CITY OF MEDICAL LAKE

TRANSPORTATION MASTER PLAN





June 2026

City of Medical Lake

ACKNOWLEDGEMENTS:

CITY OF MEDICAL LAKE

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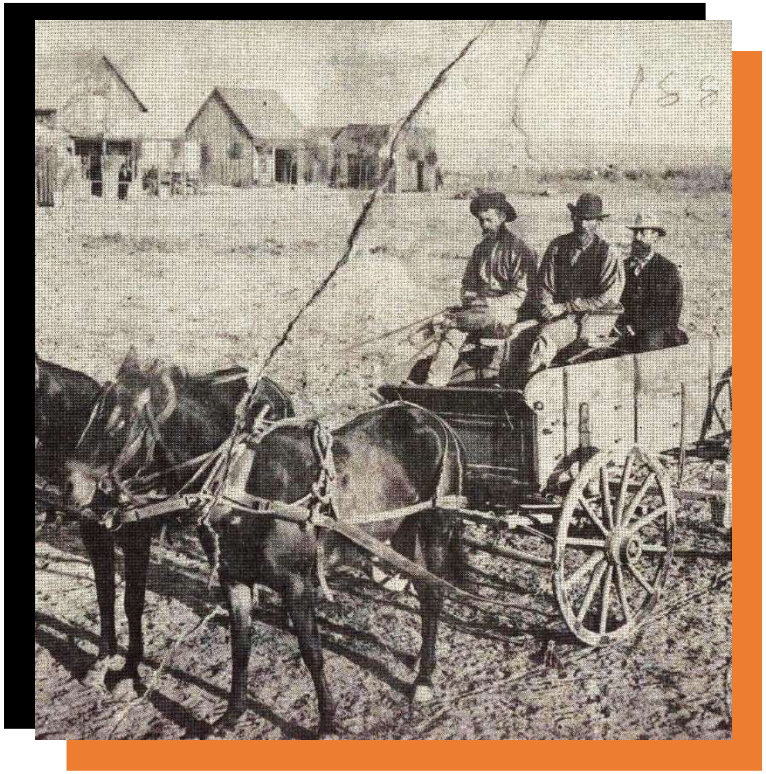
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CHAPTER 1

INTRODUCTION



Chapter 1

Medical Lake, Washington has experienced a steady rate of population growth during the City's 135-year history. The city has grown from 617 people in 1890 to 4,915 people in 2023; an average 1.57% annual growth rate in population over time. However, there have been decades with strong gains, 30% increases have occurred, as precipitated by events like the construction of Eastern State Hospital in 1891 or the development of Fairchild Air Force Base in 1942. More recently, the early 2000's saw a significant increase in population with the construction of large housing developments.

City leadership desires and is promoting continued growth in the community. They are working to advance projects that increase water and sewer capacity, this will allow for housing and commercial/retail business development. In addition, leadership is promoting the family-friendly feel of a small and enjoyable downtown environment complimented by bike and pedestrian improvements to enhance primary routes with multimodal enhancements, designating some roads as complete streets. Leaders postulate that a walkable and bikeable City, supported by Spokane Transit Authority (STA) services, will support travel alternatives, reducing reliance on personal autos, to minimize travel demand, promote healthy lifestyles, provide context sensitive street appeal, and diminish environmental impacts.

A leading example includes the recently finalized Lefevre Street (SR 902) Pedestrian and Bicycle project, Hancock Street to Brooks Road. City officials collaborated with the Transportation Improvement Board (TIB) of Washington to upgrade 0.55-miles of sidewalk, lighting, planter boxes, bike lanes (coming this year), and trees in the downtown core. This has enhanced streetscapes and active transportation facilities, which are widely used by citizens who can walk or bike to work, or for those who enjoy active movements in the Medical Lake central business district for recreational purposes.

With growth, City leaders understand the potential does exist to increase vehicle travel demand. However, it is understood that the practical capacity of arterial streets and collectors is likely sufficient to support reasonable growth trends over the next 25-plus years. Yet, a few pivotal junctions and select street segments may experience capacity issues. With that understanding, the City would like to focus on transportation endeavors that improve multimodal networks, like Lefevre Street, to improve travel options and the community-focus of Medical Lake, as well as affecting environmental benefits. Again, the City recognizes the great benefits offered by Spokane Transit Authority (STA); they wish to incorporate bus facilities into street designs, where appropriate and as supported by STA.

At the direction of the Medical Lake City Council and City Leaders, the Medical Lake Transportation Master Plan (TMP

or Plan) recommends multimodal strategies and solutions for the City. The Plan recommends active transportation and transit solutions to build mobility options and help diminish impact on the operation of key intersections and roadways. The Plan provides goals and policy advice to help promote active mobility and complete streets objectives. The intent of the Plan is to present a network strategy for assuring safe, practical, and context sensitive movements for all modes of travel as based on the consideration/review of current and forecast travel conditions.

1.1 Purpose & Study Area

The Transportation Master Plan was developed in compliance with " best " Complete Street practices, pursuant to Title 8 of the Medical Lake Municipal Code (MLMC). Also, the Plan recognizes the guidance provided with Revised Code of Washington (RCW) Chapters 47.04.320 and 47.24.06. The Plan works to recommend multimodal projects relevant to and supportable by funding agencies like TIB and the Washington State Department of Transportation (WSDOT), as it pertains to complete streets, transit, and active transportation.

This Plan recommends mobility and multimodal solutions for addressing travel demand issues in Medical Lake over two horizons; the year 2050 and a full-build scenario. Improvements for the 2050 scenario are referred to as "short-term" and are meant for the 6-Year Medical Lake Transportation Improvement Program (TIP). The horizon is 2032, recognizing Council will adopt this plan by years end, and TIP updated and finalized by June of 2026.

At the request of City leaders, a full-build land use scenario was developed. The purpose of this analysis is to identify where roadway capacity constraints may emerge over the long term, enabling City leaders to plan for potential right-of-way needs and building setbacks when reviewing land use proposals or advancing street improvement projects for 2032 or 2050.

Traditional capacity and unique multimodal measures of effectiveness were employed to help identify projects and quantify how residents will interact with the street network. These analyses were used to develop solutions for the year 2032, 2050, and long-term conditions for Medical Lake.

Study Area

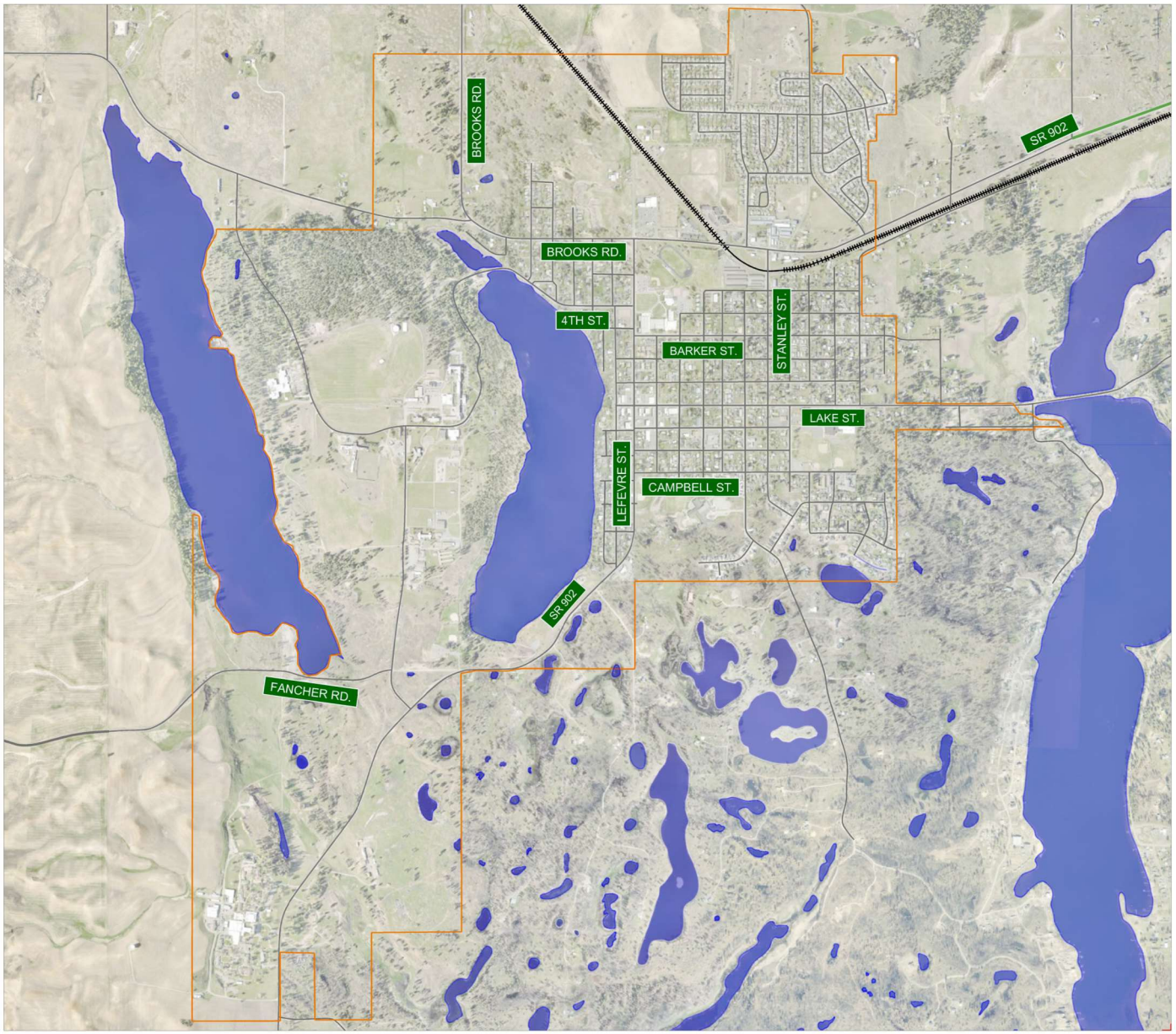
Medical Lake is situated in West Plains region of Spokane County about 14 miles southwest of the City of Spokane; aligned roughly midway between Interstate-90 (I-90) and U.S. Highway 2 (US 2). Access to/from the City is provided by State Route 902 (SR-902), Brooks Road, Lake Street, and Espanola Road/San Salvador Street. Fairchild Air Force base is 3.9 miles to the north; Airway Heights is 8.3 miles northeast. The City has commercial centers on Lake Street and Lefevre Street. Residential areas are aligned throughout the community. Streets are arranged mostly in a grid network; however,

newer neighborhoods have been laid out with limited through streets, the balance as dead-end streets with cul-de-sacs. SR 902 separates newer residential developments from rest of Medical Lake.

Arterials and collectors support most city commute needs as shown in Exhibit 3.1. A summary of these federally classified roads include:

- Arterials:
  - State Route 902 (East city limit to Lefevre)
  - Lefevre Street
- Major Collectors:
  - Brooks Road
  - Howard Street (Brooks Road to 4th Street)
  - 4th Street (Jefferson to DSHS campus)
  - Jefferson Street (4th Street to Lake Street)
  - Lake Street
  - Fancher Road
  - State Route 902 (Waterfront Park to South city limit)
- Minor Collectors:
  - San Salvador Street
  - Barker Street (Lefevre Street to Stanley Street)
  - Stanley Street (SR 902 to Campbell Street)
  - Campbell Street (Lefevre Street to Stanley Street)

The Plan was developed per directives of the City Council and staff, but it is recognized that other authorities have influence within Medical Lake's municipal boundaries. The Plan will be shared for review and comment by agencies such as Spokane County, WSDOT, and STA. **Exhibit 1.1** displays municipal boundaries and what will constitute the study area for the Plan.



N.T.S.

LEGEND

- CITY URBAN BOUNDARY
- WASHINGTON EASTERN RAIL

Exhibit 1.1

CITY AREA AND BOUNDARY

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

CHAPTER 2

GOALS & POLICY



Chapter 2

City officials are working on the 2026 to 2046 update to the Medical Lake Comprehensive Plan. This Transportation Plan highlights key objectives, goals and policies, which will guide development of the multimodal transportation network for the City. This section highlights the conclusions that will feed into the Transportation Element of the Comprehensive Plan.

2.1 City Background Documents

The context of the overarching visions of Medical Lake must be understood when developing this Transportation Master Plan. Through coordination with City leaders and the public, staff created a Vision Statement that supports development of the Comprehensive Plan. This statement is as follows:

> *The Comprehensive Plan endeavors to shape the City into the kind of place worth living, working, learning, and playing in all seasons of life by:*
>
> - *Nurturing Medical Lake's small-town charm and community spirit while honoring its history.*
> - *Integrating the natural and built environment in a thoughtful and sustainable manner.*
> - *Creating safe, walkable neighborhoods with accessible parks and housing for all.*
> - *Establishing equitable access to resources, strong social connections, and a healthy environment.*
> - *Encouraging a thriving economy through community partnerships and recreational tourism, with a focus on downtown revitalization.*

The statements of "*Creating safe, walkable neighborhoods with accessible parks and housing for all*" and "*Establishing equitable access to resources, strong social connections, and a healthy environment*" guide development of this Transportation Master Plan. The goals and policies identified, and many of the improvements highlighted by the Transportation Improvement Program, were developed to encourage a multi-modal network that provides access to community resources, connects citizens, and promotes healthy lifestyles.

In addition, City leaders created a foundation document for the Comprehensive Plan through prior development of a 2025 Strategic Plan that sets goals and objectives for managing the City. The Strategic Plan guides "*the important work of staff, citizen advisory boards, and Council as we strategically and collectively achieve the stated vision, mission, and values;*" resulting to the following target as it relates to transportation:

> *Multi-modal connections into and throughout the community. Advancing safe and reliable multi-modal transportation that facilitates the safe, efficient movement of people, goods, and services.*

The transportation strategic objectives that support this statement and the subsequent development of the Comprehensive and Transportation Master Plans were identified from the Strategic Plan. A summary of these select statements (from a range of objectives) include:

4.1 Integrated Multi-modal Transportation Network -

4.1.1. Have convenient, attractive, and visible pedestrian and bicycle access to community facilities and neighborhoods, making the trail system one of the state's best.

4.1.2. Use and maintain the transportation system effectively for all motorized and nonmotorized transportation modes within the city and between Medical Lake and neighboring communities.

4.1.3. Improve pedestrian and vehicular safety along city streets, especially SR-902, and enhance SR-902's ability to serve commercial land uses.

4.1.4. Improve aging and/or missing transportation infrastructure with safe accommodations for people and vehicles.

4.1.5. Improve safety for all travel modes in an attractive and distinctive streetscape and public realm.

4.2 Access to Transit -

4.2.1. Make public transportation available to all city residents and workers.

4.2.2. Improve transit availability and increase ridership.

2.2 Goals, Objectives, and Policies

The Strategic Plan and the draft vision statement for the Comprehensive Plan demonstrate the desire to improve mobility and safety along SR 902 and provide multimodal enhancements throughout the community. The following Goals and Policies were developed to meet the visions and objectives identified in these documents in coordination with City leaders.

Goal 1: A Safe, Low-Risk, and Human-Centered Transportation System

Create and maintain a transportation system that protects the lives and well-being of all users—including pedestrians, bicyclists, transit riders, motorists, and people with mobility challenges—through safe-systems design, proactive planning, and a commitment to reducing accidents.

Policy 1: Prioritize Vulnerable Users

Design and operate streets to protect the safety of people walking, rolling, biking, and using mobility devices, especially near schools, parks, downtown, transit stops, and along the State Route 902 corridor.

Policy 2: Adopt Safe-Systems and Complete Streets Principles

Design streets, crossings, and public spaces using safe-systems and complete-streets principles to reduce conflict points, slow vehicle speeds where appropriate,

improve crossings, and create safer conditions for all modes and ages.

Policy 3: Reduce Collisions

Focus investments and interventions on State Route 902 corridor and the intersection of Stanley and Lake Streets to reduce the likelihood and severity of collisions.

Goal 2: A Connected, Accessible, and Seamlessly Navigable Transportation System

Create a transportation system that provides convenient, and complete access for all people—regardless of age, ability, or mode—through a well-connected network of streets, sidewalks, trails, and transit that links homes, jobs, parks, schools, commercial centers, community services, and regional destinations.

Policy 1: Build a Complete, Connected Multimodal Network

Develop and maintain a network of walking, rolling, biking, and transit facilities that offer continuous, direct, and barrier-free connections between key destinations, including beginning and end of trip facilities.

Policy 2: Prioritize Accessibility for All Users

Ensure that transportation facilities meet ADA standards, support mobility-assistive devices, and remove barriers that limit access for seniors, youth, and individuals with disabilities.

Policy 3: Strengthen Local and Regional Connectivity

Enhance connections between neighborhoods and public services, parks, schools, transit stops, and commercial areas.

Policy 4: Enhance Wayfinding and Network Legibility

Provide clear signage, route information, and intuitive street and trail design that make the transportation network easy to navigate for residents and visitors.

Policy 5: Address Gaps and Barriers Proactively

Identify and fix sidewalk gaps, missing crosswalks, inaccessible transit stops, disconnected trail segments, and poor street connectivity.

Goal 3: A Mobility-Focused, Efficient, and Reliable Transportation System

Provide a transportation system that enables efficient, reliable, and seamless mobility for all users.

Policy 1: Improve Network Efficiency Across All Modes

Enhance the performance of the street, trail, and transit networks through system management, connectivity improvements, and multimodal planning.

Policy 2: Enhance Regional Mobility

Collaborate with regional partners to improve mobility between Medical Lake, Fairchild Air Force Base, and other West Plains job and commercial centers.

Goal 4: A Transportation System That Strengthens Community and Economic Vitality

Develop and maintain a transportation system that supports a thriving local economy, strengthens community identity, and enhances access to businesses, jobs, public services, and cultural destinations, while fostering vibrant, connected neighborhoods and commercial districts.

Policy 1: Support Local Business Districts Through Transportation Investments

Prioritize transportation improvements that enhance access, visibility, and circulation for local businesses.

Policy 2: Strengthen Community Identity Through Street Design

Use street design, public spaces, signage, and landscaping to reinforce community character, support placemaking, and create attractive gateways and corridors.

Policy 3: Promote Tourism Through Mobility Enhancements

Improve transportation access to parks, trails, historical sites, and regional attractions to support tourism, recreation, and local spending.

Policy 4: Integrate Transportation and Land Use to Foster Vibrant, Walkable Places

Coordinate transportation planning with zoning and development patterns to encourage mixed-use, walkable centers that attract businesses and enhance community vitality.

Goal 5: A Healthy, Sustainable, and Equitable Transportation System

Create a transportation system that supports public health, reduces environmental impacts, and provides equitable and sustainable travel options for all residents—walking, biking, transit, and driving—while reducing greenhouse gas emissions and promoting active lifestyles.

Policy 1: Promote Active Transportation

Prioritize walking, rolling, and bicycling through infrastructure and land-use decisions that encourage daily physical activity and reduce dependence on single-occupancy vehicles.

Policy 2: Reduce Transportation-Related Emissions

Support low-carbon mobility options—including transit, EV infrastructure, and compact development patterns—to reduce greenhouse gas emissions, air pollution, and climate impacts.

CHAPTER 3

EXISTING CONDITIONS



Chapter 3

This section documents current travel conditions within the City and provides a basis for gauging the impact of future changes, as precipitated by land use development with associated traffic increases.

3.1 Demographics

Demographics were found using U.S. Census Bureau Data, available through American Community Survey, Decennial Census[1]. Also, the 2046 Medical Lake Land Capacity Analysis was used to augment population and land use discussions.

Population

Medical Lake was confirmed to have a current population of 4,874 people in 2020 by US Census. The 2046 Medical Lake Land Capacity Analysis confirms a 2023 population of 4,915, representing nearly 1% growth in 3-years. The Land Capacity analysis indicates the population of Medical Lake will increase to 5,159 persons by 2046, over a 5% increase over 23 years. This equates to 0.24% growth annually.

Relevant to the future condition's discussion, confirming the growth in population is important as it assures associated traffic gains will also occur. With that said, while population forecasts are useful for confirming that growth is anticipated by City leaders, per Chapter 4, land use forecasts provide the basis for estimating forecast travel demands.

This is mentioned to indicate that, even if population growth trends vary from what has been discussed, this will not have a bearing on the conclusions derived for this Plan. Land use is the basis for forecasting, and traffic impacts are related to development growth regardless of forecast year.

Current and future populations summaries are as follows:

- **2020:** 4,874 residents, Census
- **2023:** 4,915 residents, Land Capacity Analysis
- **2032:** 5,022 residents, Estimated from Annual Growth
- **2046:** 5,195 residents, Land Capacity Analysis
- **2050:** 5,245 residents, Estimated from Annual Growth

Medical Lake and the surrounding area are comprised of a single census tract. A tract is a geographic area for which the Census Bureau defines demographics, like population, housing, age, ethnicities, etc. Census Tract 139 encompasses the City of Medical Lake. This is shown by **Exhibit 3.1** on the next page. Key year 2024 census for Medical Lake is below:

- 19.1% are age 19 and under
- 15.8% are age 65 and older
- 49.2% are female persons
- 15.8% have a disability
- 8.4% of persons are in poverty
- 87.9% are White
- 6.2% are Hispanic or Latino
- 4.1% are Black

1. https://data.census.gov/all?q=Medical+Lake+city,+Washington

Economic

Economic demographics were studied to identify commute times, degree of vehicle dependency, and network use. Commute data helps provide an understanding of how residents are moving in the network, given employment data. This also provides insight into how the community is traveling in the system (travel mode). Salary data supports deductions regarding need for travel options. **Table 3.1** shows key economic factors identified from Medical Lake 2024 Census data.

Table 3.1. Economic Demographics

Category	Population Percentage
Employment:	
Employed	56.7%
Unemployed	0.7%
Not in Labor Force	43.3%
Commuting:	
Drives Alone	76.5%
Carpools	7.4%
Public transit	3.0%
Walked	2.1%
Work from Home	10.9%
Error / Not Known	0.3%
Income per Household:	
Less than $10,000	4.0%
$10,000 to $14,999	7.1%
$15,000 to $24,999	3.2%
$25,000 to $34,999	7.0%
$35,000 to $49,999	4.8%
$50,000 to $74,999	17.6%
$75,000 to $99,999	15.5%
$100,000 to $149,999	29.3%
$150,000 to $199,999	10.8%
$200,000 or more	0.8%

Source: United States Census Bureau

As shown, 43.7% of residents have household salaries that fall below a Spokane County median annual income of $75,000. 43.3% of the city population is not in the labor force (not of working age, does not work, or is retired). Also, 76.5% of the workforce drive or commute alone. Also, 10.9% of employees work from home, 7.4% commute by carpool, 3.0% use transit, and 2.1% walk or bike to work.

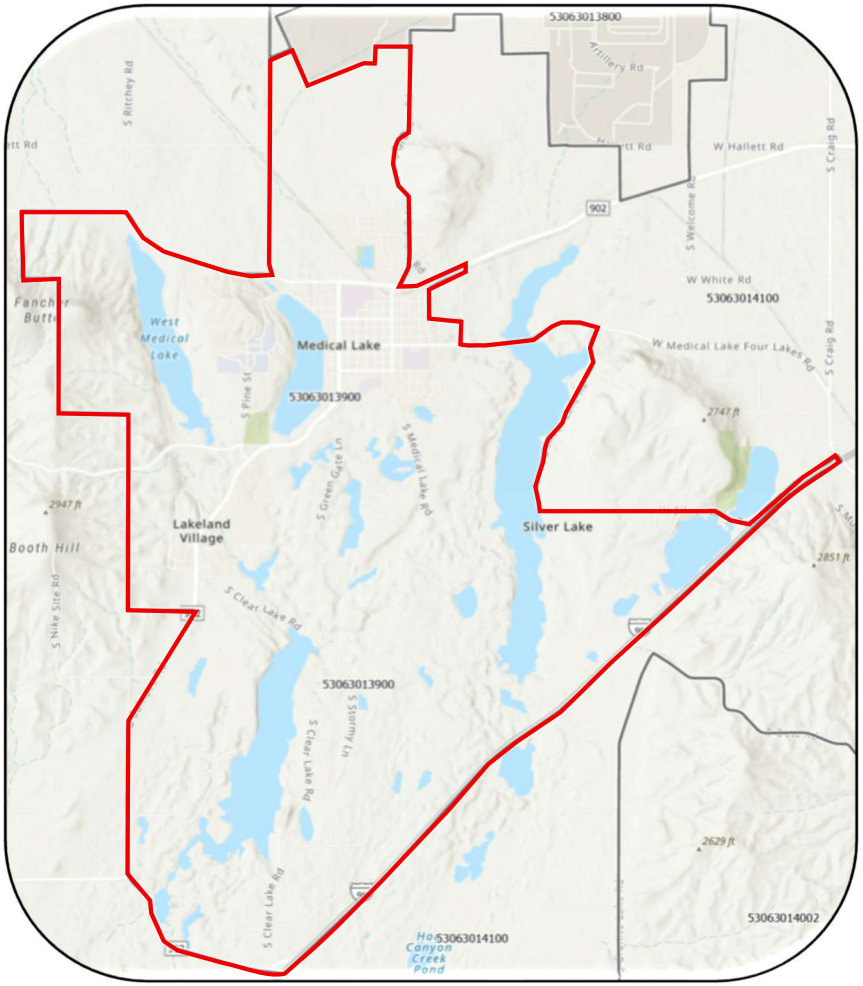


Exhibit 3.1. Medical Lake Census Tract 139 (Boundary Red Line)

A conclusion offered from Census data is an apparent reliance on personal automobiles. Increased multimodal infrastructure options could offer the benefit of improved health and/or reduced costs of autos. An extension of multimodal facilities would also reduce travel demand on roads, resulting in a reduction of infrastructure maintenance.

This reliance on personal autos will continue with growth and development unless multimodal projects are advanced. Providing accessible, connected multimodal networks is a focus of this Plan, per the direction of City officials, to address commute imbalances. The focus is on pedestrian, bicycle, and transit facilities to help redirect citizens away from single-use automobiles.

Housing

The US Census provides household data that may be used as an additional economic indicator, and this also provides growth details for Medical Lake. This data includes the number of homes, household types, and average housing size. **Table 3.2** summarizes key 2024 housing demographics for the city.

Data indicates 2,055 existing households have an average household size of 2.13 persons per home. With that said, there are 1,195 families in Medical Lake with an average size of 2.93 persons per family. The proportion of families having dependents older than 60 and younger than 18 are 30.7% and 21.7%, respectively.

The data indicates most residents own their homes (68.9%) with others as renters (31.1%). Most dwellings are single family homes (67.6%) with the next segment including multifamily units (26.6%) like town homes, apartments, or condominiums. The balance (5.8%) are mobile homes.

Table 3.2. Housing Demographics

Category	Percentage of Population
Household:	
Total households	2,055
Average household size	2.13
Families:	
Total families	1.195
Average family size	2.80
Household Type:	
Households with one or more people under 18 years	21.7%
Households with one or more people 60 years and over	30.7%
Householder living alone	36.5%
Units:	
1-unit structures	63.9%
2-or-more-unit structures	30.2%
Mobile homes and all other types of units	5.9%
Tenure:	
Owner-occupied housing units	66.1%
Renter-occupied housing units	33.9%

Source: United States Census Bureau

Collectively, a conclusion can be derived from housing data that enforces household income determinations. There is a need for multimodal infrastructure to provide travel choice;

this is evidenced by households with young or elderly drivers. There is also a high percentage of renters correlating with a high percentage of multifamily units and mobile homes; these are also strong indicators for the need for active transportation and transit accommodations.

Transportation

With housing and economic demographics established, the US Census provides travel characteristic information for the City of Medical Lake. Demographic data relates to commute times, which infers where people are working in relation to dwellings within Medical Lake.

The average commuter has a 21.4-minute commute (one-way). Of commuters, 29.0% of residents work in Medical Lake, the near areas of the West Plains, and at Fairchild Air Force Base; supported by commute lengths of 14 minutes or less. About 70% work outside of the city, defined by commutes that exceed 15 minutes, traveling to and from areas such the City of Spokane, City of Spokane Valley, and other areas of Spokane County. Roads with the most demand during the commute peak hours (in traveling to/from Medical Lake) include SR-902, Brooks Rd, I-90, US-2, and Craig Road.

3.2 Street Network

The street network within Medical Lake is primarily aligned as a grid system, which is an efficient way of moving residents between land uses. Contrarily, while providing residential appeal, cul-de-sacs and curved streets can have dead ends and are often disconnected. This creates longer travel distance between major streets and destinations. A grid system with more connecting streets should be implemented to promote multimodal mobility. A network with dead ends, long blocks, and horizontal curves should be limited as to not reduce mobility. The City prefers an enhanced network approach. In fact, dead end streets (cul-de-sacs) are limited by MLMC, allowed only with permission of the Public Works Director.

Most of the City's older neighborhoods, including the downtown and business districts, follow a traditional street grid that provides multiple access points, short blocks, and no dead-end streets. In contrast, some newer residential areas were built with cul-de-sacs, curvilinear streets, and limited connectivity. The City is now moving away from this development pattern, consistent with MLMC standards, to reduce barriers to mobility and strengthen the overall transportation network.

I-90 and US 2 are the major Highways that access this region; of which, Medical Lake capitalizes on regional access mostly from I-90. State Route 902 is the highest utilized route to access the City from I-90; this route loops through the City to connect with I-90 at the Cheney-Medical Lake Interchange (Exit 264) and the Medical Lake Interchange (Exit 272).

San Salvador Road (Espanola Road), Brooks Road, Fancher Road, and Lake Street (Medical Lake / 4-Lakes Road) are secondary routes to/from the City. They extend into Spokane

County, and in the case of Brooks Road, extend north to provide access to/from US 2. Dominant travel patterns/commutes include:

- City of Spokane by SR 902 east to I-90 and Exit 272.
- West Plains industry by SR 902 east.
- Fairchild Air Force Base by Brooks Road to US 2 or SR 902 to Craig Road.
- Airway Heights via SR 902 to Craig Road or Hayford Road.
- Western Washington via SR 902 to Exit 264 or Brooks Road to US 2.

Inventory

Roads are classified to understand how each serves local, regional, and State mobility. Federal Functional Classification (FFC) is the designation used by the Federal Highway Administration (FHWA) to classify roads, and this has been adopted by Washington State and most local agencies. Medical Lake's FFC map is shown in **Exhibit 3.2**.

Compliance with the FFC is imperative for funding requests, as grants require class designations to be eligible for award. Classes include interstates, highways, principal and minor arterials, major and minor collectors, and local streets, often with urban or rural distinction. Class definitions are noted by mobility and accessibility characteristics that define as found on the FHWA website:

https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section03.cfm

A description of functional classifications is as follows:

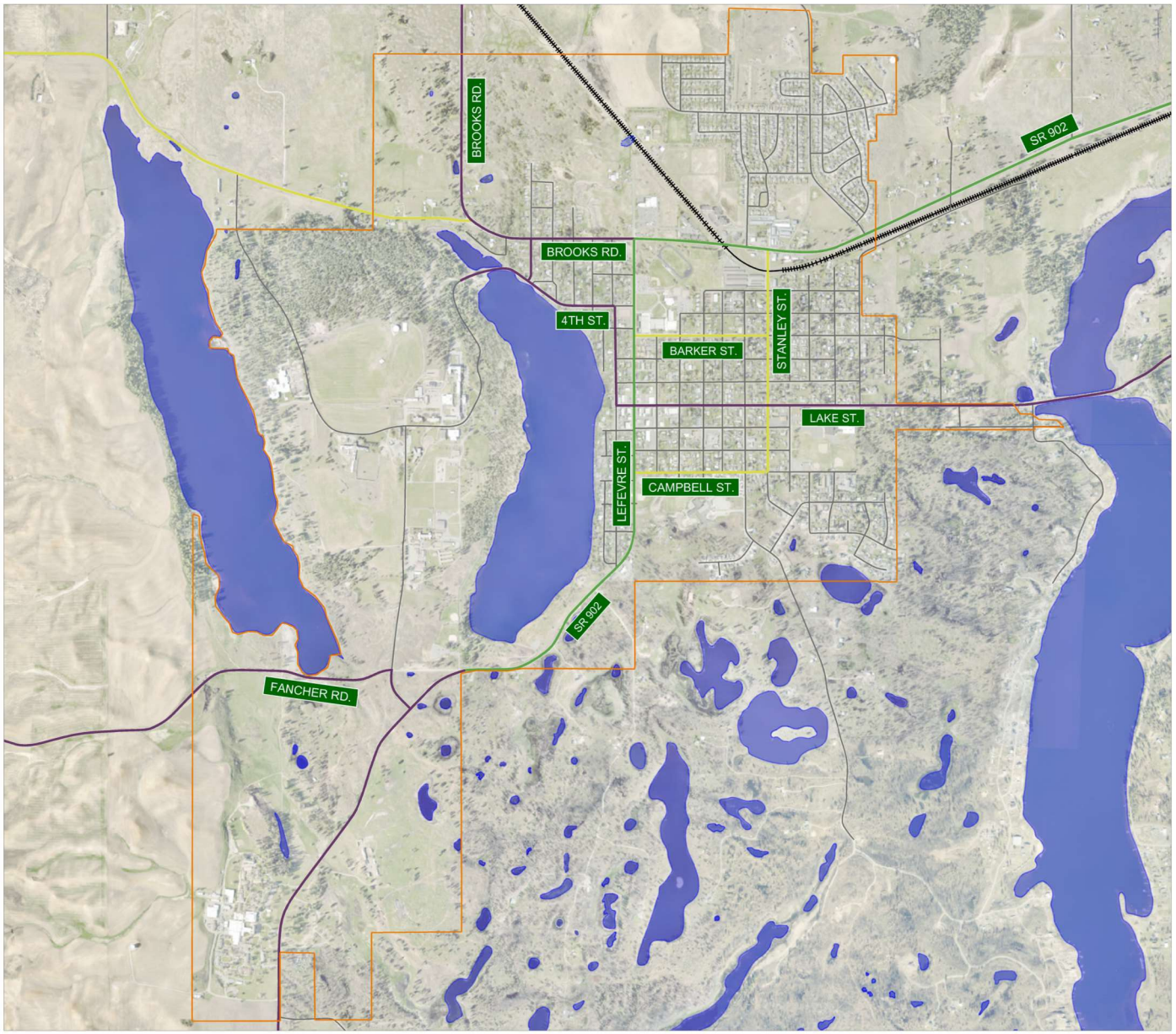
Principal Arterial. Streets and roads connecting primary community centers with major facilities. Principal arterials serve through traffic with limited direct access to abutting land uses.

Minor Arterial. Streets and roads connecting community centers to principal arterials, with partially controlled and infrequent access to abutting land uses.

Collector. Streets and roadways connecting residential commercial centers and residential neighborhoods with smaller community centers and facilities as well as access to minor and principal arterials. Through traffic is a lesser priority and access to abutting land uses is a priority.

Local Street. Streets and roadways providing access to abutting land uses as well as principal, minor and collector arterials. Through traffic is not a priority.

Access Street. Perform a variety of functions with the primary purpose of providing access to abutting land uses. Through traffic is not encouraged and buses and heavy trucks are not recommended except as needed for commercial or industrial uses. Also serve as easements for utilities and open spaces between buildings and as an element to the urban environment.



N.T.S.

LEGEND

	PRINCIPAL ARTERIAL
	MINOR ARTERIAL
	MAJOR COLLECTOR
	MINOR COLLECTOR
	LOCAL STREET
	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL

Exhibit 3.2

EXISTING FEDERAL FUNCTIONAL CLASSIFICATIONS (FFC)

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

Medical Lake uses a statutory speed limit of 25 mph unless posted otherwise per MLMC Ordinance 8.08. A summary of classifications, speed limits, and other road characteristics is summarized with **Table 3.3**. Note there are no principal arterials within the City.

Table 3.3. Road Data

Functional Class and Street	Alignment/Limits (North to South & West to East)	No. Lane	Speed (mph)
Minor Arterial			
SR 902	Lefevre St to City Limit	2	30
SR 902 (Lefevre St)	Brooks to Waterfront Park	2	30
Major Collector			
W 4th Street	Howard St to Jefferson St	2	20 - 25
Brooks Road	City limits to Lefevre St	2	30
Howard Street	Brooks Rd to W. 4th St	2	25
Jefferson St	W. 4th St to Lake St	2	20 - 25
Lake Street	Lake St to City Limit	2	20 - 25
SR 902	Waterfront Park to City Limit	2	30
Fancher Road	City Limit to SR 902	2	25 - 30
Minor Collector			
Barker Street	SR 902 to Stanley St	2	20
Campbell Street	SR 902 to Stanley St	2	20 - 25
San Salvador Street	City Limit to Brooks Rd	2	30
Stanley St	SR 902 to Campbell St	2	25

3.3 Traffic Counts & Capacity

This Plan focuses on the safety and multimodal elements of the street network. Available average daily traffic (ADT) counts were assembled for baseline information, and for a high-level capacity analysis. Counts were collected from WSDOT for functionally classified SR 902.

Capacity Methodology

Street capacity review for this Transportation Master Plan measures current and forecast average daily traffic (ADT) volumes against levels-of-service (LOS) thresholds shown in the 2020 Quality/Level-of-Service Handbook (Florida DOT, 2020). The methods presented by this handbook use street cross-section (i.e., number of lanes), speed, class, and travel assumptions to quantify conditions. The fundamental capacity methods are based on the regionally and locally accepted/endorsed methods of the Highway Capacity Manual (HCM); this FDOT resource presents an approach which simplifies capacity results for use in planning analyses. Further definition and description of LOS are included as **Appendix B**.

Thresholds used for this Plan are based on the FDOT category that pertains to "State Signalized Arterials" in a suburban environment. Per FDOT methodology, these volumes are reduced by 10% in application for town streets. However, an adjustment of 15% was applied to establish capacity for three and five-lane sections. The resulting LOS capacity thresholds used for the City are shown in **Table 3.4**.

Table 3.4. Street Capacity Thresholds				
Functional Class	Arterial	Collector	Local	Alley
Number Lanes	Average Daily Traffic			
- Two lanes	13,300	6,600	2,000	200
- Three lanes	15,300	7,600	NA	NA
- Four lanes	29,200	13,100	NA	NA
- Five lanes	33,600	15,100	NA	NA

The volumes above are thresholds that suggest a practical capacity limit; over which, the roadway will not function well. An additional metric is the volume-to-capacity ratio.

A volume-to-capacity (V/C) assessment is performed by dividing the count or forecast volume with the applicable threshold above. When using this metric, a V/C ratio of 0.79 or less indicates practical street capacity is available. An assessment of 0.80 to 0.99 is noted as "approaching standard." Finally, V/C noted at 1.0 or higher should be identified as surpassing available street capacities.

The City does use level of service (LOS) as the rating system for the capacity of roads. LOS "D" is a reasonable and an achievable standard for the City of Medical Lake's principal arterial roadways. The thresholds prior relate to the LOS C standard for arterials and collectors. If the V/C above are below the approaching threshold condition, a LOS A or B equivalent is reached, 0.79 or less. If the V/C of 0.80 to 0.99 occurs, a LOS C equivalency is reached. Exceeding 1.0 indicates the LOC C standard is not met; possibly triggering need for mitigating improvement measures.

Volumes and Capacity Review

The traffic counts identified prior were reviewed against FDOT capacity thresholds relating to V/C and LOS requirements. Again, SR 902 counts were identified from WSDOT GIS for the year 2023. These counts are recent enough for capacity analysis. A summary of the volume, capacity threshold, a V/C calculation, and an equivalent LOS grade is provided with **Table 3.5** for the typical weekday.

Table 3.5. Existing Street Capacity Analysis				
SR 902 Location	ADT* Volume	LOS Threshold	V/C Calculation	Equivalent City LOS
East City Limit	8,765	13,300	0.66	≤ LOS B
Stanley Street	6,390	13,300	0.48	≤ LOS B
Lefevre Street	5,790	13,300	0.44	≤ LOS B
Lake Street	4,630	13,300	0.35	≤ LOS B
Jefferson Street	2,765	13,300	0.21	≤ LOS B

As shown, an equivalent LOS B or better is noted for SR 902 from Lefevre Street to the eastern City limits. The conclusion is also confirmed for Lefevre Street to the southern City limit. The determinations are made as V/C are all below 0.79.

3.4 Freight

WSDOT officials specify five tonnage classes for roadways in the State ranging from T5 with 20,000 tons in 60 days to T1 with

over 10,000,000 tons per year. The truck routes in and around Medical Lake with tonnage class listings as follows:

- T3 (300,000 to 4,000,000 tons/year) – SR 902 (Lefevre Street), Brooks Road, and San Salvador/Espanola Road.
- T5 (20,000 to 105,000 tons/year) – Fancher Road

The Washington Eastern Gateway rail line is aligned through the north City limits, owned by WSDOT. This line extends from Coulee City to Cheney spanning the Cities of Hartline, Almira, Wilbur, Creston, Davenport, and Reardon. There is a transfer location in Cheney where access is secured to the Burlington Northern-Santa Fe and Union Pacific rail lines, respectively.

This is a R3 rail line, supporting 300,000 to 4,000,000 tons/year. A map of freight and rail routes are shown with **Exhibit 3.3,** as distinguished by routes by tonnage class.

3.5 Safety

Collision histories were reviewed for all roads in Medical Lake, including intersections, driveways, and mid-block locations. Collisions were reviewed for a timeline ranging from January 1, 2020, to December 31, 2024. Collision data was sourced through a records request of the WSDOT safety office. Raw Collision data is provided in Appendix C.

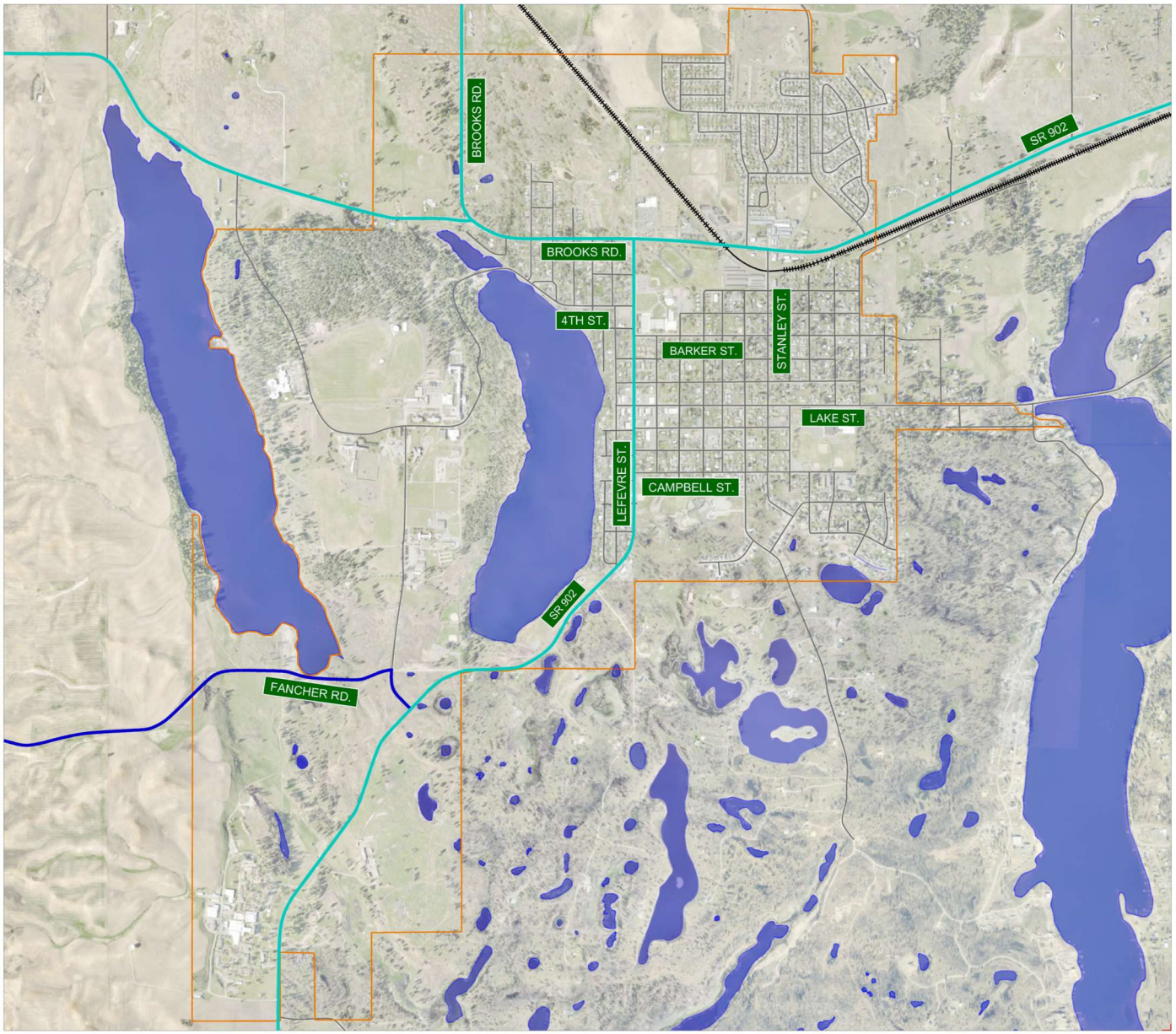
A total of 83 recorded collisions occurred in the 5-year study period, an average of 17 incidents a year. When reviewing collision data, it is important to note an incident may involve two or more vehicles, but this is reported as one accident. Thus, it should be noted that there were 151 vehicles involved in 83 reported collisions within the City of Medical Lake.

Overall, 33% of collisions involved injuries (27-incidents). Three (3) incidents included a serious injury. There were no fatalities noted from collision data. No pedestrian or bicycle-related incidents were reported. Per WSDOT data, 57% of collisions (47 incidents) occurred at intersections. 7% of collisions (6-incidents) were noted at driveways. 36% of collisions (30-incidents) occurred between intersections and driveways.

Collision types and occurrence summaries are as follows:

- 39% right angle; a right-turn vehicle and a through vehicle collide at an intersection or driveway.
- 29% object; vehicle collides with an object, a parked vehicle, or runs off road.
- 18% same direction sideswipe; vehicle strikes another in an adjacent lane traveling same direction.
- 6% left angle; left-turn vehicle tees into another going straight or turning left opposite direction.
- 5% opposite sideswipe; through vehicle hits another through vehicle traveling opposite direction.
- 2% Animal Strike; vehicle hits a wild or domesticated animal large enough to cause vehicle damage.

Accidents were shown graphically by **Exhibit 3.4** for years 2020 to 2024 for Medical Lake.



N.T.S.

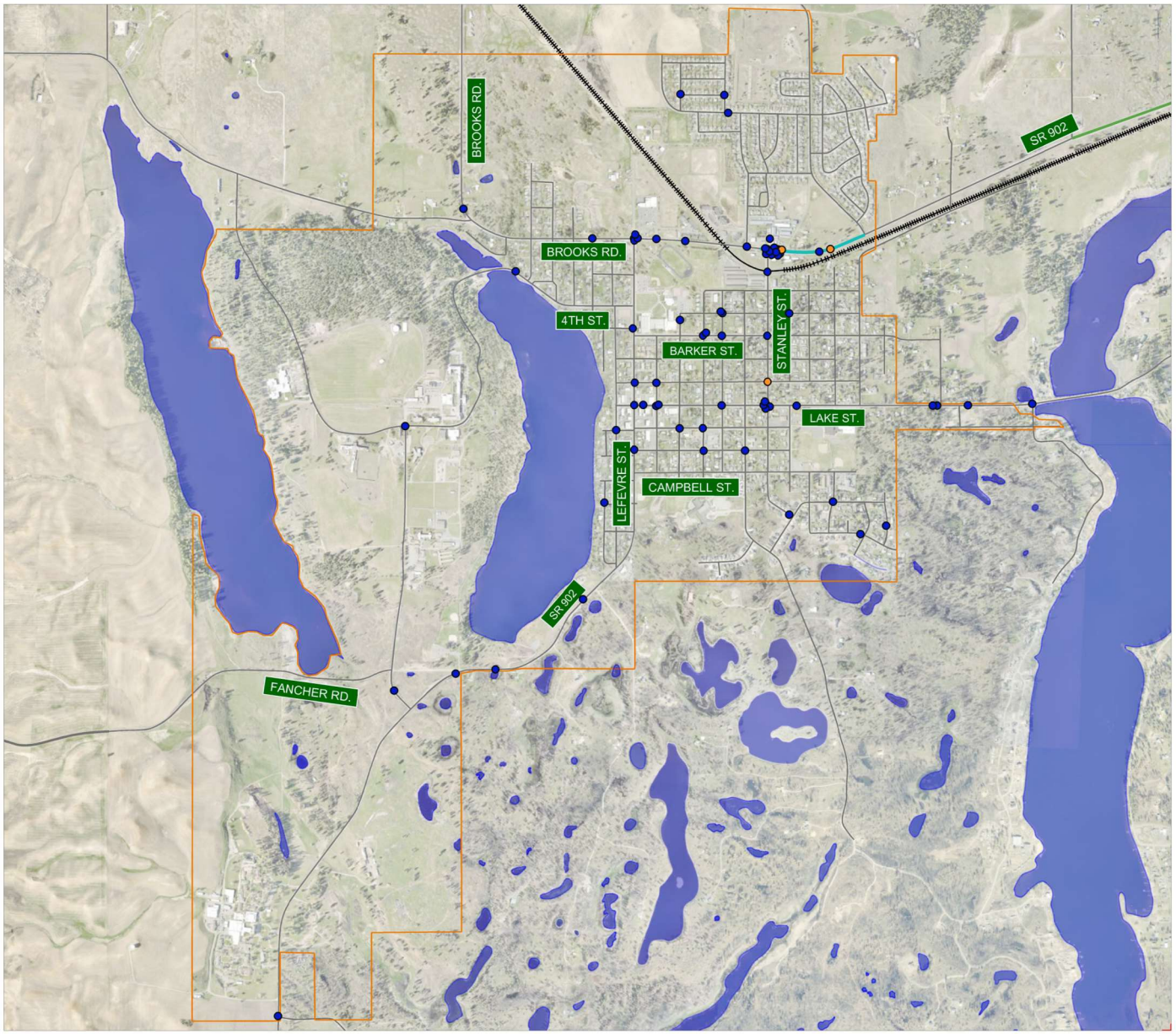
LEGEND

	T-3 TRUCK ROUTE
	T-5 TRUCK ROUTE
	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL - R-3 RAIL ROUTE

Exhibit 3.3

MEDICAL LAKE FREIGHT MAP

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON



N.T.S.

LEGEND

	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL
	DAMAGE ONLY OR MINOR INJ.
	SEVERE INJURY
	SRTC HIGH INJURY NETWORK

Exhibit 3.4

5-YEAR COLLISION (2020-24) HISTORY MAP

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

Table 3.6. Summary Intersection Collisions		
Intersections	Total	Avg
Lake & Stanley	13	2.6
SR 902 & Stanley North	5	1.0
SR 902 & Lefevre	5	1.0
Barker & Brower	2	0.4
Fellows & Walker	2	0.4
SR 902 & Stanley North	1	0.2
Barker & Stanley	1	0.2
Fellows & Prentis	1	0.2
Fellows & Barker	1	0.2
Grace & Washington	1	0.2
Herb & Hallett	1	0.2
Herb & Brower	1	0.2
Lake & Walker	1	0.2
Lake & Broad	1	0.2
Lake & Freeman	1	0.2
Maple & Spruce	1	0.2
Broad & Ladd	1	0.2
Stanley & Ladd	1	0.2
Stanley & SR 902	1	0.2
Grant & Evergreen	1	0.2
Jefferson & Hancock	1	0.2
William & Connie Ray	1	0.2
SR 902 & Hancock	1	0.2
SR 902 & Lake	1	0.2
SR 902 & Ladd & First	1	0.2
SR 902 & Third	1	0.2
Totals	47	9.4

Focus Area

Intersections are typically the focal point of incidents within a community. As indicated, 57% of recorded City collisions occurred at intersections. Collision data was reviewed to identify high incident intersections in. A summary of recorded incidents is shown with **Table 3.6** (page 22).

As shown, most intersections in the City experienced a single incident in 5 years. Of 26 intersections, only five experienced two or more collisions, and three with five or more incidents. These later three intersections are of concern to the City.

A review of safety conditions was performed for the three high incident intersections. Solutions were developed using guidance provided by a *Manual on Uniform Traffic Control Devices* (*MUTCD, 11th Edition, FHWA*) and *A Policy on Geometric Design of Highways and Streets* (*7th Edition, AASHTO*). A summary of discussion is as follows.

Lake Street / Stanley Street, 13-Incidents

Data indicates 12 of the 13 collisions were right angle, the primary contributing factors include "Did not grant right-of-way to other vehicle" or "disregard traffic sign." From the field review and consideration of data, it seems that drivers do not expect a two-way stop at this location. In addition, clear sight lines are limited in three of four corners.

Drivers commuting Stanley Street stop and roll forward, not expecting moving traffic and having a blocked view of approaching vehicles. Conversely, moving eastbound and westbound drivers, also with limited sight lines, do not anticipate vehicles pulling forward into the intersection. The result is an incident.



Improvement options to incrementally help address the incident issue:

- Add cross traffic (MUTCD W2-1) and street name (W16-8P) signs on Lake Street in advance of Stanley Street letting drivers know there is cross traffic ahead.
- Add stop signs (MUTCD R1-1) to convert into an all-way stop. This could be blinking solar lights if the City wished

to increase visibility. Advanced "stop ahead" signs (MUTCD W3-1) can be used to notify drivers of the all-way stop. The signs would replace those noted above.

- Install a compact urban roundabout with pedestrian and bicycle treatments, spitter islands with crossing refuge, and a mountable-center island.

SR 902 & Stanley Street North, 5-incidents

WSDOT data indicates 4 of 5 collisions were same direction sideswipes. Contributing circumstances include "Following too closely," "Did not grant right-of-way to other vehicle," and "Exceeding reasonable safe speed" were identified for 4 out of the 5 collisions as well.

A field visit and data suggest there is a geometric issue staging incidents between the westbound through and right-turn vehicle movements. The causal factor of incidents is not as apparent as the prior issue. However, a narrow westbound through-lane matched with a right turn lane having a shorter than MUTCD-recommended taper, given posted speed, and with location of the driveway in the turn lane, may contribute to the collision issue.

Incremental improvements to help address the issue include:

- Reflective pavement markers could be used to clearly separate through and right-turn lanes at the junction.
- Relocate drive west and lengthen the taper of the right-turn lane, as possible; the AASHTO recommended transition rate is 165-feet, but this will not be fully achievable given built environment.
- Install a compact urban roundabout with pedestrian and bicycle treatments, spitter islands with crossing refuge, and a mountable-center island.



SR 902 & Lefevre Street, 5-incidents

WSDOT data indicates all incidents involved "Entering at angle" with the contributing circumstances "Did not grant right-of-way to other vehicle" and "Exceeding reasonable safe speed."

As before, WSDOT data and a field visit do not indicate a strong causal factor. However, this is a large intersection, and the westbound SR 902 movement does not stop (free movement). These factors likely lead to confusion over driver right-of-way.

Potential remediations to incrementally help address the collision issue include:

- Add a stop sign (MUTCD R1-1) on the westbound approach to convert into an all-way stop. Advanced "stop ahead" signs (MUTCD W3-1) should be used to notify approaching drivers of the



all-way stop. Solar stop signs with flashing lights can be used if the City wishes to promote higher visibility.

- Install a compact urban roundabout with pedestrian and bicycle treatments, splitter islands with crossing refuge, and a mountable-center island.

SRTC High Injury Network

The Spokane Regional Transportation Council (SRTC) reviews collision data for Spokane County. Through this regional review, the SRTC has identified SR 902 as a part of the high injury network (HIN) for a segment extending from south Stanley Street to Graham Road. An HIN determination was based on eight collisions identified from a review of 2018 to 2022 collision data.

There are two incidents that occur in this segment with the 2020 to 2025 data used by this Plan. This is a reduction from the SRTC data. The conclusion from this comparison is that this is a "watch" segment of the corridor; meaning the City should monitor collision data for this area. If the incident trend goes up, then remediations can be considered. In the interim, no recommendations are provided.

CHAPTER 4

FORECAST CONDITIONS



Chapter 4

This section summarizes forecast transportation conditions for roadways identified for analysis by City officials. Provided is a description of the forecast land use assumptions, developed traffic forecasts, capacity conditions, and recommended road and intersection improvements.

4.1 Traffic Forecasts

Travel forecasts were generated from land uses assumptions documented by the Medical Lake Land Capacity Analysis, refined in coordination with City officials. The Land Capacity Analysis (LCA) indicates there are 150-acres of undeveloped or underdeveloped residential and commercial properties in corporate limits. These were assumed for future land use development with this Transportation Plan.

In addition, City staff has proposed two urban growth area expansions for future development, anticipating the growth areas above will be absorbed in the indefinite future. A summary of these locations include:

1. **North Growth Area**
   90-acres, north City limits between Washington Eastern Rail and Graham Road.
2. **East Growth Area**
   100-acres, south of Lake Street and east of Sherman Avenue to Silver Lake.

Further, the LCA indicates Medical Lake is expected to gain an additional 204 single family homes and 89 multi-family units, based on the current zoning ordinance. Minimal commercial growth is anticipated; a 5,000 square-foot retail pad was assumed in coordination with City officials. These comprise year 2050 development forecasts.

Full build land uses were developed per discussion with City staff. Full growth includes the occupancy of 150-existing acres and 230-expansion acres; total growth of 380-acres. Including year 2050 development assumptions, full build represents the construction of 615 single family units, 1,035 apartments and townhomes, and 27,000 acres of commercial/retail area.

A 550-student elementary school was also assumed on a 10.3-acre site owned by the school district; just north of the City wastewater treatment plant and west of Tara Lee Avenue. The full-build scenario is to assess system capacity, not predict the need in a certain year.

A summary of land use assumptions for year 2050 and the full build condition is summarized as follows:

Year 2050 Land Use Assumptions

- Single Family Homes, 204 homes
- Multifamily (Apartments & Townhomes), 89 units
- Shopping center/Commercial, 5,000 square feet (s.f.)

Full Build Assumptions

- Single Family Homes, 615 homes
- Multifamily (Apartments & Townhomes), 1,035 units
- Shopping Center/Commercial, 27,000 s.f.
- 550-Student Elementary School

These are land uses for new construction and not businesses or residences that exchange hands and/or are reoccupied. In most situations, such an exchange results in the roughly equal generation of trips and there is minimal need for reconciliation for a study like this Transportation Master Plan.

Land Use Allocation

The location and allocation of land uses are driven by parcel location, land use type, and density assumptions (i.e., housing units and building area), as developed in coordination with City officials. Residential and commercial land uses were organized into 23 aggregated transportation analysis zones (TAZs) which help simplify the presentation of data and help with the assignment of forecast trips onto the street network.

Exhibit 4.1 shows the City TAZ's; also listed is a development assumption for each zone. The following TAZ's are noted as the urban growth areas specified prior.

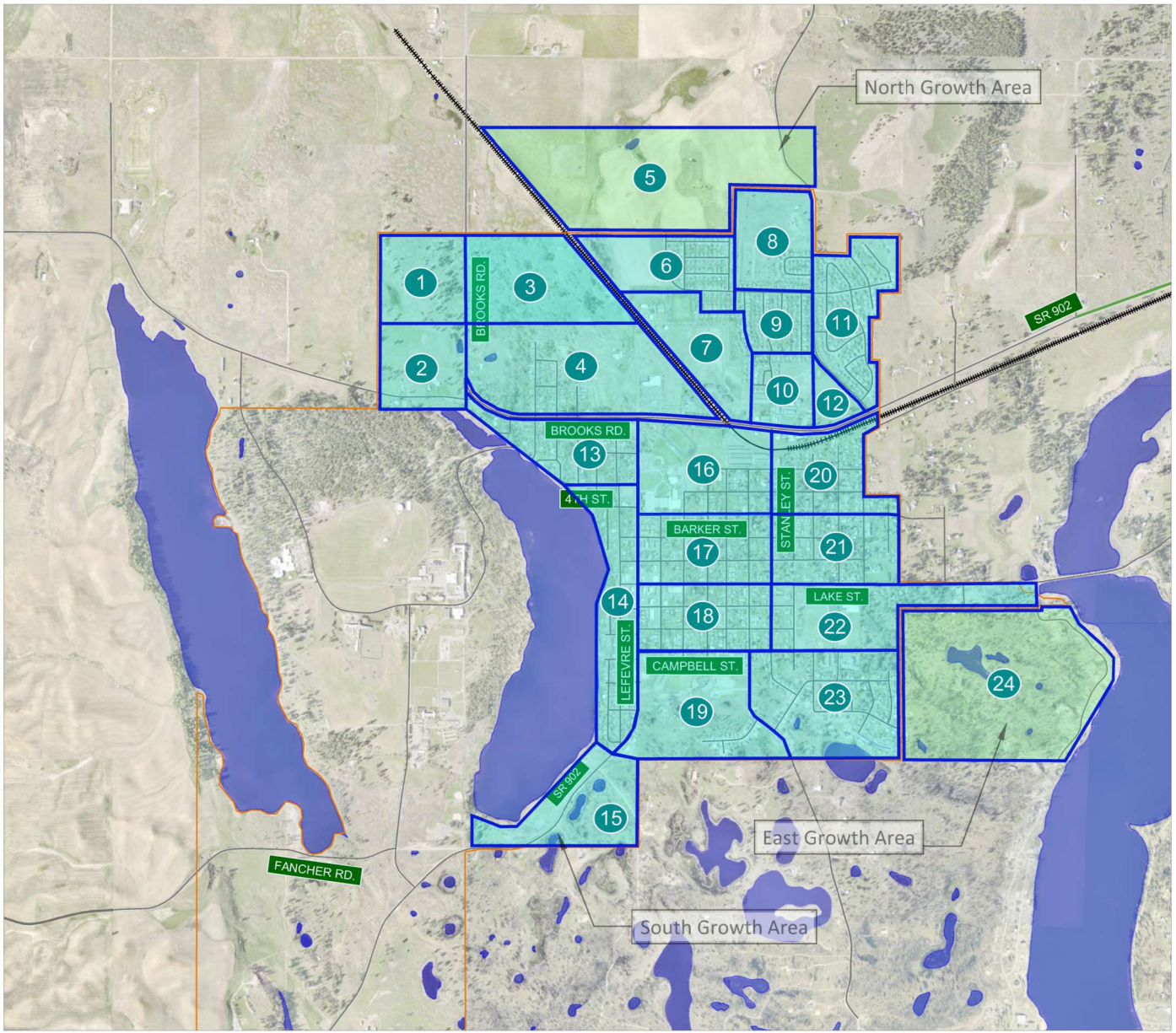
1. North Growth Area – TAZ #5
2. East Growth Area – TAZ #24

Trip Generation

Residential and commercial trip generation was forecast using the *Institute of Transportation Engineers (ITE), Trip Generation Manual* (11th Edition, 2018). Trip Generation is a nationally recognized and locally accepted approach for forecasting traffic for a range of commercial, retail, residential, and institutional land uses. The ITE provides rates and equations that forecast trips for different land uses based on variables such as building area or the number of dwellings.

ITE Land Use Codes 210 and 220 were used to forecast trips for single family homes and multifamily units, respectively. The multifamily land use includes apartments and townhomes for this Transportation Master Plan; this traditionally is a general land use that has wide application. Commercial trips were forecast using Land Use Code 822, which is small-venue retail comparable to "strip" style shops, services, and restaurants) within a small footprint building or buildings). Code 520 was used to predict trip generation for an elementary school.

Trip generation was forecast for the weekday and PM peak hour, periods of travel relevance for Medical Lake. Forecasts were prepared for year 2050 and the full-build condition. Trip generation summaries are provided by **Table 4.1** (page 30).



N.T.S.

LEGEND

	CITY URBAN BOUNDARY
	TAZ BOUNDARY
5	TAZ AREA
5	UGA TAZ AREA

TAZ UNIT ASSIGNMENTS

	Year 2050			Full Build			
TAZ	Single Family (Units)	MultiFamily (Units)	Commercial (Square-Feet)	Single Family (Units)	MultiFamily (Units)	Commercial (Square-Feet)	School (Students)
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	12	0	5,000	12	265	27,000	0
5	50	0	0	375	0	0	0
6	0	0	0	0	0	0	550
7	0	0	0	0	0	0	0
8	50	0	0	50	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0
12	0	0	0	0	115	0	0
13	15	0	0	15	0	0	0
14	5	0	0	5	0	0	0
15	25	30	0	80	30	0	0
16	2	0	0	2	0	0	0
17	2	0	0	2	0	0	0
18	3	0	0	3	0	0	0
19	2	30	0	3	115	0	0
20	1	0	0	1	0	0	0
21	4	0	0	7	0	0	0
22	5	0	0	7	0	0	0
23	3	0	0	4	0	0	0
24	25	30	0	50	510	0	0
Totals	204	90	5000	616	1035	27000	550

Exhibit 4.1

CITY TRANSPORTATION ANALYSIS ZONES

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

Table 4.1. Year 2050 & Full-Build Trip Generation						
Land Use	ITE Code	Units	Weekday Trips	PM Peak Hour		
				In	Out	Total
Year 2050 Trip Generation						
Single-Family Homes	210	204 homes	1,915	123	71	194
Multifamily Homes	220	89 units	600	28	17	45
Commercial / Retail	822	5,000 s.f.	270	17	16	33
		Trip Totals	***2,785***	***168***	***104***	***272***
Full Build Trip Generation						
Single-Family Homes	210	616 homes	5,805	366	215	581
Multifamily Homes	220	1,035 units	6,975	332	196	528
Commercial / Retail	822	27,000 s.f.	1,470	89	89	178
Elementary School	520	550 students	1,250	40	48	88
		Trip Totals	***15,500***	***827***	***548***	***1,375***
* Source ITE Trip Generation Manual, 11th Edition						

As shown, 2,785 weekday trips are forecast for 2050 with 272 trips generated during the weekday PM peak hour. Peak hour trips comprise 9.8% of weekday trips with the 25-year horizon. Expected with full build of the City, approximately 15,500 trips are projected during the weekday with 1,375 trips generated during the PM peak hour. PM peak hour trips comprise 9% of daily trips with the long-range analysis horizon.

Note this project was initiated prior to the recent release of the 12th Edition of the *Trip Generation Manual*. A conversion from the 11th Edition was not made as work had been performed. However, trip generation forecast with Land Use Codes 210, 220, 520, and 822 did not differ notably between the 11th and 12th Editions. Thus, the source of trip forecasts is inconsequential within the scope of the land uses reviewed for this Plan

Trip Assignment

Given the scope of this study was limited to a few major City streets, a hand-forecasting method was used for this Plan. It was confirmed with City officials that development of a travel demand model was unnecessary, being beyond the scope of what the City was looking to accomplish for this project, given: 1) the understanding that capacity was not going to be the primary issue for this project and 2) the City's wish to focus primarily on multimodal needs and issues for this Plan.

TAZs were aggregated into areas of Medical Lake that share cohesion in terms of accessibility. These are land use areas that use the same roads for commute purposes around town and to/from the area. Peak hour and daily traffic counts were reviewed and compared to confirm how travelers access the City. Trip distributions were derived from count comparisons; a summary of assignment routes with a percentage assumption of approaching and departing distributions include:

- SR 902 east of City limits, 65%
- San Salvador Street/Espanola Rd west of City limits, 15%
- SR 902/Lefevre Street south of City limits, 10%
- Lake Street east of City limits, 5%
- Brooks Road north of City limits, 5%

The trips of each aggregate area were assigned to/from these routes based on travel distance, meaning the shortest route

between the area and the commute route. This process was used to assign trips for year 2050 and the full build condition for the typical weekday. The only diversion from the distributions above where for school trips, assuming a higher number of trips traveling directly to/from the City versus travel easterly along SR 902 with the full build condition.

Travel Forecasts

Forecasts reflect the combination of land use trip assignments with baseline traffic. Baseline growth includes traffic increases resulting from influences outside of the City, yet commuting through or accessing areas in Medical Lake. An increase of commuters traveling from origins outside the City to Eastern State hospital is an example of how baseline growth occurs.

Historical traffic counts were reviewed for four locations along SR 902, and three locations along Lefevre Street. These counts, available from WSDOT, were reviewed from 2012 and 2024. A linear regression analysis indicates traffic increasing at a rate of 1.0 to 1.8% annually in this period, and a weighted average of 1.26% per year between all count locations.

The forecasting objective was to address baseline traffic with understanding that land use trip assignments would comprise most future traffic growth. As such, a 1% baseline growth rate was compounded annually and applied to ADT counts to generate a 28% adjustment by year 2050. This growth was also used for the full-build condition, given the conservative nature of the baseline forecasting process.

The trip assignments developed for year 2050 and the full-build condition were developed based on the distributions noted prior. They were added to baseline forecasts to generate total forecasts. The forecasts process is shown with **Table 4.2** for the weekday. Also shown are elements that comprise forecasts, including counts, baseline growth, and land use trips.

Table 4.2. Year 2050 &Full-Build Traffic Forecasts

Year 2050 Condition				
SR 902 Location	Existing ADT	Baseline Growth	ADT Assignment	Year 2050 Forecasts
East City Limit	8,765	2,475	1,825	13,065
Stanley Street	6,390	1,805	1,445	9,640
Lefevre Street	5,790	1,635	760	8,590
Lake Street	4,630	1,710	695	7,035
Jefferson Street	2,765	780	635	4,180
Full Build Condition				
SR 902 Location	Existing ADT	Baseline Growth	ADT Assignment	Full Build Forecasts
East City Limit	8,765	2,475	6,430	17,670
Stanley Street	6,390	1,805	5,650	13,845
Lefevre Street	5,790	1,635	3,780	11,205
Lake Street	4,630	1,710	3,030	9,370
Jefferson Street	2,765	780	2,755	6,300

A review of year 2050 forecasts shows volumes along SR 902 / Lefevre Street are projected to experience a 50% (+/-) gain over counts, an average of the five locations shown. This is a 1.6 to 1.7% annual growth rate with a 1.64% weighted annual average. The conclusion is that forecast 25-year growth will

exceed 12-year historical figures, 1.26% versus 1.64% annually. This represents an increased annual growth rate for Medical Lake streets, confirming land use gains will have an impact, but not to an unreasonable extent as less than a 0.4% difference is noted between forecast and historical growth.

Full build forecasts are 100% higher than ADT counts, an approximate average of locations. The timeline for growth to materialize is unknown given this is a full development scenario. However, it would require 54 years for growth to be achieved using the historical growth rate of 1.26%, for comparison, and 42-years with 1.64% annual land use growth.

4.2 Forecast Performances

Year 2050 and full-build forecasts were reviewed against the FDOT capacity thresholds disclosed with section 3.3; also, V/C were calculated. Again, the V/C ratio of 0.79 or less indicates practical street capacity is available, 0.80 to 0.99 is noted as "approaching standard," and 1.0 or higher is an indication of surpassing available street capacities.

The City has a LOS D standard for Medical Lake's principal arterial roads and LOS C for arterials and collectors. If the V/C above are below the approaching threshold condition, a LOS A or B equivalent is reached, 0.79 or less. If the V/C of 0.80 to 0.99 is calculated, a LOS C is achieved. Above 1.0 indicates the LOC C standard is not met, precipitating need for improvement. A summary of forecast conditions, capacity thresholds, a V/C calculation, and an LOS determination is provided with **Table 4.3** for the typical weekday.

Table 4.3. Street Capacity Thresholds

Year 2050 Condition				
SR 902 Location	ADT Volume	LOS Threshold	V/C Calculation	Equivalent City LOS
East City Limit	13,065	13,300	0.98	LOS C
Stanley Street	9,640	13,300	0.72	≤ LOS B
Lefevre Street	8,590	13,300	0.65	≤ LOS B
Lake Street	7,035	13,300	0.53	≤ LOS B
Jefferson Street	4,180	13,300	0.31	≤ LOS B
Full Build Condition				
East City Limit	17,670	13,300	1.33	≥ LOS D+
Stanley Street	13,845	13,300	1.04	≥ LOS D
Lefevre Street	11,205	13,300	0.84	LOS C
Lake Street	9,370	13,300	0.70	≤ LOS B
Jefferson Street	6,300	13,300	0.47	≤ LOS B

As shown, a LOS C condition is noted on SR 902 at the east City limits; this is where traffic is highest in Medical Lake. LOS C is allowed for an arterial per City criteria. Though approaching standard, V/C has not yet reached 1.0 and is acceptable per standard convention. All remaining locations are well within allowable standards by year 2050. The data suggests that long-term improvements could be considered for SR 902, though not immediately given vehicle capacity needs alone.

The long-term analysis confirms this supposition. V/C and LOS surpass limits for most of SR 902, with a high LOS, and V/C that

exceed the LOS C threshold to Stanley Street, then a high LOS C grade to Lefevre Street. This confirms the possible need for long-term capacity projects.

Intersection Considerations

Note from forecast conditions that volumes decrease between road segments at intersections (between ADT counts). This occurs because turning vehicles depart and enter routes at intersections. This may suggest need for mobility improvements at major intersections, given they support high turning volumes and/or are a junction between functionally classified roads.

The PM peak hour is the most frequently reviewed period in the region for intersection capacities; travel demands are highest during this time versus other times of the typical weekday. The LOS capacity analysis was performed for four of the highest-volume intersections in the City, SR 902 with Lefevre Street, Stanley Street North, Stanley Street South, and Graham Road.

Turning movement counts were available from the West Plains Subarea Transportation Plan, Phase II (S3R3 & Ardurra, 2025) for Lefevre Street and Graham Road with SR 902. These counts were used for the capacity analysis. Turning movements were not available for the Stanley Street intersections. As such, counts were estimated for the north and south legs of Stanley Street given review of volume changes between the Lefevre and Graham intersections as it relates to residential densities and commercial site locations on SR 902. The result is actual or estimated counts which should be sufficient for helping to confirm the need for potential intersection improvements along SR 902, the busiest road in Medical Lake.

As with roadway volumes, intersection traffic was forecast to year 2050 and a full-build condition based on prior methods; baseline growth applied to counts and peak hour volumes assigned to streets to generate forecast volumes. A summary of the turning movements for these intersections, existing and forecast conditions, is shown with **Exhibit 4.2** (Page 34).

An LOS analysis was performed using Synchro Software Suite (Cubic, 2025); which gauges capacity using the prevailing and accepted methods of the Highway Capacity Manual (TRB, 7th Edition, 2022). An LOS D standard is typical for a City like Medical Lake; this has been used as the threshold for this Transportation Master Plan.

A summary of LOS for study intersections under both forecast Plan conditions is shown with **Table 4.4** (Page 35) with summary results provided for the existing year 2050, and full-build conditions during the PM peak hour.

Exhibit 4.2. Current & Forecast Intersection Turn Movements

Existing Conditions

SR 902 / Lefevre Street / Brooks

				57	108	51											
				IN		OUT											
				17	32	8											
				SBR	SBT	SBL											
150	OUT	19	EBL	TEV =			WBR	5	IN	170							
361		142	EBT	653			WBT	80		455							
211	IN	50	EBR				WBL	85	OUT	285							
				NBL	NBT	NBR											
				53	27	135											
				OUT		IN											
				167	382	215											

SR 902 / Stanley Street N

				32	135	103											
				IN		OUT											
				14		18											
				SBR	SBT	SBL											
170	OUT	46	EBL	TEV =			WBR	57	IN	213							
455		239	EBT	530			WBT	156		470							
285	IN		EBR				WBL		OUT	257							
				NBL	NBT	NBR											
				OUT		IN											
				0	0	0											

SR 902 / Stanley Street S

				0	0	0											
				IN		OUT											
				SBR	SBT	SBL											
213	OUT		EBL	TEV =			WBR		IN	241							
470		222	EBT	580			WBT	182		514							
257	IN	35	EBR				WBL	59	OUT	273							
				NBL	NBT	NBR											
				31		51											
				OUT		IN											
				94	176	82											

SR 902 / Graham Road

				55	184	129											
				IN		OUT											
				19		36											
				SBR	SBT	SBL											
274	OUT	48	EBL	TEV =			WBR	81	IN	336							
600		278	EBT	717			WBT	255		650							
326	IN		EBR				WBL		OUT	314							
				NBL	NBT	NBR											
				OUT		IN											
				0	0	0											

Year 2050 Condition

SR 902 / Lefevre Street / Brooks

				75	141	66											
				IN		OUT											
				20	45	10											
				SBR	SBT	SBL											
215	OUT	26	EBL	TEV =			WBR	5	IN	255							
501		190	EBT	926			WBT	115		650							
286	IN	70	EBR				WBL	135	OUT	395							
				NBL	NBT	NBR											
				80	35	195											
				OUT		IN											
				250	560	310											

SR 902 / Stanley Street N

				65	235	170											
				IN		OUT											
				30		35											
				SBR	SBT	SBL											
255	OUT	75	EBL	TEV =			WBR	95	IN	320							
650		320	EBT	780			WBT	225		675							
395	IN		EBR				WBL		OUT	355							
				NBL	NBT	NBR											
				OUT		IN											
				0	0	0											

SR 902 / Stanley Street S

				0	0	0											
				IN		OUT											
				SBR	SBT	SBL											
320	OUT		EBL	TEV =			WBR		IN	415							
675		270	EBT	890			WBT	275		760							
355	IN	85	EBR				WBL	140	OUT	345							
				NBL	NBT	NBR											
				45		75											
				OUT		IN											
				225	345	120											

SR 902 / Graham Road

				95	300	205											
				IN		OUT											
				30	0	65											
				SBR	SBT	SBL											
435	OUT	70	EBL	TEV =			WBR	135	IN	540							
905		400	EBT	1105			WBT	405		1005							
470	IN	0	EBR				WBL	0	OUT	465							
				NBL	NBT	NBR											
				0	0	0											
				OUT		IN											
				0	0	0											

Full Build Condition

SR 902 / Lefevre Street / Brooks

				90	165	75											
				IN		OUT											
				20	55	15											
				SBR	SBT	SBL											
230	OUT	25	EBL	TEV =			WBR	10	IN	390							
540		205	EBT	1195			WBT	130		895							
310	IN	80	EBR				WBL	250	OUT	505							
				NBL	NBT	NBR											
				80	40	285											
				OUT		IN											
				385	790	405											

SR 902 / Stanley Street N

				100	305	205											
				IN		OUT											
				45		55											
				SBR	SBT	SBL											
390	OUT	65	EBL	TEV =			WBR	140	IN	485							
895		440	EBT	1090			WBT	345		980							
505	IN		EBR				WBL		OUT	495							
				NBL	NBT	NBR											
				OUT		IN											
				0	0	0											

SR 902 / Stanley Street S

				0	0	0											
				IN		OUT											
				SBR	SBT	SBL											
485	OUT		EBL	TEV =			WBR		IN	670							
980		380	EBT	1335			WBT	420		1155							
495	IN	115	EBR				WBL	250	OUT	485							
				NBL	NBT	NBR											
				65		105											
				OUT		IN											
				365	535	170											

SR 902 / Graham Road

				175	480	305											
				IN		OUT											
				65	0	110											
				SBR	SBT	SBL											
695	OUT	105	EBL	TEV =			WBR	200	IN	830							
1315		515	EBT	1625			WBT	630		1455							
620	IN	0	EBR				WBL	0	OUT	625							
				NBL	NBT	NBR											
				0	0	0											
				OUT		IN											
				0	0	0											

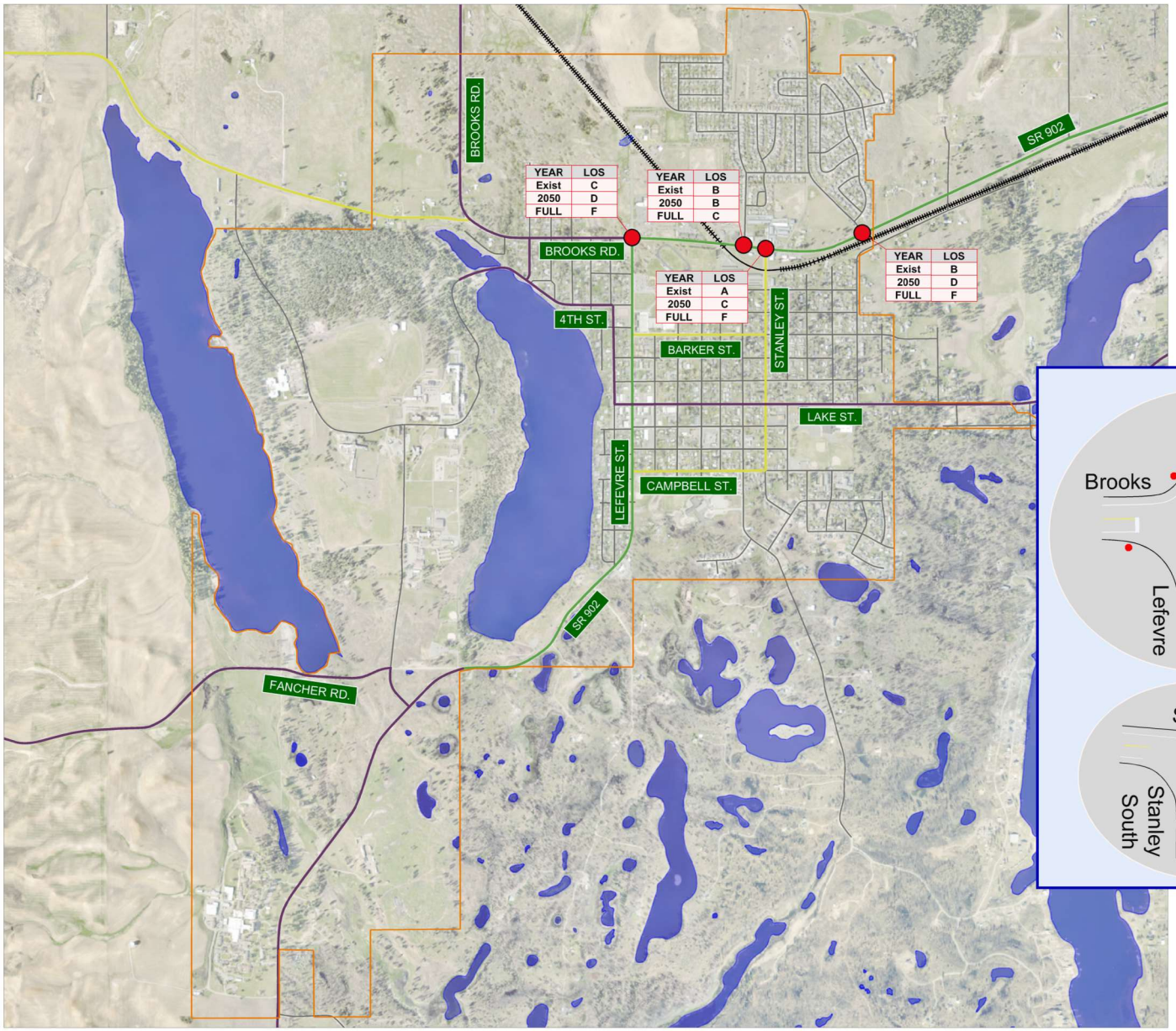
Table 4.4. Intersection Levels-of-Service, PM Peak Hour			
SR 902 Location	LOS	Control Delay	V/C Calculation
Existing Condition			
SR 902 / Lefevre St / Brooks Rd*	C	16.3	0.22
SR 902 / Stanley Street North	B	11.3	0.06
SR 902 / Stanley Street South	A	7.4	0.04
SR 902 / Graham Rd	B	14.3	0.13
Year 2050 Condition			
SR 902 / Lefevre St / Brooks Rd	D	32.4	0.50
SR 902 / Stanley Street North	B	14.1	0.15
SR 902 / Stanley Street South	C	17.6	0.32
SR 902 / Graham Rd	D	27.3	0.39
Full Build Condition			
SR 902 / Lefevre St / Brooks Rd	F	> 150.0	1.05
SR 902 / Stanley Street North	C	20.2	0.32
SR 902 / Stanley Street South	F	113.8	0.99
SR 902 / Graham Rd	F	>150.0	1.46

The intersection LOS analysis compliments the street capacity analysis. No current issues are identified for the Medical Lake intersections of focus as LOS C or better is achieved with lane V/C below 0.79 limits. The year 2050 analysis for the PM peak hour indicates that deficiencies will evolve with growth, but the LOS D standard is still maintained at Plan intersections with V/C within lane targets. The analysis does confirm that issues would evolve over time, between year 2050 and with the full-build of the City. PM peak hour results are forecast at LOS F with high lane V/C for three out of the four study intersections.

Although turn movement counts were not available to assess LOS conditions on Lefevre Street/SR 902 south of Brooks Road, there are no issues expected through the City to Fancher Connection Road. This supposition is supported by two points. First, there are no arterial capacity issues identified with the forecast year 2050 and full-build conditions, LOS B is shown with Table 4.3.

Second, forecast ADT along the corridor falls in the 4,000 to 7,000 ADT range by year 2050, and 6,000 to 9,000 ADT range with full-build. Note, existing counts range between 6,000 and 9,000 ADT for SR 902 between Lefevre Street and the east City limit under existing conditions; these volumes are comparable with forecast conditions for Lefevre Street south of Brooks Road. As there are no intersection LOS failures noted for the SR 902 intersections with Lefevre Street, Stanley Street North, Stanley Street South, and Graham Road under the current condition, there are no LOS issues anticipated for the Lefevre Street intersections compared with forecast conditions given comparable ADT.

For convenient review, summary intersection configurations, controls, and resulting LOS has been provided with **Exhibit 4.3**. Summaries are shown for the existing and future conditions. LOS summary worksheets are attached as Appendix D.

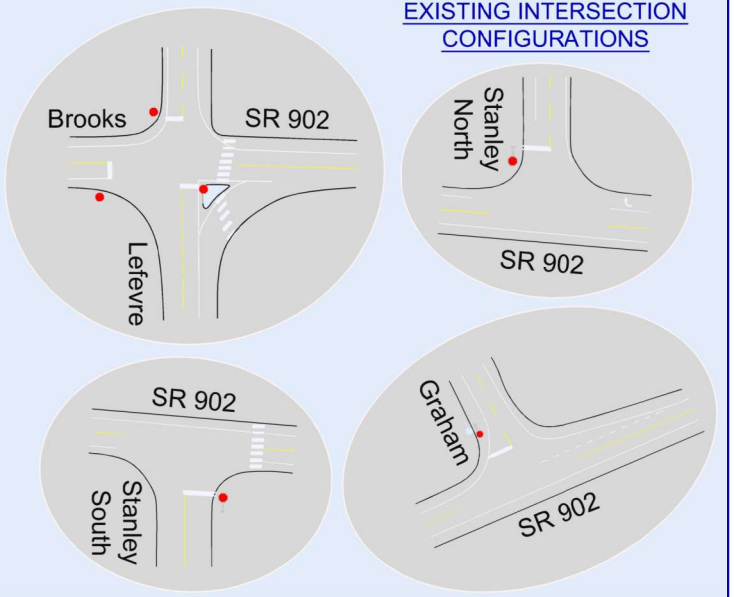


N.T.S.

LEGEND

	PRINCIPAL ARTERIAL
	MINOR ARTERIAL
	MAJOR COLLECTOR
	MINOR COLLECTOR
	LOCAL STREET
	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL
	STUDY INTERSECTION
YEAR / LOS: Exist B; 2050 D; FULL F	LOS TEXT BOX

EXISTING INTERSECTION CONFIGURATIONS



N.T.S.

Exhibit 4.3

INTERSECTION CONFIGURATION AND LOS RESULTS

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

4.3 Roadway Improvements

Medical Lake benefits from having no evident capacity issues identified from the current or year 2050 conditions. Roadway improvements are suggested only in the long-term to provide capacity for full-build, this is forecast after the year 2050 horizon year. This allows City officials time to plan, secure funding, and deploy improvements. The balance of Section 4.3 recommends projects to address long-term capacity needs for City roadways.

To be clear, this does not relate to safety mitigations and active transportation improvements. Also, as highlighted next, there are City collectors and arterials that do not conform with current Medical Lake design standards.

Roadway Improvements

Summarized are roadway improvements; recommended for deployment as funding opportunities arise organically given no capacity need is urgent. With that said, the importance of pedestrian and bicycle activities may advance the need for multimodal/complete street and safety improvements, regardless of capacity performance results. Discussion on project timing is provided in Chapter 6, the Capital Facilities summary of this Transportation Master Plan.

Roadway Public Works Design Standards

Chapter 11.20 and Chapter 15.20 of Medical Lake Municipal Code (MLMC) provide partial guidance on design standards for City streets. Although both Chapters identify complete street policy, this Plan recommends that the City could benefit from a more extensive Public Works standard. These standards provide a heighted level of detail regarding the design of City collector and arterial roads and intersections, addressing requirements relating to, but not limited to:

- Design reports, studies, and documentation,
- Plan set requirements,
- Signing and striping details,
- Pavement and surfacing design,
- Cul-de-sac, alley, private street, and driveway details,
- Private development and frontage expectations,
- Intersection control and geometric design guidance,
- Landscaped areas that function as buffers to pathways, trails, and sidewalks, with curb and gutter details,
- Planned unit development standards,
- General street lighting, signal, and PHB/RRFB guide, and
- Complete street guidelines.

Complete streets advancement is a directive that comes from City leadership. To that end, although lacking definition on specifics, this Plan offers complete streets and multimodal improvements recognizing that Public Works Standards would follow to provide design details and clarify construction cost estimates beyond what is highlighted in Chapter 6.

SR 902 Complete Street

As indicated, a recommendation of this Plan is for City officials to define new street design standards that include guidance on the advancement of multimodal and/or complete street facilities, in addition to traditional capacity and pavement thickness details, as associated with functional classes. These determinations will influence the recommendations of this Plan particularly from a right-of-way and cost perspective. However, for the sake of Chapter 6.0 TIP recommendations, arterials and collectors were assumed to have widening modifications with active transportation adaptations identified by Chapter 5.

This section recognizes potential capacity improvement may be needed to support vehicle mobility within the City. SR 902 was noted to have a practical capacity impact; conditions that approach standard by year 2050 and exceed standard with full buildout of Medical Lake.

The full-build condition suggests a four or five lane roadway may be needed to address long-range capacity concerns. This Transportation Master Plan does not advocate this level of lane widening. Travel demand forecasts are conservative, meaning higher end. Also, the timing of such need was noted as indefinite, meaning the timeline for forecasts in excess of 18,000 ADT is unknown and are not likely to occur for nearly 50-years, if at all. As such, the strategy of this Plan is to recommend that right-of-way and setbacks be preserved with development, as possible, for the possibility of a four or five lane road. In the interim, more sensible improvements are suggested, with the intersection control improvements noted subsequently, to promote acceptable capacity levels that address need indefinitely.

To that end, expansion of SR 902 includes a center, two-way left-turn lane recommended from Lefevre Street to Graham Road. Per Table 3.4, this will elevate the capacity limit of the street to 15,300 ADT; given increased capacity provided for vehicles turning to/from the Highway. This will promote capacity through the year 2050, given a threshold of 15,300 ADT, plus provides room for 40% of full-build volumes following year 2050 (2,200 additional ADT, after year 2050 with the forecast of 13,065 ADT.

Recommendation (Long-Term): Add a center, two-way left-turn lane along SR 902 extending from Lefevre Street to the east City limit.

Functionally Classified Streets

Although developed to the prevailing standard of the time, most Medical Lake arterials and collectors were improved with only partial multimodal accommodation. Principally, this included features like sidewalk along a single side of a street or a paved road with wide shoulders; most roadways lack gutter and curb sections except along a few sections with sidewalk. Also, it appears that most developed sidewalks were not buffered or offset from existing curb, as typical with the prevailing complete street guidelines applied.

As indicated, a recommendation of this Plan is for City officials to define new street design standards that include guidance on the advancement of multimodal facilities and complete streets. As it pertains to capacity details, road mobility can be improved with definition of curb and gutter sections, along with the improvement of pavement to a depth standard.

The active mobility element is discussed in Chapter 5. This section recommends the City develop an approach to improving arterials and collectors throughout town, focusing on providing curb and gutter with improved pavement sections, as warranted. The priority of these improvements is as follows:

- SR 902, Lefevre Street to east City limits; improvements were better described prior.
- Lefevre Street, Hancock Street to Jefferson Street (match current TIB project)
- Lake Street, Sherman Street to Freeman Drive
- Jefferson Street, W 4th Street to Lake Street
- W. 4th Street, North Trail Head to Jefferson Street
- Howard Street, Brooks Road to W. 4th Street
- Brooks Road, San Salvador Street to Lefevre Street
- Stanley Street, Percival Street to Campbell Street
- Barker Street sidewalk (South side), Lefevre Street to Stanley Street
- Campbell Street, Lefevre Street to Stanley Street

Recommendation (Long-Term): Deploy complete street improvements to bring roadways to standards developed by City officials; focusing on arterials followed by major and then minor collectors.

SR 902 Intersections

The forecast conditions analysis indicates LOS D conditions for the SR 902/Lefevre Street/Brooks Street and SR 902/Graham Road intersections by year 2050 and LOS F under the full build condition. In addition, the SR 902/Stanely Street intersection is also forecast to degrade to LOS F under the full-build condition. The conclusion from the analysis is that intersection control improvements should be considered for deployment in the future; this will improve the capacity/function of intersections, and for SR 902 overall.

There are three principal approaches to increasing capacity at intersections: geometric improvements (adding turn lanes), signalization, and the deployment of a roundabout. Of these approaches, the roundabout provides the highest degree of strategic benefit to the City and WSDOT.

A roundabout improvement provides capacity comparable to a signal, yet minimal delay is experienced as traffic moves without interruption. As indicated in Section 3.5, two of these intersections have high collision rates. A roundabout offers the best safety benefit of the three improvement options. Lastly, the roundabout provides the best integration with complete streets and (arguably) provides the best protection bicycle and pedestrian movements/crossings.

The shorter-term improvements noted with Section 3.5 are still recommended; these are low-cost measures to help preserve safety until roundabouts can be developed. Roundabouts are ultimately recommended for the SR 902 intersection with Lefevre Street, Stanley Street South, and Graham Road. The design of roundabouts would accommodate the three-lane, complete street section recommended prior. However, they would also be designed so they could be constructed without street improvements, if/when warranted.

These would be single-lane roundabouts provided with splitter islands on the north-south legs of the intersection, and with elongated splitters or minor chicanes on the east-west legs. All legs to the intersection would be designed with crossings, islands would be designed with refuges. If the City were to select bike-lanes for application along SR 902, as a complete street, then transitions to/from the roadway to the pedestrian crossings could be developed. Pathways would simply tie into crossings, if selected as the element of the complete street.

Recommendation (Long-Term): Deploy a single-lane, multimodal roundabout at the intersections of SR 902 and Lefevre Street, Stanley Street South, and Graham Road.

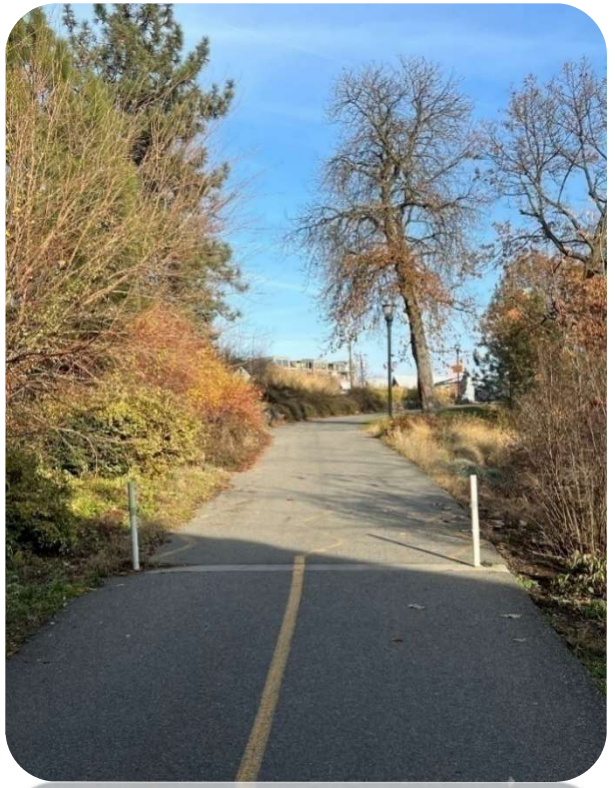
Lake Street / Stanley Street

As indicated, short-term improvements are recommended in Section 3.5 to help preserve safety at this highest incident intersection within the City. Although capacity has not been quantified, and it is unlikely that LOS is an issue at the junction, this is also a good roundabout candidate given the safety and complete street integration reasons mentioned earlier. This would negate sight-distance issues, given right-turns only occur at these junctions, and provide a traffic calming effect for the community.

Recommendation (Long-Term): Deploy a single-lane, multimodal roundabout at intersection of Lake Street and Stanley Street.

CHAPTER 5

MULTIMODAL DISCUSSION



Chapter 5

This section summarizes the multimodal review. Presented are a discussion of bike, pedestrian, and transit conditions within the City with recommendations for improvement.

5.1 Active Transportation

The goals and policies presented with Section 2 strongly focus on improving active mobility and transit networks via application of bike lanes, shared use paths, trails, separated sidewalks, and transit connections. Multimodal solutions offer a cost-effective option to single-occupancy vehicle use. They are key to helping cities like Medical Lake promote small-town values, improve health, and improve livability.

Sidewalk

Research provided with *Economic and Health Benefits of Walking, Hiking, and Bicycling on Recreational Trails in Washington* (Washington Recreation and Conservation, 2019) found the presence of sidewalk is the chief factor in determining a person's willingness to walk. There is a lack of continuity regarding sidewalk along arterials and collectors. This can be detrimental to active mobility in the City. The lack of sidewalk is a theme in the older, developed areas of the County overall, and not just Medical Lake. Past agency standards did not consistently require sidewalks, so they were not provided on many streets, historically.

The *Pedestrian Safety Guide and Countermeasure Selection* guide of the Federal Highway Administration (FHWA) shows the types of sidewalks needed in varied transportation and land use settings. Guidance is shown with **Table 5.1** below.

Roadway Classification and Land Use	Sidewalk/Walkway
Rural Highways (< 400 ADT)	Shoulders preferred, with minimum of 0.9 m (3 ft).
Rural Highways (400 to 2,000 ADT)	1.5-m (5-ft) shoulders preferred, minimum of 1.2 m (4 ft) required.
Rural/Suburban Highway (ADT > 2,000 and less than 1 dwelling unit (d.u.) / .4 hectares (ha) [1 d.u. / acre])	Sidewalks or side paths preferred. Minimum of 1.8-m (6-ft) shoulders required.
Suburban Highway (1 to 4 d.u. / .4 ha [1 to 4 d.u. / acre])	Sidewalks on both sides required.
Major Arterial (residential)	Sidewalks on both sides required.
Urban Collector and Minor Arterial (residential)	Sidewalks on both sides required.
Urban Local Street (residential — less than 1 d.u. / .4 ha [1 d.u. / acre])	Sidewalks on both sides preferred. Minimum of 1.5-m (5-ft) shoulders required.
Urban Local Street (residential — 1 to 4 d.u. / .4 ha [1 to 4 d.u. / acre])	Both sides preferred.
Local Street (residential — more than 4 d.u. / .4 ha [4 d.u. / acre])	Sidewalks on both sides required.
All Commerical Urban Streets	Sidewalks on both sides required.
All Streets in Industrial Areas	Sidewalks on both sides preferred. Minimum of 1.5-m (5-ft) shoulders required.

Table 5.1. FHWA Sidewalk Needs by Roadway Type

Any arterial or collector is recommended by the FHWA as needing sidewalks along both sides of urban and suburban streets in Medical Lake. Share-use paths or separated sidewalk are recommended on roads with greater than 2,000 ADT, sidewalks or wide shoulders are supportable on roads with less than 2,000 ADT.

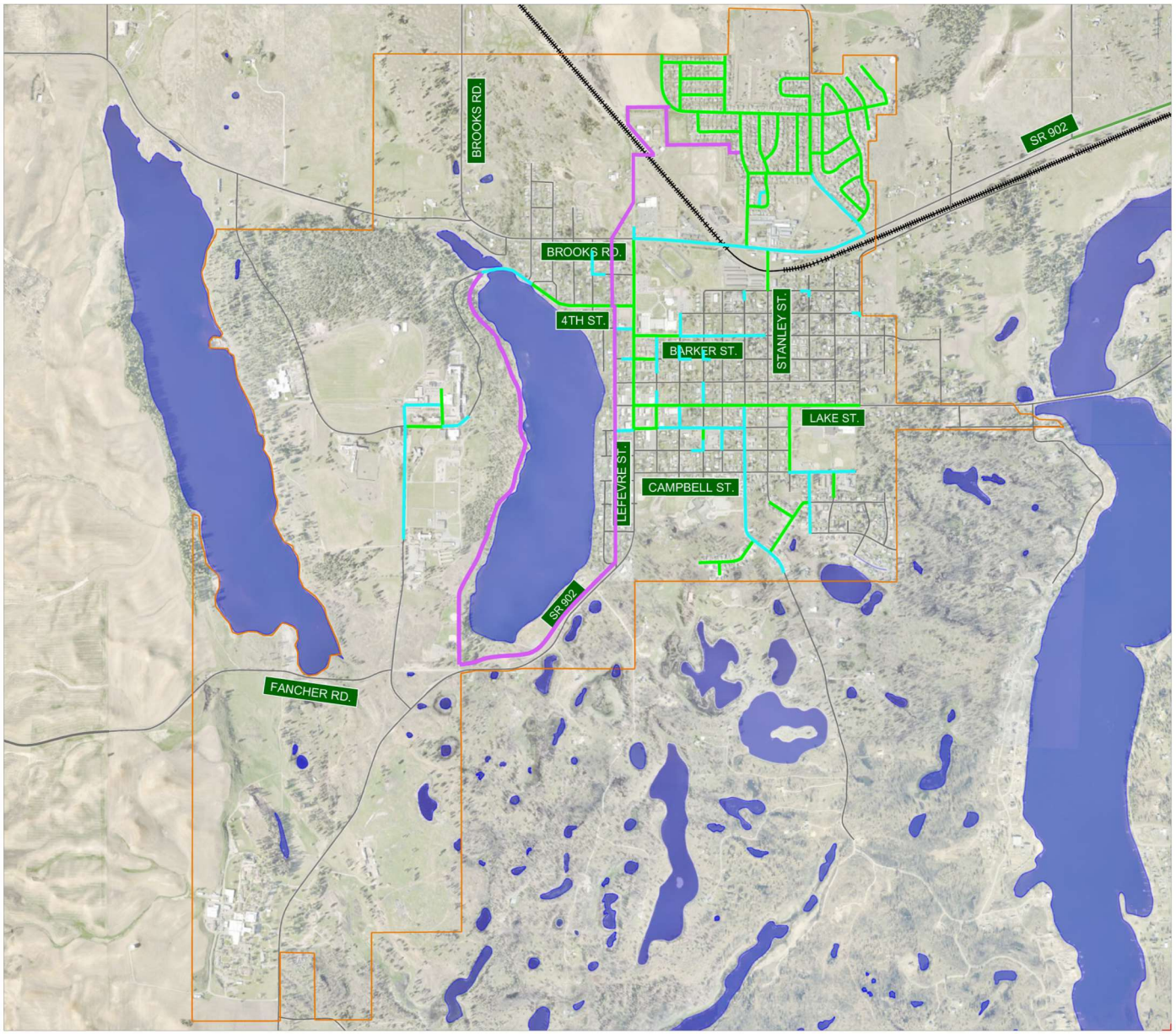
Exhibit 5.1 shows existing sidewalk sections within Medical Lake. As shown, sidewalk is aligned along one or both sides of streets within more newly developed areas, and in districts City officials have made a priority for pedestrian circulation. Older street segments tend to lack sidewalk, the function of historical design standards from a time when sidewalk was not a priority along low volume roads.

This Transportation Master Plan confirms the need to extend sidewalks or paths along city streets. Planning,

design, and construction should be prioritized for classified streets (arterials and collectors), higher volume local streets, and local streets that provide pedestrian and bike connections to City services like schools, retail, businesses, etc. Also, streets that support travel between functionally classified roads.

The decision between sidewalk or pathways should consider whether the route would also serve cyclists, precipitating the need for a shared use path on at least one side of the road. With this premise, a summary of the streets that should be considered a priority for sidewalks are noted below. This should be reviewed in coordination with the pathway versus bike lane discussion shown with the following section.

- Arterials
  - Lefevre Street (SR 902),
    - Sidewalk Infill Both Sides, SR 902 to Jefferson St
- Collectors
  - Brooks Road
    - Sidewalk North Side, San Salvador to Lefevre
  - Howard Street
    - Sidewalk both sides, Brooks to 4th Street
  - Jefferson Street
    - Sidewalk infill both Sides, 4th St to Lake
  - Stanley Street South
    - Sidewalk both Sides, Percival to Campbell
  - San Salvador Street
    - No Sidewalk Recommended, Rural Section
  - Barker Street
    - Sidewalk both Sides, Washington to Stanley
  - Lake Street
    - Sidewalk Both Sides, Sherman to Freeman
  - Campbell Street.
    - Sidewalk both sides, Lefevre to Stanley
- Priority Locals and Future Collectors
  - Jefferson Street
    - Sidewalk both sides, Brooks to Lefevre



N.T.S.

LEGEND

	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL
	SIDEWALK BOTH SIDES
	SIDEWALK ONE SIDE
	SHARED USE PATHWAY

Exhibit 5.1

EXISTING SIDEWALK FACILITIES

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

- Barker Street
  - Sidewalk south side, Washington to Stanley
  - Sidewalk both sides, Stanley to Sherman
- Sherman Street/Henderson Street
  - Sidewalk both sides, Lake to SR 902
- Graham Road
  - Sidewalk west side, Kathy Lee to SR 902

Pathways and Bikeways

Exhibit 5.2 shows the dedicated bicycle network of Medical Lake. The bike network is comprised of shared use pathways, dedicated bike lanes, and routes where shared interaction of bicycles and vehicles has been assigned.

The success of a pathway system is typically in the number of people observed using the pathways, tails, and bike lanes on a regular basis, and in all seasons. The reasons for this are not only that it links neighborhoods to destinations, but also pathways and bike lanes protect pedestrians and bicycles from moving vehicles.

Research from FHWA confirms that separated paths, either standalone or alongside major roads, are what encourage bicycle activity. **Exhibit 5.3** shows bicyclists affirm a 51 to 56% comfort factor with a shared use path, trail, or side path. The level of comfort of cyclists reduces with proximity to vehicles; buffered bike lanes and typical on-street bike lanes result in a 5 to 9% comfort level. Shared vehicle lanes and shoulder cycling precipitate a 4% to 7% comfort level.

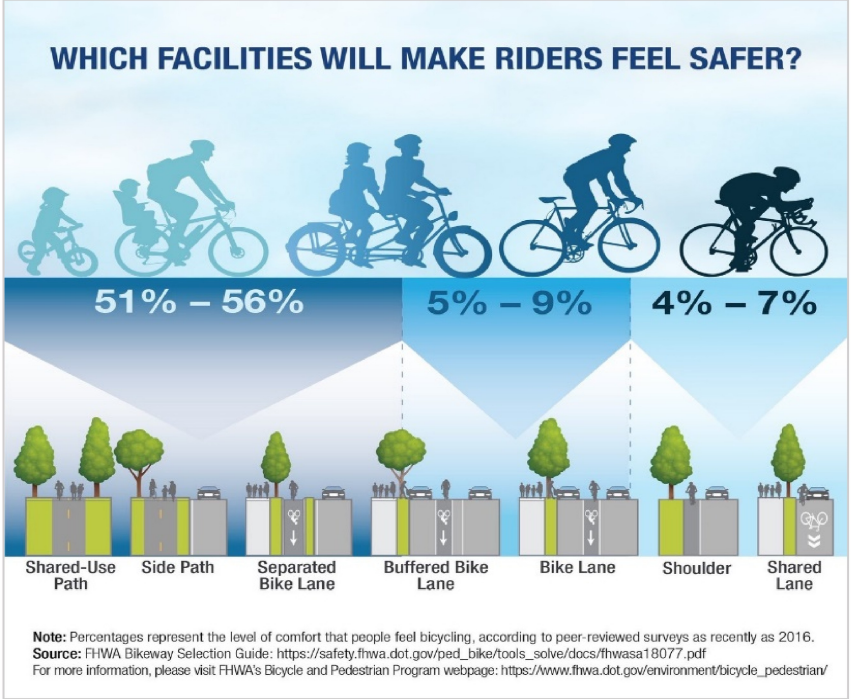
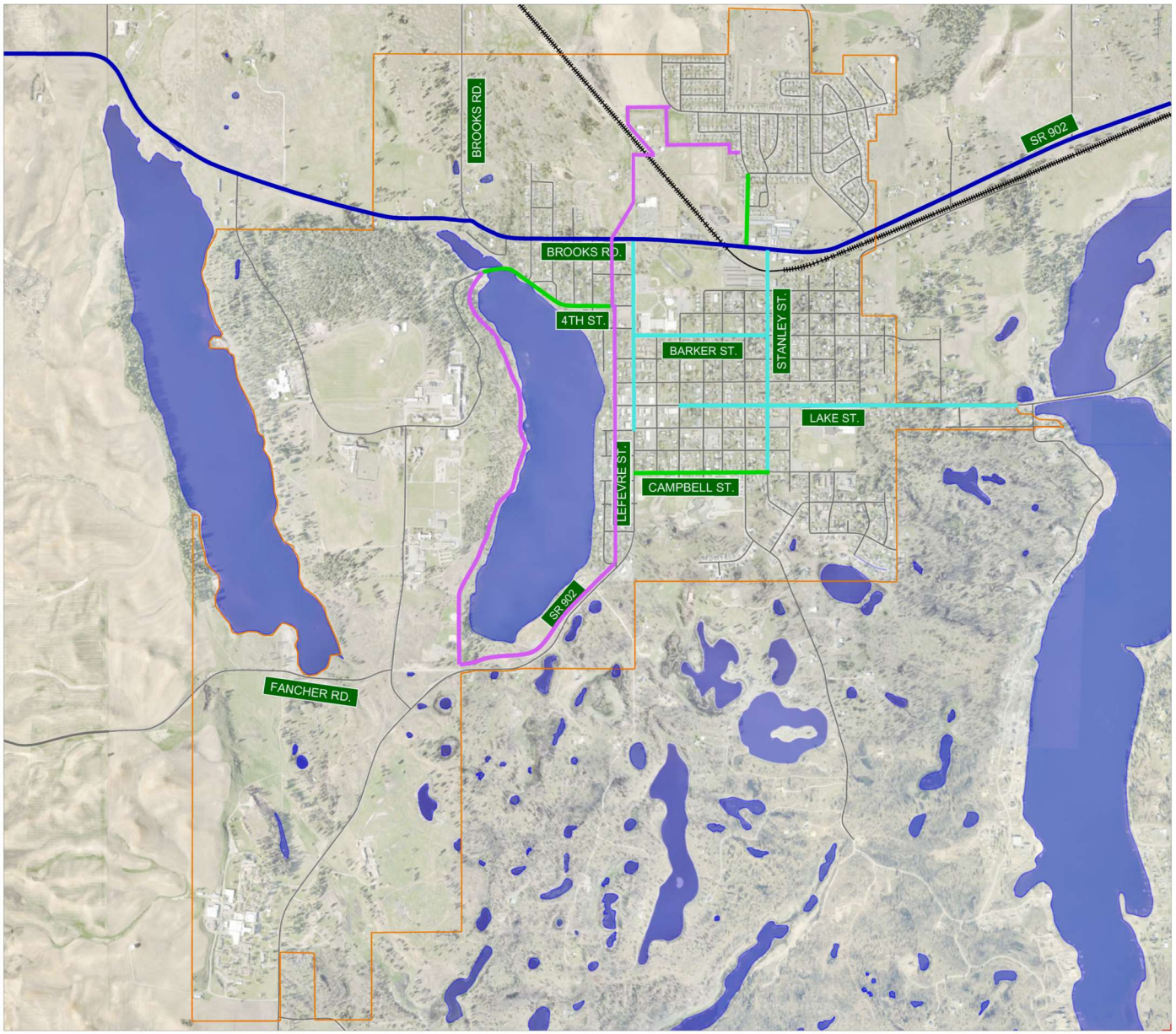


Exhibit 5.2. FHWA Safe Facilities Results

The conclusion is that, while providing bike lanes or shared lanes does encourage some use, the separation of cyclists from traffic using buffered or separated bicycle lanes or pathways is what will optimally encourage bicycling within the community.



N.T.S.

LEGEND

	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL
	SHARED ROADWAY
	BIKE LANES
	BIKE LANE, ONE SIDE
	SHARED USE PATHWAY

Exhibit 5.3

EXISTING BICYCLE FACILITIES

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

For this reason, the active element of this Transportation Plan recommends buffered bike lanes or off-street shared-use pathways, trails, and side paths along major routes to link people to their destinations. Buffered bike lanes refer to the use of street parking to separate bikes from moving vehicles. The Bikeway Selection Guide (FHWA, 2019) offers direction on the selection of bicycle facilities when considering volume and speed conditions. **Exhibit 5.4** (next page) for Medical Lake streets. A street with a posted speed limit of 35 mph and higher and/or with traffic volumes of 7,000 or higher should be planned as a separated facility. Per this guidance, SR 902 should be developed with a shared use path, side path, or separated bike lane to address the needs of cyclists.

Bike lanes in streets are supported with speed limits between 25 and 35 mph, and with traffic volumes between 3,000 and 7,000 vehicles per day. However, given the comfort level of cyclists with on-street facilities, attempts should be made to separate or buffer these facilities, as much as possible.

Below thresholds of 3,000 trips per day, a street is a candidate for a shared lane per the matrix below. However, a shared lane is not an optimal solution per the cyclist comfort level discussions provided prior. For streets with reduced volumes, in-street bike lanes would be a more optimal solution compared with in-lane sharing.

Several sidewalk routes noted prior could be enhanced for bicycle improvements, new or revised facilities provided with or in-lieu of sidewalk.

A summary of bicycle improvement considerations is below. These would be provided as a part of complete street improvements highlighted subsequently.

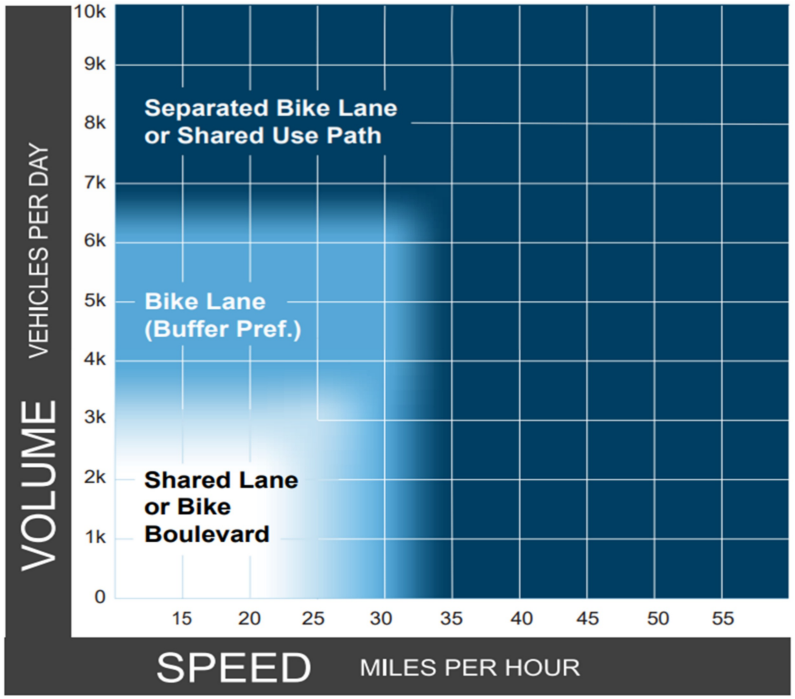


Exhibit 5.4. FHWA Facility Selection Matrix

- Arterials
  - Lefevre Street (SR 902)
    - Bike lanes, Hancock to Jefferson.
  - SR 902
    - Shared-use path south side, Lefevre to Graham.

- Collectors
  - Brooks Road
    - Pathway south side, San Salvador to Lefevre
  - Howard Street
    - Bike lanes, Brooks to 4th Street
  - Jefferson Street
    - Bike lanes (both sides), 4th St to Lake
  - 4th Street,
    - Pathway south side, North Trailhead to Jefferson
  - Barker Street
    - Bike lanes, Stanley to Sherman
  - Lake Street
    - Bike lanes, Sherman to Freeman
  - Campbell Street
    - Bike lanes, Lefevre to Stanley
- Priority Locals and Future Collectors
  - Jefferson Street
    - Bike lanes both sides, Brooks to Lefevre
  - 4th Street
    - Pathway south side, North Trail Head to Jefferson
  - Barker Street
    - Path or Bike Lanes, Stanley to Sherman
  - Sherman Street/Henderson Street
    - Bike lanes or pathway, Lake to SR 902
  - Stanley Street North
    - Bike lanes, Tara Lee to SR 902
  - Graham Road
    - Bike lanes or Path, City Limit to SR 902

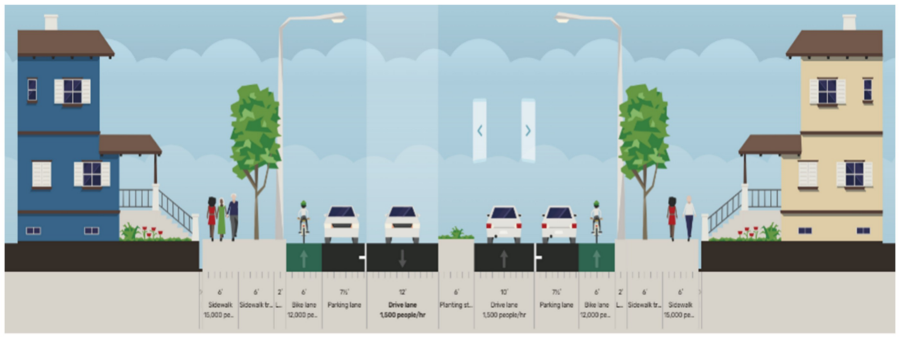


Exhibit 5.5. Sample Complete Street Cross Section w/Parking Lanes as Buffers from Bike Lanes

As indicated, streets in core residential areas, pathways and bike lanes are recommended to include buffered areas to protect pedestrians and cyclists. This includes landscaped area projection for sidewalk and pathways, or a parking lane aligned between the bike and vehicle through lanes. From a practical standpoint, the recommendation is a complete street like what the City leaders completed with TIB for Lefevre Street. This recommendation is reinforced in capacity discussions. **Exhibit 5.5** provides an example of a complete street section for highlighted roadways in Medical Lake.

Crossings

There are several crossings throughout the City; the emphasis of this section is on highlighting any improvements that may be needed for junctions between two classified roadways, or a classified roadway with a major local street. Lastly, primary routes to/from Medical Lake schools were examined to determine whether crossing improvements may promote student safety at key intersections.

Potential crossing treatments were reviewed in coordination with *A Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* (FHWA, 2018). This provides guidance on treatment options given variables of speed and daily vehicle volume data. The guidance is shown with **Exhibit 5.6** (right).

To be clear, this is a guide, and this Transportation Master Plan follows FHWA advisements for most intersections. However, there were key locations where enhanced treatments were recommended. As justification, the FWHA guide was based largely on analysis of larger metropolitan areas; areas where drivers and pedestrians are accustomed to wider streets with higher travel demands. The citizens from Medical Lake will have different perceptions of roadway geometry and traffic volumes; criteria should be tempered situationally to be of relevance to this community. This is true especially of the higher volume roads, SR 902 and Lefevre Street.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	❶ 2 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6 7 9	① 5 6 7 9	① 5 6 ❾
3 lanes with raised median (1 lane in each direction)	❶ 2 3 4 5	❶ ❸ 5 7 9	① ❸ 5 ❼ ❾	① 3 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❼ ❾	① ❸ 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❾
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	❶ 2 3 4 5 6 7 9	❶ ❸ 5 6 7 9	① ❸ 5 6 ❾	① 3 4 5 6 7 9	① ❸ 5 6 ❼ ❾	① ❸ 5 6 ❾	① ❸ 4 5 6 7 9	① ❸ 5 6 ❾	① ❸ 5 6 ❾
4+ lanes with raised median (2 or more lanes in each direction)	❶ ❸ 5 7 8 9	❶ ❸ 5 7 8 9	① ❸ 5 8 ❾	① ❸ 5 7 8 9	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 8 ❾
4+ lanes w/o raised median (2 or more lanes in each direction)	❶ ❸ 5 6 7 8 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 8 ❾

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
- ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
- ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

Exhibit 5.6. FHWA Crossing Treatment Matrix

Based on the preamble, a summary of the recommended treatments for key intersections is summarized as follows:

Install or update with high visibility markings, install lighting, and provide advanced signs:

- Brooks Road / San Salvador Street
- Barker Street / Lefevre Street

- Howard Street / Brooks Road
- Howard Street / 4th Street
- Jefferson Street / 4th Street
- Lefevre Street / 4th Street
- Lefevre Street / Barker Street
- Stanley Street / Barker Street
- Sherman Street / Barker Street
- Jefferson Street / Lake Street
- Lefevre Street / Lake Street
- Sherman Street / Lake Street
- Lefevre Street / Campbell Street
- Stanley Street / Campbell Street

Install or update with high visibility markings, install lighting, provide advanced signs, and install pedestrian-actuated rapid rectangular flashing beacon (RRFB):

- Lefevre Street / Brooks Road / SR 902
- Stanley Street South / SR 902
- Stanley Street South / Lake Street

The last three intersections noted above are also candidates for intersection improvements, as described with the future condition's discussion. The installation of RRFBs would occur as an interim improvement until the City determines elevated intersection improvements are required.

5.2 City Transit

Spokane Transit Authority (STA) operates the Medical Lake public bus system. Route 62 "Medical Lake" operates on an hourly rotation during weekdays between 5:30 AM and 11:30 PM. The route also operates hourly from 6:00 AM and 11:00 PM on Saturdays, and hourly on Sundays between 7:00 AM and 8:30 PM.

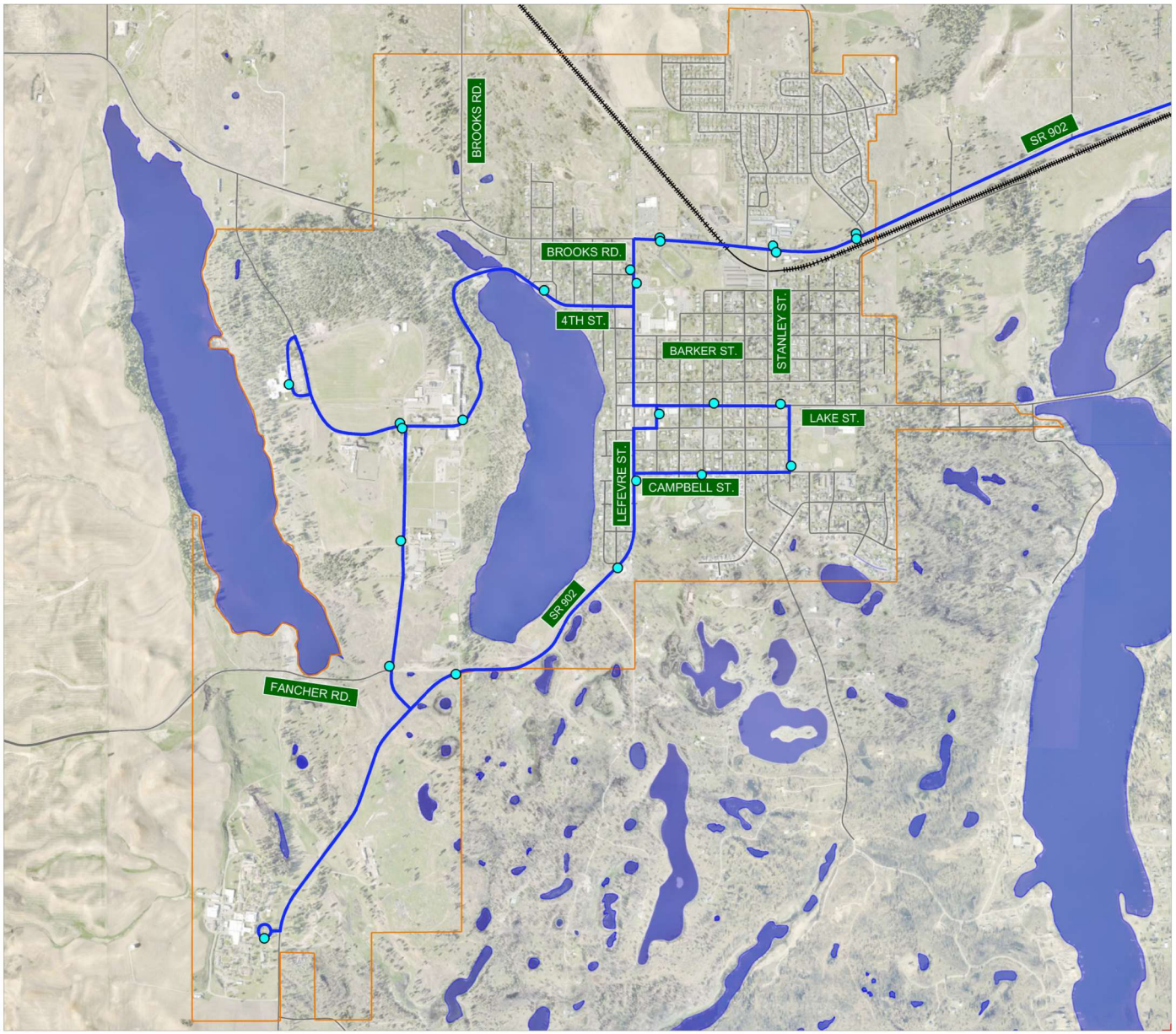
The Annual Route and Passenger Facilities Performance Report - 2024 Data (STA, 2024)* provides metrics regarding use of STA in Medical Lake. Key metrics are as follows:

Route 62: Medical Lake

- Annual Ridership – 47,062 passengers
- Average Weekday Ridership – 147.2 passengers
- Peak Boardings - 3 PM, 19 passengers
- Peak Location, Medical Lake Center (54 in/out)

STA provides paratransit service comparable to fixed-route service. Origins and destinations must be in a three-quarter mile radius of a fixed route. This means many areas of the City are served by paratransit.

The route operates between Medical Lake and the West Plains Transit Center, where connections to Airway Heights, Cheney, Spokane, and other areas of Spokane County can be achieved. A route map is shown with **Exhibit 5.7**, highlighting notable stops.



N.T.S.

LEGEND

	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL
	STA ROUTE 62 STOP
	STA ROUTE 62

Exhibit 5.7

STA BUS SERVICE AND STOPS

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

Recommendations

STA services are provided in response to ridership demands, as determined by leadership. City of Medical Lake leaders can make route addition or change requests of the agency, but the decision is up to STA.

With that said, in line with multimodal goals of Medical Lake, City leaders can encourage STA ridership. The provision of facilities that help augment the access and convenience of public bus stops is a large factor. For instance, the extension of sidewalk, paths, and bike lanes is a key strategy. Additional ideas include, but are not limited to, the following actions:

- Amenities such as bike racks and shelters,
- Improving the lighting around the facilities,
- Improving the visibility of transit stops,
- Adding security cameras/surveillance systems,
- Education and promotion (benefits of transit),
- Preferred vehicle parking at stops, and
- Discounted passed or service subsidies.

Many solutions above require capital investment by the City to affect multimodal changes. For that reason, they are identified as long-term solutions with the proposed City TIP presented with Chapter 6.0.

Transportation Orientated Development

Transit-oriented developments (TODs) are a transportation demand management strategy that could be considered by City leaders for Medical Lake. A TOD is a land use area, supported by policy, which maximizes the use of property in suburban or urban environment to promote walking, biking, and transit activities. Employment, recreation, and residential land uses are promoted in a focused area, which also has clear/direct access to Spokane Transit. A TOD reduces reliance on single occupancy vehicles, promoting healthy lifestyles, as active mobility can occur between land uses. Also, transit ridership increases as occupants can more easily access buses with commutes to/from the region.

STA leaders are working to initiate the first TOD developments along key corridors, like Division Street and Sprague Avenue within Spokane and Spokane Valley, respectively. However, there is opportunity to advance to a TOD center in Medical Lake. This has strong synergies with the multimodal vision of City leaders and offers many benefits for the community.

The benefits of a TOD center for the City of Medical Lake:

- Mobility and Access.
  - A range of travel choices are promoted beyond personal vehicles, including transit, walking, biking, and often micro-mobility.
  - Service, employment, and residential centers are within convenient/near walking, biking, and transit proximities, diminishing reliance on personal autos.
  - To that end, a TOD can reduce/eliminate need for an automobile.

  - The TOD can reduce travel demand, as measured in diminished vehicle miles of travel (VMT).
- Land Use and Economics.
  - Private development can be stimulated, helping to promote works centers and access to service and retail services.
  - Apartments and townhomes are normally a key feature of a TOD, providing diverse and affordable housing options.
  - Costs for auto fuel and maintenance are eased, allowing citizens economic benefit.
  - Reduces road preservation costs for agencies due to reduction of vehicle friction.
- Sociability and Quality of Life.
  - Walking, biking, and micro-mobility are important accessibility features of a TOD, promoting health.
  - Harmful vehicle emissions are reduced, improving and reducing environmental impact.
  - Social interactions are improved on transit and within service and retail hubs of TOD's.
  - Aesthetics like street art, landscaping, decorative lights, and parks are often developed within TOD's, augmenting appeal and a sense of community.
  - Historical or cultural centers can be a focal point of the TOD, enhancing community pride.
  - Enhancing pride in one's community can increase cooperation and stewardship.

The TOD should be considered as a multimodal strategy for Medical Lake. As noted, this travel demand management strategy will help promote land use, economic, and quality of life benefits, as well as positive mobility and environmental outcomes.

Given STA Route 62 covers many areas within Medical Lake, there are several options the City can consider for a TOD. The downtown area and Harvest Food areas are two examples of deployment areas, though more examples do exist.

5.3 Medical Lake School District

Medical Lake school district has two elementary schools, a middle school, and a high school that services a geographic area extending from just north of U.S. Highway 2 to the north, I-90 to the south, Pine Street and Maple Street to the west, and Craig Road to the east. The District serves the City, areas of Spokane County, and Fairchild Air Force Base.

The District provides bus services to students located outside of an approximate mile circumference of the schools. There are three schools located in City limits, an elementary school located in and servicing Fairchild. **Exhibit 5.8** (next page) shows the limits of the school district.

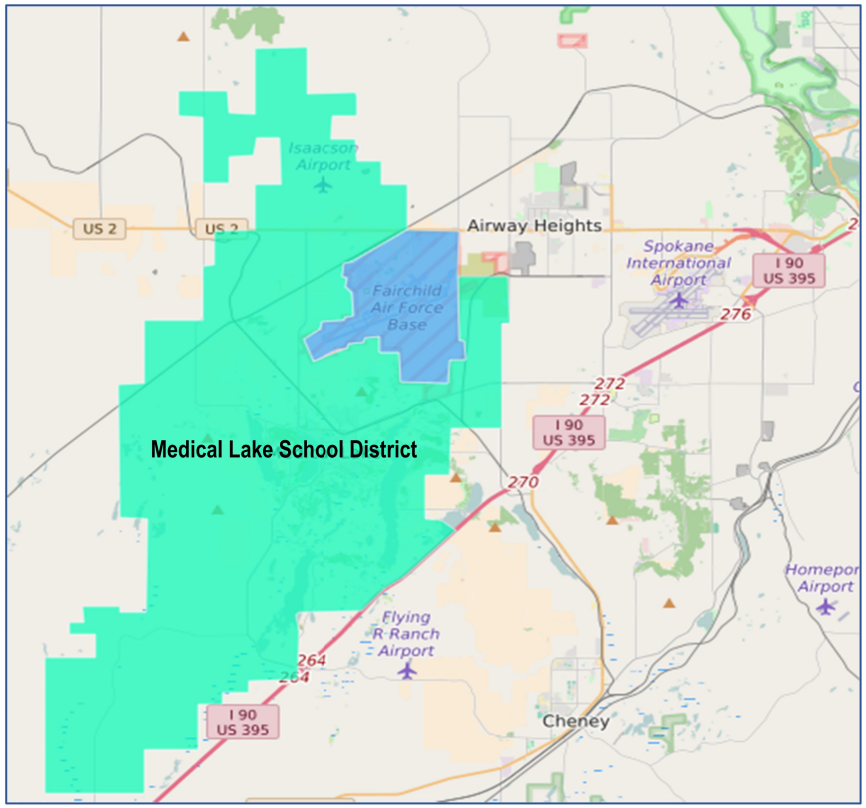


Exhibit 5.8. Medical Lake School District (Green)
(Source: Zipdatamaps.com)

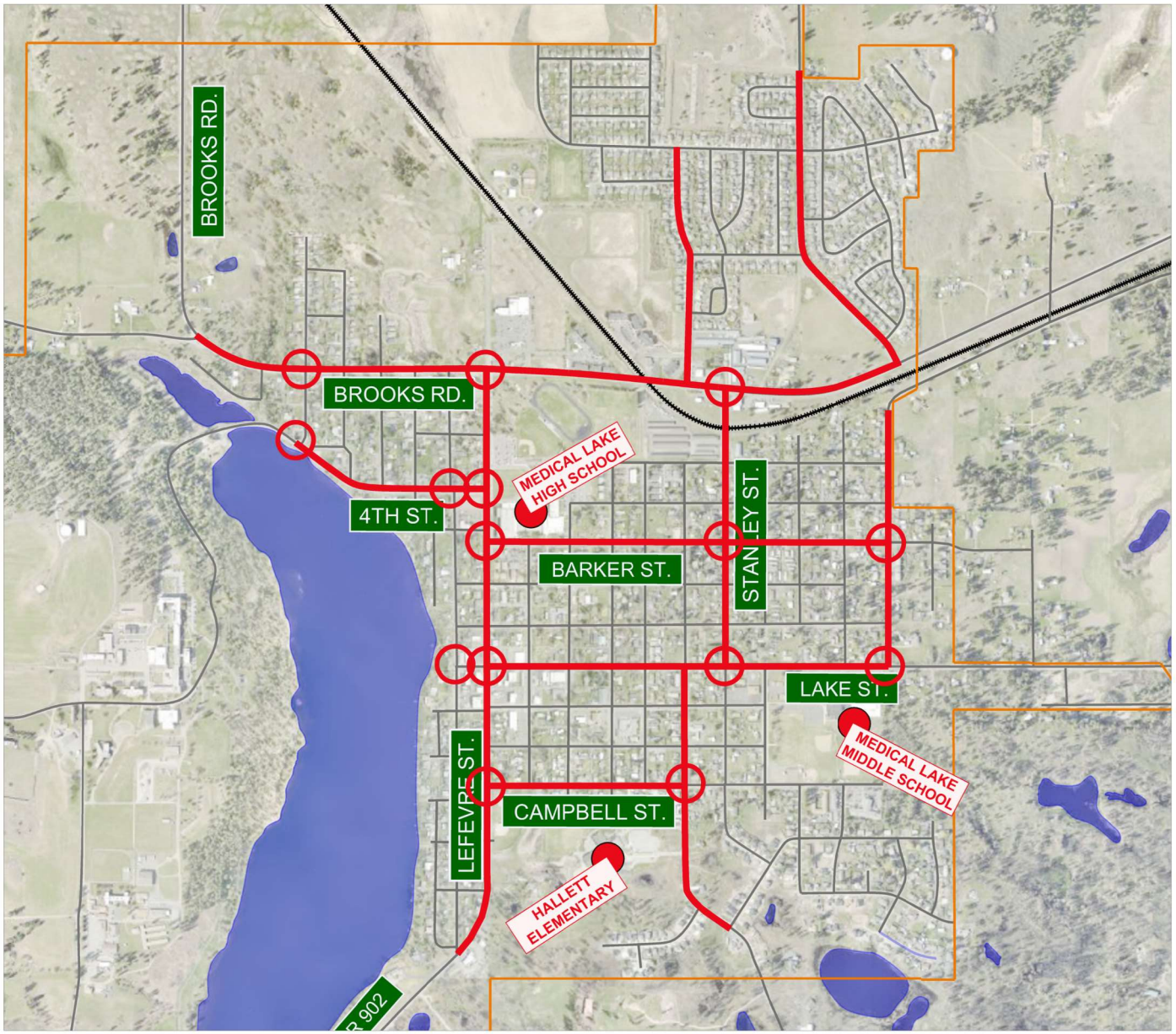
Lighting and visibility improvements may be considered for areas that may support the recurrent pickup and drop of students. However, many areas are outside of City control given they are in Spokane County or Fairchild Air Force Base authority. The City can coordinate with MLSD leadership and affected agencies for changes, strategies, or improvements outside of Medical Lake.

However, as indicated prior, there are students that walk to school within Medical Lake. There is a lack of sidewalk and bicycle accommodation along many routes for walking and bicycling students.

A Safe Routes to Schools analysis was provided to help confirm routes, many of them noted prior, for priority implementation of active mobility and safety improvements. The criteria for these routes were:

- The route has application for serving a large residential area of Medical Lake.
- The route provides duplication in supporting active movements for all citizens in Medical Lake (broader investment implications).
- The route captures students for up to an approaching mile of schools, this captures most routes in the City.

The results of this review are shown with **Exhibit 5.9**. This map shows roadways and intersections of emphasis for the safe mobility of students between schools and neighborhoods. There is much duplicity in this and prior multimodal analyses, this affirms the investments can be made to serve complete purposes for the community.



N.T.S.

LEGEND

	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL
	SCHOOL LOCATION
	SAFE SCHOOLS ROUTE
	SAFE SCHOOLS CROSSING

Exhibit 5.9

SAFE ROUTE ROADS AND INTERSECTIONS

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

CHAPTER 6

TRANSPORTATION IMPROVEMENT PROGRAM



Chapter 6

Chapter 6 summarizes the improvements recommended for the Transportation Master Plan. Short-term strategies and projects would be included in the 6-Year City Transportation Improvement Program (TIP). Long-Term projects would be those moved into the TIP for implementation over time. All of these projects could be included in the Capital Improvement Element of the Medical Lake Comprehensive Plan, which is currently being updated.

6. 1 TIP Cost Estimates

Planning level construction costs were developed to support the development of the TIP. Costs are provided to help City officials plan for, secure, and allocate capital for right-of-way acquisition, design, and construction. Unit pricing was based on the recent bid estimates of projects in the region; the City of Spokane and the City of Airway Heights were primary examples used in material costs. The bid forms from agencies are typically downloadable from websites, or as available from past project work.

Materials include the cost of construction. Markups were applied to material costs for Washington taxes (9%); traffic control (3%); mobilization (7%); survey, design, permitting, bid documents, and administration (15%); construction survey and construction engineering (16%). This calculates to a 50% total markup on material/construction costs.

Short Term: Lake Street / Stanley Street

Option 1. Cross traffic (MUTCD W2-1) and street name (W16-8P) signs on Lake Street in advance of Stanley Street, two breakaway signs with poles and bases.

Material & Construction	$1,800
Project Markups	$900
Option 1. Project Estimate	**$2,700**

Option 2. Stop signs (MUTCD R1-1) to convert to an all-way stop. Advanced "stop ahead" signs (MUTCD W3-1) used to notify approaching drivers of the all-way stop.

Material & Construction	$3,760
Project Markups	$1,885
Option 2. Project Estimate	**$5,645**

Option 3. Solar-powered stop signs (MUTCD R1-1) to convert to an all-way stop. Advanced "stop ahead" signs (MUTCD W3-1) used to notify approaching drivers of the all-way stop.

Material & Construction	$16,585
Project Markups	$8,300
Option 3. Project Estimate	**$24,885**

Short Term: SR 902 & Stanley Street North

Option 1. Reflective markers on a 1-foot interval for length of right-turn lane line (150-feet), improving lane visibility.

Material & Construction	$2,250
Project Markups	$1.135
Option 1. Project Estimate	**$3.385**

Option 2. Driveway pushed 15 feet west, width reduced by 5-feet, and terminus pushed east 10-feet, prior to ADA ramp. This allows taper length to increase from 30 to 60 feet.

Material & Construction	$87,380
Project Markups	$43,650
Option 2: Project Estimate	**$131,030**

Short Term: SR 902 & Lefevre Street

Option 1: Stop signs (MUTCD R1-1) to convert to an all-way stop. Advanced "stop ahead" signs (MUTCD W3-1) used to notify approaching drivers of the all-way stop.

Material & Construction	$3,315
Project Markups	$1,565
Option 1. Project Estimate	**$4,700**

Option 2. Solar-powered stop signs (MUTCD R1-1) to convert to an all-way stop. Advanced "stop ahead" signs (MUTCD W3-1) used to notify approaching drivers of the all-way stop.

Material & Construction	$16,585
Project Markups	$5,640
Option 2. Project Estimate	**$22,225**

Short Term: Roadway Public Works Design Standards

Develop Public Works standards that provide guidance on the design of multimodal streets within Medical Lake.

Option 1. Project Estimate	**$10,000**

Short Term: Intersection Crossing Improvements

Section 5.1 recommends the improvement of 14 crossings in Medical Lake with high visibility markings, lighting, and signs. In addition, three intersections were recommended with an RRFB set in addition to these measures. The City does not have the capital to provide all improvements at once unless a safety grant is obtained. As such, installation of 5-basic and 1-RRFB crossing is assumed every 6-years to address identified locations, 18-years needed to address all intersections.

The assumption for a basic location is two sets of signs assumed for main-line: two pedestrian crossing (W11-2) with diagonal arrow (W-16-7PL/R) signs. In addition, there would be two sets of signs with the pedestrian crossing (W11-2) and ahead signs (W16-P). All signs would have breakaway posts. Continental striping would be used on all approaches (4-crossings), and a streetlight is assumed for one corner with a candle strong enough to light the entire intersection.

Assumptions are the same at enhanced locations, just with the addition of an RRFB set to face traffic on the major street.

Material & Construction	$17,110
Project Markups	$8,560
Base Crossing Project Estimate	**$25,670**

Material & Construction	$76,760
Project Markups	$38,385
Base Crossing Project Estimate	**$115,145**

Short Term: SR 902 Complete Street, Lefevre to Graham

Widening includes the addition of a center lane with curb, gutter, and separated pathway south side (sidewalk, cu. The assumption adds 12-feet of pavement widening south from

the existing, southerly lane line. A 1.5-foot curb and gutter section would be provided, then a 6-foot separation to a 10-foot shared-use pathway extending 3,600-feet from Lefevre Street to Graham Road. Note there are cross-section widths that are moderately below typical WSDOT and AASHTO recommendations. This is to avoid the foundations of transmission power line poles located about 33-feet south of the southerly lane line.

Per County GIS, right-of-way is available to support widening. However, there is a BNSF rail line crossing of SR 902 about 300-feet west of North Stanley Street. The provision of a path on the south side of SR 902 would promote need for crossings. Long term, these would occur with roundabouts at Lefevre, Stanley Street, and Graham. In the interim, RRFB's could be deployed with advanced crossings notification signs.

Material & Construction	$3,198,915
Project Markups	$1,599,415
Project Estimate	**$4,798,330**

Short Term: Lefevre Complete Street, Hancock to Jefferson

Per County GIS, there is an approximate 73-foot right-of-way from Hancock Street to California Street, narrowing to 63-feet for the remainder of the corridor to Jefferson Street. To minimize the need for property acquisition, a 73-foot cross section was used for to 1,550-feet starting at Hancock Street and then 63-feet for the remainder to Jefferson Street, about 650-feet. The difference between the two cross sections is the provision of parking lanes on both sides of the street.

The Hancock Street to California Street section includes 12-foot through lanes, and 8-foot parking lanes which protect 5-foot bike lanes. The project assumes widening from outside lane lines, no reconstruction. There would be 1.5-foot curb and gutter sections, the gutter pan providing an additional foot to the bike lanes on each side of the street. Lastly, 10-foot sidewalk would be aligned on each side of the road. Again, the 8-foot parking lanes would drop from California Street to Jefferson Street. Yet, bicycle protection is needed, so the parking lanes would narrow to a hatched 3-foot buffer area to separate through lanes from vehicle lanes.

A bicycle crossing would be located at Jefferson Street so path users located on the west side of Lefevre Street, south of this intersection, could access the northbound bike lane.

Material & Construction	$2,544,805
Project Markups	$1,272,420
Project Estimate	**$3,817,225**

6. 2 Medical Lake TIP

The 6-Year City of Medical Lake Transportation Improvement Program recommended for Medical Lake is summarized by following **Table 6.1**. Shown is the recommended project with a brief description, the action, and the project construction cost estimate. Where improvement options were presented, the least expensive project was selected for initial installation. In addition, the complete street projects were identified with phases given the time it takes to advance large projects.

Table 6.1. Medical Lake 6-Year TIP		
Target Year and Project	Project Type	Project Cost
Year 2026		
Lake / Stanley: Install Cross-Traffic Signs	Design & Construction	$2,700
SR 902 / Stanley N.: Install Reflective Markers	Design & Construction	$3,385
SR 902 / Lefevre: Convert to All-Way Stop	Design & Construction	$4,700
Basic Crossing Installation	Design & Construction	$25,670
Year 2026 TIP Total		**$36,455**
Year 2027		
Roadway Public Works Design Standards	Planning	$10,000
SR 902 Complete Street; Multimodal Street	Planning & TIB Grant	$32,000
RRFB Crossing Installation	Design & Construction	$115,145
Year 2027 TIP Total		**$157,145**
Year 2028		
SR 902 Complete Street; Multimodal Street	Design, Permits, & Plans	$447,850
Basic Crossing Installation	Design & Construction	$25,670
Year 2028 TIP Total		**$473,520**
Year 2029		
SR 902 Complete Street; Multimodal Street	Construction	$4,318,490
Lefevre Complete Street; Multimodal Street	Planning & TIB Grant	$25,445
Basic Crossing Installation	Design & Construction	$25,670
Year 2029 TIP Total		**$4,369,605**
Year 2030		
Lefevre Complete Street; Multimodal Street	Design, Permits, & Plans	$356,275
Basic Crossing Installation	Design & Construction	$25,670
Year 2030 TIP Total		**$381,945**
Year 2031		
Lefevre Complete Street; Multimodal Street	Construction	$3,435,505
Basic Crossing Installation	Design & Construction	$25,670
Year 2030 TIP Total		**$3,461,175**

6. 3 Long-Range Projects

Again, the strategy presented by this Transportation Master Plan is to advance multimodal facilities through the provision of widening with active facilities and/or complete street upgrades for City arterials, collectors, and major local streets. Improvements were identified for several streets in Medical Lake. A loose priority is inferred in Section 4.3. These projects would include some variation of sidewalk, buffered bike lanes, shared-use paths, parking, lighting, crossing, widening, and/or sign improvements.

Construction costs do change with time, as do the priorities of agencies and funding agents. As such, the detailed cost of long-range projects were not estimated for this Plan. However, some level of understanding is needed for to help with City planning functions. Thus, a range of project costs were developed based on the costs estimated from the TIP; the SR 902 and Lefevre Street projects. The result is a planning, design, and construction cost estimate range of $1,300 to $1,700 per linear road foot; $7,000,000 to $9,000,000 per mile. This does align with FHWA's year 2020 "*Status of the Nation's Highways, Bridges, and Transit*", which provides urban lane-mile costs for roads (planning level costs), when factoring in inflation (https://www.fhwa.dot.gov/policy/23cpr/).

These ranges were then applied to the priorities from Section 4.3 to give cost ranges to the City, for planning functions. For instance, a complete street has been recommended as a

priority for Lake Street, Sherman Street to Freeman Drive. This is measured at a horizontal distance of about 2,650-feet per Google Earth. Thus, a cost range of $3.445 to $4.505 million would be estimated for the project.

Again, this is just a tool provided as a resource for planning purposes until the next TIP update is provided, with refined construction costs provided by the City Engineer. All of the road improvements planning costs suggested below include a degree of widening with active mobility improvements.

The priority improvements for functionally classified roadways with cost ranges are as follows, these would be targeted for construction by year 2050 following TIP project construction:

- Lake Street, Sherman to Freeman (2,650 ft)
  Cost Range: $3.445 to $4.505 million
- Jefferson Street, W 4th St to Lake (1,450 ft)
  Cost Range: $1.885 to $2.465 million
- W. 4th Street, North Trailhead to Jefferson (2,120 ft)
  Cost Range: $2.756 to $3.604 million
- Howard Street, Brooks to W. 4th St (610 ft)
  Cost Range: $0.793 to $1.037 million
- Brooks Road, San Salvador to Lefevre (2,520 ft)
  Cost Range: $3.276 to $4.284 million
- Stanley Street, Percival to Campbell (2,780 ft)
  Cost Range: $3.614 to $4.726 million
- Barker Street, Lefevre to Stanley (2,000 ft)
  Cost Range: $2.600 to $3.400 million
- Campbell Street, Lefevre to Stanley (2,000 ft)
  Cost Range: $2.600 to $3.400 million

To be clear, these are the priority projects for the City over the next 25 years. They do not address all City multimodal needs; just those important to commutes and safety. The assumption is this plan would be updated in 5 to 10-years, the TIP and long-range list would be updated with revised project priorities provided with time.

There were local streets identified for improvements, some as a function of proposed functional class upgrades noted subsequently. These are widening with active improvement or complete street projects developed following 25-year projects, summarized below with preliminary project costs.

- Jefferson Street, Brooks to Lefevre (3,370 feet)
  Cost Range: $4.381 to $5.729 million
- Barker Street, Stanley to Sherman (1,360 feet)
  Cost Range: $1.768 to $2.312 million
- Sherman/Henderson, SR 902 to Lake (3,965 feet)
  Cost Range: $5.155 to $6.741 million
- Stanley Street North, Tara Lee to SR 902 (2,000 ft)
  Cost Range: $2.600 to $3.400 million
- Graham Road, City Limits to SR 902 (3,685 feet)
  Cost Range: $4.791 to $6.265 million

Roundabout Intersections

Similarly, planning level construction cost estimates were also provided for roundabouts proposed at SR 902 with Lefevre

Street, South Stanley Street, and Graham Road; and for Stanley Street and Lake Street. Again, as this is a long-range review, a detailed cost estimate was developed for a typical single-lane roundabout for the City.

The design for this roundabout was modeled after Wellesley and A Street in the City of Spokane. This roundabout has an inscribed diameter of 125-feet, which is sufficient for school buses, city buses, and WB-50 trucks. A mountable center island is provided to accommodate WB-67 vehicles. Wider sidewalk was assumed in the roundabout for pedestrian and bike activities, with typical sidewalk in the approach. Bike lanes lead to transitions at the edges of the roundabout to the wide sidewalk. Landscaped buffers would be provided.

The footprint was assessed at locations mentioned, minor rights-of-way may be needed for intersection corners, which has been factored into costs. The roundabout assumes spitter islands with refuge. A resulting total cost estimate of **$2 million** can be assumed per each of the SR 902 roundabouts. Scaling down, an estimate of **$1.6 million** can be assumed for Stanley Street / Lake Street.

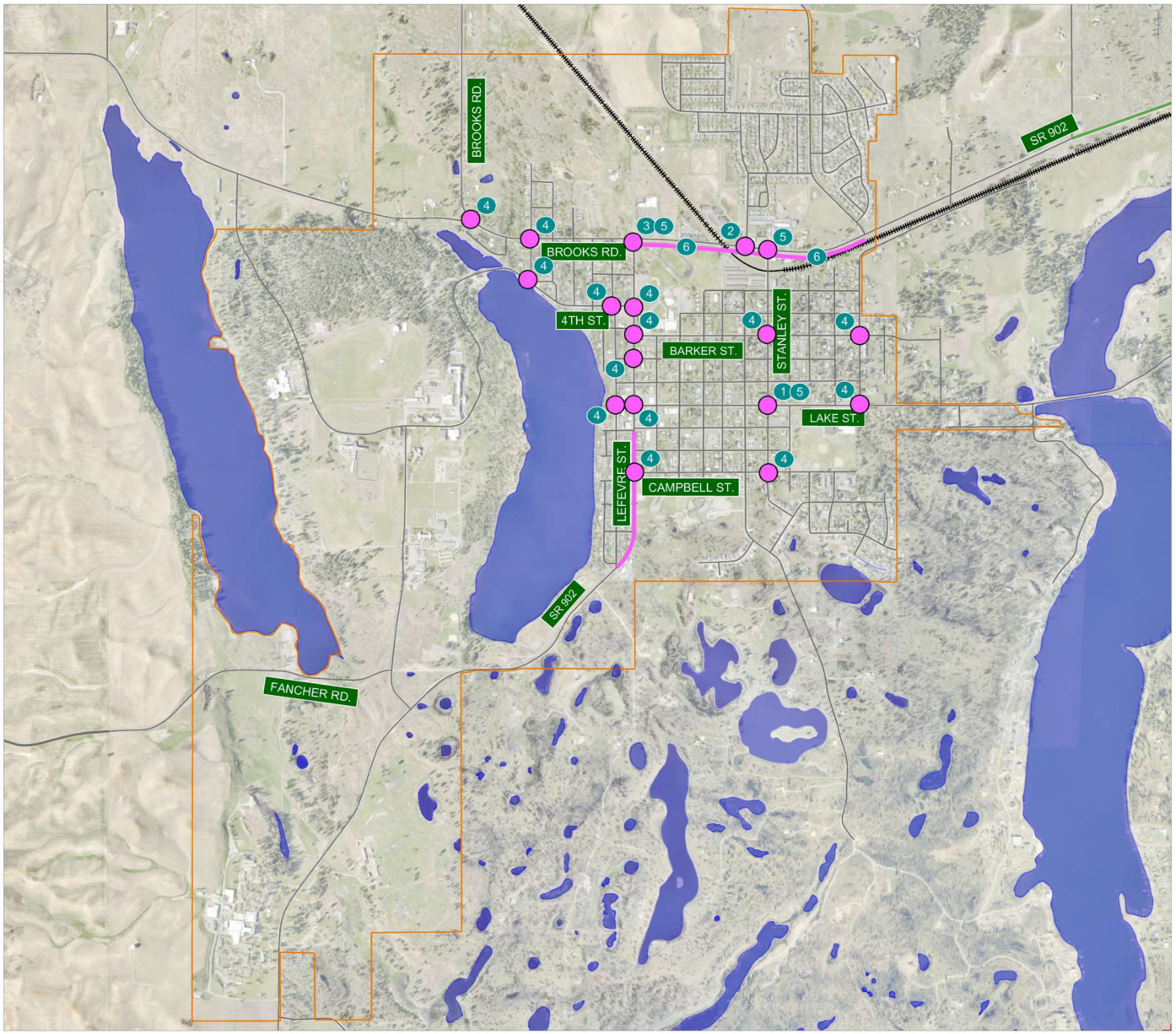
Exhibit 6.1 shows the type of roundabout that would be envisioned for these intersections, Wellesley Avenue and A Street in Spokane.

These are street projects that assume the road and sidewalk improvements discussed prior. Also highlighted are the bicycle recommendations emphasized for complete streets and intersections targeted for enhancement.



Exhibit 6.1. Wellesley Avenue & A Street Roundabout

Improvement maps were created to help show the limits of the road and intersection projects discussed for the TIP and long-range plans. **Exhibit 6.2** shows 6-year improvements. **Exhibit 6.3** shows short-term improvements targeted for 6 to 20 years. Finally, **Exhibit 6.4** shows the longer-term projects anticipated for development after 20-years, as well as general alignments for growth areas (discussed Section 6.5).



N.T.S.

LEGEND

	6 YEAR IMPROVEMENTS
	6 YR INTERSECTION PROJECT

Summary of Proposed Improvements:

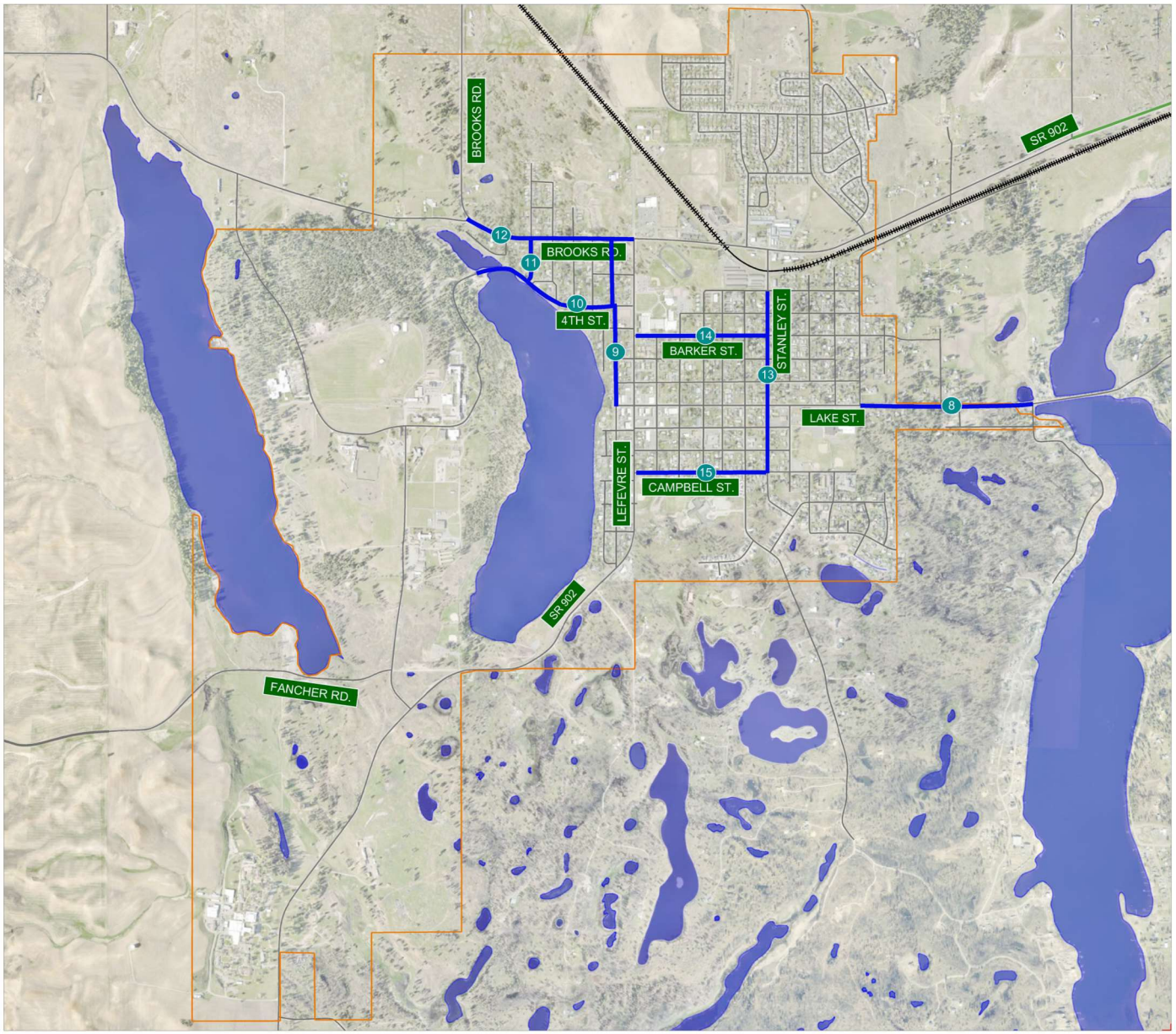
1. Lake/Stanley: Install Cross-Traffic Signs
2. SR 902/Stanley North; Install Reflective Markers
3. SR 902/Lefevre: Convert to All-Way Stop
4. High Viability Crossing Improvements/Upgrades
5. RRFB Crossing Improvement w/Signs and Stripes
6. SR 902 Complete Street; Widening, Curb, Gutter, and Path
7. Lefevre Complete Street; Curb, Gutter, Sidewalk, and Direction Bike Lanes

N.T.S.

Exhibit 6.2

PROPOSED IMPROVEMENTS
SHORT-TERM, 6-YEAR

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON



N.T.S.

LEGEND

———	6 - 20 YEAR ROAD PROJECTS
●	6 - 20 YR INTERSECTION PROJ

Summary of Proposed Improvements:

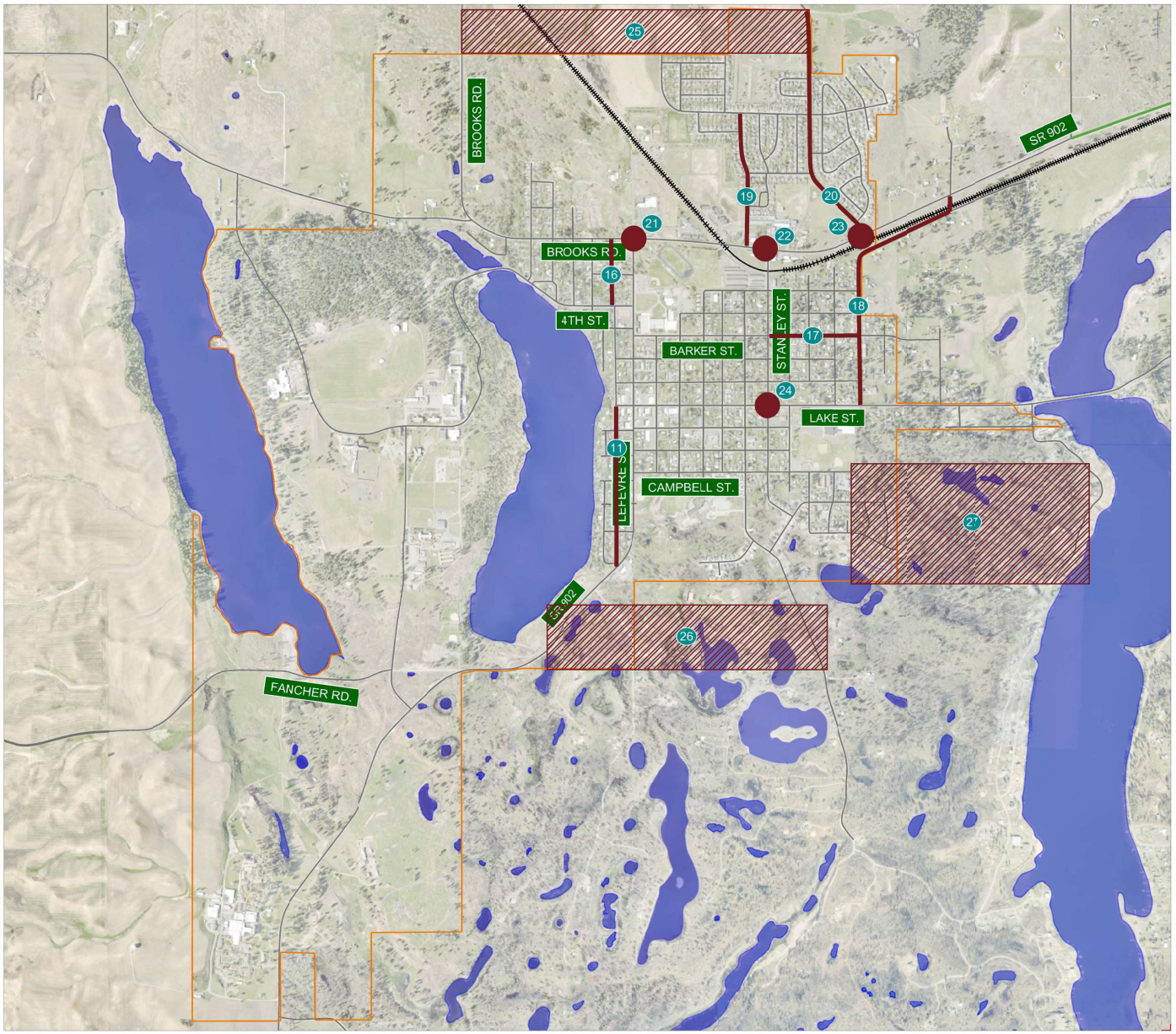
8. Lake St, Sidewalk and Bike Lanes, Sherman to Freeman
9. Jefferson, Sidewalk and Bike Lane (Both), 4th St to Lake St
10. 4th St, Pathway South Side, North Trail Head to Jefferson
11. Howard, Sidewalk and Bike Lanes, Brooks to 4th St
12. Brooks, Sidewalk and Pathway, San Salvador to Lefevre
13. Stanley, Sidewalk, Percival to Campbell
14. Barker St, Sidewalk and Bike Lanes, Lefevre to Stanley
15. Campbell St, Sidewalk and Bike Lanes, Lefevre to Stanley

N.T.S.

Exhibit 6.3

PROPOSED IMPROVEMENTS
MID-TERM, 6 - 20 YEAR

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON



N.T.S.

LEGEND

	20 PLUS YR ROAD PROJECTS
	20 PLUS YR INTERSECTION PR

Summary of Proposed Improvements:

16. Jefferson St, Bike Lanes, Brooks to Lefevre
17. Barker St, Bike Lanes, Stanley to Sherman
18. Sherman/Henderson, Bike Lanes, SR 902 to Lake
19. Stanley, Bike Lanes, Tara Lee to SR 902
20. Graham, Bike Lanes or Path, City Limit to SR 902
21. Lefevre Street/SR 902 Roundabout
22. Stanley Street South/SR 902 Roundabout
23. Stanley Street/Lake Street Roundabout
24. Lefevre Street/SR 902 Roundabout
25. North Collector, Shoulders Road and Share Use Path, Brooks to Graham
26. South Collector, Shouldered Road and Shared Use Path, SR 902 to Hallet Road/Medical Lake Road
27. East Collector, Shouldered Road and Shared Use Path, Hallet Road/Medical Lake Road to Freeman Street

N.T.S.

Exhibit 6.4

PROPOSED IMPROVEMENTS
LONG-TERM, 20-PLUS YEAR

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

6. 4 Functional Classification Revisions

As indicated, streets are classified to understand how each serves local, regional, and State mobility. For instance, a principal or minor arterial serves regional needs, moving high levels of traffic between smaller communities or areas of a large city. Conversely, a local street is intended to access residential or small commercial areas. A collector directs local trips from these residential areas to arterials or highways.

There distinctions between roadway classes are based on factors such as use and intent. As it pertains to Medical Lake, several streets have been identified throughout this Plan for increased multimodal use within Medical Lake within intention of access more expansive residential areas. To that end, this report recommends the City consider petitioning (applying to) WSDOT to elevate the classification of select roads and roadway segments to collectors.

Reclassifications can be proposed as either major or minor collectors, depending on the preference of City officials. Reclassifying roads will help the City achieve three primary measures for future development:

1. A higher and better, complete street design standard would therefore become applicable.
2. When accepted by WSDOT, the roads become eligible for grant funding support (local roads are not typically eligible for grant funds from Federal and State agencies).
3. A network is established that development must adhere to when extending frontage and mitigating improvements as a function of entitlement processes.

Exhibit 6.5 shows and lists the proposed collector designation revisions for Medical Lake.

6. 5 Growth Area Roadway Alignments

City officials requested a review of possible road alignments to help move traffic within targeted growth areas of the City. Two of these are the north and east UGA expansion areas. The third is a developing district in south Medical Lake. The purpose was establishing alignments between established roadways to and through these areas.

A very preliminary review was performed, considering factors like topography, minimizing the number of owners that would be impacted by ROW/property, and attempting to minimize alignment through wetlands and sensitive areas. The general limits of these long-term future/possible, collectors are as follows, summarized with a basic design consideration:

- North UGA Collector
  Two lanes, wide shoulders and a shared-use path, Brooks Road to Graham Road.
- South Development Area Collector
  - Two lanes, wide shoulders and a shared-use path, SR 902 to Hallett Road/Medical Lake Road.

- East UGA Collector
  - Two lanes with wide shoulders and a shared-use path, Hallet/Medical Lake Road to Freeman Street

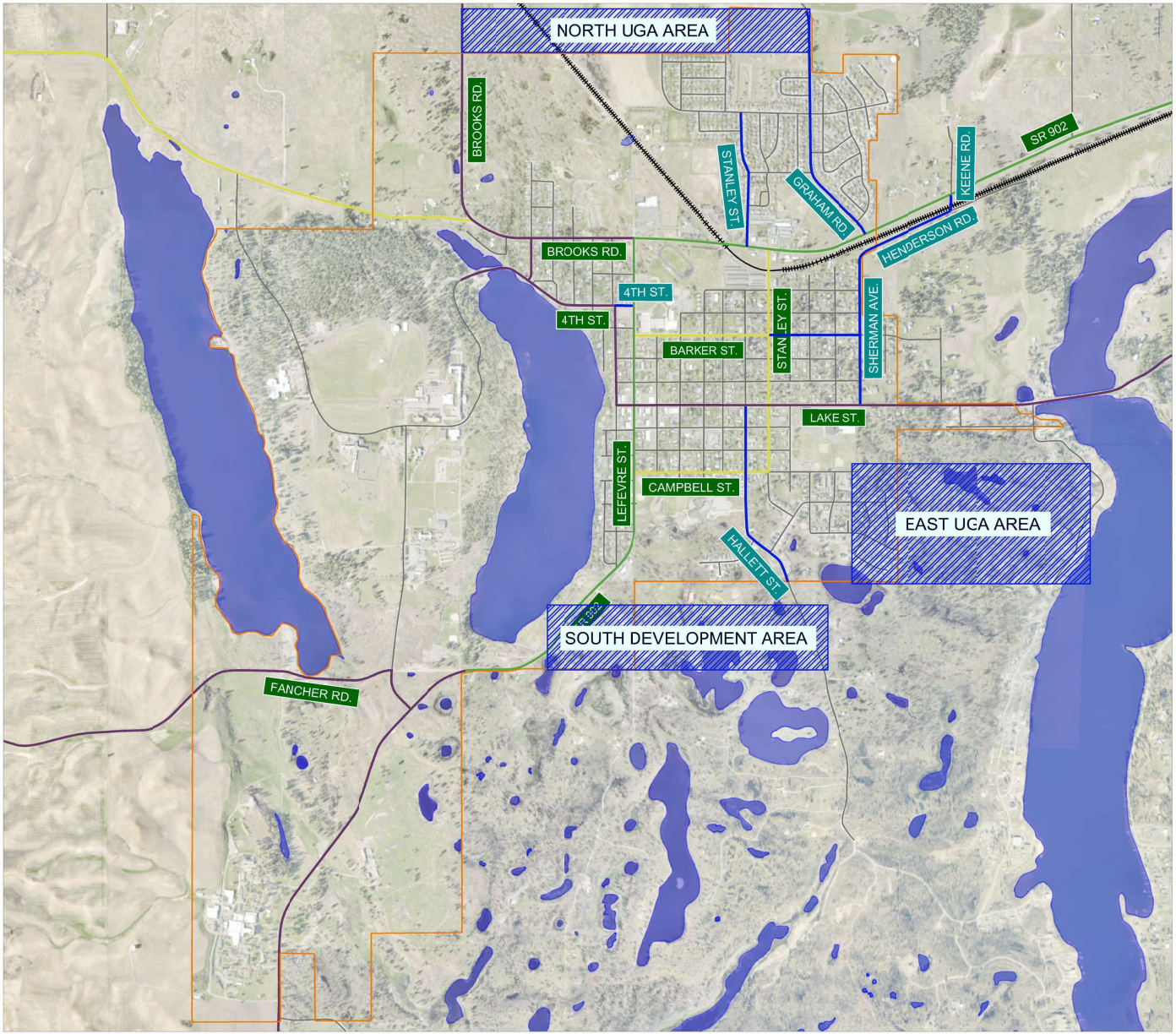
6. 6 Inflation

Inflation has been neglected to this point. The construction costs shown in Table 6.1 are conservative (high-end), so inflation was not addressed, the same with the long-range planning estimates. With that said, inflation is a very real issue for agencies to understand and reflect in project costs.

The recommendation is that any future update to the TIP or this Plan factor inflation, accounting for increasing prices. Per resources such as WSDOT's historical pricing index pages (unit bid history webpage) and Engineering News Record (https://www.enr.com/) inflation tables, a 2.8% inflation factor has been occurring within more recent histories. To ensure conservative results, a 3% annual adjustment should be used to estimate future costs.

Per the prior example, a cost range of $3.445 to $4.505 million was estimated to provide a complete street along Lake Street, Sherman Street to Freeman Drive. If a year 2036 cost estimate were to be developed, a 3% compounding of 10-years would be applied for a total adjustment factor of 1.344. This would be applied against former costs to develop a revised range of $4.63 to $6.055 million for year 2036. For convenience, an inflation adjustment summary is as follows:

2027 = 1.03	2035 = 1.305	2043 = 1.653
2028 = 1.061	2036 = 1.344	2044 = 1.702
2029 = 1.093	2037 = 1.384	2045 = 1.754
2030 = 1.126	2038 = 1.426	2046 = 1.806
2031 = 1.159	2039 = 1.469	2047 = 1.860
2032 = 1.194	2040 = 1.513	2048 = 1.916
2033 = 1.230	2041 = 1.558	2049 = 1.974
2034 = 1.267	2042 = 1.605	2050 = 2.033



N.T.S.

LEGEND

	PRINCIPAL ARTERIAL
	MINOR ARTERIAL
	MAJOR COLLECTOR
	MINOR COLLECTOR
	LOCAL STREET
	CITY URBAN BOUNDARY
	WASHINGTON EASTERN RAIL
	FUTURE COLLECTOR
	FUTURE COLLECTOR AREA

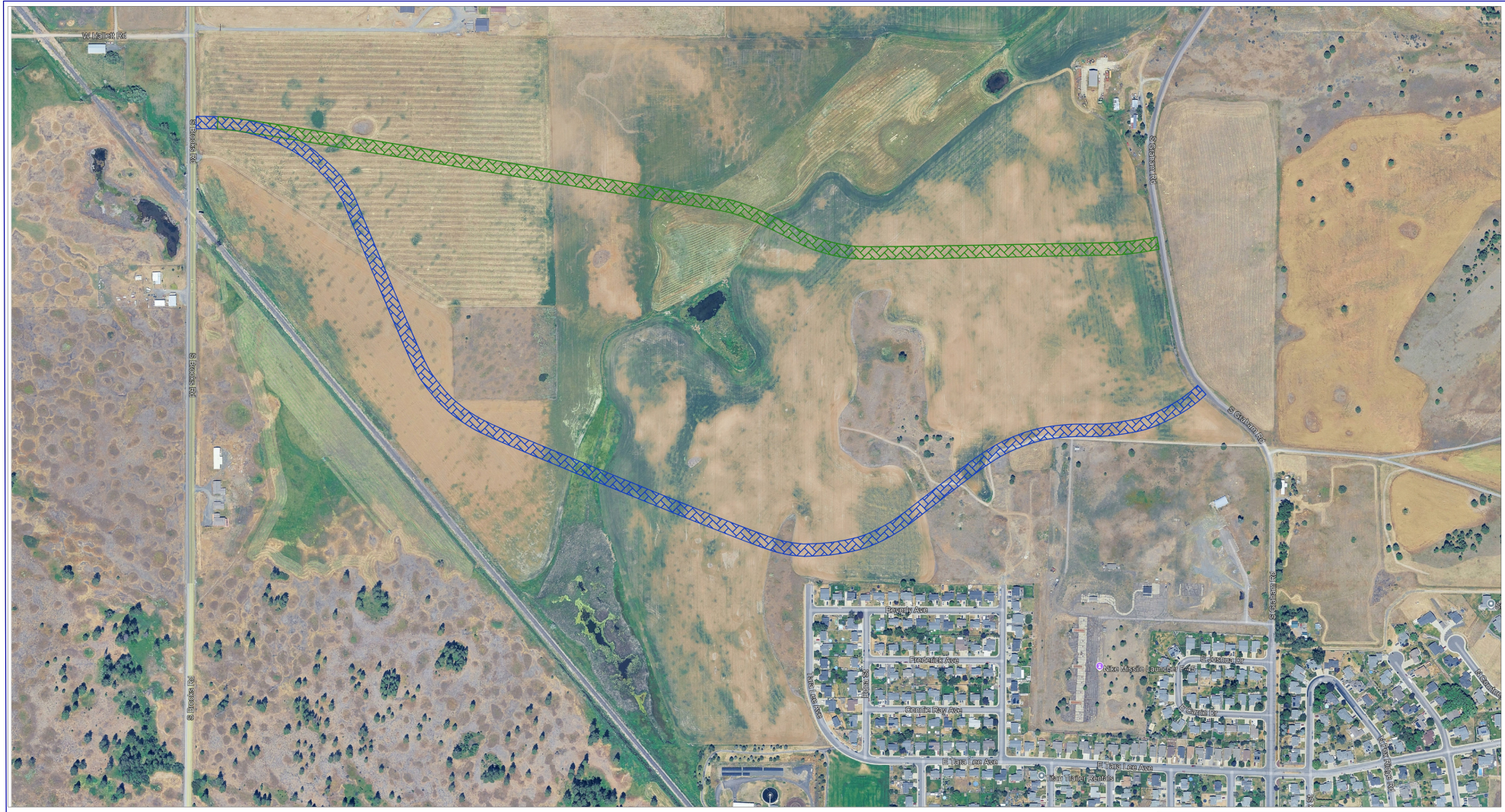
Proposed Revision to Major or Minor Collector

- Hallett Street, Lake Street to City Limit
- Stanley Street, Tara Lee Avenue to SR 902
- Graham Road, Tara Lee Avenue to SR 902
- Sherman Avenue, Henderson Rd to Lake St
- Henderson Rd, Sherman Ave to Keene Rd
- Keene Road, Henderson Road to SR 902
- 4th Street, Jefferson Street to Lefevre Street
- Barker Street, Stanley St to Sherman Ave

Exhibit 6.5

PROPOSED FUNCTIONAL CLASSIFICATIONS

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON



N

N.T.S.

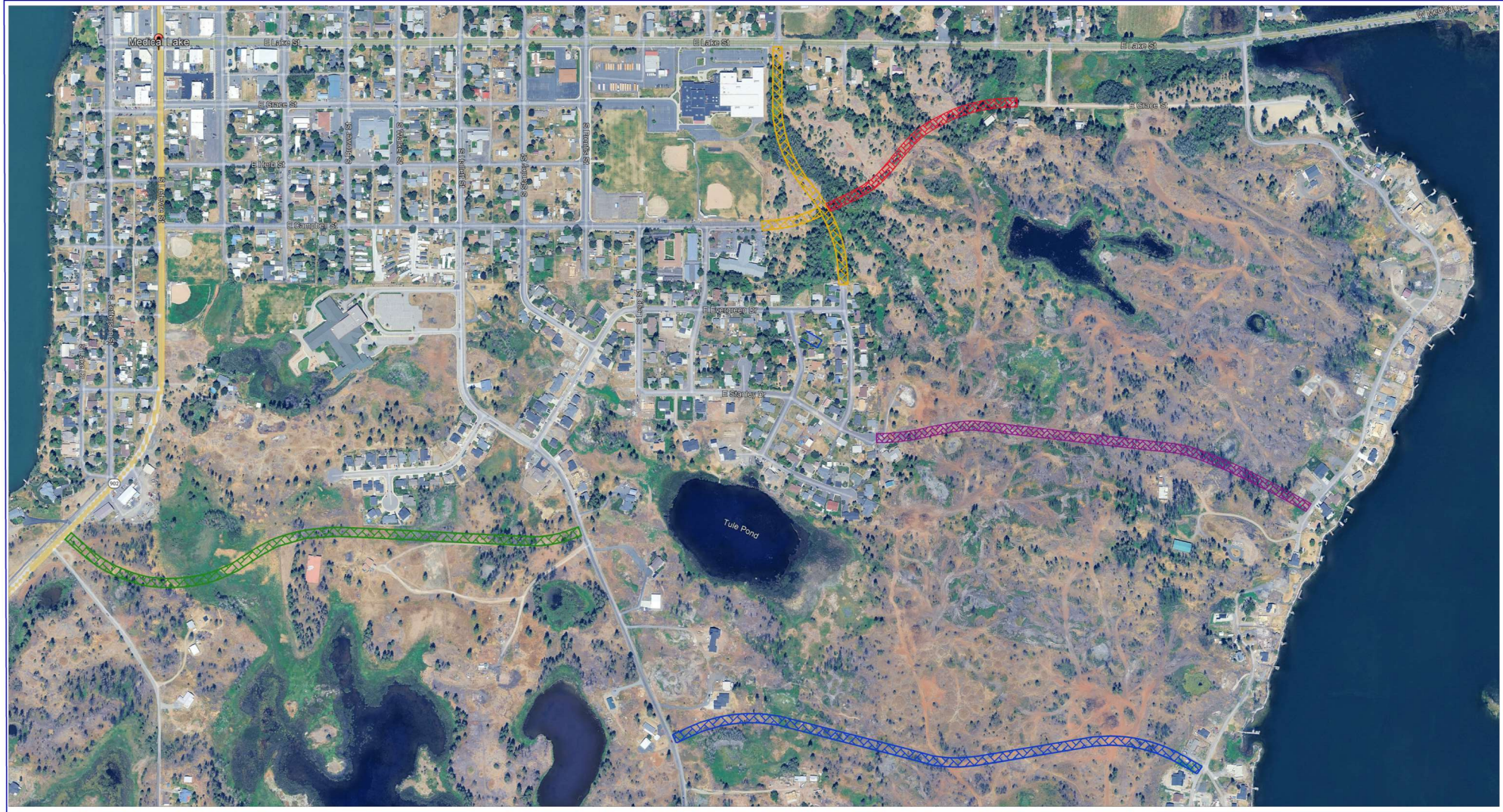
LEGEND

	ALIGNMENT OPTION # 1
	ALIGNMENT OPTION # 2

Exhibit 6.6

PROPOSED ROAD ALIGNMENTS
NORTH UGA AREA

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON



LEGEND

	ALIGNMENT OPTION # 1		ALIGNMENT OPTION # 3		ALIGNMENT OPTION # 5
	ALIGNMENT OPTION # 2		ALIGNMENT OPTION # 4		

N

N.T.S.

Exhibit 6.7

PROPOSED ROAD ALIGNMENTS
SOUTH DEVELOPMENT & EAST UGA

CITY OF MEDICAL LAKE
TRANSPORTATION MASTER PLAN
MEDICAL LAKE, WASHINGTON

Appendix A:

Glossary of Terms

This section of the Technical Appendix provides a glossary of terms.

- Access point - An intersection, driveway, or opening on a roadway that provides access to a land use or facility.
- All-way stop-controlled - An intersection with stop signs located on all approaches.
- Arterial - (General Definition) A signalized street that primarily serves through traffic and secondarily provides access to abutting properties.
- Average daily traffic (ADT) - The average 24-hour traffic volume at a given location on a roadway.
- Capacity - The number of vehicles or persons that can be accommodated on a roadway, roadway section, or at an intersection over a specified period. Capacity is also a term used to define limits for transit, pedestrian, and bicycle facilities. Concept typically expressed as vehicles per hour, vehicles per day, or persons per hour or per day.
- Collector street - (General Definition) A surface street providing land access and traffic circulation within residential, commercial, and industrial areas.
- Cycle - A complete sequence of cycle indicators.
- Cycle length - The total time for a signal to complete one cycle.
- Delay - The additional travel time experienced by a driver, passenger, or pedestrian.
- Demand - The number of users desiring service on a highway system or street over a specified time. Concept typically expressed as vehicles per hour, vehicles per day, or persons per hour or per day.
- Departing sight distance - The length of road required for a vehicle to turn from a stopped position at an intersection (or driveway) and accelerate to travel speed.
- Design Hour - The peak hour of traffic volumes/conditions; typically used in traffic studies, design analyses, and design. Typically recognized as the 85th percentile hours and often one of the peak/commute hours.
- Downstream - The direction of traffic flow.
- Functional class - A transportation facility defined by the traffic service it provides.
- Growth factor - A percentage increase applied to current traffic demands or counts to estimate future demands/volumes.
- Intersection Control Analysis - An intersection control analysis (ICA) is a traffic/transportation study used to recommend geometric and traffic control improvements for an intersection or intersections.
- Level of Service - The standard used to evaluate traffic operating conditions of the transportation system. This is a qualitative assessment of the quantitative effect of factors such as speed, volume of traffic, geometric

features, traffic interruptions, delays, and freedom to maneuver. Operating conditions are categorized as LOS A through LOS "F." LOS A generally represents the most favorable driving conditions and LOS F represents the least favorable conditions.

- Mainline - The primary through roadway as distinct from ramps, auxiliary lanes, and collector-distributor roads.
- Major Street - The street not controlled by stop signs at a two-way stop-controlled intersection.
- Minor arterial - (General Definition) A functional category of a street allowing trips of moderate length within a small geographical area.
- Operational analysis - A use of capacity analysis to determine the level of service on an existing or projected facility, with known projected traffic, roadway, and control conditions.
- Peak Generator Hour - The single hour (or hours) in a day during which trip generation for a development or land use is highest.
- Peak hour - A single hour (or hours) in a day during which the maximum traffic volume occurs on a given facility (roadway, intersection, etc.). Typically, the peak hour is known as the "rush" hour that occurs during the AM or PM work commutes of the typical weekday. The absolute peak hour of the day can also be referred to as the design hour.
- Peak Generator Hour - The peak hourly volume generated by a particular development or land use. In the context of traffic reports, the generator hour can occur in the morning and afternoon, described as AM and PM peak generator hours, respectively.
- Peak hour factor - The hourly volume during the maximum-volume hour of the day divided by the peak 15-minute flow rate within the peak hour; a measure of traffic demand fluctuation within the peak hour.
- Principal Arterial - (General Definition) A major surface street with relatively long trips between major points, and with through-trips entering, leaving, and passing through the urban area.
- Queue - A line of vehicles, bicycles, or persons waiting to be served by the system in which the flow rate from the front of the queue determines the average speed within the queue. Slower moving vehicles or people joining the rear of the queue are usually considered a part of the queue.
- Roadside obstruction - An object or barrier along a roadside or median that affects traffic flow, whether continuous (e.g., a retaining wall) or not continuous (e.g., light supports or a bridge abutment).
- Road characteristic - A geometric characteristic of a street or highway, including the type of facility, number and width of lanes, shoulder widths and lateral clearances, design speed, and horizontal and vertical alignment.

- Roundabout - An unsignalized intersection with a circulatory roadway around a central island with all entering vehicles yielding to the circulating traffic.
- Shoulder - A portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, emergency use, and lateral support of the subbase, base, and surface courses.
- Stopping sight distance - The length of road needed for a moving vehicle to come to a complete stop prior to an obstruction sighted on the road.
- Traffic conditions - A characteristic of traffic flow, including distribution of vehicle types in the traffic stream, directional distribution of traffic, lane use distribution of traffic, and type of driver population on a given facility.
- Travel speed - The average speed, in miles per hour, of traffic computed as the length of the roadway segment divided by the average travel time of the vehicles traversing the segment.
- Travel time - The average time spent by vehicles traversing a highway segment, including control delay, in seconds per vehicle or minutes per vehicle.
- Trip Distribution and Assignment - The predicted travel patterns of vehicle trips as they approach and depart a land use. Distribution refers to the travel pattern, usually defined in percentages or fractions, and assignment refers to vehicle trip ends.
- Traffic forecast - The predicted traffic volume of the analysis horizon year or period. Most typically predicted for the weekday, AM peak hour, PM peak hour, or AM or PM peak generator hours of the typical weekday.
- Traffic impact analysis - A traffic impact analysis (TIA) is an engineering and planning study that forecasts the potential traffic and transportation impacts of a proposed development on an area, neighborhood, or community. Reports can also be referred to as a traffic impact study (TIS).
- Trip generation - The number of vehicle trips generated by a development or land use. Most typically predicted for the weekday, AM peak hour, PM peak hour, or AM or PM peak generator hours of the typical weekday.
- Two-way left-turn lane - A lane in the median area that extends continuously along a street or highway and is marked to provide a deceleration and storage area, out of the through-traffic stream, for vehicles traveling in either direction to use in marking left turns at intersections and driveways.
- Two-way stop-controlled - The type of traffic control at an intersection where drivers on the minor street or drivers turning left from the major street wait for a gap in the major street traffic to complete a maneuver. Typically, the minor approaches are stop-controlled.
- Unsignalized intersection - An intersection not controlled by traffic signals.

- Upstream - The direction from which traffic is flowing.
- Volume - The number of persons or vehicles passing a point on a lane, roadway, or other traffic-way during some time interval, often one hour, expressed in vehicles, bicycles, or persons per hour.
- Volume-to-capacity ratio - The ratio of flow rate to capacity for a transportation facility.
- Walkway - A facility provided for pedestrian movement and segregated from vehicle traffic by a curb or provided for on a separate right-of-way.

Appendix B:

HCM Methodology

All intersections capacity conditions were analyzed using the methodologies presented in the latest (7th) edition of the *Highway Capacity Manual* (HCM) updated in 2022. The concept of level of service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The individual levels of service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions; a description of each LOS grade is provided as follows:

LOS A represents uninterrupted travel operations. A roadway operating at LOS B may also be over-engineered, where resources could have been allocated to higher priority areas.

LOS B represents reasonably free-flow travel operations, unaffected by the presence of other vehicles. A roadway operating at LOS A may be over-engineered, where resources could have been allocated to higher priority areas.

LOS C represents stable travel operations and average speeds remain at or near free-flow conditions. This is an ideal LOS, requiring drivers to be vigilant for safety and representing appropriate infrastructure investment.

LOS D represents travel operations that are acceptable but are approaching instability. Speeds decrease and the roadway investment is serving an appropriate number of users.

LOS E represents travel operations that are unacceptable to the city. Traffic is unstable and flow, speed, and maneuverability are limited. LOS E may be mitigated with improvements that include traffic control measures, signal timing adjustments, or capacity improvements.

Table 5. Intersection LOS Criteria

Level of Service	Control Delay (sec/veh)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80 (or v/c>1)	> 50 (or v/c>1)

Source: Exhibits 19-8, 20-2, 21-8, and 22-8, Highway Capacity Manual, 7th Edition (2022)

LOS F represents travel operations that are forced flow or breakdown conditions in queued traffic. Stop-and-go travel with long delays exists as vehicles shuffle through queues. Like LOS E, these conditions must be mitigated.

Levels of service for intersections are defined within ranges of average control delay experienced per vehicle, the number of seconds a vehicle can expect to wait due to the presence of a traffic control device. Signalized LOS is the function of control delay experienced by all vehicles at the intersection, as is LOS for an all-way stop. However, LOS for an unsignalized one or two-way stop to another road is the function of control delay experienced within the worse, stopped approach or approach movement. **Table 5** lists LOS criteria for signalized and unsignalized intersections (all or partial stops).

The LOS (capacity) analysis was developed using Synchro software, version 12.0. Synchro 12.0 software calculates the LOS per HCM 7th edition methodology. The 7th edition HCM documents the signalized LOS calculation methodology which considers lane geometry,

traffic volumes and cycle length/phasing to compute LOS. Synchro analysis worksheets report individual movement delay/LOS and overall delay/LOS for signalized intersections; unsignalized intersection worksheets report the worst-case delay/LOS and the average overall intersection delay.

Appendix C:

Summary Collision Data

CURRED ON ALL ROADS IN THE CITY OF MEDICAL LAKE

1/2020 - 12/31/2024

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FATH	# VEH	# PEDS	# BIKES
City Street	Medical Lake	CONNIE RAY AVE	300		30	F	E	EDNA ST		EC03447	12/20/2021	12:12	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E BARKER ST	416	N BROWER ST						EC65936	07/19/2022	18:17	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E BARKER ST	698	N STANLEY ST						ED33562	02/07/2023	14:47	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E FELLOWS ST		N PRENTIS ST						EC98654	10/30/2022	12:05	Suspected Minor Injury	1	0	2	0	0
City Street	Medical Lake	E FELLOWS ST	407	N WALKER ST						3878554	10/22/2021	14:33	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E GRACE ST	0	S WASHINGTON ST						3841229	02/24/2020	11:34	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E HERB ST	0	S HALLETT ST						EA05828	01/15/2020	21:31	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST	609	N STANLEY ST						EF36617	09/20/2024	08:44	Possible Injury	1	0	2	0	0
City Street	Medical Lake	E LAKE ST	609	N STANLEY ST						EB90581	11/14/2021	16:49	Suspected Minor Injury	5	0	3	0	0
City Street	Medical Lake	E LAKE ST	609	N STANLEY ST						3878559	07/15/2022	10:27	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST	486	N WALKER ST						EE89672	06/22/2024	10:48	Possible Injury	1	0	2	0	0
City Street	Medical Lake	E LAKE ST	298	S BROAD ST						ED97728	09/08/2023	17:03	Possible Injury	1	0	2	0	0
City Street	Medical Lake	E LAKE ST	1845	S FREEMAN DR						3879723	08/21/2022	12:45	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST	0	S STANLEY ST						EA08867	01/25/2020	09:02	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST	609	S STANLEY ST						EF19813	09/27/2024	13:18	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST		S STANLEY ST						ED90146	08/13/2023	17:02	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST	609	S STANLEY ST						EA81311	11/14/2020	14:21	Suspected Minor Injury	2	0	2	0	0
City Street	Medical Lake	E LAKE ST	100		157	F	E	902		EB41830	06/22/2021	18:10	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST	1501		149	F	E	KEENE LN		EA67790	09/29/2020	20:20	No Apparent Injury	0	0	1	0	0
City Street	Medical Lake	E LAKE ST	100		38	F	W	N BROAD ST		EA71807	10/08/2020	18:21	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST	800		99	F	E	N PRENTIS ST		EB23133	04/16/2021	14:00	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E LAKE ST	1200		269	F	W	S BRAYTON RD		EE72351	04/27/2024	07:40	Unknown	0	0	1	0	0
City Street	Medical Lake	E LAKE ST	1300		150	F	W	S BRAYTON RD		EF41836	12/02/2024	08:44	No Apparent Injury	0	0	1	0	0
City Street	Medical Lake	E STANLEY DR	1000		75	F	E	S STANLEY CT		3878558	05/02/2022	09:39	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	E TARA LEE AVE	500		45	F	E	WILLIAM ST		EA93659	12/20/2020	00:01	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	MAPLE ST		SPRUCE ST						ED37732	02/25/2023	07:03	Suspected Minor Injury	1	0	1	0	0
City Street	Medical Lake	MAPLE ST			350	F	E	N HOWARD ST		EF13725	09/09/2024	18:35	Suspected Minor Injury	1	0	1	0	0
City Street	Medical Lake	N BROAD ST	101	E LADD ST						3878555	11/11/2021	09:14	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N BROOKS RD	700		118	F	NW	W BROOKS RD		EA22948	03/11/2020	08:32	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N BROWER ST	401	E BARKER ST						EE98057	07/20/2024	15:27	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N STANLEY ST	201	E LADD ST						EE36690	12/25/2023	03:59	Suspected Serious Injury	1	0	2	0	0
City Street	Medical Lake	N STANLEY ST		E LAKE ST						EE81061	05/24/2024	09:33	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N STANLEY ST	101	E LAKE ST						EC57283	06/18/2022	10:56	Suspected Minor Injury	1	0	2	0	0
City Street	Medical Lake	N STANLEY ST	101	E LAKE ST						ED93492	08/25/2023	22:05	Suspected Minor Injury	3	0	2	0	0
City Street	Medical Lake	N STANLEY ST	101	E LAKE ST						EC66360	07/20/2022	18:22	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N STANLEY ST	0	E LAKE ST						3841231	02/25/2020	11:54	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N STANLEY ST	101	E LAKE ST						EB28072	05/06/2021	12:27	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N STANLEY ST	600	RR S OF SR 902						EB05262	02/05/2021	08:50	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N STANLEY ST	821		100	F	N	SR 902		ED03886	11/14/2022	00:00	No Apparent Injury	0	0	1	0	0
City Street	Medical Lake	N WALKER ST	351	E BARKER ST						EB01485	01/26/2021	19:54	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N WALKER ST	501	E FELLOWS ST						EC99122	10/31/2022	21:10	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	N WASHINGTON ST	400		112	F	S	E FELLOWS ST		ED24216	01/09/2023	09:31	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	PINE ST	300		335	F	NW	S MEDICAL LAKE TYLER RD		EB38874	06/13/2021	17:40	Suspected Minor Injury	1	0	1	0	0
City Street	Medical Lake	S BROWER ST	364	E HERB ST						EC59466	06/27/2022	22:55	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	S BROWER ST	100		26	F	N	E GRACE ST		EB23144	04/17/2021	17:12	No Apparent Injury	0	0	1	0	0
City Street	Medical Lake	S GRANT AVE	473	E EVERGREEN DR						EA78978	10/30/2020	21:30	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	S JEFFERSON ST	298	W HANCOCK ST						3878551	10/11/2020	12:30	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	S LAKE DR	500		57	F	N	OREGON ST		EE72819	04/30/2024	16:10	Unknown	0	0	1	0	0
City Street	Medical Lake	S SILVER LAKE AVE	600		278	F	S	E EVERGREEN DR		ED39812	02/28/2023	16:21	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	S STANLEY ST	500		111	F	NW	S EVERGREEN DR		EC81009	09/02/2022	05:00	No Apparent Injury	0	0	2	0	0
City Street	Medical Lake	W BROOKS RD	277	N STAPLES ST						EF30083	10/29/2024	15:08	Possible Injury	1	0	2	0	0
City Street	Medical Lake	WILLIAM ST	1109	CONNIE RAY AVE						3879708	12/09/2021	08:00	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							3.86	EB15589	03/20/2021	13:29	Possible Injury	1	0	1	0	0
State Route	Medical Lake	902							5.00	EA21332	03/02/2020	22:10	No Apparent Injury	0	0	1	0	0
State Route	Medical Lake	902							5.11	ED06140	11/20/2022	00:00	Unknown	0	0	1	0	0
State Route	Medical Lake	902							5.46	EB24270	04/09/2021	19:35	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.03	EE65198	04/03/2024	13:07	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.09	EB23134	04/17/2021	14:11	Suspected Minor Injury	2	0	2	0	0
State Route	Medical Lake	902							6.16	EA31837	04/29/2020	20:48	No Apparent Injury	0	0	1	0	0
State Route	Medical Lake	902							6.31	ED05275	11/15/2022	14:55	Possible Injury	2	0	2	0	0
State Route	Medical Lake	902							6.56	EA77972	11/04/2020	17:34	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.56	EF47296	12/17/2024	14:24	Suspected Minor Injury	1	0	2	0	0
State Route	Medical Lake	902							6.56	EC20364	02/09/2022	15:04	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.56	EB17711	03/29/2021	16:55	Possible Injury	1	0	2	0	0
State Route	Medical Lake	902							6.62	ED07016	11/22/2022	16:16	Possible Injury	1	0	2	0	0
State Route	Medical Lake	902							6.71	EA35641	05/24/2020	15:47	No Apparent Injury	0	0	1	0	0
State Route	Medical Lake	902							6.88	EC99043	10/27/2022	07:07	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.94	EF51446	12/27/2024	17:28	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.94	EB38245	06/06/2021	17:20	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.94	EA95280	12/30/2020	08:14	Possible Injury	1	0	2	0	0
State Route	Medical Lake	902							6.94	3878553	09/29/2021	07:25	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.94	3878556	04/05/2022	11:55	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.95	EF36620	11/12/2024	07:17	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							6.95	EC76147	08/19/2022	13:16	Possible Injury	1	0	2	0	0
State Route	Medical Lake	902							6.95	EC98653	10/29/2022	10:39	Suspected Minor Injury	1	0	2	0	0
State Route	Medical Lake	902							6.97	EA84102	11/24/2020	09:04	Suspected Minor Injury	2	0	2	0	0
State Route	Medical Lake	902							6.97	EC90342	10/05/2022	07:27	Suspected Minor Injury	1	0	2	0	0
State Route	Medical Lake	902							6.98	EA14329	02/11/2020	15:20	Suspected Serious Injury	1	0	2	0	0
State Route	Medical Lake	902							6.98	EB97185	11/27/2021	13:47	Possible Injury	1	0	2	0	0
State Route	Medical Lake	902							6.99	EF02301	07/30/2024	19:38	No Apparent Injury	0	0	2	0	0
State Route	Medical Lake	902							7.06	EE74481	05/03/2024	06:44	No Apparent Injury	0	0	1	0	0
State Route	Medical Lake	902							7.10	EC76926	08/09/2022	19:10	Suspected Serious Injury	1	0	1	0	0
State Route	Medical Lake	902							10.84	ED74495	06/28/2023	05:35	No Apparent Injury	0	0	2	0	0

REPORT NUMBER	VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
EC03447	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Intersection Related but Not at Intersectio	Overcast	Snow/Slush	Daylight	One parked--one moving	Making Right Turn	Legally Parked, Unoccupied	North	East			Other Contributing Circ Not Listed	Operating Recklessly or Aggressively	None	Outside Shoulder of Primary Trafficway
EC65936	Not Stated	Passenger Car	At Intersection and Related	Clear	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Other Contributing Circ Not Listed		None	Lane of Primary Trafficway
ED33562	Passenger Car	Passenger Car	At Intersection and Related	Raining	Wet	Daylight	Entering at angle	Starting in Traffic Lane	Making Left Turn	West	East	South	West	Distractions Outside Vehicle		Unknown Distraction	Lane of Primary Trafficway
EC98654	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	West	East	South	North	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
3878554	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Raining	Wet	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
3841229	Passenger Car	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Did Not Grant RW to Vehicle	Disregard Traffic Sign and Signals	None	Lane of Primary Trafficway
EA05828	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Snowing	Ice	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	East	West	North	South	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EF36617	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Disregard Traffic Sign and Signals		None	Lane of Primary Trafficway
EB90581	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Overcast	Wet	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Disregard Traffic Sign and Signals		None	Lane of Primary Trafficway
3878559	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EE89672	Motorcycle	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped for Traffic	West	East	West	Vehicle Stopped	Follow Too Closely		None	Lane of Primary Trafficway
ED97728	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	East	South	West	West	None		None	Lane of Primary Trafficway
3879723	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	South	West	West	East	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EA08867	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Raining	Wet	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EF19813	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	West	East	North	South	None		Disregard Traffic Sign and Signals	Lane of Primary Trafficway
ED90146	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EA81311	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Disregard Traffic Sign and Signals		None	Lane of Primary Trafficway
EB41830	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	One parked--one moving	Backing	Legally Parked, Unoccupied	Vehicle Backing	Vehicle Backing			Improper Backing		None	Outside Shoulder of Primary Trafficway
EA67790	Pickup,Panel Truck or Vanette under 10,000 lb		Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Vehicle Strikes Deer	Going Straight Ahead		East	West			None			Lane of Primary Trafficway
EA71807	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Clear	Dry	Dusk	One parked--one moving	Backing	Legally Parked, Unoccupied	Vehicle Backing	Vehicle Backing			Improper Backing		None	Outside Shoulder of Primary Trafficway
EB23133	Not Stated	Passenger Car	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	One parked--one moving	Going Straight Ahead	Legally Parked, Unoccupied					Unknown Distraction		None	Outside Shoulder of Primary Trafficway
EE72351	Not Stated		Not at Intersection and Not Related	Clear	Dry	Unknown	Garbage / Recycle Containers (Out for PU)	Going Straight Ahead		East	West			Other Contributing Circ Not Listed			Outside Shoulder of Primary Trafficway
EF41836	Pickup,Panel Truck or Vanette under 10,000 lb		Not at Intersection and Not Related	Overcast	Dry	Daylight	Tree or Stump (stationary)	Going Straight Ahead		East	West			Apparently Asleep or Fatigued			Past the Outside Shoulder of Primary Trafficway
3878558	Not Stated	Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	One parked--one moving	Other*	Legally Parked, Unoccupied			Vehicle Backing	Vehicle Stopped	Unknown Distraction		None	Outside Shoulder of Primary Trafficway
EA93659	Passenger Car	Not Stated	Not at Intersection and Not Related	Clear or Partly Cloudy	Unknown	Unknown	One parked--one moving	Legally Parked, Occupied	Going Straight Ahead					None		Other Contributing Circ Not Listed	Outside Shoulder of Primary Trafficway
ED37732	Pickup,Panel Truck or Vanette under 10,000 lb		At Intersection and Not Related	Clear	Ice	Daylight	Tree or Stump (stationary)	Going Straight Ahead		North	North			Exceeding Reas. Safe Speed			Past the Outside Shoulder of Primary Trafficway
EF13725	Motorcycle		Not at Intersection and Not Related	Clear	Dry	Daylight	Earth Bank or Ledge	Negotiating a Curve		Southeast	West			Other Contributing Circ Not Listed			Past the Outside Shoulder of Primary Trafficway
3878555	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Raining	Wet	Daylight	Entering at angle	Starting in Traffic Lane	Starting in Traffic Lane	West	East	South	North	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EA22948	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Not at Intersection and Not Related	Clear	Dry	Daylight	From opposite direction - both moving - head-on	Going Straight Ahead	Going Straight Ahead	East	West	West	East	Other Contributing Circ Not Listed		None	Lane of Primary Trafficway
EE98057	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	South	North	East	West	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EE36690	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear	Dry	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	West	East	South	North	Under Influence of Alcohol		None	Lane of Primary Trafficway
EE81061	Passenger Car	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EC57283	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
ED93492	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear	Dry	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EC66360	Passenger Car	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	None		None	Lane of Primary Trafficway
3841231	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped at Signal or Stop Sign	North	South	North	South	Follow Too Closely		None	Lane of Primary Trafficway
EB28072	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EB05262	Pickup,Panel Truck or Vanette under 10,000 lb	School Bus	At Intersection and Related	Clear	Wet	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped at Signal or Stop Sign	South	North	Vehicle Stopped	Vehicle Stopped	Other Distractions		None	Lane of Primary Trafficway
ED03886	Passenger Car		Not at Intersection and Not Related	Clear	Dry	Dark-Street Lights On	Other Objects	Going Straight Ahead		North	South			Overcorrecting / Oversteering			Outside Shoulder of Primary Trafficway
EB01485	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear	Ice	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	South	North	East	West	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EC99122	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Raining	Wet	Dark-No Street Lights	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Distractions Outside Vehicle	Disregard Traffic Sign and Signals	None	Lane of Primary Trafficway
ED24216	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Driveway	Clear	Wet	Daylight	One parked--one moving	Backing	Legally Parked, Unoccupied	Vehicle Backing	Vehicle Backing			Improper Backing		None	Outside Shoulder of Primary Trafficway
EB38874	Motorcycle		Not at Intersection and Not Related	Clear	Dry	Daylight	Earth Bank or Ledge	Negotiating a Curve		North	South			Under Influence of Alcohol			Past the Outside Shoulder of Primary Trafficway
EC59466	Passenger Car	Passenger Car	At Intersection and Related	Clear	Dry	Dark - Unknown Lightin	Entering at angle	Making Right Turn	Going Straight Ahead	South	East	West	East	Exceeding Stated Speed Limit		Did Not Grant RW to Vehicle	Lane of Primary Trafficway
EB23144	Passenger Car		Not at Intersection and Not Related	Clear	Dry	Daylight	Wood Sign Post	Going Straight Ahead		North	South			Improper Signal			Past the Outside Shoulder of Primary Trafficway
EA78978	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Overcast	Unknown	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	North	East	South	North	Other Contributing Circ Not Listed		None	Lane of Primary Trafficway
3878551	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	North	South	South	North	Disregard Traffic Sign and Signals		None	Lane of Primary Trafficway
EE72819	Not Stated		Not at Intersection and Not Related	Clear	Dry	Daylight	Building	Backing		Vehicle Backing	Vehicle Backing			Other Contributing Circ Not Listed			Past the Outside Shoulder of Primary Trafficway
ED39812	Farm Tractor and/or Farm equipment	Passenger Car	Not at Intersection and Not Related	Clear	Snow/Slush	Daylight	One parked--one moving	Going Straight Ahead	Legally Parked, Unoccupied	South	North			Unknown Distraction		None	Outside Shoulder of Primary Trafficway
EC81009	Not Stated	Passenger Car	Not at Intersection and Not Related	Clear	Dry	Dawn	One parked--one moving	Going Straight Ahead	Legally Parked, Unoccupied	Northwest	Southeast			Unknown Distraction		None	Outside Shoulder of Primary Trafficway
EF30083	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped at Signal or Stop Sign	West	East	West	Vehicle Stopped	Follow Too Closely		None	Lane of Primary Trafficway
3879708	Pickup,Panel Truck or Vanette under 10,000 lb	School Bus	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Going Straight Ahead	Making Right Turn	North	South	West	South	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway
EB15589	Passenger Car		Not at Intersection and Not Related	Overcast	Dry	Daylight	Tree or Stump (stationary)	Going Straight Ahead		South	North			Other Distractions			Past Right Shoulder Increasing Milepost
EA21332	Passenger Car		Not at Intersection and Not Related	Clear	Dry	Dark-No Street Lights	Domestic animal (horse, cow, sheep, etc)	Going Straight Ahead		South	North			None			Lane 1 Increasing Milepost
ED06140	Passenger Car		Not at Intersection and Not Related	Clear	Dry	Dark-Street Lights On	Culvert and/or other Appurtenance in Ditch	Negotiating a Curve		East	West			Other Contributing Circ Not Listed			Past Right Shoulder Increasing Milepost
EB24270	Passenger Car	Not Stated	Not at Intersection and Not Related	Clear	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - rear-en	Going Straight Ahead	Going Straight Ahead	South	North	South	North	None		Other Contributing Circ Not Listed	Lane 1 Increasing Milepost
EE65198	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped for Traffic	North	South	Vehicle Stopped	Vehicle Stopped	Other Distractions		None	Lane 1 Decreasing Milepost
EB23134	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	East	West	North	South	Did Not Grant RW to Vehicle		None	Lane 1 Decreasing Milepost
EA31837	Pickup,Panel Truck or Vanette under 10,000 lb		At Intersection and Related	Clear	Dry	Dark-No Street Lights	Street Light Pole or Base	Making Left Turn		East	South			Physically Impaired			Past Right Shoulder Decreasing Milepost
ED05275	Passenger Car	School Bus	At Intersection and Related	Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped at Signal or Stop Sign	South	North	South	Vehicle Stopped	Follow Too Closely		None	Lane 1 Increasing Milepost
EA77972	Passenger Car	Truck & Trailer	At Intersection and Related	Clear	Ice	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	West	East	East	West	Under Influence of Alcohol		None	Lane 1 Decreasing Milepost
EF47296	Passenger Car	Passenger Car	At Intersection and Related	Raining	Wet	Other	Entering at angle	Going Straight Ahead	Going Straight Ahead	West	East	North	South	Did Not Grant RW to Vehicle		None	Lane 1 Decreasing Milepost
EC20364	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Did Not Grant RW to Vehicle		None	Lane 1 Decreasing Milepost
EB17711	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	South	North	East	West	Did Not Grant RW to Vehicle		None	Lane 1 Increasing Milepost
ED07016	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Snowing	Snow/Slush	Dark-Street Lights Off	Entering at angle	Making Right Turn	Stopped for Traffic	East	North	Vehicle Stopped	Vehicle Stopped	Exceeding Reas. Safe Speed		None	Intersecting Road Decreasing Milepost
EA35641	Pickup,Panel Truck or Vanette under 10,000 lb		Not at Intersection and Not Related	Clear	Dry	Daylight	Boulder (stationary)	Going Straight Ahead		East	West			Under Influence and Alcohol or Dr	Operating Recklessly or Aggressively		Past Right Shoulder Increasing Milepost
EC99043	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Overcast	Dry	Dawn	Entering at angle	Making Left Turn	Making Left Turn	North	East	West	North	Did Not Grant RW to Vehicle		None	Lane 1 Decreasing Milepost
EF51446	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersectio	Overcast	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-en	Starting in Traffic Lane	Stopped for Traffic	East	West	East	Vehicle Stopped	Unknown Distraction		None	Lane 1 Decreasing Milepost
EB38245	Passenger Car	Passenger Car	At Intersection and Related	Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped for Traffic	East	West	East	Vehicle Stopped	Distractions Outside Vehicle		None	Lane 1 Decreasing Milepost
EA95280	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway within Major Intersection	Snowing	Snow/Slush	Daylight	Entering at angle	Making Right Turn	Going Straight Ahead	North	West	East	West	Did Not Grant RW to Vehicle		None	Lane 1 Decreasing Milepost
3878553	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-en	Going Straight Ahead	Going Straight Ahead	West	East	West	East	Follow Too Closely		None	Lane 1 Increasing Milepost
3878556	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped for Traffic	East	West	East	West	Follow Too Closely		None	Lane 1 Decreasing Milepost
EF36620	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Clear	Dry	Daylight	From opposite direction - all others	Going Straight Ahead	Going Straight Ahead	West	East	East	West	Apparently Asleep or Fatigued		None	Lane 1 Decreasing Milepost
EC76147	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped for Traffic	East	West	East	Vehicle Stopped	Exceeding Reas. Safe Speed		None	Lane 1 Decreasing Milepost
EC98653	Passenger Car	Passenger Car	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	East	South	West	East	Did Not Grant RW to Vehicle		None	Lane 1 Increasing Milepost
EA84102	Passenger Car	Passenger Car	Not at Intersection and Not Related	Overcast	Wet	Daylight	From opposite direction - all others	Negotiating a Curve	Going Straight Ahead	East	West	West	East	Exceeding Stated Speed Limit		None	Lane 1 Increasing Milepost
EC90342	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-en	Going Straight Ahead	Stopped for Traffic	West	East	East	Vehicle Stopped	Follow Too Closely		None	Lane 1 Increasing Milepost
EA14329	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersectio	Clear	Dry	Daylight	From same direction - both going straight - both moving - rear-en	Going Straight Ahead	Slowing	West	East	West	East	Follow Too Closely		None	Lane 1 Increasing Milepost
EB97185	Passenger Car	Passenger Car	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Right Turn	Going Straight Ahead	South	East	West	East	Did Not Grant RW to Vehicle		None	Lane 1 Decreasing Milepost
EF02301	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersectio	Overcast	Dry	Daylight	From same direction - both going straight - both moving - rear-en	Going Straight Ahead	Slowing	West	East	West	East	Exceeding Reas. Safe Speed		None	Lane 1 Increasing Milepost
EE74481	Passenger Car		Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Fence	Negotiating a Curve		East	North			None			Past Right Shoulder Increasing Milepost
EC76926	Passenger Car		Not at Intersection and Not Related	Clear	Dry	Daylight	Earth Bank or Ledge	Going Straight Ahead		West	East			Under Influence of Alcohol			Past Right Shoulder Decreasing Milepost
ED74495	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	East	South	East	West	Did Not Grant RW to Vehicle		None	Lane 1 Increasing Milepost

Appendix D:

Summary LOS Worksheets

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	19	142	50	85	80	5	53	27	135	8	32	17
Future Vol, veh/h	19	142	50	85	80	5	53	27	135	8	32	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	154	54	92	87	5	58	29	147	9	35	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	92	0	0	209	0	0	512	500	182	485	524	90
Stage 1	-	-	-	-	-	-	223	223	-	274	274	-
Stage 2	-	-	-	-	-	-	289	277	-	210	250	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1502	-	-	1362	-	-	472	473	861	493	458	968
Stage 1	-	-	-	-	-	-	780	719	-	732	683	-
Stage 2	-	-	-	-	-	-	719	681	-	792	700	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1502	-	-	1362	-	-	391	432	861	350	418	968
Mov Cap-2 Maneuver	-	-	-	-	-	-	391	432	-	350	418	-
Stage 1	-	-	-	-	-	-	767	708	-	679	634	-
Stage 2	-	-	-	-	-	-	619	632	-	620	689	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.67	3.92	12.38	13.45
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	404	861	154	-	-	890	-	-	488
HCM Lane V/C Ratio	0.215	0.17	0.014	-	-	0.068	-	-	0.127
HCM Ctrl Dly (s/v)	16.3	10	7.4	0	-	7.8	0	-	13.5
HCM Lane LOS	C	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.8	0.6	0	-	-	0.2	-	-	0.4

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	46	239	156	57	18	14
Future Vol, veh/h	46	239	156	57	18	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	160	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	260	170	62	20	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	232	0	-	0	529	170
Stage 1	-	-	-	-	170	-
Stage 2	-	-	-	-	360	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1336	-	-	-	510	874
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	706	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1336	-	-	-	488	874
Mov Cap-2 Maneuver	-	-	-	-	488	-
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	706	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	1.26	0	11.32
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	291	-	-	-	605
HCM Lane V/C Ratio	0.037	-	-	-	0.058
HCM Ctrl Dly (s/v)	7.8	0	-	-	11.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	22	35	59	182	31	51
Future Vol, veh/h	22	35	59	182	31	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	38	64	198	34	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	62	0	369	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	326	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1541	-	631	1027
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	731	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1541	-	602	1027
Mov Cap-2 Maneuver	-	-	-	-	602	-
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	697	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.82	9.99
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	811	-	-	441	-
HCM Lane V/C Ratio	0.11	-	-	0.042	-
HCM Ctrl Dly (s/v)	10	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	48	278	255	81	36	19
Future Vol, veh/h	48	278	255	81	36	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	302	277	88	39	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	365	0	-	0	728	321
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	407	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1193	-	-	-	391	720
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	672	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1193	-	-	-	370	720
Mov Cap-2 Maneuver	-	-	-	-	370	-
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	672	-

Approach	EB	WB	SE
HCM Ctrl Dly, s/v	1.2	0	14.35
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1
Capacity (veh/h)	265	-	-	-	445
HCM Lane V/C Ratio	0.044	-	-	-	0.134
HCM Ctrl Dly (s/v)	8.2	0	-	-	14.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	25	190	70	135	115	5	80	35	195	10	45	20
Future Vol, veh/h	25	190	70	135	115	5	80	35	195	10	45	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	207	76	147	125	5	87	38	212	11	49	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	130	0	0	283	0	0	742	723	245	701	758	128
Stage 1	-	-	-	-	-	-	299	299	-	421	421	-
Stage 2	-	-	-	-	-	-	443	424	-	280	337	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1455	-	-	1280	-	-	332	353	794	353	336	922
Stage 1	-	-	-	-	-	-	710	666	-	610	589	-
Stage 2	-	-	-	-	-	-	594	587	-	727	641	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1455	-	-	1280	-	-	236	302	794	198	288	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	302	-	198	288	-
Stage 1	-	-	-	-	-	-	694	651	-	535	516	-
Stage 2	-	-	-	-	-	-	460	514	-	490	627	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.66	4.33	19.04	19.55
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	253	794	150	-	-	945	-	-	328
HCM Lane V/C Ratio	0.494	0.267	0.019	-	-	0.115	-	-	0.248
HCM Ctrl Dly (s/v)	32.4	11.2	7.5	0	-	8.2	0	-	19.6
HCM Lane LOS	D	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.5	1.1	0.1	-	-	0.4	-	-	1

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	320	225	95	35	30
Future Vol, veh/h	75	320	225	95	35	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	160	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	82	348	245	103	38	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	348	0	-	0	755	245
Stage 1	-	-	-	-	245	-
Stage 2	-	-	-	-	511	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1211	-	-	-	376	794
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	602	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1211	-	-	-	345	794
Mov Cap-2 Maneuver	-	-	-	-	345	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	602	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	1.55	0	14.09
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	342	-	-	-	467
HCM Lane V/C Ratio	0.067	-	-	-	0.151
HCM Ctrl Dly (s/v)	8.2	0	-	-	14.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Intersection	
Int Delay, s/veh	3.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	270	85	140	275	45	75
Future Vol, veh/h	270	85	140	275	45	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	293	92	152	299	49	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	386	0	943	340
Stage 1	-	-	-	-	340	-
Stage 2	-	-	-	-	603	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1173	-	291	703
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	546	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1173	-	246	703
Mov Cap-2 Maneuver	-	-	-	-	246	-
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	461	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	2.88	17.63
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	414	-	-	607	-
HCM Lane V/C Ratio	0.315	-	-	0.13	-
HCM Ctrl Dly (s/v)	17.6	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0.4	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	70	400	405	135	65	30
Future Vol, veh/h	70	400	405	135	65	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	435	440	147	71	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	587	0	-	0	1101	514
Stage 1	-	-	-	-	514	-
Stage 2	-	-	-	-	587	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	988	-	-	-	235	561
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	556	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	988	-	-	-	211	561
Mov Cap-2 Maneuver	-	-	-	-	211	-
Stage 1	-	-	-	-	540	-
Stage 2	-	-	-	-	556	-

Approach	EB	WB	SE
HCM Ctrl Dly, s/v	1.33	0	27.32
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1
Capacity (veh/h)	268	-	-	-	263
HCM Lane V/C Ratio	0.077	-	-	-	0.393
HCM Ctrl Dly (s/v)	8.9	0	-	-	27.3
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	1.8

Intersection	
Int Delay, s/veh	25.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	25	205	80	250	130	10	80	40	285	15	55	20
Future Vol, veh/h	25	205	80	250	130	10	80	40	285	15	55	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	223	87	272	141	11	87	43	310	16	60	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	310	0	0	1035	1016	266	989	1054	147
Stage 1	-	-	-	-	-	-	321	321	-	690	690	-
Stage 2	-	-	-	-	-	-	715	696	-	299	364	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1429	-	-	1251	-	-	210	238	772	226	226	900
Stage 1	-	-	-	-	-	-	691	652	-	435	446	-
Stage 2	-	-	-	-	-	-	422	443	-	710	624	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1429	-	-	1251	-	-	108	177	772	81	168	900
Mov Cap-2 Maneuver	-	-	-	-	-	-	108	177	-	81	168	-
Stage 1	-	-	-	-	-	-	675	637	-	332	340	-
Stage 2	-	-	-	-	-	-	259	338	-	387	609	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.61	5.56	57.18	52.42
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	124	772	137	-	-	1138	-	-	168
HCM Lane V/C Ratio	1.05	0.401	0.019	-	-	0.217	-	-	0.581
HCM Ctrl Dly (s/v)	162.7	12.7	7.6	0	-	8.7	0	-	52.4
HCM Lane LOS	F	B	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	7.4	1.9	0.1	-	-	0.8	-	-	3.1

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	65	440	345	140	55	45
Future Vol, veh/h	65	440	345	140	55	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	160	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	478	375	152	60	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	995	375
Stage 1	-	-	-	-	375	-
Stage 2	-	-	-	-	620	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1040	-	-	-	272	671
Stage 1	-	-	-	-	695	-
Stage 2	-	-	-	-	537	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1040	-	-	-	246	671
Mov Cap-2 Maneuver	-	-	-	-	246	-
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	537	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	1.12	0	20.19
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	232	-	-	-	345
HCM Lane V/C Ratio	0.068	-	-	-	0.315
HCM Ctrl Dly (s/v)	8.7	0	-	-	20.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.3

Intersection	
Int Delay, s/veh	16.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	380	115	250	425	65	105
Future Vol, veh/h	380	115	250	425	65	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	413	125	272	462	71	114

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	538	0	1481	476
Stage 1	-	-	-	-	476	-
Stage 2	-	-	-	-	1005	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1030	-	138	589
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	354	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1030	-	89	589
Mov Cap-2 Maneuver	-	-	-	-	89	-
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	228	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	3.61	113.77
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	187	-	-	667	-
HCM Lane V/C Ratio	0.987	-	-	0.264	-
HCM Ctrl Dly (s/v)	113.8	-	-	9.7	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	8.2	-	-	1.1	-

Intersection	
Int Delay, s/veh	33.7

Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	105	515	630	200	110	65
Future Vol, veh/h	105	515	630	200	110	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	114	560	685	217	120	71

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	902	0	-	0	1582	793
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	788	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	753	-	-	-	120	388
Stage 1	-	-	-	-	445	-
Stage 2	-	-	-	-	448	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	753	-	-	-	~ 93	388
Mov Cap-2 Maneuver	-	-	-	-	~ 93	-
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	448	-

Approach	EB	WB	SE
HCM Ctrl Dly, s/v	1.8	0	$ 306.75
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1
Capacity (veh/h)	305	-	-	-	130
HCM Lane V/C Ratio	0.151	-	-	-	1.462
HCM Ctrl Dly (s/v)	10.6	0	-	-	$ 306.7
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.5	-	-	-	13

Notes	
~: Volume exceeds capacity	$: Delay exceeds 300s
+: Computation Not Defined	*: All major volume in platoon