bureau of Labor Statistics
4 - Historical data for Labor are based on a sampling of historical prevailing wage rates for relevant trades obtained from the Washington Department of Labor and Industries
5 - Historical data for Other Materials and Services are the BLS CPI-U Seattle-Tacoma-Bremerton Index
6 - Share weightings provided by Sound Transit and applied by WSP. WSP provided only the cost component forecast. Economic factors outside of the individual cost components provided may or may not impact the bottom-line forecast

Appendix E
A-ACEI Estimating Accuracy Range

AACE – Classification System



Construction Cost Estimate Accuracy Ranges

CH2MHILL

Estimate Class	Class 5	Class 4	Class 3	Class 2	Class 1
LEVEL OF PROJECT DEFINITION Expressed as a % of complete definition	0% to 2%	1% to 15%	10% to 40%	30% to 70%	50% to 100%
END USAGE Typical Purpose of Estimate	Concept Screening	Study or Feasibility	Budget Authorization, or Control	Control or Bid / Tender	Check Estimate or Bid / Tender
METHODOLOGY Typical estimating method	Capacity Factored, Parametric Models, Judgment, or Analogy	Equipment Factored or Parametric Models	Semi-Detailed Unit Costs with Assembly Level Line Items	Detailed Unit Cost with Forced Detailed Take-Off	Detailed Unit Cost with Detailed Take-Off
EXPECTED ACCURACY RANGE Typical variation in low and high ranges [a]	L: -20% to -50% / H: +30% to +100%	L: -15% to -30% / H: +20% to +50%	L: -10% to -20% / H: +10% to +30%	L: -5% to -15% / H: +5% to +20%	L: -3% to -10% / H: +3% to +15%
PREPARATION EFFORT Typical degree of effort relative to least cost index of 1 [b]	1	2 to 4	3 to 10	4 to 20	5 to 100
REFINED CLASS DEFINITION	Class 5 estimates are generally prepared based on very limited information, and subsequently have very wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systematic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with very little effort expended - sometimes requiring less than 1 hour to prepare. Often, little more than proposed plant type, location, and capacity are known at the time of estimate preparation.	Class 4 estimates are generally prepared based on very limited information, and subsequently have very wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 5% complete, and would comprise at a minimum the following: plant capacity, block schematics, indicated layout, process flow diagrams (PFDs) for main process systems and preliminary engineered process and utility equipment lists. Level of Project Definition Required: 1% to 15% of full project definition.	Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored. Typically, engineering is from 10% to 40% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, preliminary piping and instrument diagrams, utility flow diagrams, preliminary piping and instrument diagrams, plot plan, developed layout drawings, and essentially complete engineering process and utility equipment lists. Level Of Project Definition Required: 10% to 40% of full project definition.	Class 2 estimates are generally prepared to form a detailed control baseline against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the "bid" estimate to establish contract value. Typically, engineering is from 30% to 70% complete, and would comprise at a minimum the following: Process flow diagrams, utility flow diagrams, piping and instrument flow diagrams, heat and material balances, final plot plan, final layout drawings, complete engineered process and utility equipment lists, single line diagrams for electrical, electrical equipment and motor schedules, vendor quotations, detailed project execution plans, resourcing and work force plans, etc.	Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than generating this level of detail for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute claims. Typically, engineering is from 50% to 100% complete, and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans. Level for Project Definition Required: 50% to 100% of full project definition.
END USAGE DEFINED	Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.	Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.	Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase "control estimate" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate may be the last estimate required and could well form the only basis for cost/schedule control.	Class 2 estimates are typically prepared as the detailed control baseline against which all actual costs an resources will now be monitored for variation to the budget, and form a part of the change/variation control program.	Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual coasts and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.
ESTIMATING METHODS USED	Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Handy-Whitman factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques.	Class 4 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, the Miller method, gross unit costs/ratios, and other parametric and modeling techniques.	Class 3 estimates usually involve more deterministic estimating methods that stochastic methods. They usually involve a high degree of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less-significant areas of the project.	Class 2 estimates always involve a high degree of deterministic estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detailed takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods.	Class 1 estimates involve the highest degree of deterministic estimating methods, and require a great amount of effort. Class 1 estimates are prepared in great detail, and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities.
EXPECTED ACCURACY RANGE	Typical accuracy ranges for Class 5 estimates are -20% to 50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 2 estimates are-5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 1 estimates are-3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.
EFFORT TO PREPARE (for US$20MM project):	As little as 1 hour or less to prepare to perhaps more than 200 hours, depending on the project and the estimating methodology used.	Typically, as little as 20 hours or less to perhaps more than 300 hours, depending on the project and the estimating methodology used.	Typically, as little as 150 hours or less to perhaps more than 1500 hours, depending on the project and the estimating methodology used.	Typically, as little as 300 hours or less to perhaps more than 3000 hours, depending on the project and the estimating methodology used. Bid Estimates typically require more effort than estimates used for funding or control purposes	Class 1 estimates require the most effort to create, and as such are generally developed for only selected areas of the project, or for bidding purposes. A complete Class 1 estimate may involve as little as 600 hours or less, to perhaps more than 6,000 hours, depending on the project and the estimating methodology used. Bid estimate typically require more effort than estimates used for funding or control purposes.
ANSI Standard Reference Z94.2-1989 name; Alternate Estimate Names, Terms, Expressions, Synonyms:	Order of Magnitude Estimate; Ratio, ballpark, blue sky, seat-of-pants, ROM, idea study, prospect estimate, concession license estimate, guesstimate, rule-of thumb.	Budget Estimate; Screening, top-down, feasibility, authorization, factored, pre-design, pre-study.	Budget Estimate; Budget, scope, sanction, semi-detailed, authorization, preliminary control, concept study, development, basic engineering phase estimate, target estimate.	Definitive Estimate; Detailed Control, forced detail, execution phase, master control, engineering, bid, tender, change order estimate.	Definitive Estimate; Full detail, release, fall-out, tender, firm price, bottoms-up, final, detailed control, forced detail, execution phase, master control, fair price, definitive, change order estimate.

Estimate Class	Class 5	Class 4	Class 3	Class 2	Class 1
Estimate Input Checklist and Maturity Index	Class 5	Class 4	Class 3	Class 2	Class 1
GENERAL PROJECT DATA					
Project Scope Description	General	Preliminary	Defined	Defined	Defined
Plant Production / Facility Capacity	Assumed	Preliminary	Defined	Defined	Defined
Plant Location	General	Approximate	Specific	Specific	Specific
Soils & Hydrology	None	Preliminary	Defined	Defined	Defined
Integrated Project Plan	None	Preliminary	Defined	Defined	Defined
Project Master Schedule	None	Preliminary	Defined	Defined	Defined
Escalation Strategy	None	Preliminary	Defined	Defined	Defined
Work Breakdown Structure	None	Preliminary	Defined	Defined	Defined
Project Code of Accounts	None	Preliminary	Defined	Defined	Defined
Contracting Strategy	Assumed	Assumed	Preliminary	Defined	Defined
ENGINEERING DELIVERABLES:	**Class 5**	**Class 4**	**Class 3**	**Class 2**	**Class 1**
Block Flow Diagrams	Started / Preliminary	Preliminary / Complete	Complete	Complete	Complete
Plot Plans		Started	Preliminary / Complete	Complete	Complete
Process Flow Diagrams (PFDs)		Started / Preliminary	Preliminary / Complete	Complete	Complete
Utility Flow Diagrams (UFDs)		Started / Preliminary	Preliminary / Complete	Complete	Complete
Piping & Instrument Diagrams (P&IDS)		Started	Preliminary / Complete	Complete	Complete
Heat and Material Balances		Started	Preliminary / Complete	Complete	Complete
Process Equipment List		Started / Preliminary	Preliminary / Complete	Complete	Complete
Utility Equipment List		Started / Preliminary	Preliminary / Complete	Complete	Complete
Electrical One Line Drawings		Started / Preliminary	Preliminary / Complete	Complete	Complete
Specifications and Datasheets		Started	Preliminary / Complete	Complete	Complete
General Equipment Arrangement Drawings		Started	Preliminary / Complete	Complete	Complete
Spare Parts Lists			Started / Preliminary	Preliminary	Complete
Architectural Details / Schedules		Started	Preliminary / Complete	Complete	Complete
Structural Details		Started	Preliminary / Complete	Complete	Complete
Mechanical Discipline Drawings			Started	Preliminary	Preliminary / Complete
Electrical Discipline Drawings			Started	Preliminary	Preliminary / Complete
System Discipline Drawings			Started	Preliminary	Preliminary / Complete
Civil/Site Discipline Drawings			Started	Preliminary	Preliminary / Complete
Demolition Details		Started	Preliminary / Complete	Complete	Complete