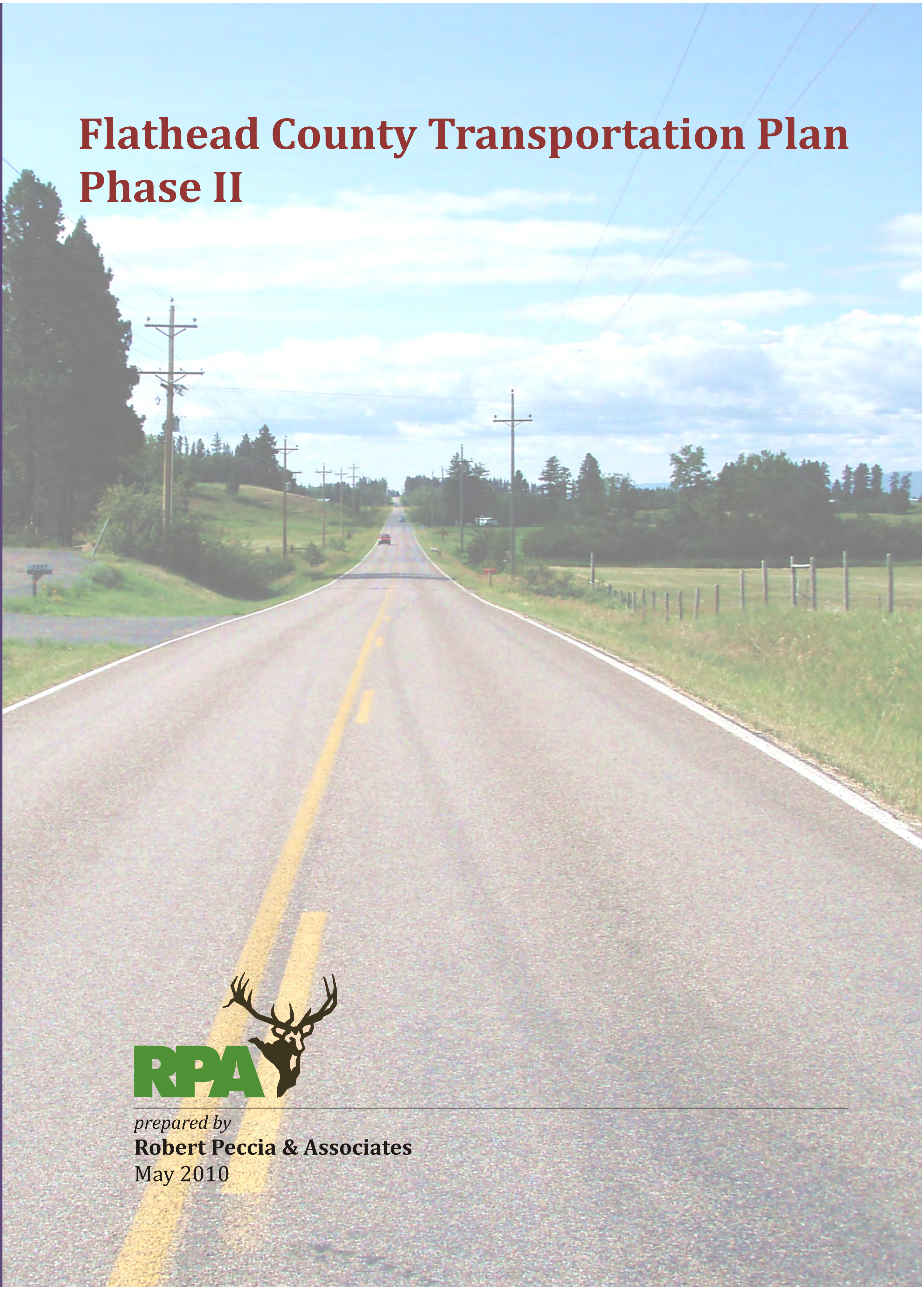


Flathead County Transportation Plan Phase II

prepared by

Robert Peccia & Associates

May 2010

Flathead County

TRANSPORTATION PLAN – PHASE II

May 2010

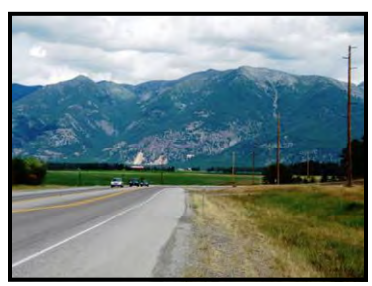
Prepared For:

FLATHEAD COUNTY PLANNING AND ZONING

Kalispell, Montana

In Cooperation With:

MONTANA DEPARTMENT OF TRANSPORTATION



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Definitions

Access Management/Control – Controlling or limiting the types of access or the locations of access on major roadways to help improve the carrying capacity of a roadway, reduce potential conflicts, and facilitate proper land usage.

Average Daily Traffic (ADT) – The total amount of traffic observed, counted or estimated during a single, 24-hour period.

Annual Average Daily Traffic (AADT) – The average daily traffic averaged over a full year.

Americans with Disabilities Act (ADA) – The Federal regulations which govern minimum requirements for ensuring that transportation facilities and buildings are accessible to individuals with disabilities.

Bikeway – Any road, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Bike Path – A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right of way or within an independent right of way.

Bike Lane – A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bike Route – A segment of a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers, with or without a specific bicycle route number.

Capacity – The maximum sustainable flow rate at which vehicles can be expected to traverse a roadway during a specific time period given roadway, geometric, traffic, environmental, and control conditions. Capacity is usually expressed in vehicles per day (vpd) or vehicles per hour (vph).

Collector Roads – Provides for land access and traffic circulation between residential neighborhoods, and commercial and industrial areas. They provide for the equal priority of the movement of traffic, coupled with access to residential, business and industrial areas.

Congested Flow – A traffic flow condition caused by a downstream bottleneck.

Context Sensitive Design (CSD) – A concept in transportation planning and highway design that integrates transportation infrastructure improvements to the context of the adjacent land uses and functions, with a greater sensitivity to transportation impacts on the environment and communities being realized.

Delay – The additional travel time experienced by a driver, passenger, or pedestrian.

Facility – A length of highway composed of connected section, segments, and points.

Level of Service (LOS) – A qualitative measure of how well an intersection or road segment is operating based on traffic volume and geometric conditions. The level of service "scale" represents the full range of operating conditions. The scale is based on the ability of an intersection or street segment to accommodate the amount of traffic using it, and can be used for both existing and projected conditions. The scale ranges from "A" which indicates little, if any, vehicle delay, to "F" which indicates significant vehicle delay and traffic congestion.

Local Road – Comprises all facilities not included in a higher system. Its primary purpose is to permit direct access to abutting lands and connections to higher systems. Usually through-traffic movements are intentionally discouraged. Posted speed limits on local roads typically range from 25 mph to 35 mph and designed for less than 3000 vehicles per day.

Major Street Network (MSN) – The network of roadways defined for the Transportation Plan effort that include the interstate, principal arterials, minor arterials, collectors and some local streets.

Minor Arterial Road – Interconnects with and augments the Principal Arterial system. It also provides access to lower classifications of roads on the system and may allow for traffic to directly access destinations. They provide for movement within sub-areas of the city, whose boundaries are largely defined by the Principal Arterial road system. They serve through traffic, while at the same time providing direct access for commercial, industrial, office and multifamily development but, generally, not for single-family residential properties. The purpose of this classification of road is to increase traffic mobility by connecting to both the Principal Arterial system and also providing access to adjacent land uses.

Multi-modal – A transportation facility for different types of users or vehicles, including passenger cars and trucks, transit vehicles, bicycles, and pedestrians.

Oversaturation – A traffic condition in which the arrival flow rate exceeds capacity on a roadway lane or segment.

Peak Hour – A design criterion based on the worse 15 minute condition used to represent the hour of greatest traffic flow at an intersection or on a road segment. Typically broken down into AM and PM peak hours.

Principal Arterial Road – Is the basic element of a road system. All other functional classifications supplement the Principal Arterial network. Direct access is minimal and controlled. The purpose of a principal arterial is to serve the major centers of activity, the highest traffic volume corridors, and the longest trip distances. This classification of roads carries a high proportion of the total traffic within an urban area. The major purpose is to provide for the expedient movement of traffic.

Road Failure – This can refer to two different conditions: 1) a condition by which a road has reached maximum capacity, or 2) a condition by which a road has experienced structural failure.

Running speed – The actual vehicle speed while the vehicle is in motion (travel speed minus delay).

Service Life – The design life span of roadway based on capacity or physical characteristics.

Transportation Analysis Zone (TAZ) – Geographical zones identified throughout the study area based on land use characteristics and natural physical features for use in the traffic model developed for this project.

Transportation Demand Management (TDM) - Programs designed to maximize the people-moving capability of the transportation system by increasing the number of persons in a vehicle, or by influencing the time of, or need to, travel.

Travel speed – The speed at which a vehicle travels between two points including all intersection delay.

Volume to Capacity (V/C) Ratio – A qualitative measure comparing a roads theoretical maximum capacity to the existing (or future) volumes. Commonly described as the result of the flow rate of a roadway lane divided by the capacity of the roadway lane.

Acronyms

AASHTO	**A**merican **A**ssociation of **S**tate **H**ighway and **T**ransportation **O**fficials
ADT	**A**verage **D**aily **T**raffic
CIP	**C**apital **I**mprovement **P**rogram
CSS	**C**ontext **S**ensitive **S**olutions
CTEP	**C**ommunity **T**ransportation **E**nhancement **P**rogram
E+C	**E**xisting plus **C**ommitted
FHWA	**F**ederal **H**ighway **A**dministration
HCM	**H**ighway **C**apacity **M**anual
HCS	**H**ighway **C**apacity **S**oftware
ITE	**I**nstitute of **T**ransportation **E**ngineers
LOS	**L**evel **o**f **S**ervice
MDT	**M**ontana **D**epartment of **T**ransportation
MSN	**M**ajor **S**treet **N**etwork
MUTCD	**M**anual on **U**niform **T**raffic **C**ontrol **D**evices
NAICS	**N**orth **A**merican **I**ndustry **C**lassification **S**ystem
NHS	**N**ational **H**ighway **S**ystem
PATHS	**P**eople for **A**thletics, **T**ravel, **H**ealth, & **S**afety
SAFETEA-LU	**S**afe, **A**ccountable, **F**lexible, **E**fficient **T**ransportation **E**quity **A**ct: A **L**egacy for **U**sers
STIP	**S**tate **T**ransportation **I**mprovement **P**roject
TDM	**T**ransportation **D**emand **M**anagement
TEA-21	**T**ransportation **E**fficiency **A**ct for the **21**st Century
TIP	**T**ransportation **I**mprovement **P**rogram
TSM	**T**ransportation **S**ystem **M**anagement

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Executive Summary

This Transportation Plan is intended to offer guidance for the decision makers in Flathead County. It contains an analysis of the transportation system in Flathead County including an examination of the traffic operations, road network, non-motorized transportation alternatives, transportation demand management, and growth management techniques. This document also identifies the problems with the various transportation systems and offers recommendations in the form of improvement projects and progressive programs that will help to improve conditions and/or meet future needs.

The development and implementation of a Transportation Plan is a good tool for managing growth and accommodating development needs. Not only do Transportation Plans provide analysis and mitigation for the existing transportation system currently being utilized, they also provide an opportunity to try and predict future growth; where it is likely to happen, when it is likely to happen, and how much of it is likely to occur. More importantly, by predicting this growth local officials can be primed to deal with the increasing transportation demands before infrastructure problems become apparent. By identifying transportation system needs early on, planners and community leaders can begin to plan and program needed infrastructure improvements important to the transportation system.

Flathead County experienced rapid population growth rates during the late 1990's and early 2000's. The recent economic downturn, however, has slowed development rates considerably and has resulted in high unemployment rates. While the coming years may see minimal amounts of growth, if any at all, it is only a matter of time before new development pressures are experienced. A Transportation Plan provides the means of addressing existing impacts of growth, while at the same time allows for comprehensive planning for the future.

Growth within Flathead County was projected using a computer traffic model. The model used socioeconomic data and growth trends to project future traffic volumes and conditions, as presented in **Chapter 3** and **Chapter 4**. These projected traffic volumes were used to identify future traffic conditions within the area. A future analysis year of 2030 was picked to represent an arbitrary point in time. If development happens faster or slower than was predicted in this Transportation Plan, the recommendations and conclusions made will still be valid; only the date at which they are needed will change. The actual rate of development will ultimately determine which projects are needed and when they will be necessary.

Generally the biggest task is to make sure appropriate infrastructure is in place to accommodate the anticipated growth over the planning horizon. Several major travel corridors will be pushed to their limits in the coming years. Additionally, as the City of Kalispell grows and contemplates property annexation, many currently now rural roadways will become urban roadways.

It should be noted that Transportation Plans for Kalispell and Whitefish were recently completed and deal directly with the areas in and around the city limits. This Plan recognizes these previous planning efforts and does not attempt to reanalyze the areas contained in the Kalispell and Whitefish Transportation Plans. The focus area of the Flathead County Transportation Plan is mainly on the areas expected to be most affected by future growth outside of the city limits.

A detailed review was conducted of current and anticipated future conditions along twelve study corridors and sixteen study intersections to determine where problems currently exist or potentially may exist in the future. Project recommendations were specifically aimed at improving issues identified along these study corridor and study intersections. These infrastructure project recommendations are contained in **Chapter 7** of this plan and are split into two categories based on estimated cost; 1) Transportation System Management (TSM) improvements, 2) Major Street Network (MSN) improvements.

TSM projects have an estimated cost of less than $500,000 and focus mainly on intersection improvements, such as the addition of turn lanes, traffic signals, or other modifications. A total of twenty-three (23) TSM projects are recommended in this Plan. MSN projects, by comparison, have estimated costs of greater than $500,000 and focus on upgrading entire road corridors or the construction of new roadways. A total of ten (10) MSN projects are recommended in this Plan.

In addition to recommended projects, this Plan considers policy and procedural actions for both motorized and non-motorized travel. **Chapter 6** provides information for miscellaneous transportation system considerations, including access management, transportation demand management, complete streets, gravel to pavement program, and impact fees. **Chapter 5** discusses various traffic calming techniques. **Chapter 8** deals with alternative travel modes and gives guidance on various non-motorized accommodations.

One of the most important components of this Plan is a projection of the major street network. A map showing this projection is presented in **Chapter 7** and identifies where the arterial and collector routes in the study area should be located as the area develops. This projection provides a blueprint of how the road network should be developed and is essential for county planners. It enables the planners to locate future corridors and to request appropriate amounts of right-of-way throughout the development process, thus allowing the county to create a logical and functional road network for the future. It is important to note that identifying the desired general alignment of future road corridors is significantly different from building roads to encourage development.

The cost of the recommended improvement projects far exceeds the funds available through the federal-aid programs that are traditionally used to finance transportation improvements as defined in **Chapter 9**. Many projects will need to be financed by the private sector during the development process. The TSM projects should be completed as needed and as funding allows. Implementation of the TSM projects will keep most of the transportation system functioning at a satisfactory level during the planning horizon.

The tables on the following pages show the recommended projects from **Chapter 7** along with their corresponding priority. The priority ranking system discussed below was developed to provide a broad idea about general need for each project and is not intended to be binding in any way. "A" priority projects are of the highest priority and should be completed as soon as funding is available. These projects are immediate need projects and are recommended to address existing safety, geometric, level of service, or traffic flow issues. "B" priority projects are of medium priority and are not considered immediate need projects. These projects are recommended to address anticipated future traffic issues related to failing levels of service, safety, geometric, or traffic flow problems generally occurring along high growth corridors. These projects are likely going to be needed at some point in the future to accommodate anticipated growth. "C" priority projects are of low priority and are considered long-term future project considerations. These projects are recommended to be constructed at the time of development and are only necessary if development occurs in the area. These projects would serve specific localized development areas.

While these tables show recommended project prioritization, changes in traffic conditions or future development may alter actual project need. The recommended project prioritization contained herein is only intended to provide a general idea of project need at the time this Plan was developed. Actual project implementation will need to be determined on a case-by-case basis by local authority.

Table ES.1: TSM Recommended Project Prioritization

Project ID	Project Title / Description	Priority
TSM-1	Auction Road / Demersville Road ▪ Realign intersection	C
TSM-2	Batavia Lane / US Highway 2 ▪ Install control device ▪ Realign intersection ▪ Install southbound right-turn lane	A
TSM-3	Beach Drive / Holt Drive ▪ Realign intersection	C
TSM-4	Best Way / Truck Route ▪ Modify corner radii	C
TSM-5	Church Drive / Prairie View Road ▪ Realign intersection	B
TSM-6	Columbia Falls Stage / Hellman Lane ▪ Realign intersection	C
TSM-7	Columbia Falls Stage / Kelley Road ▪ Realign intersection	B
TSM-8	Columbia Falls Stage / River Road ▪ Realign intersection	B
TSM-9	East Reserve Drive / US Highway 2 ▪ Install turn lanes ▪ Add protected turn phasing	A
TSM-10	Fairmont Road / MT Highway 35 ▪ Install turn lanes ▪ Install traffic control device	A
TSM-11	Foothills Road / Bachelor Grade Road ▪ Realign intersection	B
TSM-12	Foothills Road / Jewel Basin Road ▪ Realign intersection	C
TSM-13	Helena Flats Road / East Evergreen Drive ▪ Trim vegetation	C
TSM-14	Helena Flats Road / East Reserve Drive ▪ Relocate fence along northwest corner	C
TSM-15	Helena Flats Road / MT Highway 35 ▪ Install traffic signal control device	B
TSM-16	Hodgson Road / US Highway 93 ▪ Install advance intersection warning sign	A
TSM-17	Hodgson Road / Whitefish Stage ▪ Realign intersection	C
TSM-18	Kila Road / US Highway 2 ▪ Realign intersection ▪ Install southbound left-turn lane	B
TSM-19	Lake Blaine Road / Foothills Road ▪ Realign intersection	C

TSM-20	Lower Valley Road / Foys Bend Lane ▪ Realign intersection	**C**
TSM-21	West Springcreek Road / US Highway 2 ▪ Install traffic control device	**A**
TSM-22	West Valley Drive / Three Mile Drive ▪ Modify existing traffic control	**C**
TSM-23	Whitefish Stage / West Evergreen Drive ▪ Install traffic control device	**A**

A = Immediate need (high priority); **B** = Near future need (medium priority); **C** = Long-term need (low priority)

Table ES.2: MSN Recommended Project Prioritization

Project ID	Project Title / Description	Priority
MSN-1	Ashley Lake Road (US Highway 2 to North Ashley Lake Road) ▪ Pave corridor	**C**
MSN-2	Church Drive (Farm to Market Road to Whitefish Stage Road) ▪ Upgrade to minor arterial	**C**
MSN-3	Columbia Falls Stage / River Road (MT Highway 35 to US Highway 2) ▪ Upgrade to rural major collector	**B**
MSN-4	East Reserve Drive (US Highway 2 to Helena Flats Road) ▪ Upgrade to urban minor arterial	**A**
MSN-5	Helena Flats Road (MT Highway 35 to East Reserve Drive) ▪ Upgrade to urban minor arterial	**B**
MSN-6	Hodgson Road (US Highway 93 to US Highway 2) ▪ Upgrade to rural major collector	**B**
MSN-7	Holt Stage (MT Highway 35 to Steel Bridge Road) ▪ Upgrade to rural major collector	**B**
MSN-8	Kila Road (northern intersection with US Highway 2 to Smith Lake Road) ▪ Upgrade to rural major collector	**C**
MSN-9	Lake Blaine Road (MT Highway 35 to Foothills Road) ▪ Upgrade to rural major collector	**B**
MSN-10	LaSalle Road / Conrad Drive Connection (Conrad Drive to MT Highway 35 / US Highway 2 Intersection ▪ Construct new extension between Conrad Drive and MT Highway 35 / US Highway 2 intersection	**C**

A = Immediate need (high priority); **B** = Near future need (medium priority); **C** = Long-term need (low priority)

It should be noted that the projects shown in these tables are for motorized recommendations only. While this Transportation Plan does not make specific non-motorized project recommendations, every effort needs to be made to implement non-motorized projects whenever possible. This plan acknowledges the Flathead County Trails Plan which was in development stages at the time of publication of this transportation plan. Any bicycle/pedestrian pathway policies and goals in the Transportation Plan need to support and complement the final Trails Plan.

Lastly, although this Transportation Plan is a tool that can be used to guide development of the transportation system in the future, local and state planners must continually re-evaluate the findings and recommendations in this document as growth is realized and development occurs. If growth within the county occurs in a manner different than was assumed for this Plan, the transportation needs may be different from those analyzed in this Plan. An update and re-evaluation of this document should occur every five years, at a minimum, for at least a cursory review to determine how implementation of the county's transportation system is progressing. Again, it should be stated that the recommendations made in this Plan are intended for guidance purposes only and any specific project implementation will need to be reviewed on a case-by-case basis to determine project validity.

CHAPTER 1

INTRODUCTION AND BACKGROUND

Chapter 1: Introduction and Background

1.1 INTRODUCTION

Flathead County experienced high development growth rates, comprised of a mixture of commercial, residential, industrial, retail and office, during the late 1990's and early 2000's. Resultant transportation demands from this growth, coupled with existing transportation system constraints, have necessitated the development of a county Transportation Plan. Recent economic conditions, however, have slowed development rates considerably and have resulted in high unemployment rates and few new development projects. While current conditions are resulting in significantly fewer developments, it is only a matter of time before new development pressures in Flathead County are experienced again. As such, this Transportation Plan was developed to help address the existing impacts of growth while also planning for the future.

This plan is ultimately intended to offer guidance for the decision-makers in the greater Flathead County. It contains a multi-modal analysis of the transportation system in the county outside of the incorporated cities. This Plan includes an examination of the traffic operations, road network, transit services, non-motorized transportation alternatives and growth management techniques that will help encourage the use of alternative modes of travel. This document also identifies the problems with the various transportation systems and offers recommendations in the form of improvement projects and progressive programs that will relieve existing problems and/or meet future needs.

1.2 PROJECT BACKGROUND

Comprehensive transportation planning has not been previously undertaken for the Flathead County outside of the incorporated cities. Presently, Kalispell, Whitefish and the surrounding Flathead County are experiencing the slowdown of a previously aggressive growth trend. Residential developments are locating on the fringes of the cities within the county, reaching out to both the northern part of the Flathead Valley (i.e. Church Drive), east towards the Flathead River, and also south to Somers. For the most part, however, most of these residential developments rely on work destinations within the cities (or directly adjacent to the cities). This pattern results in unique travel considerations that places stress on the major roadways and intersections. When the major roadways and intersections begin to fail, local streets begin to see higher traffic volumes and system users begin to experience frustrations as they travel the network. The trends that are currently being established result in inherent limitations, and proper planning to identify these limitations and work towards mitigation is a primary vision of this planning document.

It is important to note the planning efforts currently in the process of becoming a reality: that of the US Highway 93 Bypass. Plans for a bypass have been well known and defined since the original EIS document, and in 2003 a consulting firm was retained by the Montana Department of Transportation (MDT) to develop the project design. As part of the design efforts, a "Re-evaluation" of the approved 1994 EIS was completed which resulted in "*...no significant changed conditions*". This finding allowed the consultants (Stelling Engineers) to continue on with the project and develop design plans.

The first completed portion is known as the “Reserve Loop” and connects Stillwater Road to US Highway 93 just south of Reserve Street. This segment serves an area of the Kalispell community that has seen recent commercial and residential growth. This project has already been constructed and as such was included in the existing conditions model for this planning document.

US Highway 2 South is the next major segment identified for construction. This project plans to construct the interim two-lane Bypass between US Highway 93 (south of Four Corners) to US Highway 2 (near Appleway Drive). The interim project will build two-lanes of the future four-lane road. At-grade access at the future Siderius Commons, Airport and Foys Lake roads will be provided through roundabouts. It is planned that construction start in 2010 on the US Highway 2 South interim project. Funding for this project was made available through the American Recovery and Reinvestment Act. This portion of the US Highway 93 Bypass project was not included in the existing conditions model due to the uncertainty of available funds at the time the traffic model was created. The completed bypass is shown as an alternate scenario and is included in the future Major Street Network model, however.

It is the intent of this planning process and document to build upon neighborhood planning efforts and transit evaluations, with the resulting document providing a comprehensive analysis of the existing transportation system, future growth and socio-economic considerations, and recommended improvements to the area road network and intersections.

1.3 STUDY AREA BOUNDARY

All transportation plans begin by defining the study area. Flathead County is the third largest county in Montana, encompassing approximately 3,361,230 acres. According to the Flathead County Growth Policy, of the total 3,361,230 acres, over 80% is managed by Federal, State or Tribal interests. The remaining land is managed mainly by private landowners. Therefore, for the Flathead County Transportation Plan, the appropriate study area boundary was not expected to encompass the entire jurisdictional limits of Flathead County. It is important to recognize that areas outside of the formal study area boundary will still have an effect on the transportation system within the study area boundary. To that end, land use changes outside of the “formal” boundary are still accounted for and incorporated into the travel demand model, however precise transportation system impacts are not identified for facilities outside of the “formal” study area boundary.

It should be noted that there are several incorporated areas within Flathead County that are excluded from this Plan (Kalispell, Whitefish, and Columbia Falls). Kalispell and Whitefish have recently completed their own comprehensive Transportation Plans. Although the transportation systems in these areas are not being assessed, they contain employment centers that County residents are attracted to, necessitating the need for land use forecasting across jurisdictional areas.

For Flathead County, the study area boundary was developed with two objectives in mind. First, to include land where recent growth has occurred throughout Flathead County or is anticipated to occur in the foreseeable future and second, to include the areas that are subject to the goals and policies of the Flathead County Growth Policy. The study boundary shown on **Figure 1.1** has been used for all aspects of the Flathead County Transportation Plan. This study boundary includes all of the major employers in the County and includes land that may be used for employment centers in the next twenty years. It also includes developing residential land uses in the County and those areas likely to increase the housing supply in the future and subsequently add traffic to the transportation network.

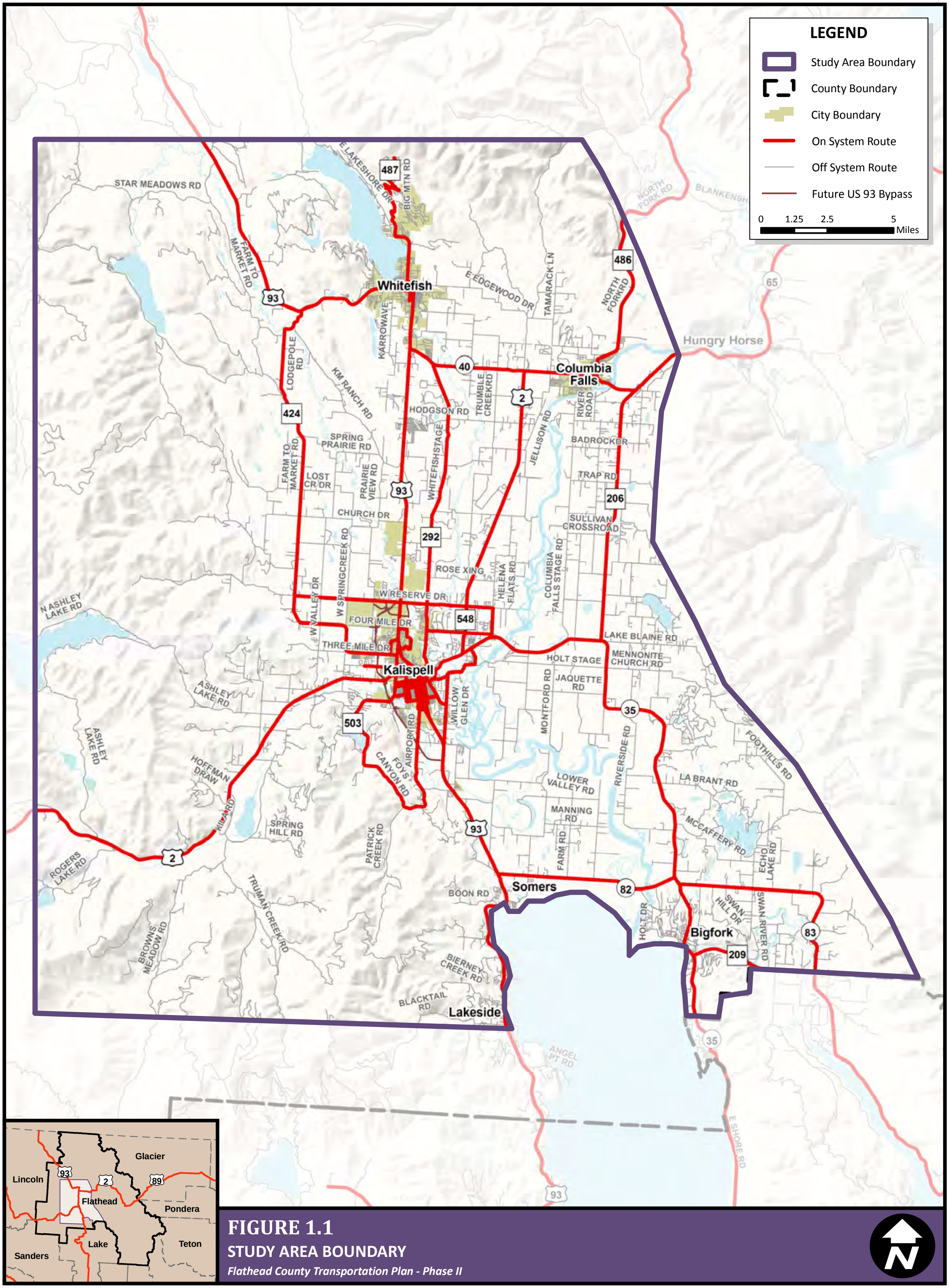


FIGURE 1.1

STUDY AREA BOUNDARY

Flathead County Transportation Plan - Phase II

1.4 GOALS, POLICIES, AND OBJECTIVES

The overall goal of this project is to develop a county-wide Transportation Plan that will address regional transportation issues, overall travel convenience, traffic safety, and property access. The Plan will include recommendations for short-term Transportation System Management (TSM) improvements as well as recommended modifications and capital improvements to the “Major Street Network (MSN)”. The Plan will address all modes of transportation in a balanced attempt to meet the current and future transportation needs of Flathead County while complying with state and federal requirements.

The Flathead County Growth Policy addressed transportation related issues by developing three general goals coupled with numerous policies specific to each goal. Additionally, existing Neighborhood Plans also identified transportation related goals and policies that were found to be unique to their plan geographies. The goals and policies of the Growth Policy and neighborhood plans have been thoroughly considered and integrated into the preparation of this Transportation Plan.

The Growth Policy identified the following goals to promote public safety in transportation:

- Maintain safe and efficient traffic flow and mobility on county roadways;
- Develop a quality transportation network to meet present and future needs of the public;
- Identify and support alternative modes of transportation.

Public health and safety and air quality issues have become more prevalent since the approval and adoption of the Growth Policy in March, 2007. Fugitive dust concerns caused by increased vehicle traffic on unpaved roads (i.e. gravel and dirt roads) have intensified as well as the number of dust complaints. In response, the county has initiated a Dust Control program and dedicated considerable resources to reduce the amount of fugitive dust from unpaved roads. The Transportation Plan includes approaches to characterizing and prioritizing unpaved roads for dust abatement, treatment and road improvements. In response to these concerns, a fourth goal specific to this Transportation Plan was developed and focuses on the need to address dust related concerns:

- Reduce fugitive dust caused by increasing vehicle traffic on unpaved county roads.

The following objectives were designed to provide measurable milestones regarding transportation planning and to assist in achieving the goals stated above.

- Plan and implement a logical, efficient, long-range arterial and collector transportation system to ensure that public and private investments in transportation infrastructure support other land use decisions in the county.
- Meet the current and future needs of the county that can be maintained with available resources.
- Provide adequate emergency service access to all residents inside and outside of the Study Area Boundary.
- Develop a “Major Street Network” classifying existing roadways by functional usage (as well as future corridors) within the Study Area Boundary.
- Review the most recent three-year accident history and crash statistics to evaluate potential safety problems and possible mitigation efforts that can improve and/or resolve identified concerns on the existing transportation system.

- Examine population and employment growth trends to assess demographic changes and how those changes may affect transportation system users over the 20-year planning horizon.
- Develop a 20-year traffic model that can be used to predict future transportation system needs as growth occurs within the Study Area Boundary limits.
- Identify current and foreseeable traffic problems.
- Provide for citizen involvement in the planning and implementation of transportation plans and projects.
- Review all existing and on-going planning reports and studies for compatibility.
- Identify funding mechanisms that may be viable alternatives to the traditional funding programs currently used to fund transportation system improvements.
- Make construction of new sidewalks and pathways in areas where they do not currently exist, including rural areas, a high funding priority.
- Make the provision of sidewalks, pathways, and other non-motorized transportation facilities part of a concurrency program and policy.
- Plan for through, continuous streets to the extent possible. When cul-de-sacs are appropriate due to ownership, topography, or other constraints, ensure that a future street extension can be made via a right-of-way dedication, or at the very least, a pedestrian connection.
- Develop a menu of traffic calming measures for use on new and newly reconstructed residential collector streets.

It is recommended for the county-wide Transportation Plan that existing transportation related goals be incorporated from the previously prepared community planning documents, including those developed in the current Growth Policy Update. These documents contain guiding principles used to develop and implement a functioning transportation system in the community. The Growth Policy and incorporated plans and elements, including this Transportation Plan, are guiding documents and are not intended to be used as regulatory documents.

1.5 PREVIOUS TRANSPORTATION PLANNING EFFORTS

In the course of data collection, past plans and studies were obtained. From the review of these documents, applicable issues were incorporated into this plan. The contributing documents are as follows:

- US Highway 93 Bypass Environmental Impact Statement (EIS) Re-evaluation (2005);
- Flathead County Growth Policy (2007);
- Kalispell Growth Policy 2020 (2003);
- Flathead County Subdivision Regulations;
- Kalispell Area Transportation Plan (2006 Update);
- Flathead County Minimum Standards for Design and Construction (2007);
- Flathead County Trails Plan (Ongoing);
- School Bus Routes;
- Postal Routes;
- Locally adopted neighborhood plans, master plans, public facility plans, and related development regulations;
- Eagle Transit Transportation Development Plan Update (2007-2012);
- Montana Department of Transportation STIP and other Local Planning Documents

- U.S. Bureau of Census data;
- City building permits & utility records; and
- Socioeconomic data and projections compiled by the Planning Board, Montana Department of Commerce, and/or University of Montana.

1.6 PUBLIC INVOLVEMENT

Public involvement is a key component to the success of the Flathead County Transportation Plan. The public involvement efforts provided the public and officials with continuing opportunities to be involved in the identification of issues and improvements to the existing and future transportation network. Providing public outreach opportunities served to:

- Educate the public on the critical elements of planning and engineering the county's transportation system;
- Respond to the increasing interest of the general public to participate in planning of the county; and
- Increase the public's investment in our Transportation Plan.

Below is a brief summary of some of the project outreach activities utilized during the development of this Plan.

- **Public Meetings** – Two formal public meetings were held during the study progress. The first meeting focused on informing the public about the Plan including the study area boundary, the roadways, corridors, and intersections being studied. Public comment on any existing transportation system deficiencies and concerns was solicited. The second public meeting was held after the Public draft document was released and during the public comment period. This meeting gave the public the opportunity to review the Draft Plan and provide comments.

- **Public Hearing** – One public hearing will be conducted near the completion of this planning process to obtain formal public comments on the document before the Planning Board.

- **Road Advisory Committee (RAC)** – The Road Advisory Committee (RAC) provided project input for this plan to serve in an advisory capacity and to review and comment on materials over the project's duration. Membership was composed of individuals as noted on the acknowledgements page of this document, and generally included local business owners and citizens.

- **News Releases** – Newspaper articles were used during the planning process to keep the public informed. These news releases were issued prior to public meetings and the public hearing to generate interest and encourage participation.

- **Internet Access** – Developing sections and graphic displays from the report during the study process were made available to the public on the Internet website. These technical memos were posted on the Flathead County Planning Department's web site for public review and comment. This enabled the public to stay abreast of the developments occurring during the planning process. It also provided an opportunity for the public to submit comments.

1.7 COORDINATION SUMMARY

The following tables (**Table 1-1** thru **Table 1-3**) summarize all of the coordination that occurred over the course of this planning project. They encompass all formal and informal meetings, including but not limited to Road Advisory Committee (RAC) meetings, formal public meetings, County Commission and Planning Board meetings, and others.

Table 1.1: Summary of Transportation Coordinating (RAC) Activities

Date	Agency or Individual
12/13/2007	Road Advisory Committee (RAC) Meeting No. 1
2/8/2008	Road Advisory Committee (RAC) Meeting No. 2
6/26/2008	Road Advisory Committee (RAC) Meeting No. 3
7/9/2009	Road Advisory Committee (RAC) Meeting No. 4
11/12/2009	Road Advisory Committee (RAC) Meeting No. 5
12/03/2009	Road Advisory Committee (RAC) Meeting No. 6

Table 1.2: Summary of "Formal" Local Government Outreach Activities

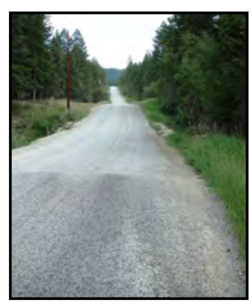
Date	Agency or Individual
2/12/2008	"Kick-Off" Meeting with Flathead County Staff
3/19/2008	Flathead County Planning Board Meeting No. 1
3/20/2008	Flathead County Commission Meeting No. 1
5/22/2008	Flathead County Planning Staff Meeting
8/13/2008	Flathead County Planning Board Meeting No. 2
8/13/2008	Flathead County Commission Meeting No. 2
5/27/2009	Land Use Advisory Committee Meeting
7/8/2009	Flathead County Planning Staff Meeting
7/8/2009	Flathead County Planning Board Meeting No. 3
7/9/2009	Flathead County Commission Meeting No. 3
11/12/2009	Flathead County Planning Board Meeting No. 4
11/12/2009	Flathead County Commission Meeting No. 4
12/03/2009	Flathead County Planning Board Meeting No. 5

Table 1.3: Summary of "Other" Outreach Activities

Date	Agency or Individual
3/18/2008	Flathead Citizen's for Paved Roads (F-CPR)
8/14/2008	Public Information Meeting #1
5/27/2009	Flathead County PATHS Advisory Committee
11/12/2009	Public Information Meeting #2
Various	Bi-Monthly Conference Calls - Flathead County Planning Staff

CHAPTER 2

EXISTING TRANSPORTATION SYSTEM



Chapter 2: Existing Transportation System

2.1 INTRODUCTION

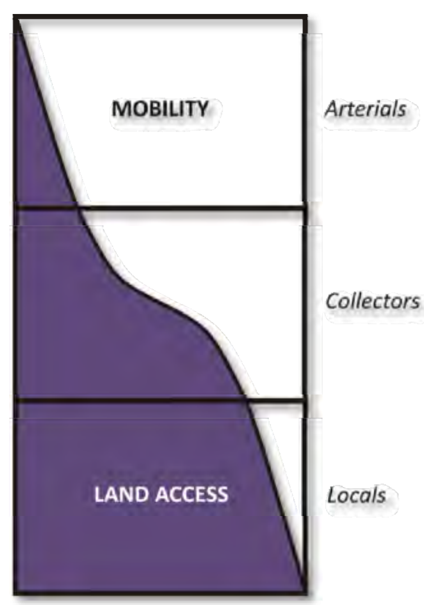
In an effort to clearly understand the existing traffic conditions and determine potential problem areas, it was necessary to gather current information about different aspects of the transportation system.

Existing traffic volume data collected by Flathead County and the Montana Department of Transportation was used to determine average daily traffic (ADT) volumes on major road segments within the county. Additional traffic data was collected by RPA during the development of the *Flathead County Transportation Study – Phase 1* and throughout the development of this Plan. The combination of supplied data and collected data was used to determine current operational characteristics and to identify traffic problems that may exist or are likely to occur within the foreseeable future. Information that was gathered to help evaluate the system included, but was not limited to, the following:

- Existing functional classifications;
- Existing traffic volumes (ADTs);
- Existing roadway corridor conditions;
- Speed data for select corridors;
- Intersection turning movement counts;
- Current intersection control types;
- Traffic crash records.

2.2 EXISTING FUNCTIONAL CLASSIFICATIONS

One of the initial steps in trying to understand an existing transportation system is to first identify what roadways will be evaluated as part of the larger planning process. A transportation system is made up of a hierarchy of roadways, with each roadway being classified by the character of service provided. It is standard practice to examine roadways that are functionally classified as collectors, minor arterials, or principal arterials in a regional transportation plan project. These functional classifications can be encountered in both the "urban" and "rural" setting. **Graphic 2.1** shows the intended use of each functional classification.



Graphic 2.1: Functional classification proportion of service

The reasoning for examining the collector, minor arterial and principal arterial roadways, and not local roadways, is that when the major roadway system (i.e. collectors or above) is functioning to an acceptable level, then the local roadways are not used beyond their intended function. When problems begin to occur on the major roadway system, vehicles and resulting issues begin to infiltrate neighborhood routes (i.e.

local routes). As such, the overall health of a regional transportation system can be typically characterized by the health of the major roadway network.

The roadways being studied under this Transportation Plan, along with the appropriate functional classifications, are shown on **Figure 2.1** and **Figure 2.2**. It should be noted that the functional classifications shown on these figures are recommended as part of the Transportation Plan and do not reflect the "federally approved" functional classification criteria which is based on current conditions rather than anticipated future conditions. The "Federally Approved Functional Classification" system can be seen graphically via maps available at the Montana Department of Transportation's (MDT's) website at the following addresses:

http://www.mdt.mt.gov/other/urban_maps/fc_internet/KALISPELLFUNC.PDF (Kalispell Urban Area)

http://www.mdt.mt.gov/other/urban_maps/fc_internet/WHITEFISHFUNC.PDF (Whitefish Urban Area)

http://www.mdt.mt.gov/travinfo/docs/funct-classification.pdf (State Rural Area)

Roadway functional classifications within rural Flathead County include principal arterials, minor arterials, major and minor collector routes, and local/subdivision roads. The urban areas of Flathead County are also served by a similar hierarchy of streets. However, due to their urban nature, the volumes on these streets are generally higher than in rural areas. Although volumes may differ on urban and rural sections of a street, it is important to maintain coordinated right-of-way standards to allow for efficient operation of urban development. A description of these classifications is provided in the following sections.

Principal Arterial System

Photo 2.1: Highway 35 - Principal Arterial

The purpose of the principal arterial is to serve the major centers of activity, the highest traffic volume corridors, and the longest trip distances. This group of roads carries a high proportion of the total traffic. Most of the vehicles entering and leaving the area, as well as most of the through traffic bypassing a central business district, utilize principal arterials. Significant intra-area travel, such as between central business districts and outlying residential areas, and between major suburban centers, is served by principal arterials.

The spacing between principal arterials may vary from less than one mile in highly developed areas (e.g., the central business district), to five miles or more on the urban fringes. Principal arterials should connect only to other principal arterials or to the interstate system and should not allow for direct residential driveway access.

The major purpose of the principal arterial is to provide for the expedient movement of traffic. Service to abutting land is a secondary concern. Principal arterials should be public roads maintained by the MDT or through agreements with other agencies. Right-of-way widths for arterials should meet MDT standards. The speed limit on a principal arterial could range from 25 to 70 mph depending on the area setting.

Minor Arterial System

The minor arterial street system interconnects with and works in conjunction with the principal arterial system. It accommodates trips of moderate length at a somewhat lower level of travel mobility than principal arterials, and it distributes travel to smaller geographic areas. With an emphasis on traffic mobility, this network includes all arterials not classified as principal arterials. While minor arterials provide access to adjacent lands, direct residential driveway access is not desirable.

Photo 2.2: Whitefish Stage - Minor Arterial

The spacing of minor arterial streets may vary from several blocks to a half-mile in the highly developed areas, to several miles in the suburban fringes. They are not normally spaced more than one mile apart in fully developed areas.

Minor arterials should be public, county or state secondary roads. Easement/right-of-way widths for state minor arterials must meet MDT's standards. Typical easement/right-of-way widths for minor arterials are 80' to 100'. Actual easement/right-of-way standards for Flathead County are identified in the County Road Design Manual. Posted speed limits on minor arterials would typically range between 25 and 70 mph, depending on the setting.

Collector System

Photo 2.3: West Valley Drive - Major Collector

The collector street network serves a dual purpose. It provides equal priority to the movement of traffic, and to the access of residential, business, and industrial areas. This type of roadway differs from those of the arterial system in that collector roadways may access residential neighborhoods. The collector system affords easy access to the arterial system and distributes trips from the arterials to ultimate destinations. The collector streets also collect traffic from local streets in the residential neighborhoods, channeling it into the arterial system. Posted speed limits on urban collectors typically range between 25 and 45 mph; rural collector speed limits can range from 25 to 70 mph depending on setting and roadway surfacing.

Collectors penetrate but should not have continuity through residential neighborhoods. Direct residential driveway access onto collector streets is typically not desirable. The actual location of collectors should be flexible to best serve developing areas and the public.

Photo 2.4: Batavia Lane - Minor Collector

The most important concept is that long segments of continuous collector streets are not compatible with a good functional classification of streets. Long, continuous collectors will encourage through traffic, essentially turning them into arterials. This, in turn, results in the undesirable interface of local streets with arterials, causing safety problems and increased costs of construction and maintenance. The collector street system should intersect arterial streets at a uniform spacing of one to one-quarter mile in order to maintain good progression on the arterial network. Ideally, collectors should be no longer than one to two miles without discontinuities. Collectors are typically dedicated to the public and maintained by the county. Typical easement/right-of-way widths for collectors are 60' to 80'. Actual easement/right-of-way standards for Flathead County are identified in the County Road Design Manual.

Collectors are divided into two categories: minor and major. Major collectors are intended to serve higher traffic volumes than minor collectors which are intended to serve less than 1000 ADT.

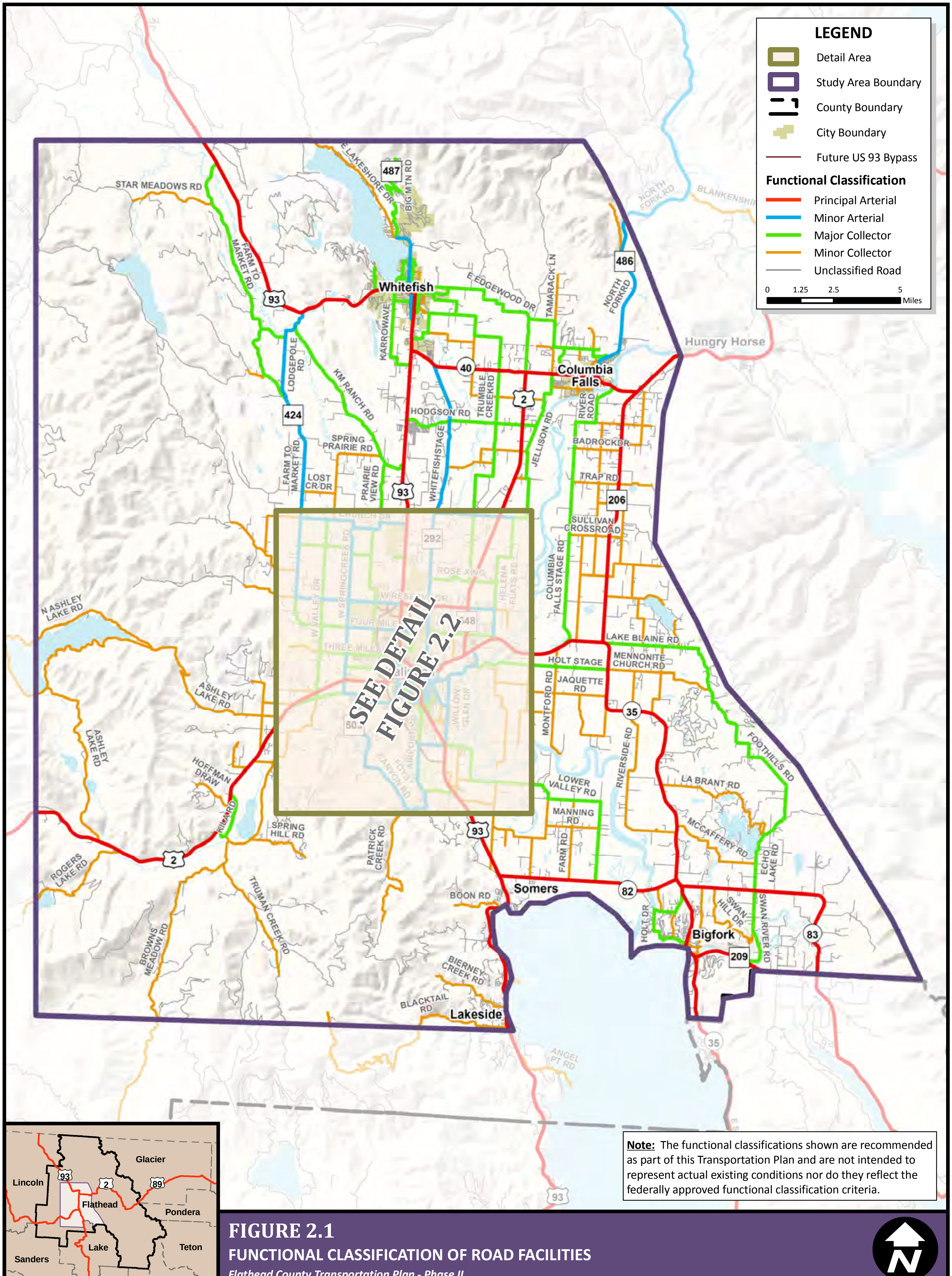
Unclassified Roads

Unclassified roads are all facilities not included in one of the higher systems. These roadways may function as minor collectors, local roads or subdivision roads and their classification is determined on a case-by-case basis.

Subdivision Road System

Photo 2.5: Winchester Street - Local / Subdivision Street

The subdivision road network provides direct access to residential, commercial or industrial lots, or other abutting lands, and connections to higher order systems. These roads typically service subdivisions and through-traffic movement is typically discouraged. Subdivision roads may be internal, located on the perimeter, or external to the subdivision. The minimum easement/right-of-way width for a subdivision road is generally 60 feet. The speed limit on subdivision roads is usually 25 mph or less.



Note: The functional classifications shown are recommended as part of this Transportation Plan and are not intended to represent actual existing conditions nor do they reflect the federally approved functional classification criteria.

FIGURE 2.1
FUNCTIONAL CLASSIFICATION OF ROAD FACILITIES
Flathead County Transportation Plan - Phase II

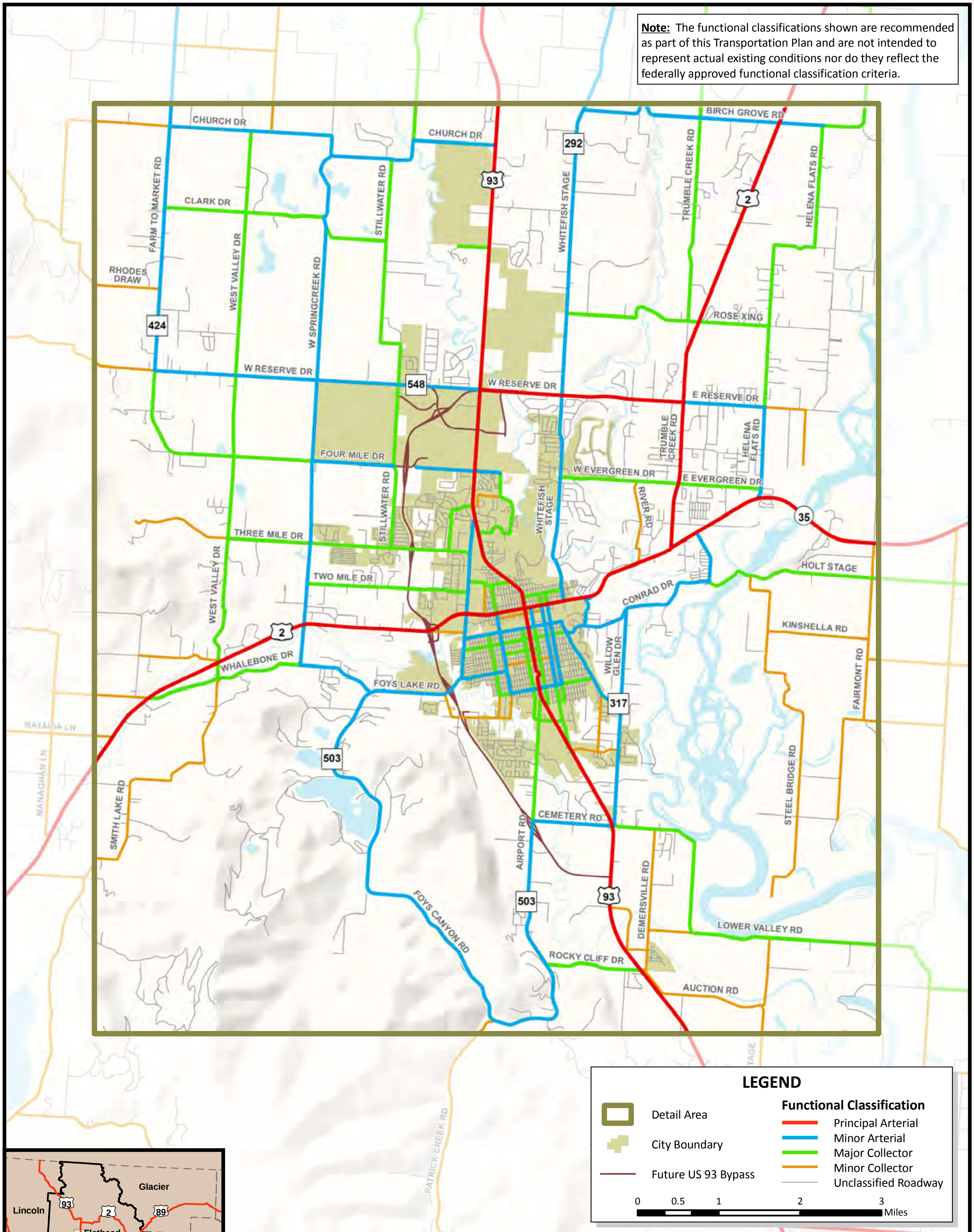


FIGURE 2.2

FUNCTIONAL CLASSIFICATION OF ROAD FACILITIES - DETAIL

Flathead County Transportation Plan - Phase II

2.3 CORRIDOR VOLUMES, CAPACITY AND LEVELS OF SERVICE

Traffic volumes collected by MDT, Flathead County, and Robert Peccia and Associates (RPA) were used to determine current traffic conditions and to provide reliable data on historic traffic volumes. The most recent average daily traffic (ADT) counts available on major road segments within the county were used. This information is shown on **Figure 2.3** and **2.4**. After identifying the current traffic volumes, the existing road network was examined to determine the current size of the major routes. This information is presented on **Figure 2.5** and **2.6**.

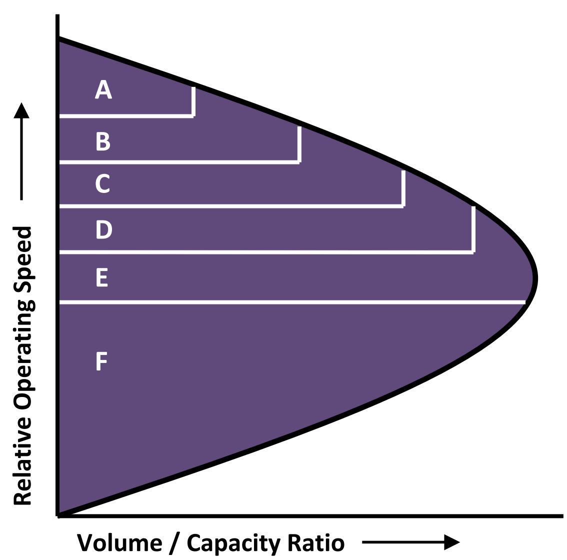
Capacity and Level of Service (LOS) are two common terms used to describe traffic conditions and corridor operation. Capacity is intended to represent the theoretical ability of the roadway to handle a defined amount of traffic. LOS is used to describe the performance of the roadway from the driver's perspective. Both of these parameters should be looked at when comparing corridor performance.

The capacity of a roadway is based on a number of features including roadway width, number of approaches along the facility, whether the road is urban or rural, speed limit, surfacing, etc. Individual roadway capacity varies greatly and should be calculated based on the procedures identified in the *Highway Capacity Manual*. For planning and comparison purposes, a discussion about the relationship between roadway capacity and LOS is provided in this Chapter. This discussion is not intended to be used to set any thresholds for roadway performance, but rather provide some general information to be used to compare roadway performance.

Rural roadway corridors are somewhat unique from their urban counterparts in that oftentimes, excessive traffic volumes are not the primary issue governing travel operations. For the more rural roadways, issues such as sight distance, surface conditions, passing zones and travel speeds have the greatest affect on travel conditions. The maximum number of vehicles that could theoretically be accommodated on a roadway (i.e. physical capacity) is generally greater than the number typically acceptable in rural communities. The physical capacity of a roadway is based on roadway geometrics and other design factors and is generally higher than what a typical driver in a rural community would anticipate.

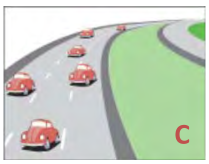
Roadway LOS is intended to provide a comparison value to represent the driver's perception of the roadway performance. The LOS is ultimately based on a combination of factors, all of which play a part in the driver's perception of how the roadway is performing. When drivers experience delays due to reduced travel speeds, lack of passing opportunities, heavy vehicles in the traffic stream, and steep roadway grades, the roadway LOS deteriorates.

Graphic 2.2 shows a general relationship between the v/c ratio, operating speed, and roadway LOS. As the graphic indicates, corridors with lower LOS see decreases in speed due to deteriorating travel conditions. **Table 2.2** on the following page gives a description of the general travel conditions for each LOS category.



Graphic 2.2: Roadway Level of Service Relationships

Table 2.1: Roadway LOS and V/C Ratios

LOS Rank	Description
	Represents free-flow conditions. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to drivers is excellent.
	Also allows speeds at or near free-flow speeds, but the presence of other users begins to be noticeable. Freedom to select speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream relative to LOS A.
	Has speeds at or near free-flow speeds, but the freedom to maneuver is noticeably restricted (lane changes require careful attention on the part of the drivers). The general level of comfort and convenience declines significantly at this level. Disruptions in the traffic stream, such as an incident (for example, vehicular crash or disablement), can result in significant queue formation and vehicular delay. In contrast, the effects of incidents at LOS A or LOS B are minimal, with only minor delay in the immediate vicinity of the event.
	Represents the conditions where speeds begin to decline slightly with increasing flow. The freedom to maneuver becomes more restricted, and drivers experience reductions in physical and psychological comfort. Incidents can generate lengthy queues because the higher density associated with the LOS provides little or no space to absorb disruptions in traffic flow.
	Represents operating conditions at or near the roadway's capacity. Even minor disruptions to the traffic stream, such as vehicles entering from a ramp or vehicles changing lanes, can cause delays as other vehicles give way to allow such maneuvers. In general, maneuverability is extremely limited, and drivers experience considerable physical and psychological discomfort.
	Describes a breakdown in vehicular flow. Queues form quickly behind points in the roadway where the arrival flow rate temporarily exceeds the departure rate, as determined by the roadway's capacity. Such points occur at incidents and on- and off-ramps, where incoming traffic results in capacity being exceeded. Vehicles typically operate at low speeds under these conditions and are often required to come to a complete stop, usually in a cyclic fashion. The cyclic formation and dissipation of queues is a key characterization of LOS F.

Source: Highway Capacity Manual; Transportation Research Board, 2000

It should be noted that most Flathead County roads are well under the physical roadway capacity and generally function at a LOS of C or better. As future development occurs in the County, traffic volumes will ultimately rise and may result in decreased LOS. Actual roadway LOS is based on a number of factors and is intended to represent driver perception of the roadway performance. The LOS of a roadway can be improved by either increasing the capacity or decreasing the traffic volume. To increase the capacity, improvements must be made along the roadway to increase its ability to handle traffic. Reducing traffic volumes is difficult but may be achieved by providing an alternate travel route or by implementing traffic calming techniques.

Issues concerning gravel roads are generally not tied to capacity. The actual capacity of a gravel road would likely be much higher than what would typically be acceptable. Issues with traffic on gravel roads due to dust, maintenance, etc. will likely be realized long before the capacity is ever reached. It is suggested that a paving threshold of approximately 400 vpd be utilized to determine when to pave a gravel road. Refer to **Chapter 6** for more information on paving gravel roads.

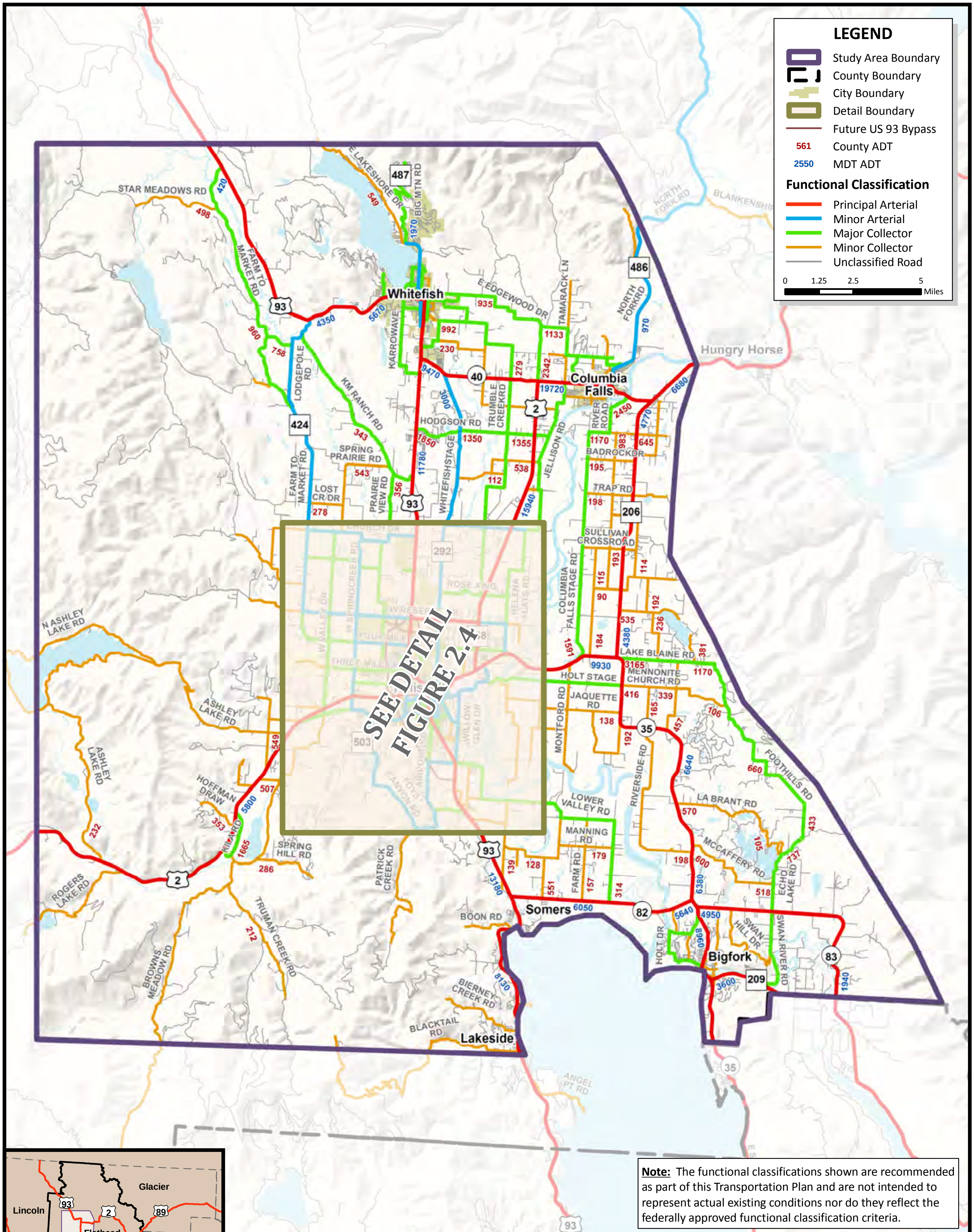


FIGURE 2.3

EXISTING AVERAGE DAILY TRAFFIC (ADT) COUNTS

Flathead County Transportation Plan - Phase II

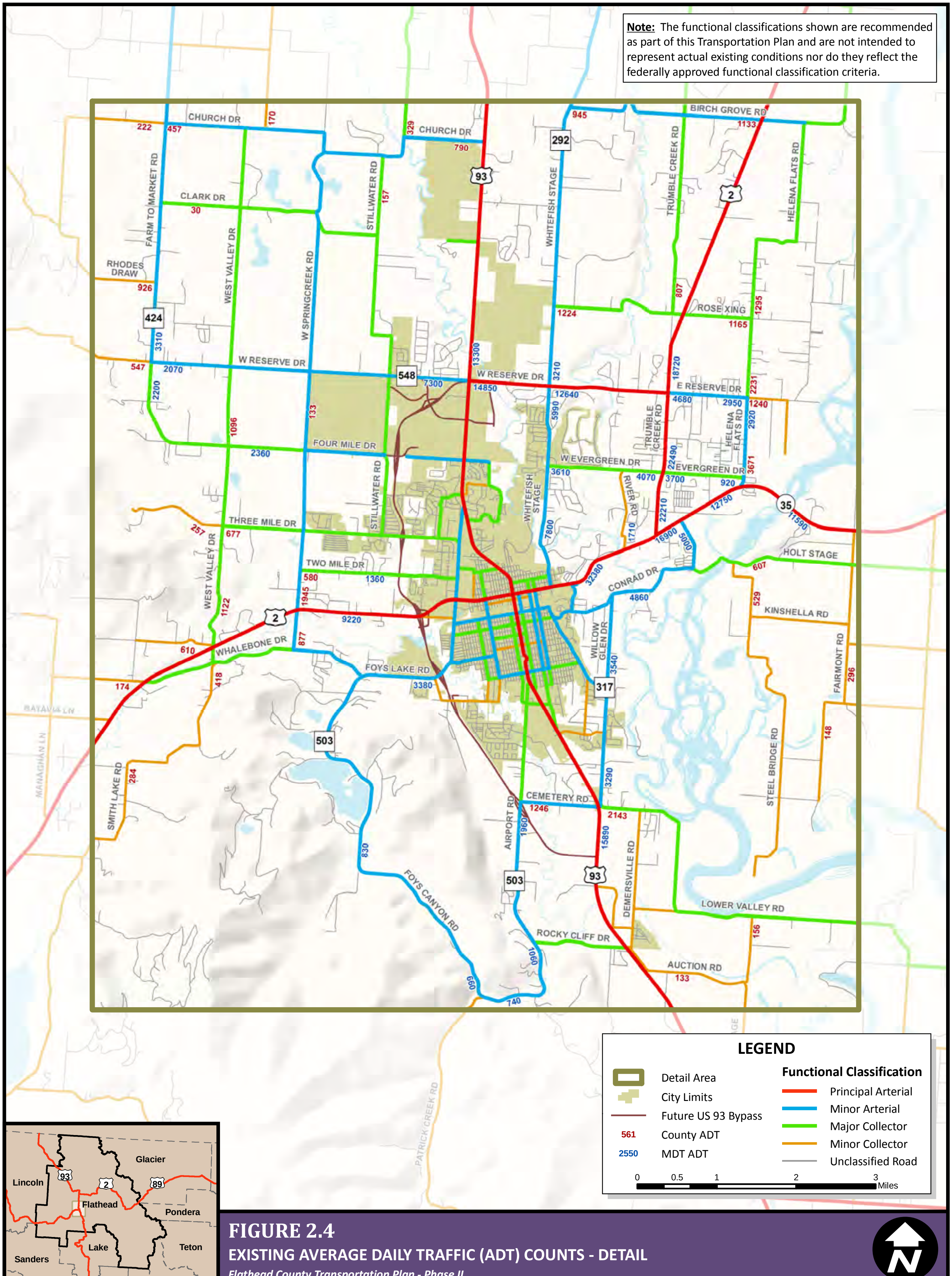


FIGURE 2.4

EXISTING AVERAGE DAILY TRAFFIC (ADT) COUNTS - DETAIL

Flathead County Transportation Plan - Phase II

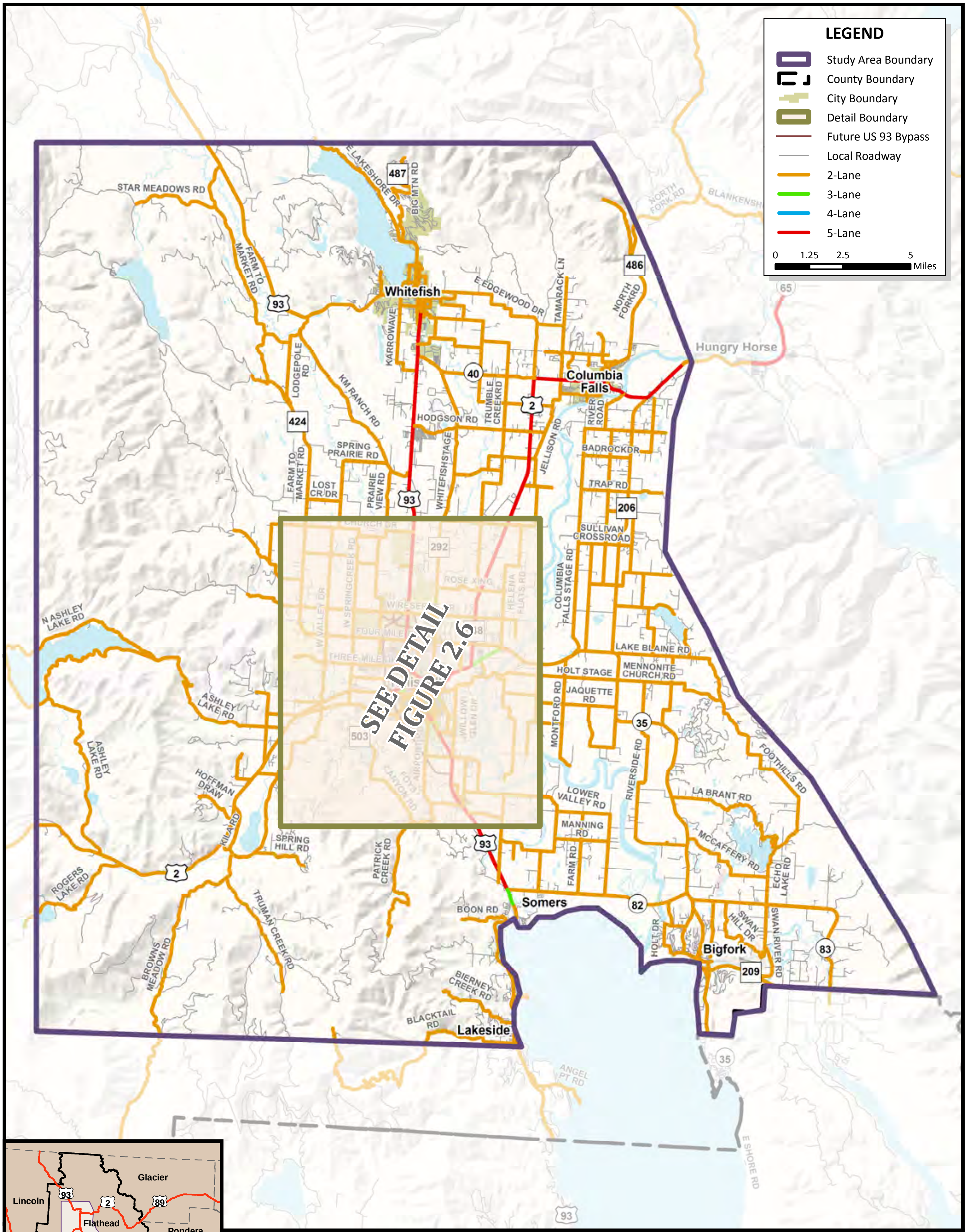


FIGURE 2.5

EXISTING CORRIDOR FACILITY SIZE

Flathead County Transportation Plan - Phase II

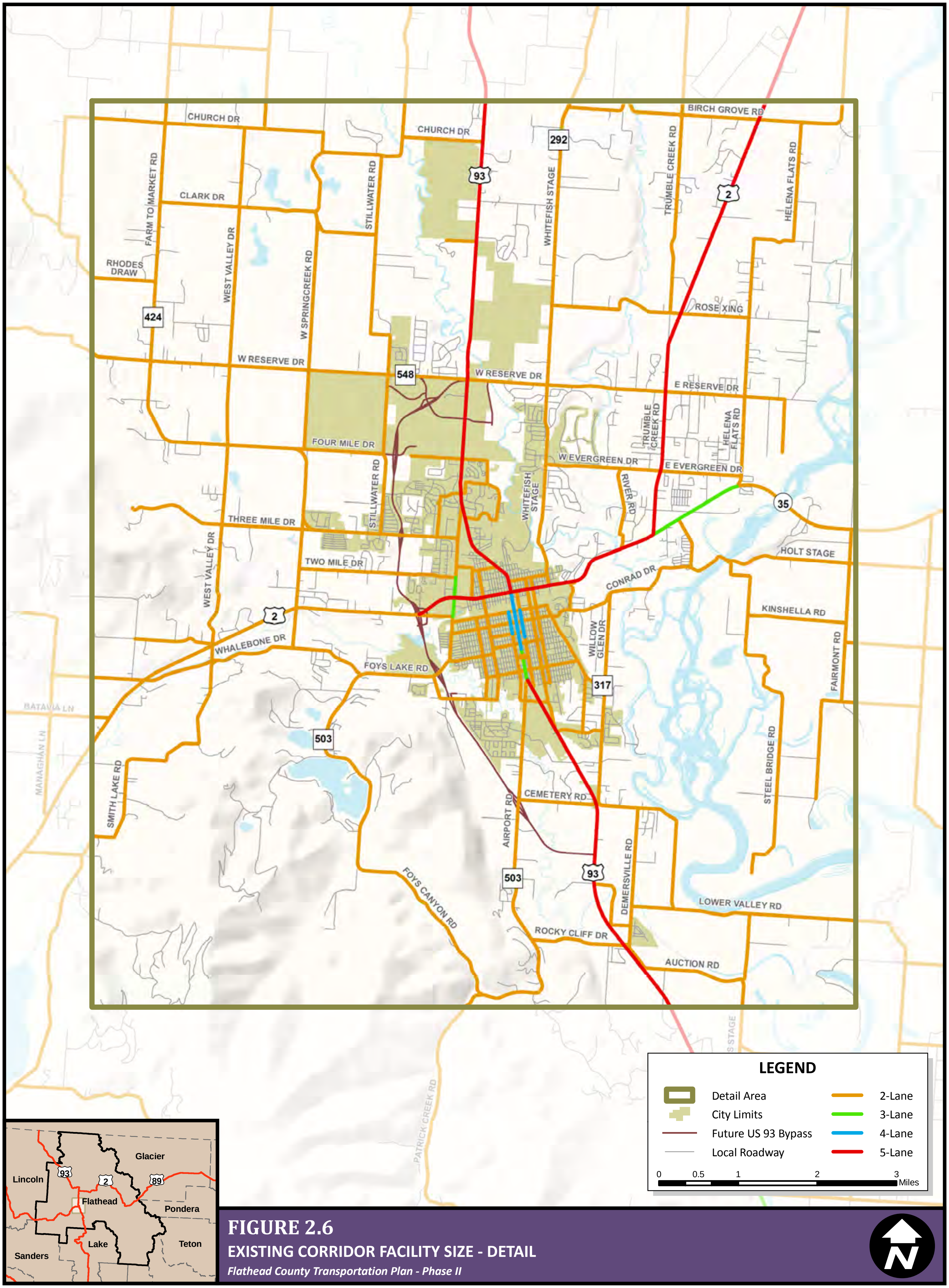


FIGURE 2.6

EXISTING CORRIDOR FACILITY SIZE - DETAIL

Flathead County Transportation Plan - Phase II

2.4 EXISTING INTERSECTION LEVELS OF SERVICE

Road systems are ultimately controlled by the function of the major intersections. Intersection failure directly reduces the number of vehicles that can be accommodated during the peak hours, which have the highest demand, and the total daily capacity of a corridor. As a result of this strong impact on corridor function, intersection improvements can be a very cost-effective means of increasing a corridor's traffic volume capacity. In some circumstances, corridor expansion projects may be able to be delayed with correct intersection improvements.

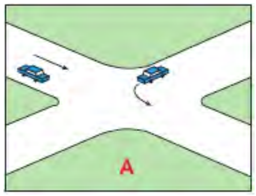
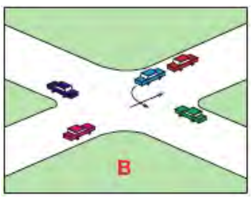
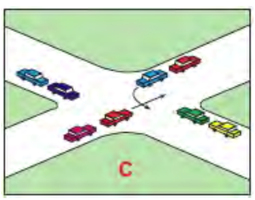
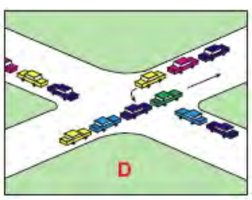
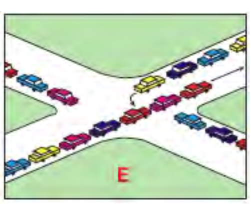
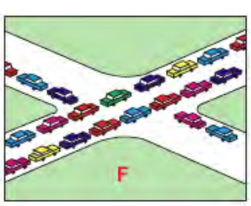
Due to the significant portion of total expense for road construction projects used for project design, construction, mobilization, and adjacent area rehabilitation, a careful analysis must be made of the expected service life from intersection-only improvements. If adequate design life can be achieved with only improvements to the intersection, then a corridor expansion may not be the most efficient solution. With that in mind, it is important to determine how well the major intersections are functioning by determining their Level of Service.

Intersection LOS is a qualitative measure developed by the transportation profession to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles. It provides a scale that is intended to match the motorists' perception of the operation of the intersection. LOS provides a means for identifying intersections that are experiencing operational difficulties, as well as providing a scale to compare intersections with each other.

The LOS scale represents the full range of operating conditions. This scale is based on the ability of an intersection or street segment to accommodate the amount of traffic using it. As was the case with corridor LOS, the scale ranges from "A" which indicates little, if any, vehicle delay, to "F" which indicates significant vehicle delay and traffic congestion. **Table 2.2** on the following page gives a description of each LOS ranking along with delay thresholds for signalized and unsignalized intersections.

Intersection counts were conducted during the fall of 2006 as part of the *Phase 1* LOS analysis. Each intersection was counted between 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM to ensure that the intersection's peak volumes were represented. Based upon this data, the operational characteristics of each intersection were determined. The LOS analysis contained in this section was conducted according to the procedures outlined in the Transportation Research Board's *Highway Capacity Manual – Special Report 209* using the Highway Capacity Software, version 4.1 f.

Table 2.2: Intersection Level of Service Criteria

LOS Rank	Description	Average Delay per Vehicle (sec) Signalized Intersections	Average Delay per Vehicle (sec) Unsignalized Intersections
	Traffic moves freely, low volumes accompany the free flow condition. At signalized intersections, progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. At unsignalized intersections, nearly all drivers find freedom of operation with very little time spent waiting for an acceptable gap. Very seldom is there more than one vehicle in queue.	< 10	< 10
	Traffic moves fairly freely, volumes are somewhat low. At signalized intersections, there is good progression and/or short cycle lengths. Vehicles generally clear on one green phase. At unsignalized intersections, some drivers begin to consider the average control delay an inconvenience, but acceptable gaps are still very easy to find. Occasionally there is more than one vehicle in queue.	10 to 20	10 to 15
	Traffic moves smoothly, volumes are beginning to increase. At signalized intersections, higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping. At unsignalized intersections, average control delay becomes noticeable to most drivers, even though acceptable gaps are found on a regular basis. It is not uncommon for an arriving driver to find a standing queue of at least one additional vehicle.	20 to 35	15 to 25
	Traffic approaching unstable flow, the influence of congestion becomes more noticeable. At signalized intersections, longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable. At unsignalized intersections, average control delay is long enough to be an irritation to most drivers. Acceptable gaps are hard to find because there is a standing queue of vehicles already waiting when the driver arrives.	35 to 50	25 to 35
	Unstable traffic flow, volumes at or near capacity. At signalized intersections, the high delays generally indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences. At unsignalized intersections, drivers find the length of the average control delay approaching intolerable levels. Acceptable gaps are hard to find because there is a standing queue of vehicles already waiting when the driver arrives.	50 to 80	35 to 50
	Saturation condition, volumes are over capacity. This is considered to be unacceptable to most drivers. This condition occurs with oversaturation. At signalized intersections, it may occur at high volume/capacity ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values. At unsignalized intersections, delays are high because acceptable gaps are hard to find. Acceptable gaps are hard to find because there is a standing queue of vehicles already waiting when the driver arrives.	> 80	> 50

Source: Highway Capacity Manual; Transportation Research Board, 2000

2.4.1 Signalized Intersections

The procedures used to evaluate signalized intersections use detailed information on geometry, lane use, signal timing, peak hour volumes, arrival types and other parameters. This information is then used to calculate delays and determine the capacity of each intersection. Generally, an intersection is determined to be functioning adequately if operating at LOS C or better.

For signalized intersections, recent research has determined that “average control delay” per vehicle is the best available measure of level of service. The amount of control delay that a vehicle experiences is approximately equal to the time elapsed from when a vehicle joins a queue at the intersection (or arrives at the stop line when there is no queue) until the vehicle departs from the stopped position at the head of the queue. Control delay takes into account uniform delay, incremental delay, and initial queue delay. The control delay is primarily a function of volume, capacity, cycle length, green ratio, and the pattern of vehicle arrivals. There were no signalized intersections analyzed as part of this Plan.

2.4.2 Unsignalized Intersections

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The LOS for an AWSC type intersection is computed in the same way as signalized intersections and is based on the average control delay per vehicle at the intersection. Since there is no major street, the highest delay could be experienced by any of the approaching streets.

TWSC type intersection LOS values are computed in a manner different than signalized and AWSC type intersections. The LOS for a TWSC intersection is generally not defined for the intersection as a whole, but rather is determined by the delay experienced for each individual minor street approach. However, for the purposes of this Plan, and to gauge the overall intersection performance, the LOS for a TWSC was based on the average delay experienced along the minor street approaches. This difference from the method used for signalized intersections is necessary since the operating characteristics of a stop-controlled intersection are substantially different. Driver expectations and perceptions are also entirely different.

For TWSC intersections, through traffic on the major (uncontrolled) street only experiences delay if the lane includes a combined left-turn. If there is a designated left-turn lane along the major street, the through and right-turn movements do not directly experience delay at the intersection. Conversely, vehicles turning left from the minor street experience more delay than other movements and at times can experience significant delay. Vehicles on the minor street, which are turning right or going across the major street, experience less delay than those turning left from the same approach. **Table 2.2** on the previous page shows the criteria used to determine the LOS for both signalized and unsignalized intersections.

Using the guidelines discussed previously, the data collected in the fall of 2006, and calculation techniques for TWSC and AWSC type intersections, the LOS was calculated for sixteen unsignalized intersections. The results of this analysis are shown in **Table 2.3** on the following page. The intersection LOS is also shown graphically in **Figure 2.7** and **2.8**. A more detailed analysis of each of these intersections is given in **Section 2.7.2**.

Table 2.3: Unsignalized Intersection Level of Service (Existing Conditions)[1]

Unsignalized Intersection	AM Peak Hour			PM Peak Hour		
	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
Auction Road / Demersville Road	**8.7**	**A**	**-**	**8.8**	**A**	**-**
Northbound Left / Thru	7.2	A	0.00	7.3	A	0.01
Eastbound Left / Right	8.7	A	0.03	8.8	A	0.01
Batavia Lane / US Highway 2	**33.9**	**D**	**-**	**17.1**	**C**	**-**
Northbound Left	8.1	A	0.06	8.6	A	0.03
Eastbound Left / Right	33.9	D	0.65	17.1	C	0.34
Beach Drive / Holt Drive	**9.7**	**A**	**-**	**10.7**	**B**	**-**
Eastbound Left / Thru / Right	7.5	A	0.00	7.5	A	0.00
Westbound Left / Thru / Right	7.4	A	0.00	7.6	A	0.01
Northbound Left / Thru	10.2	B	0.00	11.3	B	0.01
Northbound Right	9.0	A	0.01	9.2	A	0.01
Southbound Left / Thru / Right	10.2	B	0.01	11.3	B	0.00
Best Way / Truck Route (AWSC)	**8.05**	**A**	**-**	**7.75**	**A**	**-**
Eastbound Left / Thru / Right	7.39	A	-	7.35	A	-
Westbound Left / Thru / Right	8.42	A	-	8.00	A	-
Northbound Left / Thru / Right	8.04	A	-	7.66	A	-
Southbound Left / Thru / Right	8.16	A	-	8.12	A	-
Columbia Falls Stage / Kelley Road	**9.9**	**A**	**-**	**9.5**	**A**	**-**
Eastbound Left / Thru	7.6	A	0.09	7.4	A	0.05
Southbound Left / Right	9.9	A	0.08	9.5	A	0.11
Helena Flats Road / East Evergreen Drive	**12.2**	**B**	**-**	**11.6**	**B**	**-**
Northbound Left / Thru / Right	7.6	A	0.03	7.7	A	0.02
Southbound Left / Thru / Right	7.6	A	0.00	7.6	A	0.00
Westbound Left / Thru / Right	13.0	B	0.06	11.5	B	0.02
Eastbound Left / Thru / Right	11.4	B	0.12	11.6	B	0.10
Helena Flats Road / East Reserve Drive (AWSC)	**8.44**	**A**	**-**	**9.45**	**A**	**-**
Eastbound Left / Thru / Right	8.03	A	-	9.52	A	-
Westbound Left / Thru / Right	8.32	A	-	8.68	A	-
Northbound Left / Thru / Right	9.02	A	-	10.00	A	-
Southbound Left / Thru / Right	7.94	A	-	8.58	A	-
Hodgson Road / Whitefish Stage	**10.3**	**B**	**-**	**11.9**	**B**	**-**
Northbound Left / Thru / Right	7.3	A	0.01	7.4	A	0.02
Southbound Left / Thru / Right	7.5	A	0.01	7.5	A	0.02
Westbound Left / Thru / Right	10.1	B	0.09	12.0	B	0.16
Eastbound Left / Thru / Right	10.4	B	0.13	11.7	B	0.16
Kila Road / US Highway 2	**10.7**	**B**	**-**	**9.6**	**A**	**-**
Southbound Left / Thru	8.0	A	0.07	7.9	A	0.10
Westbound Left / Right	10.7	B	0.14	9.6	A	0.07
MT Highway 35 / Fairmont Road	**42.9**	**E**	**-**	**28.8**	**D**	**-**
Northbound Left / Thru / Right	62.9	F	0.49	39.5	E	0.35
Southbound Left / Thru / Right	22.9	C	0.02	18.1	C	0.06

Westbound Left / Thru / Right	8.2	A	0.02	9.8	A	0.01
Eastbound Left / Thru / Right	10.4	B	0.00	8.3	A	0.01
West Springcreek Road / US Highway 2	**60.5**	**F**	**-**	**24.5**	**C**	**-**
Eastbound Left / Thru / Right	8.0	A	0.08	8.8	A	0.04
Westbound Left / Thru / Right	9.1	A	0.01	7.9	A	0.02
Northbound Left / Thru / Right	26.6	D	0.24	25.3	D	0.18
Southbound Left / Thru / Right	94.4	F	0.90	23.7	C	0.39
West Valley Drive / Three Mile Drive	**9.8**	**A**	**-**	**9.8**	**A**	**-**
Eastbound Left / Thru / Right	7.2	A	0.00	7.3	A	0.00
Westbound Left / Thru / Right	7.3	A	0.01	7.2	A	0.01
Northbound Left / Thru / Right	9.6	A	0.09	9.8	A	0.10
Southbound Left / Thru / Right	10.0	A	0.10	9.8	A	0.10
Whitefish Stage / Granrud Lane	**14.2**	**B**	**-**	**14.1**	**B**	**-**
Northbound Left / Thru	8.2	A	0.00	8.2	A	0.01
Eastbound Left / Right	14.2	B	0.10	14.1	B	0.04
Whitefish Stage / Mission Trail	**16.3**	**C**	**-**	**17.4**	**C**	**-**
Southbound Left / Thru	7.9	A	0.00	8.1	A	0.01
Westbound Left / Right	16.3	C	0.18	17.4	C	0.12
Whitefish Stage / West Evergreen Drive	**15.1**	**C**	**-**	**133.7**	**F**	**-**
Southbound Left / Thru	7.9	A	0.04	9.2	A	0.22
Westbound Left / Right	15.1	C	0.34	133.7	F	1.11
Whitefish Stage / Winchester Street	**19.1**	**C**	**-**	**21.1**	**C**	**-**
Northbound Left / Thru / Right	8.5	A	0.00	8.1	A	0.00
Southbound Left / Thru / Right	8.0	A	0.01	8.5	A	0.01
Westbound Left / Thru / Right	24.2	C	0.35	22.4	C	0.13
Eastbound Left / Thru / Right	14.0	B	0.03	19.8	C	0.30

[1]Intersection LOS for two-way stop-controlled intersections is based on average delay along minor approach legs.

The LOS analyses of the existing conditions for these study intersections reveals that a few unsignalized intersections are currently functioning at LOS D or lower. These intersections are ideal candidates for closer examination and potential intersection improvement measures.

It should be noted that it is not unusual for an unsignalized intersection to experience a poor LOS due to conditions for the minor street left-turn movement. It should be understood that, often this poor LOS is experienced by a small minority of the total number of vehicles at the intersection and that the intersection as a whole may operate acceptably. Therefore, LOS along the minor street approach may be representative of only a small percentage of the total vehicles utilizing the intersection. A more detailed analysis should be completed to determine how the intersection functions as a whole.

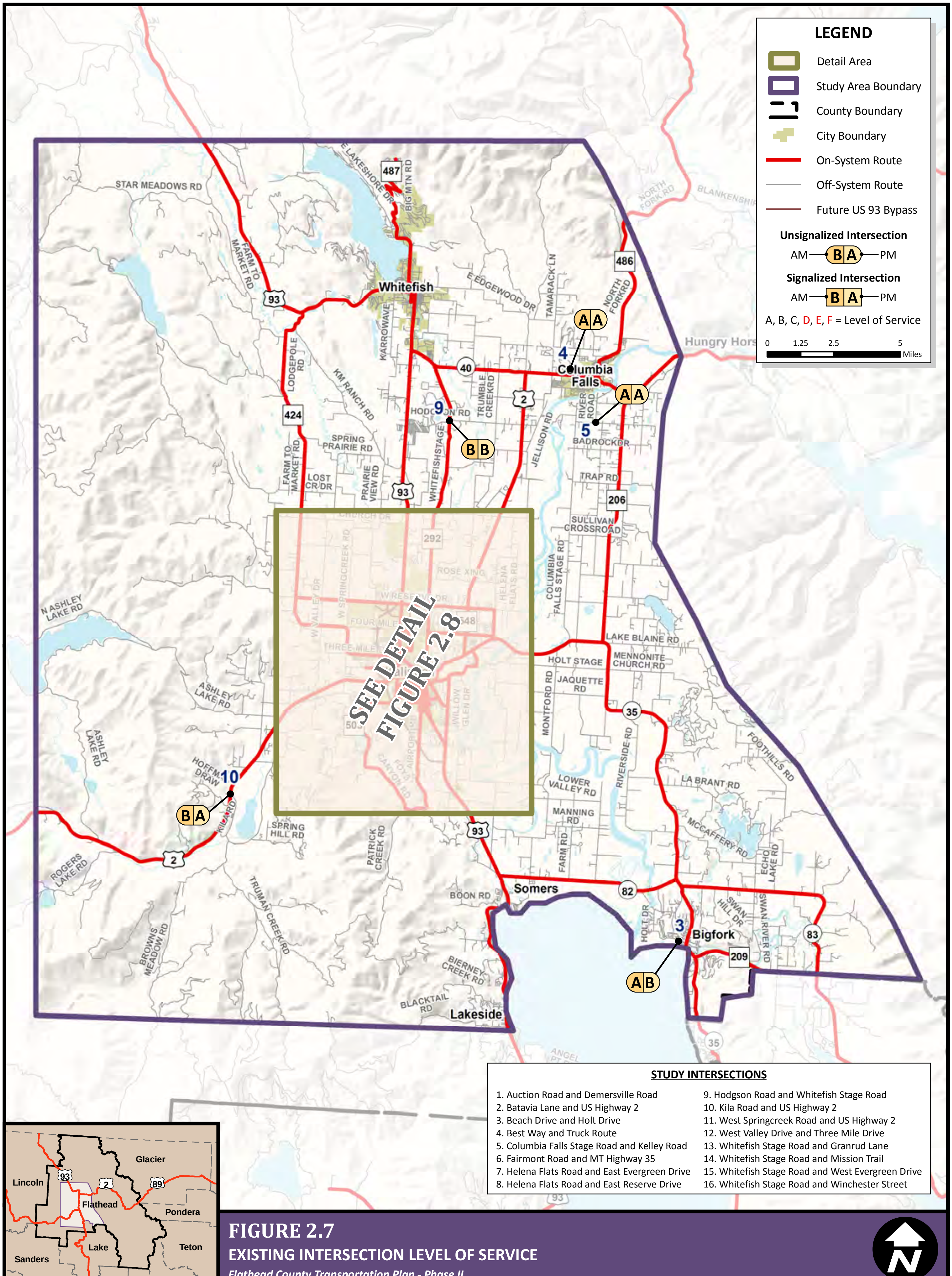


FIGURE 2.7
EXISTING INTERSECTION LEVEL OF SERVICE

Flathead County Transportation Plan - Phase II

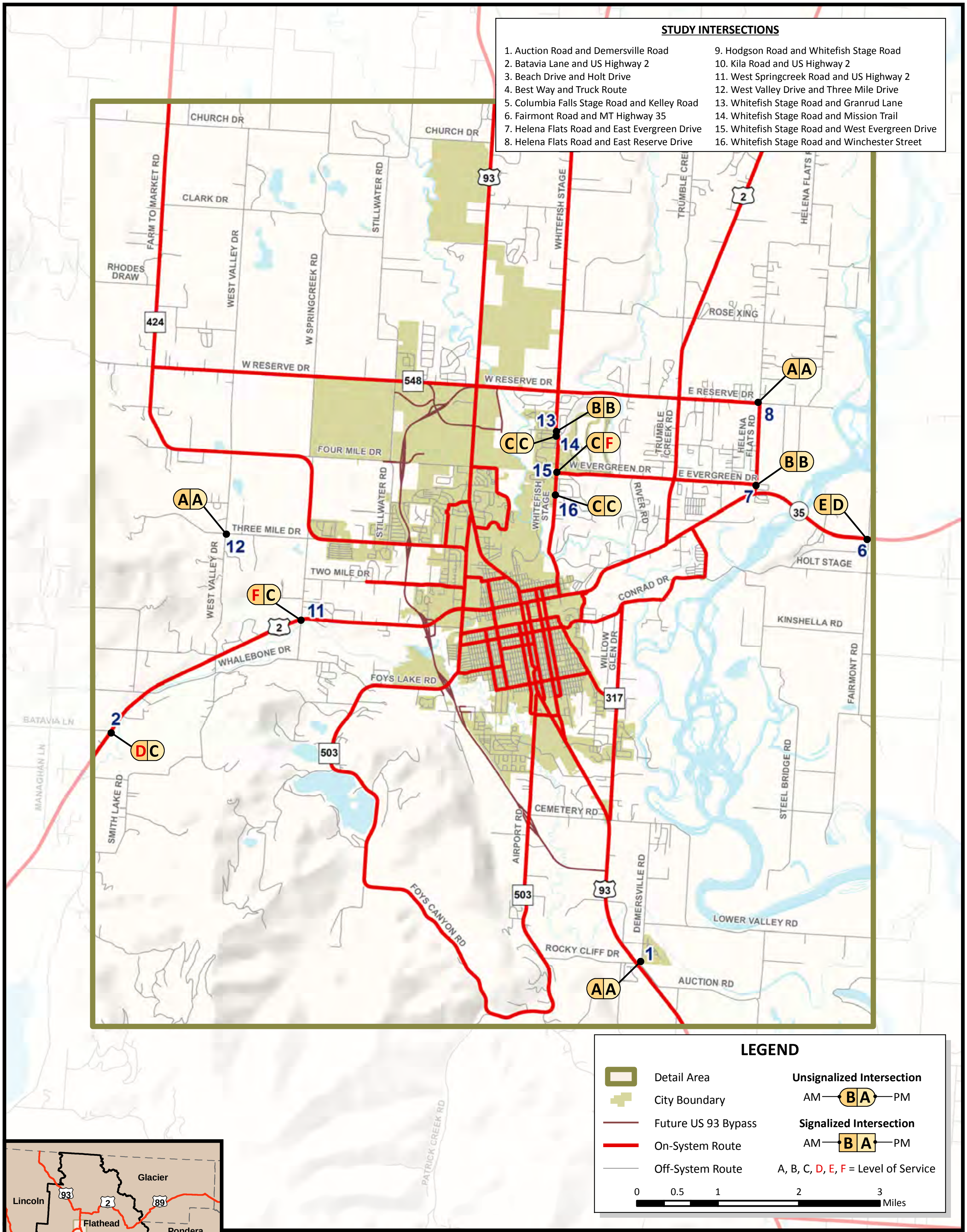


FIGURE 2.8

EXISTING INTERSECTION LEVEL OF SERVICE - DETAIL

Flathead County Transportation Plan - Phase II

2.5 SIGNAL WARRANT ANALYSIS

A signal warrant analysis was conducted to determine if any of the existing unsignalized intersections listed in **Table 2.3** with levels of service of D or lower met signal warrants. According to the 2003 Edition of the *Manual on Uniform Traffic Control Devices (MUTCD)*, there are eight signal warrants that must be analyzed for the installation of a traffic control signal. The MUTCD states that a traffic signal should not be installed unless one or more warrants are satisfied. The eight signal warrants that must be analyzed are as follows:

1. **Eight-Hour Vehicular Volume** – This warrant is intended for application at locations where a large volume of intersection traffic is the principal reason to consider the installation of a traffic signal (Condition A) or where the traffic volume on the major street is so heavy that traffic on the minor street experiences excessive delay or conflict in entering or crossing the major street (Condition B) during any eight hours of an average day. The criteria for Warrant 1 may be met if either Condition A or Condition B is met. The combination of Condition A and B are not required. *This warrant was not analyzed due to insufficient project data.*

2. **Four-Hour Vehicular Volume** – This warrant is intended for locations where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. This warrant requires that the combination of the major-street traffic (total of both approaches) and the higher-volume minor-street traffic (one direction only) reach the designated MUTCD volume during any four hours of an average day. This warrant was based upon a combination of AM and PM peak hour volumes to account for the four-hour period. *This warrant was met for two of the intersections analyzed as shown in* ***Table 2.5****.*

3. **Peak Hour** – This warrant is intended for use at a location where during any one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This warrant also requires that the combination of the major-street traffic (total of both approaches) and the higher-volume minor-street traffic (one direction only) reach the designated MUTCD volume. The peak hour warrant was conducted assuming that this peak hour would fall within the peak periods. *This warrant was met for three of the intersections analyzed as shown in* ***Table 2.5****.*

4. **Pedestrian Volume** – The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. *This warrant was not analyzed due to insufficient project data.*

5. **School Crossing** – This warrant addresses the unique characteristics that a nearby school may have on the roadways. It requires that the major roadway be unsafe to cross and that there are no other feasible crossings in the area. *This warrant was not analyzed due to insufficient project data.*

6. **Coordinated Signal System** – Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles. *This warrant was not met for any of the intersections under consideration.*

7. **<u>Crash Experience</u>** – The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal. *This warrant was not analyzed due to insufficient project data.*

8. **<u>Roadway Network</u>** – This warrant is intended for locations where the installation of a traffic signal may encourage concentration and organization of traffic flow on a roadway network. *This warrant was not met for any of the intersections under consideration.*

Ideally, before considering a signal for traffic control at an intersection, it is desirable to meet more than one signal warrant. A detailed analysis of an intersection that meets at least one signal warrant should be completed to determine if less restrictive traffic controls, or possible geometric modifications, would benefit the operational characteristics of the intersection. Intersections meeting multiple signal warrants may be candidates for signalization, but must be analyzed carefully to consider the major and minor street traffic movements and volumes. It should be noted that anytime a signal warrant analysis is conducted the intersection should also be studied for a roundabout.

As is shown in **Table 2.4**, three of the four intersections analyzed appear to meet one or more traffic signal warrants based upon the preliminary warrant analysis and thus could be considered for traffic signal control going forward.

Table 2.4: Signal Warrant Analysis (Existing Unsignalized Intersections)

Intersection	LOS		Signal Warrant			
	AM	PM	#2	#3	#6	#8
Batavia Lane / US Highway 2	D	C	X	X		
MT Highway 35 / Fairmont Road	E	D				
West Springcreek Road / US Highway 2	F	D	X	X		
Whitefish Stage / West Evergreen Drive	C	F		X		

Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control signals, even if one or more of the signal warrants has been satisfied. Some of the available alternatives may include, but are not limited to, the following:

- Installing signs along the major street to warn road users approaching the intersection;
- Relocating the stop line(s) and making other changes to improve the sight distance at the intersection;
- Installing measures designed to reduce speeds on the approaches;
- Installing a flashing beacon at the intersection to supplement STOP sign control;
- Installing flashing beacons on warning signs in advance of a STOP sign controlled intersection on major- and/or minor-street approaches;
- Adding one or more lanes on a minor-street approach to reduce the number of vehicles per lane on the approach;
- Revising the geometrics at the intersection to channelize vehicular movements and reduce the time required for a vehicle to complete a movement, which could also assist pedestrians;
- Installing roadway lighting if a disproportionate number of crashes occur at night;

- Restricting one or more turning movements, perhaps on a time-of-day basis, if alternate routes are available;
- If the warrant is satisfied, installing multi-way STOP sign control;
- Installing a roundabout; and
- Employing other alternatives, depending on conditions at the intersection.

2.6 SAFETY AND CRASH ANALYSIS

The MDT Traffic and Safety Bureau provided crash information and data for use in the *Flathead County Transportation Plan – Phase II*. The crash information was analyzed to identify potential problem areas along corridors and at intersections and was also used to indicate areas that may warrant further study. General crash characteristics and potential roadway deficiencies were determined through the crash analysis. Specific corridors and intersections that have been identified as problem areas during this time period are evaluated in more detail in **Section 2.7** of this Plan.

The crash information covers a three-year time period from January 1st, 2004 to December 31st, 2006. It should be noted that reconfiguration projects around the County during this time period were not taken into account in this analysis.

2.6.1 CORRIDOR ANALYSIS

Twelve study corridors were evaluated as part of this crash analysis. Problem areas were identified at locations along the corridor that have an unusually high number of crashes. **Section 2.7.1** provides more detail about the areas where potential safety problems exist. The following locations along the study corridors appear to have an unusually high number of crashes:

- **Church Drive**
    - Intersection with US Highway 93
    - 90 degree corners along the corridor
- **Columbia Falls Stage / River Road**
    - Intersection of Columbia Falls Stage and River Road
    - Intersection with Hellman Lane
    - Intersection with Kelley Road
- **East Reserve Drive**
    - Between Ash Road and US Highway 2
    - Intersection with US Highway 2
- **Foothills Road**
    - At or near Jewel Basin Road
    - Between Peters Creek Way and Bachelor Grade Road
    - North of Snowberry Trail
- **Helena Flats Road**
    - Intersection with MT Highway 35
- **Hodgson Road**
    - Intersection with US Highway 2
    - Between Hare Trail and Lidstrom Road

- o Intersection with Whitefish Stage
- **Kila Road**
  - o Intersection with US Highway 2
- **Lower Valley Road**
  - o At or near intersection with Foys Bend Lane
  - o Along other sharp corners

2.6.2 Intersection Crash Analysis

Sixteen intersections were evaluated as part of this crash analysis. Three analyses were performed to rank these sixteen intersections based on different crash characteristics. These three analysis measures and their results are described in this section.

First, the intersections were ranked by number of crashes. A summary of these intersections, along with the number of crashes at each intersection, is shown in **Table 2.5**. The intersections at which no reported crashes occurred were not analyzed further as part of this crash analysis.

Table 2.5: Number of Crashes at Intersections (Jan 1, 2004 - Dec 31, 2006)

Intersection	Type[1]	Crashes
West Springcreek Road / US Highway 2	U-2W	11
Hodgson Road / Whitefish Stage	U-2W	9
Fairmont Road / MT Highway 35[2]	U-2W	8
Kila Road / US Highway 2	U-2W	3
Whitefish Stage / West Evergreen Drive	U-1W	2
Batavia Lane / US Highway 2	U-2W	2
Helena Flats Road / East Evergreen Drive	U-2W	2
Whitefish Stage / Granrud Lane	U-1W	2
Columbia Falls Stage / Kelley Road	U-2W	2
West Valley Drive / Three Mile Drive	U-2W	1
Whitefish Stage / Winchester Street	U-1W	1
Auction Road / Demersville Road	U-2W	0
Beach Drive / Holt Drive	U-2W	0
Best Way / Truck Route	U-4W	0
Helena Flats Road / East Reserve Drive	U-2W	0
Whitefish Stage / Mission Trail	U-1W	0

[1] "U-1W" = Unsignalized one-way stop control; "U-2W" = Unsignalized two-way stop control; "U-4W" = Unsignalized four-way stop control.
[2] This intersection was temporarily signalized after the crash data collection and analysis was completed.

The second crash analysis performed involved a more detailed look at the crashes to determine the MDT "severity index rating". Crashes were broken out into three categories of severity: property damage only (PDO), other injury crash, and fatality or incapacitating injury. Each of these three types is given a different rating: one (1) for a PDO crash; three (3) for a non-incapacitating injury crash; eight (8) for a fatality or incapacitating injury crash. The MDT severity index rating for each intersection in the analysis is shown in **Table 2.6**. The calculation used to arrive at the severity index rating is shown below.

Table 2.6: Intersection Crash Analysis - MDT Severity Index Rating

Intersection	PDO	Injury	Fatality / Incap.	Severity Index
Whitefish Stage / Granrud Lane	1	0	1	4.50
West Springcreek Road / US Highway 2	3	4	4	4.27
Hodgson Road / Whitefish Stage	4	3	2	3.22
Batavia Lane / US Highway 2	0	2	0	3.00
Fairmont Road / MT Highway 35	3	4	1	2.88
Kila Road / US Highway 2	1	2	0	2.33
Whitefish Stage / West Evergreen Drive	1	1	0	2.00
Helena Flats Road / East Evergreen Drive	1	1	0	2.00
Columbia Falls Stage / Kelley Road	2	0	0	1.00
West Valley Drive / Three Mile Drive	1	0	0	1.00
Whitefish Stage / Winchester Street	1	0	0	1.00

The third analysis ranked the number of crashes against the average daily traffic (ADT) at each intersection, expressed in crashes per million entering vehicles (MEV). A summary of the intersections in the analysis is shown in **Table 2.7**. The calculation used to arrive at the crash rates is as follows:

$$\frac{\textit{Total Number of Crashes in a Three-Year Period}}{\textit{(AADT for Intersection) x (3 years) x (365 days/year) / (1,000,000 vehicles)}} = \textbf{\textit{(Crash Rate)}}$$

Table 2.7: Intersection Crash Analysis - Crash Rate

Intersection	Crashes	Volume[1]	Crash Rate
Hodgson Road / Whitefish Stage	9	3,239	2.54
West Springcreek Road / US Highway 2	11	8,821	1.14
Columbia Falls Stage / Kelley Road	2	1,667	1.10
Fairmont Road / MT Highway 35	8	10,863	0.67
West Valley Drive / Three Mile Drive	1	1,427	0.64
Kila Road / US Highway 2	3	4,778	0.57
Helena Flats Road / East Evergreen Drive	2	3,838	0.48
Whitefish Stage / Granrud Lane	2	7,000	0.26
Batavia Lane / US Highway 2	2	7,991	0.23
Whitefish Stage / West Evergreen Drive	2	9,949	0.18
Whitefish Stage / Mission Trail	1	6,889	0.13

[1] Volume determined using turning movement counts collected for this Plan.

$$\frac{\textit{[(\# PDO) x (1)] + [(\# Non-Incapacitating Crashes) x (3)] + [(\# Fatalities or Incapacitating Crashes) x (8)]}}{\textit{Total Number of Crashes in a Three-Year Period}} = \textbf{\textit{(MDT Severity Index Rating)}}$$

In order to give the intersections included in the crash analysis a comparable rating, a composite rating score was developed based on the three analyses presented previously. The intersections were ranked based on their position on each of the three previous tables, giving each equal weight. For example, the intersection of West Valley Drive and Three Mile Drive was given a ranking of 10 for its position in **Table 2.5**, another ranking of 9 for its position in **Table 2.6**, and a ranking of 5 for its ranking in **Table 2.7**. Thus its composite rating is 24. Refer to **Table 2.8** for the composite rating of each intersection.

Table 2.8: Intersection Crash Analysis Composite Rating

Intersection	Crash	Severity	Crash Rate	Composite
West Springcreek Road / US Highway 2	1	2	2	5
Hodgson Road / Whitefish Stage	2	3	1	6
Fairmont Road / MT Highway 35	3	5	4	12
Whitefish Stage / Granrud Lane	5	1	8	14
Kila Road / US Highway 2	4	6	6	16
Columbia Falls Stage / Kelley Road	5	9	3	17
Batavia Lane / US Highway 2	5	4	9	18
Helena Flats Road / East Evergreen Drive	5	7	7	19
Whitefish Stage / West Evergreen Drive	5	7	10	22
West Valley Drive / Three Mile Drive	10	9	5	24
Whitefish Stage / Winchester Street	10	9	11	30

The top problematic intersections as identified through the composite rating score method may warrant further study and may be in need of mitigation measures to specifically address crash trends. Each of the sixteen intersections studied in this crash analysis were analyzed in more detail in **Section 2.7.2**.

2.7 STUDY CORRIDORS AND INTERSECTIONS

This section provides information about the existing conditions of the twelve corridors and sixteen intersections that were evaluated in detail as part of this *Transportation Plan*. Each study intersection and corridor was analyzed to identify areas where problems currently exist or potentially may exist in the future. The crash analysis, LOS analysis and capacity levels contained in the previous sections were also used to help identify potentially deficient areas.

All of the sixteen study intersections and ten of the twelve study corridors evaluated in this Chapter were also evaluated in the *Flathead County Transportation Study - Phase 1*. **Figure 2.9** shows the location of the study corridors and intersections.

2.7.1 STUDY CORRIDORS

The corridors discussed in this section were evaluated in detail and are shown in **Figure 2.9**. All other roads within the study area were not individually evaluated but rather were analyzed as elements of the transportation system as a whole. These study corridors were chosen based on their importance to the roadway network, known traffic patterns, accessibility, and community desire. Information collected along these corridors includes signage, intersection control, surfacing conditions, drainage, sight distances, crash data, and other factors that may contribute to the performance of the corridor. The following twelve corridors were evaluated:

1. **Ashley Lake Road** – US Highway 2 to North Ashley Lake Road
2. **Church Drive** (not evaluated in *Phase 1*) – US Highway 93 to Bald Rock Road
3. **Columbia Falls Stage / River Road** – MT Highway 35 to US Highway 2
4. **East Reserve Drive** – US Highway 2 to Helena Flats Road
5. **Foothills Road** – Lake Blaine Road to Echo Lake Road
6. **Helena Flats Road** – MT Highway 35 to East Reserve Drive
7. **Hodgson Road** – US Highway 93 to US Highway 2
8. **Holt Stage Road / Mennonite Church Road** – Steel Bridge Road to Creston Hatchery Road
9. **Kila Road** – North intersection with US Highway 2 to south intersection with US Highway 2
10. **Lake Blaine Road** – MT Highway 35 to Hemler Creek Drive
11. **Lower Valley Road** (not evaluated in *Phase 1*) – Willow Glen Drive to MT Highway 82
12. **Spring Hill Road** – Smith Lake Road to its end

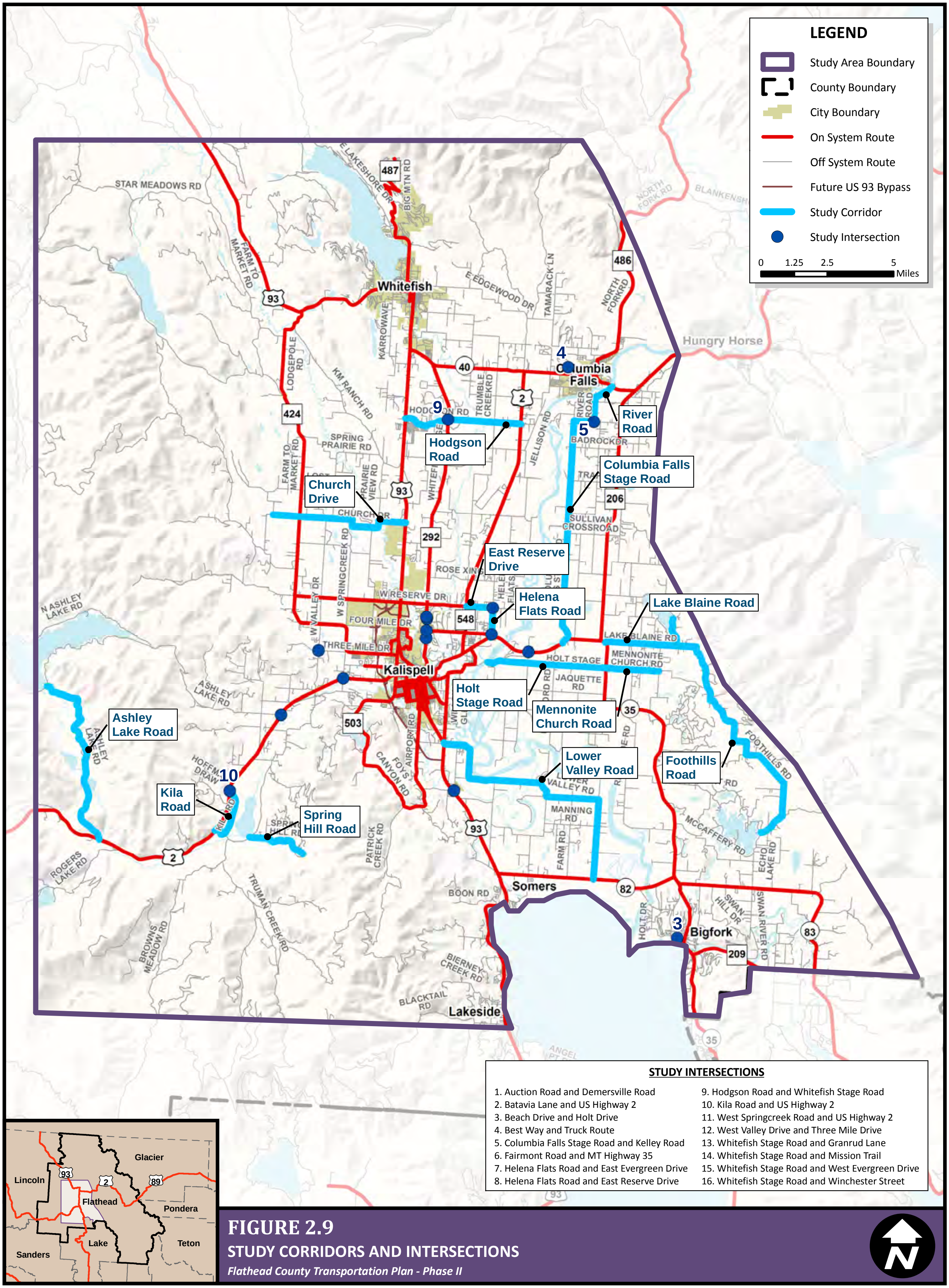


FIGURE 2.9
STUDY CORRIDORS AND INTERSECTIONS
Flathead County Transportation Plan - Phase II

1. Ashley Lake Road

Photo 2.6: Ashley Lake Road

Ashley Lake Road was evaluated from the intersection with US Highway 2 north to the intersection of North Ashley Lake Road and Ashley Lake Road. Ashley Lake Road is a two-lane gravel roadway classified as a minor collector and has little to no shoulder. This roadway is used to access recreational areas around Ashley Lake in addition to serving residential areas along the corridor. The speed limit along Ashley Lake Road is 35 mph.

A speed study was conducted by RPA along Ashley Lake Road in August 2008, approximately 4.4 miles north of US Highway 2. The speed study showed an average speed of 35.9 mph and an 85th percentile speed of 42.8 mph. As the speed study shows, the average speed is close to the speed limit, while the 85th percentile speed is almost 8 mph higher than the posted speed limit. Generally it is desirable to have an 85th percentile speed within 5 mph of the posted speed limit.

Table 2.9 shows various ADT counts conducted along the study corridor by Flathead County, MDT, and RPA. These ADT counts show that current traffic volumes are well under theoretical capacity levels for a two-lane roadway and are also under the suggested roadway paving threshold value of 400 vehicles per day (vpd). As traffic increases in the future, these volumes may reach or exceed this paving trigger.

Table 2.9: Ashley Lake Road ADT

Source	Location	Date	ADT
County	North of US 2	Aug-03	232
MDT	0.5 miles north of US 2	2004	200
RPA[1]	4.4 miles north of US 2	Aug-08	191

[1]Represents single day ADT count; value was not adjusted for seasonal or daily variation.

There were five crashes reported along the study area of Ashley Lake Road between January 1st, 2004 and December 31st, 2006. Four out of the five crashes reported involved only one vehicle, the majority of which occurred along the shoulder of the roadway. No fatalities or injuries were reported as a result of any of the crashes.

Photo 2.7: Dust created by passing vehicle

In general, Ashley Lake Road has had very few crashes along the study corridor. An analysis of the crash data shows that most of the crashes are likely due to users driving too fast for the conditions and as a result, running off the road. The roadway is gravel and the majority of the crashes were due to drivers overcorrecting and rolling over into the ditch. There appears to be no pattern of where the crashes are taking place. The crash analysis does not identify specific deficient areas that are directly resulting in unsafe conditions along the study corridor.

A general concern regarding Ashley Lake Road is the amount of dust created by vehicles traveling along the unpaved roadway. The high speeds present along the corridor only increases this problem. Dust control efforts such as reducing travel speeds, restricting access, and adding dust control stabilizers may help reduce the amount of dust created by passing vehicles. However, as traffic volumes continue to rise along the corridor, the dust problem will only increase further necessitating the need for future paving.

Identified Issues

- Future ADTs may reach paving threshold
- Dust created by speeding vehicles and increasing ADTs
- No shoulders and limited sight distance

2. Church Drive

Church Drive was evaluated from the intersection with US Highway 93 west to the intersection with Bald Rock Road. Church Drive is a two-lane paved roadway classified as a minor arterial between US Highway 93 and Secondary 424 and as a minor collector west of Secondary 424. This corridor was not evaluated as part of the *Phase 1* plan.

Photo 2.8: Church Drive

Church Drive has no shoulder and has a posted speed limit of 35 mph. The corridor provides residential access to the area and also serves to provide connection to US Highway 93 and Secondary 424. The surrounding area generally consists of fields, some of which are expected to see future commercial and/or residential development. As the area grows, it is expected that Church Drive will see a dramatic increase in traffic volumes, particularly east of West Springcreek Road.

Table 2.10 below shows ADT counts conducted by Flathead County along various portions of the study corridor. These ADT counts show that current traffic volumes are well under theoretical capacity levels for a two-lane roadway.

Table 2.10: Church Drive ADT

Source	Location	Date	ADT
County	East of Secondary 424	Sep-07	457
County	East of Stillwater Road	Sep-03	593
County	South of Prairie View Road	May-01	568
County	West of Bald Rock Road	Jun-02	138
County	West of Secondary 424	Sep-07	222
County	West of Stillwater Road	Sep-03	571
County	West of US Highway 93	Jul-06	790

There were sixteen reported crashes along the study area of Church Drive between January 1st, 2004 and December 31st, 2006. Of these sixteen crashes, ten involved only one vehicle, the majority of which occurred along the shoulder of the roadway. Seven of the crashes occurred when the roadway surfacing conditions were dry. Eight crashes resulted in injury, none of which were incapacitating or resulted in fatalities.

Of the sixteen reported crashes, five occurred at the intersection with US Highway 93. At the time of these crashes, this intersection had stop control along Church Drive. This intersection is presently being constructed to incorporate a "junior interchange" along with the reconstruction of US Highway 93 to a 5-lane roadway. It is expected that the safety of this intersection will improve as a result of the intersection being reconstructed.

Photo 2.9: Church Drive / Prairie View Drive; from top to bottom: Looking west; looking north.

A number of crashes also occurred at or near one of the 90-degree corners along Church Drive. These sharp corners can be difficult to navigate, especially in adverse weather conditions. Relatively low traffic volumes currently exist along Church Drive (particularly along the western section of the corridor); however, as development occurs in the area, and as traffic volumes will ultimately increase along Church Drive.

The intersection of Prairie View Drive and Church Drive is of particular concern. This is a standard three-legged intersection with stop-control along the eastern leg of Church Drive. The majority of the traffic occurs along the southern and eastern Church Drive approach legs. The current signing and geometric configuration of the intersection gives priority to the north/south movement. While traveling northbound along Church Drive it is difficult to see this intersection due to the trees and foliage along the southeastern corner.

Identified Issues

- Lack of advance warning signing for curves
- Substandard 90-degree curves
- No shoulders
- Areas with steep side slopes
- Worn pavement markings
- Intersection with Prairie View Drive has inadequate signing and priority

3. Columbia Falls Stage / River Road

This corridor was evaluated from the intersection US Highway 2 south to the intersection with MT Highway 35. River Road runs from the intersection with US Highway 2 southwest approximately 0.75 miles to intersect with Columbia Falls Stage; Columbia Falls Stage runs from the intersection with River Road south to intersect with MT Highway 35. The study corridor is a two-lane paved roadway classified as a major collector and is approximately 10.75 miles long.

Photo 2.10: Columbia Falls Stage

This corridor mainly serves a variety of residential neighborhoods and provides access to some recreational areas along the Flathead River. The corridor also provides an alternate north/south connection for Secondary 206 between Columbia Falls and Kalispell east of the Flathead River.

The pavement and striping is generally in good condition; however, there is a lack of shoulders, and some areas with steep side slopes. There are also a number of short vertical curves that result in decreased sight distances. The speed limit along Columbia Falls Stage is 45. The speed limit of River Road is 35 mph.

A speed study was conducted by RPA along Columbia Falls Stage approximately 0.5 miles north of Sullivan Crossroad in August, 2008. The speed study showed an average speed of 57.0 mph and an 85th percentile speed of 66.8 mph. The average speed is 12 mph higher than the posted speed limit, while the 85th percentile speed is more than 20 mph higher than the posted speed limit.

Table 2.11 shows various ADT counts conducted by Flathead County and RPA along the study corridor. These ADT values are well under theoretical capacity levels for a paved two-lane major collector roadway.

Table 2.11: Columbia Falls Stage ADT

Source	Location	Date	ADT
County	North of Badrock Drive	Jul-01	691
County	North of Gosney Crossroad	Jul-01	792
County	North of Kelley Road	Jul-04	1,919
County	North of MT 35	Oct-07	1,591
County	North of Trap Road	Jul-01	706
County	South of Helman Lane	Jul-04	796
County	West of Kelley Road	Sep-02	1,170
County	East of Columbia Falls Stage	Jul-04	2,395
County	South of US 2	Aug-06	2,450
RPA[1]	0.5 Miles north of Sullivan Crossroad	Aug-08	852

[1]Represents single day ADT count; value was not adjusted for seasonal or daily variation.

There were twenty-seven reported crashes along Columbia Falls Stage between January 1st, 2004 and December 31st, 2006. Sixteen of the twenty-seven crashes reported involved only one vehicle, the majority of which occurred along the shoulder of the roadway. Approximately half of the reported crashes occurred when the roadway surface was dry, while the remaining crashes occurred when the roadway surface conditions were poor (due to snow, ice, mud, or loose gravel). Ten reported crashes resulted in injuries, none of which resulted in fatalities.

There have been three crashes reported at or near the intersection of Columbia Falls Stage and River Road. This intersection creates a sharp curve that requires drivers to slow down substantially.

The intersections of Columbia Falls Stage with Kelley Road (see **Section 2.7.2** for more detail) and with Hellman Lane are also potentially substandard intersections. Three crashes were reported at or near the intersection with Hellman Lane while one occurred at the intersection with Kelley Road. Both of these intersections involve 90-degree corners that require the driver to either slow substantially or come to a complete stop.

Photo 2.11: Intersection of Columbia Falls Stage / River Road looking east

Overall there are a large number of crashes occurring along the corridor. Most are scattered single vehicle crashes along the corridor. There are a number of minor approaches that connect to Columbia Falls Stage.

It is expected that the land use along this corridor will see substantial future commercial and residential development. As development pressures are realized along this corridor, new right-of-way should be set aside as part of project approval for a future wider roadway section. It will be highly desirable to provide shoulders along this route in the future as traffic volumes increase.

As developments are planned, traffic impact studies should be required that evaluate what mitigation may be needed, both on-site and off-site, to alleviate potential impacts. Along Columbia Falls Stage, the planning for left-turn bays, and potentially right-turn bays, are likely mitigation techniques that may be warranted as land use changes. In addition to roadway improvements, the intersection of Columbia Falls Stage and MT Highway 35 should continually be evaluated for traffic signal control warrants and roundabout feasibility as land use changes. It is likely that this route will transform from one that serves primarily local traffic, to one that may start to serve regional through traffic as an alternate to US Highway 206.

<u>Identified Issues</u>

- No shoulders
- Steep side slopes
- Substandard vertical curves / limited sight distances
- High density of access roads
- High number of crashes around the intersection of Columbia Falls Stage and River Road
- Sharp curve at the intersection with Hellman Lane; inadequate advance warning signage
- Possible need to signalize the intersection with MT Highway 35
- Alignment of Kelley Road and Columbia Falls Stage (see **Section 2.7.2**)
- Future development may dramatically increase ADT volumes

4. East Reserve Drive

Photo 2.12: East Reserve Drive / Helena Flats

East Reserve Drive was evaluated from the intersection with Helena Flats Road west to the intersection with US Highway 2. East Reserve Drive is a two-lane paved roadway classified as a minor arterial. There is a posted speed limit of 45 mph and little to no shoulder is provided along the corridor. This corridor is approximately one mile long and serves multiple residential neighborhoods and businesses in the area. There are also three schools within a one-mile radius of East Reserve Drive. There are currently no sidewalks or bike lanes provided along the study corridor.

There have been seventeen crashes reported along the study corridor between January 1st, 2004 and December 31st, 2006. Of these crashes, fourteen involved multiple vehicles. Twelve crashes occurred while pavement conditions were dry. A total of six crashes resulted in injuries, none resulted in fatalities. The most common type of collision was right angle collisions typically occurring at or near access points along the corridor.

There were six reported crashes between Ash Road and US Highway 2, three of which occurred at the Town Pump gas station entrance. There are multiple driveways associated with the commercial development along this stretch that are in close proximity to the high volume intersection with US Highway 2. The ten crashes that occurred at the signalized intersection with US Highway 2 involved vehicles either traveling along East Reserve Drive, or turning from US Highway 2 onto East Reserve Drive. Further analysis of the implications of the high number of access points and speeds along the corridor is suggested.


Photo 2.13: East Reserve Drive / US Highway 2

Table 2.12 shows various ADT counts conducted along the study corridor by MDT and Flathead County. These ADT counts show that current traffic volumes are under theoretical capacity levels for a paved two-lane facility.

Table 2.12: East Reserve Drive ADT

Source	Location	Date	ADT
County	East of US Highway 2	Apr-99	3,523
County	West of Helena Flats Road	Sep-05	3,439
MDT	East of US Highway 2	2005	4,680
MDT	West of Helena Flats Road	2005	2,950

East Reserve Drive is increasingly seeing use as an informal "bypass" for vehicles traveling between US Highway 2 and MT Highway 35. As development occurs in the area, and as traffic volumes increase along US Highway 2, it is likely that this corridor will see an increase in "bypass" usage.

Identified Issues

- Limited or no shoulder
- High density of access points
- Concentration of crashes between US Highway 2 and Ash Road
- Increasing use as a "bypass" to connect US Highway 2 and MT Highway 35
- Limited bicycle/pedestrian facilities
- High number of crashes at the intersection with US Highway 2

5. Foothills Road

Foothills Road was evaluated from Lake Blaine Road south to Echo Lake Road. Foothills Road is a two-lane paved roadway with little or no shoulder. This roadway is used to access recreation and residential areas along the corridor. Foothills Road has several sharp curves and is very rural in nature. The study corridor has a posted speed limit of 35 mph and is classified as a major collector.

Table 2.13 shows various ADT counts completed by Flathead County. These ADT counts show that current traffic volumes are well under theoretical capacity levels for a two-lane paved roadway.

Table 2.13: Foothills Road ADT

Source	Location	Date	ADT
County	East of Echo Lake Road	Nov-07	737
County	North of Jewel Basin Road	Nov-07	433
County	West of Krause Lane	Nov-07	660
County	South of Bachelor Grade	Nov-07	868
County	East of Lake Blaine Road	Nov-07	1,170

There were seventeen reported crashes along the ten-mile stretch of Foothills Road from January 1st, 2004 to December 31st, 2006. Fourteen (or 82%) of the reported crashes involved only one vehicle, the majority of which occurred along the shoulder of the roadway. Nine of the reported crashes occurred when road surface conditions were wet, icy, or covered in snow or slush. Five crashes resulted in injuries, none of which resulted in fatalities. An analysis of the crash info shows a cluster of crashes reported at or near the following three locations.

- **Intersection with Jewel Basin Road –** There were three reported crashes at this location. Jewel Basin Road intersects Foothills Road along a curve. There are sight distance issues, particularly southbound, at this intersection. The approach to Jewel Basin Road is skewed to Foothills Road.

Photo 2.14: Foothills Road / Jewel Basin Road

- **North of Snowberry Trail –** There were seven reported crashes along the one-mile stretch of Foothills Road north of Snowberry Trail. The majority of these crashes occurred just south of the last sharp curve along Foothills Road that heads to Lake Blaine Road. This stretch of Foothills Road generally has poor sight distances in addition to multiple sharp curves that lack appropriate signing.

Photo 2.15: Snowberry Trail / Foothills Road

- **Peters Creek Way to Bachelor Grade Road –** There were four reported crashes along this one-mile stretch of Foothills Road. This stretch has multiple sharp curves with limited sight distance in addition to multiple approaches connecting to the corridor. Currently, a yield sign is provided along Bachelor Grade Road at the intersection with Foothills Road. The yield sign, coupled with the approach angle of Bachelor Grade Road, gives priority to drivers accessing Foothills Road at this location.

Photo 2.16: Bachelor Grade Road / Foothills Road

In general, Foothills Road is windy, has locations of limited sight distance, and has little to no shoulder.

Identified Issues:

- Multiple sharp horizontal curves and substandard vertical curves that limit sight
- Intersections along curves
- Inadequate signing in some locations
- Increasing ADT

6. Helena Flats Road

Photo 2.17: Helena Flats Road

Helena Flats Road was evaluated from MT Highway 35 north to East Reserve Drive. Helena Flats Road is a two-lane paved roadway with little to no shoulder and is classified as a minor arterial. This corridor serves local residents and connects Highway 35 to Highway 2 via East Reserve Drive. The study corridor has a posted speed limit of 35 mph.

This corridor is increasingly seeing use as an informal "bypass" for vehicles traveling between US Highway 2 and MT Highway 35. This usage is being fueled by those travelers wishing to avoid the intersection and additional trip length by going through the intersection of LaSalle Road and MT Highway 35.

Helena Flats Road is a major corridor used to access the Evergreen Schools (both junior high and elementary). This corridor currently lacks sidewalks and bike lanes. The close proximity to schools in the area increases the likelihood of students being present along the corridor, either walking or biking. There are limited pedestrian and bicycle facilities.

A speed study was conducted by RPA along Helena Flats Road in August 2008 north of US Highway 2. The speed study showed an average speed of 34.5 mph and an 85th percentile speed of 39.2 mph. The speed study indicates that the average speed is lower than the posted speed limit of 35 mph, while the 85th percentile speed is within 5 mph of the posted speed limit.

Table 2.14 shows various ADT counts conducted along the study corridor by MDT, RPA and Flathead County. These ADT counts show that current traffic volumes are under theoretical capacity levels for a paved two-lane facility.

Table 2.14: Helena Flats Road ADT

Source	Location	Date	ADT
County	North of East Evergreen Drive	Sep-05	3,671
County	South of East Evergreen Drive	Oct-07	3,864
MDT	South of East Reserve Drive	2005	2,920
MDT	North of MT Highway 35	2005	3,410
RPA[1]	North of East Evergreen Drive	Aug-08	3,962

[1]Represents single day ADT count; value was not adjusted for seasonal or daily variation.

There have been sixteen crashes reported along the study corridor between January 1st, 2004 and December 31st, 2006. Of these crashes, fourteen involved multiple vehicles. Seven crashes occurred while pavement conditions were dry while the remaining nine occurred while the pavement was wet or icy. A total of six crashes resulted in injuries, none of which resulted in fatalities. The most common type of collision was right angle collisions typically occurring at access points along the corridor.

There were two reported crashes at the intersection with East Evergreen Drive (see **Section 2.7.2** for more detail). Eight crashes occurred at the unsignalized intersection with MT Highway 35. This intersection is wide and without defined turn lanes. Also, southbound to eastbound drivers have a difficult time entering the traffic stream. Potential traffic signal control and/or intersection improvements may be warranted as land use changes are proposed east of the Flathead River.

Photo 2.18: Helena Flats Road / MT Highway 35

Identified Issues:

- Increasing traffic volumes
- Narrow roadway with no shoulders
- Lack of bicycle and pedestrian facilities
- Potential traffic signal and/or intersection improvements needed at the intersection with MT Highway 35
- Presence of schools in the area

7. Hodgson Road

Photo 2.19: Hodgson Road / Whitefish Stage

Hodgson Road was evaluated from US Highway 93 to US Highway 2. Hodgson Road is a two-lane paved roadway with little to no shoulder and is classified as a major collector. The corridor serves local traffic and also serves as a connecting route between US Highway 93 and US Highway 2. The speed limit along Hodgson Road is 40 mph. Hodgson Road between US Highway 2 and Whitefish Stage is generally flat with some locations of steep side slopes. This portion of the study corridor is fairly undeveloped. Hodgson Road between Whitefish Stage and US Highway 93 is generally curvy and has areas with substandard vertical curves. A number of residential developments exist in this area and utilize Hodgson Road.

The adjacent land use is expected to see future development. As development pressures are realized along this corridor, new right-of-way should be set aside as part of project approval for a future wider roadway section. It will be highly desirable to provide shoulders along this route in the future. Access control along this roadway should also be considered as development occurs in the area.

As developments are planned, traffic impact studies (TISs) should be required that evaluate what mitigation may be needed, both on-site and off-site, to alleviate potential impacts. Along Hodgson Road, the planning for left-turn bays, and potentially right-turn bays, are likely mitigation techniques that may be warranted as land use changes.

Table 2.15 shows various ADT counts conducted along the study corridor by Flathead County. These ADT counts show that current traffic volumes are under theoretical capacity levels for a paved two-lane facility.

Table 2.15: Hodgson Road ADT

Source	Location	Date	ADT
County	East of Trumble Creek Road	Sep-07	1,222
County	East of Whitefish Stage	Sep-07	1,350
County	East of US Highway 93	Oct-07	1,850
County	West of US Highway 2	Sep-07	1,355
County	West of Whitefish Stage	Oct-07	1,388

There have been twenty-five reported crashes along the study corridor between January 1st, 2004 and December 31st, 2006. Of these crashes, fourteen involved multiple vehicles. Thirteen crashes occurred while pavement conditions were dry while the remaining eleven occurred while the pavement was wet, snowy, slushy, or icy. Seven crashes resulted in injuries, one of which resulted in a fatality. The most common type of collision was right angle collisions typically occurring at access points or intersections along the corridor.

An analysis of the crash data shows clusters of crashes along Hodgson Road at four locations: 1) intersection with US Highway 93; 2) between Hare Trail and Lidstrom Road; 3) intersection with Whitefish Stage (see **Section 2.7.2** for more detail); and 4) intersection with US Highway 2.

- **Hare Trail to Lidstrom Road** – There were ten reported crashes along this ¾ mile section of Hodgson Road. This section of Hodgson Road is narrow and windy and has multiple residential access points and connecting roads, many of which have poor sight distance. The majority of these crashes occurred at intersections or along corners or hills where sight distance is limited. Seven crashes occurred when the roadway was icy or snowy. Three crashes resulted in injuries along this section of Hodgson Road.

Photo 2.20: Limited sight distances along Hodgson Road

- **Intersection with US Highway 93** – There were three reported crashes at this location, none of which resulted in injuries. This is a three-legged intersection with stop control along Hodgson Road. US Highway 93 has two travel lanes in each direction along with a center two-way left-turn lane. This intersection has some sight distance issues, particularly along the Hodgson Road leg. While traveling west along Hodgson Road, it is difficult to see this intersection due to the vertical curve present near the intersection. There is also no advanced warning sign for this intersection along Hodgson Road.

Photo 2.21: Hodgson Road / US Highway 93

- **Intersection with US Highway 2 –** There were five crashes reported at this intersection. Of these crashes, all but one involved multiple vehicles. Three crashes resulted in injuries, one of which resulted in a fatality. US Highway 2 is a five-lane roadway consisting of two travel lanes in each direction and a two-way left-turn lane. This intersection does not appear to have sight distance or geometric configuration issues.

Photo 2.22: Hodgson Road / US Highway 2

As discussed, Hodgson Road between US Highway 93 and Whitefish Stage has experienced a high number of crashes. This portion of Hodgson Road is windy, has locations of limited sight distances, has little to no shoulder, and has multiple access roads and residential roads connecting to it. As development occurs along Hodgson Road, ADTs will continue to rise. The current speed limit of 40 mph along Hodgson Road may need to be reanalyzed.

Identified Issues:

- Increasing traffic volumes
- Narrow windy roadway with no shoulders
- Limited sight distance
- High rate of crashes, particularly between Whitefish Stage and US Highway 93
- High volume of truck traffic

8. Holt Stage Road / Mennonite Church Road

Photo 2.23: Holt Stage Road

Holt Stage Road / Mennonite Church Road was evaluated from Steel Bridge Road to Creston Hatchery Road. This corridor is a two-lane roadway that is paved along Holt Stage Road and recently paved in the summer of 2009 along Mennonite Church Road. This corridor serves local residents and connects the City of Kalispell to MT Highway 35. There is generally no shoulder provided and there are areas with steep side slopes. This corridor is classified as a major collector roadway along Holt Stage and as a minor collector roadway along Mennonite Church Road. The area that the corridor serves is fairly undeveloped and consists mostly of fields and farmland.

The Old Steel Bridge is currently being replaced, and as a result, current traffic volumes may not be representative of typical use. Once the new bridge is in place, travel patterns are likely to change in this area. The lands adjacent to Holt Stage Road will be ripe for development, and as time goes on development pressures will certainly increase.

Table 2.16 shows various ADT counts conducted along the study corridor by Flathead County. These ADT counts show that current traffic volumes along Holt Stage Road and Mennonite Church Road are under theoretical capacity levels for a paved two-lane facility.

Table 2.16: Holt Stage Road / Mennonite Church Road ADT

Source	Location	Date	ADT
County	East of Steel Bridge Road	Sep-04	607
County	East of Montford Road	Aug-04	248
County	West of MT Highway 35	Sep-06	190
County	East of MT Highway 35	Nov-07	416
County	West of Creston Hatchery Road	Nov-07	339

There have been six reported crashes along the study corridor between January 1st, 2004 and December 31st, 2006. Five out of the six crashes reported involved only one vehicle, all of which occurred at night. Two crashes resulted in injuries, none of which resulted in fatalities. In general, the study corridor has seen very few crashes over the three year study period. There appears to be no pattern of where the crashes are taking place. As a result, there are no identified deficient areas directly contributing to crashes along the study corridor.

Identified Issues:

- Potentially increasing traffic volumes
- Bridge reconstruction and paving may change roadway usage
- Steep side slopes lack guardrail along the western portion of Holt Stage Road

9. Kila Road

Kila Road was evaluated from the east intersection with US Highway 2 to the west intersection with US Highway 2. Kila Road has little to no shoulder and has multiple sharp curves, especially along the southern portion of the corridor. This is a two-lane paved roadway that serves the residents of Kila and surrounding areas. The roadway is classified as a major collector and has a speed limit of 35 mph.

Photo 2.24: Kila Road

Kila Road west of Smith Lake Road is windy, steep, has steep side slopes, and has areas with very limited sight distance. Both the eastern and western intersections of Kila Road and US Highway 2 are skewed and provide limited sight distance (see **Section 2.7.2** for more detail).

Table 2.17 shows various ADT counts conducted along the study corridor by Flathead County. These ADT counts show that current traffic volumes are under theoretical capacity levels for a paved two-lane facility. As is indicated by these traffic volumes, the majority of traffic along Kila Road utilizes the eastern most intersection with US Highway 2.

Table 2.17: Kila Road ADT

Source	Location	Date	ADT
County	At east intersection with US Highway 2	Sep-05	1,960
County	East of Smith Lake Road	Sep-05	1,665
County	West of Smith Lake Road	Aug-03	166
County	At west intersection with US Highway 2	Aug-03	151

There have been eleven reported crashes along Kila Road between January 1st, 2004 and December 31st, 2006. Nine of the eleven reported crashes involved a single vehicle, most of which occurred along the shoulder of the roadway. Four crashes resulted in injuries, none of which resulted in a fatality. Four crashes occurred while the road was snowy or icy, while the other seven occurred when the road surface was dry. Five of the reported crashes occurred at the northern intersection of Kila Road and US Highway 2 (see **Section 2.7.2** for more detail). The remaining six reported crashes occurred sporadically along Kila Road.

Kila Road generally has seen very few crashes over the three year study period other than those occurring at the intersection with US Highway 2. An analysis of the crash data shows that most of the crashes involved only one vehicle running off the road.

Identified Issues:

- Skewed intersections with US Highway 2 with limited sight distance
- Sharp curves, steep slopes, and limited sight distance west of Smith Lake Road
- No advanced warning signs for intersections
- Substandard vertical and horizontal geometrics at western intersection with US Highway 2

10. Lake Blaine Road

Photo 2.25: Lake Blaine Road / Foothills Road

Lake Blaine Road was evaluated from MT Highway 35 to the intersection with Hemler Creek Drive. Lake Blaine Road has little to no shoulder and has some sharp curves along its northern end that limit sight distance. This is a paved two-lane roadway that serves local residents and allows access to Lake Blaine. The speed limit along Lake Blaine Road is 45 mph from MT Highway 35 to Foothills Road, and 25 mph from Foothills Road to its end. Lake Blaine Road is classified as a major collector between MT Highway 35 and Foothills Road and as a minor collector from Foothills Road to its end.

Cayuse Prairie School is located off Lake Blaine Road. Currently there is no designated “school zone” identified along the roadway in the vicinity of the school. A lack of signing and pedestrian / bicycle facilities exist near the school and along Lake Blaine Road.

The intersection of Lake Blaine Road and Foothills Road currently has limited sight distance. A yield sign exists along the northern leg of this intersection. Vehicles currently traveling south along Lake Blaine

Road wishing to take a right at the intersection may feel a false sense of priority to westbound vehicles based on the current intersection conditions.

A speed study was conducted by RPA along Lake Blaine Road in August 2008, west of Van Sant Road. The speed study showed an average speed of 47.5 mph and an 85th percentile speed of 53.4 mph. The study results showed that the average speed is slightly higher than the posted speed limit of 45 mph, while the 85th percentile speed is more than 8 mph higher than the posted speed limit.

Table 2.18 shows various ADT counts conducted along the study corridor by Flathead County, MDT, and RPA. These ADT counts show that current traffic volumes are under theoretical capacity levels for a paved two-lane facility.

Table 2.18: Lake Blaine Road ADT

Source	Location	Date	ADT
County	East of MT Highway 35	Nov-07	3165
County	North of Foothills Road	Nov-07	381
MDT	East of MT Highway 35	2005	2600
RPA[1]	West of Van Sant Road	Aug-08	1713

[1]Represents single day ADT count; value was not adjusted for seasonal or daily variation.

There were seventeen reported crashes along Lake Blaine Road between January 1st, 2004 and December 31st, 2006. Of these crashes, eleven involved only one vehicle, most of which occurred along the shoulder of the roadway. Six crashes occurred while the road surface was dry, while the remaining eleven occurred while the road was wet, snowy, slushy, or icy. Of the seventeen reported crashes, eight resulted in injuries, none of which resulted in fatalities. An analysis of the crash data shows that the majority of the crashes were spread out along Lake Blaine Drive. No apparent cluster of crashes has been identified. In general, the majority of the crashes appear to be vehicles running off the roadway.

Identified Issues:

- Lack of shoulders and steep side slopes
- Vertical curves limit sight distance
- Multiple access points
- No “School Zone” near Cayuse Prairie School
- Lack of pedestrian and bicycle facilities
- Sight distance and signing issues at the intersection with Foothills Road
- High number of single vehicle crashes

11. Lower Valley Road

Lower Valley Road was evaluated from the intersection with Willow Glen Drive to the intersection with MT Highway 82. Lower Valley Road is a paved two-lane roadway with little to no shoulder and is classified as a major collector. This corridor was not evaluated as part of the *Phase 1* plan.

This corridor is flat but has multiple sharp horizontal curves, many of which are 90-degree corners. A speed limit of 45 mph exists along Lower Valley Road; however, some of the sharp corners are signed for slower speeds. Farmland generally surrounds the corridor, with some light residential mixed in, mostly along the northern portion.

A speed study was conducted by RPA along Lower Valley Road east of Foys Bend Lane in August 2008. The speed study showed an average speed of 46.5 mph and an 85th percentile speed of 55.7 mph. The speed study indicates that the average speed is slightly higher than the posted speed limit of 45 mph, while the 85th percentile speed is more than 10 mph higher than the posted speed limit.

Photo 2.26: Lower Valley Road

Table 2.19 shows various ADT counts conducted along the study corridor by Flathead County and RPA. These ADT counts show that current traffic volumes are under theoretical capacity levels for a paved two-lane facility.

Table 2.19: Lower Valley Road ADT

Source	Location	Date	ADT
County	East of Willow Glen Drive	Sep-05	2143
County	North of Manning Road	Aug-07	178
County	North of MT Highway 82	Jun-05	314
RPA[1]	East of Foys Bend Lane	Aug-08	1094

[1]Represents single day ADT count; value was not adjusted for seasonal or daily variation.

There were eighteen reported crashes along Lower Valley Road between January 1st, 2004 and December 31st, 2006. Fifteen of these reported crashes involved only one vehicle, the majority of which occurred along the shoulder of the roadway. Thirteen of the eighteen reported crashes occurred while the road surface was dry. Eight crashes resulted in injuries, none of which resulted in fatalities.
An analysis of the crash data shows that nine of the reported crashes (or 50%) occurred at or near the intersection with Foys Bend Lane. This intersection is a 90-degree corner with substandard advanced warning signing. The majority of the remaining nine reported crashes occurred near other sharp corners present along Lower Valley Road, although no other clusters of crashes were observed. In general, the majority of the crashes along Lower Valley Road appear to be the result of drivers leaving the roadway on curves.

Identified Issues:

- Lack of shoulders
- Multiple sharp corners
- Inadequate signing at some locations
- Large number of crashes at or near the intersection with Foys Bend Lane

12. Spring Hill Road

Photo 2.27: Spring Hill Road

Spring Hill Road was evaluated from the intersection with Smith Lake Road to its end. Spring Hill Road is a two-lane gravel roadway with little to no shoulder. The road has several sharp curves and a portion of the roadway is on a steep vertical grade. This roadway serves residents along the corridor and also provides access to recreational areas in the area. The speed limit along Spring Hill Road is 35 mph and it is classified as a minor collector.

Table 2.20 shows various ADT counts conducted along the study corridor by Flathead County. These ADT counts show that current traffic volumes are well under theoretical capacity levels for a two-lane roadway. Current traffic volumes are also under the suggested roadway paving trigger value of 400 vpd.

Table 2.20: Spring Hill Road ADT

Source	Location	Date	ADT
County	East of Smith Lake Road	Aug-07	286
County	1.1 miles east of Smith Lake Road	Sep-00	100

There was only one reported crash along Spring Hill Road between January 1st, 2004 and December 31st, 2006. The crash occurred near the intersection with Smith Lake Road and was the result of a single vehicle running off of the road due to excessive speed for the conditions.

In general, Spring Hill Road is a steep windy road that is difficult to traverse during times of inclement weather. Chains or studded tires are recommended during the winter. The crash analysis completed for the corridor did not identify any specific problematic areas resulting in crashes. If development occurs in the area, and ADTs increase, this corridor may approach the roadway paving trigger.

Identified Issues:

- Lack of advance warning signs for curves
- Future ADTs may reach paving threshold
- No shoulders
- Sight distance
- Difficult to traverse during inclement weather
- Steep grades

2.7.2 Study Intersections

This section provides information on the sixteen intersections that were evaluated as part of this *Transportation Plan*. These study intersection were chosen based on their importance to the roadway network, known traffic patterns, community desire, and identified problem areas. Each of the study intersections were also analyzed in the previous *Phase 1* study and are signalized and unsignalized intersections. The following are the sixteen study intersections evaluated in detail (also shown graphically in **Figure 2.9**):

1. Auction Road and Demersville Road
2. Batavia Lane and US Highway 2
3. Beach Drive and Holt Drive
4. Best Way and Truck Route
5. Columbia Falls Stage and Kelley Road
6. Fairmont Road and MT Highway 35
7. Helena Flats Road and East Evergreen Drive
8. Helena Flats Road and East Reserve Drive
9. Hodgson Road and Whitefish Stage
10. Kila Road and US Highway 2
11. West Springcreek Road and US Highway 2
12. West Valley Drive and Three Mile Drive
13. Whitefish Stage and Granrud Lane
14. Whitefish Stage and Mission Trail
15. Whitefish Stage and West Evergreen Drive
16. Whitefish Stage and Winchester Street

Each study intersection was analyzed in detail using a number of factors. The previous sections of this Chapter provide information for the intersection performance, preliminary signal warrants and crash analysis. This section uses this previous information along with site visit data to look at each study intersection in detail to define the existing conditions and to identify potential problems.

1. Auction Road and Demersville Road

The intersection of Auction Road and Demersville Road is located south of Kalispell just off of US Highway 93. Auction Road is a two-lane paved roadway that connects to US Highway 2. Demersville Road is a two-lane paved roadway that runs north/south. The intersection of Auction Road and Demersville Road is a skewed three-way intersection that has stop control along the western leg of Auction Road.

No reported crashes occurred at this intersection during the three-year crash analysis period. The traffic volumes are currently low at this intersection, which result in a LOS of A for both the morning and evening peak hours. This is currently a very low volume intersection with fairly evenly distributed turning movements.

The development and construction presently occurring along Demersville Road will increase the traffic at this location in the near future.

Identified Issues:

- Skewed
- Ill-defined travel paths – lack of pavement markings delineating lanes

Photo 2.28: Auction Road / Demersville Road intersection; from top to bottom: Looking north; looking west; looking south.

2. Batavia Lane and US Highway 2

Photo 2.29: Batavia Lane / US Highway 2 intersection; from top to bottom: looking west; looking north; looking south.

The intersection of Batavia Lane and US Highway 2 is located west of Kalispell. Batavia Lane is a paved two-lane roadway. US Highway 2 is a two-lane highway that serves regional and local traffic. This intersection is a skewed three-way intersection that has stop control along Batavia Lane. A northbound left-turn lane is provided along US Highway 2 at this location. A widened paved shoulder is provided along the southbound lane which serves as a right-turn lane. No striping currently exists designating this as a right-turn lane, however.

A gas station is located at the northwest corner and Smith Valley School is located along the southwest corner of this intersection. Painted crosswalks currently exist across the southern leg of US Highway 2 and across Batavia Lane. Crossing guards are used to help students cross US Highway 2 at this intersection. The speed limit along US Highway 2 is 45 mph in the adjacent school zone.

Two crashes occurred at this location during the three-year study period. Both crashes involved multiple vehicles and each resulted in non-incapacitating injuries. The LOS analysis completed for this intersection indicates a LOS of D for the AM peak hour and a LOS of C for the PM peak hour. It is expected that a large portion of the AM peak hour traffic is directly a result of the school located at this intersection.

The preliminary signal warrant analysis completed in **Section 2.5** indicates that a signal is warranted based on four-hour traffic volumes and peak hour traffic volumes. It should be noted that the school crossing signal warrant (number 5) was not analyzed due to insufficient data. This intersection should be analyzed in more detail to determine if a traffic signal and/or other improvements are appropriate for this location.

Identified Issues:

- Poor alignment of skewed Batavia Lane approach
- School along the southwest corner causes increased pedestrian presence
- Gas station approaches close to the intersection along the northwest corner
- Traffic flow interruption from students crossing US Highway 2
- Failing LOS during AM peak hour
- Preliminary signal warrant analysis indicates a signal may be warranted
- Shoulder along southbound lane is not striped for a right-turn lane

3. Beach Drive and Holt Drive

The intersection of Beach Drive and Holt Drive is located in Bigfork, southeast of Kalispell. Holt Drive is a paved two-lane major collector roadway which connects to MT Highway 35. Beach Drive makes up the southern leg of the intersection and is a local road which provides access to local residents and to Flathead Lake. Ichabod Lane makes up the northern approach leg of the intersection and is a local residential access road.

This intersection is a four-legged intersection with stop control provided along Beach Drive and Ichabod Lane. The approach along Beach Drive is very skewed and steep. A separate right-turn lane is provided along the southern leg of the intersection. A stop sign and curbing divides the right-turn lane and thru/left-turn lane along this leg. The sight distance along the southern leg is limited due to the approach angle and steepness of the roadway.

No reported crashes occurred at this intersection during the three-year analysis period. The LOS analysis shows a LOS of B during the AM and PM peak hours. Overall this is a very awkward intersection that has multiple geometric issues.

<u>*Identified Issues:*</u>

- Holt Drive is skewed and steep
- Separate right-turn lane divided by stop sign and curbing
- Limited sight distance
- Northern and southern approach alignment is poor

Photo 2.30: Beach Drive / Holt Drive intersection; from top to bottom: looking west; looking south; looking east; looking north.

4. Best Way and Truck Route

Photo 2.31: Best Way / Truck Route Intersection; from top to bottom: looking west; looking east; looking north; looking south.

The intersection of Best Way and Truck Route is located along the western portion of Columbia Falls. Best Way and Truck Route are both two-lane paved roadways that mostly serve industrial and commercial businesses in the area. This intersection is a four-way stop-controlled intersection. A substantial number of large trucks utilize this intersection due to its close proximity to a logging mill and other businesses in the area.

No reported crashes occurred at this intersection during the three-year crash analysis period. The traffic volumes are currently low at this intersection, which result in a LOS of A for both the AM and PM peak hours.

This intersection presently functions at an acceptable LOS and does not have high crash rates. An analysis of the current traffic volumes utilizing this intersection indicate that the volumes are fairly distributed along all four legs of the intersection. As traffic volumes increase, this intersection should be analyzed in more detail to determine if the stop control currently being provided along all four legs is still necessary, or if other traffic control measures are needed. It should be noted that the four-way stop-controlled intersection is the most restrictive form of intersection traffic control and often results in increased delay and vehicle emissions.

It is uncertain if all four corners of the intersection currently accommodate large trucks. Due to the high percentage of large trucks utilizing this intersection, it is important that the corner radii accommodate a large enough design vehicle.

Identified Issues:

- High volume of large truck traffic
- Four-way stop control
- Small corner radii

5. Columbia Falls Stage and Kelley Road

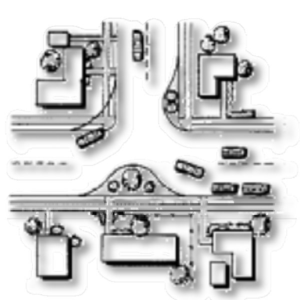
Photo 2.32: Columbia Falls Stage / Kelley Road Intersection; from top to bottom: looking west; looking south; looking east.

The intersection of Columbia Falls Stage and Kelley Road is located south of Columbia Falls. Columbia Falls Stage is a two-lane paved roadway classified as a major collector. This corridor serves as an alternate route to MT Highway 206 and connects Kalispell to Columbia Falls east of the Flathead River. Kelley Road is a two-lane paved roadway classified as a minor collector. Kelley Road connects Columbia Falls Stage to MT Highway 206 south of Columbia Falls. The intersection of Columbia Falls Stage and Kelley Road is a three-legged intersection with stop control along the northern leg of Columbia Falls Stage.

The crash analysis completed for this intersection shows that two crashes occurred during the three-year study period. Both crashs did not result in any reported injuries. The LOS analysis completed shows that this intersection performs at a LOS of A during both the AM and PM peak hours.

An analysis of the traffic distribution at this intersection indicates that the majority of the traffic occurs along Columbia Falls Stage which acts as the mainline corridor. A large portion of the traffic at this intersection travels along the western and southern approach of Columbia Falls Stage. Most of the traffic along the eastern leg of Kelley Road takes a right at the intersection to head north along Columbia Falls Stage.

Given the traffic distribution discussed above, it may be desirable to allow free flow traffic along Columbia Falls Stage Road. This could be achieved by realigning this intersection to create a smooth curve along the northwest corner (see illustration). The eastern leg of Kelley Road could then be realigned to connect to the intersection at a 90-degree angle. Stop control would then be provided along Kelley Road. Realigning the intersection in this fashion would allow for unobstructed movements for the majority of traffic. This will become increasingly important as traffic volumes increase at this intersection.



Identified Issues:

- Majority of intersection traffic occurs along Columbia Falls Stage
- Poor geometric configuration
- “T” intersection requires a stop along northern leg

6. Fairmont Road and MT Highway 35

Photo 2.33: Fairmont Road / MT Highway 35; from top to bottom: looking east; looking west; looking north; looking south.

The intersection of MT Highway 35 and Fairmont Road is located east of Kalispell and east of the Flathead River. MT Highway 35 is a two-lane paved highway classified as a principal arterial. MT Highway 35 has a speed limit of 70 mph at this location. Fairmont Road is a two-lane paved minor collector roadway that serves local traffic. The intersection of MT Highway 35 and Fairmont Road is a four-legged intersection with stop control on Fairmont Road and Amdahl Lane. Temporary construction signal control currently exists at this location due to the Old Steel Bridge replacement project.

The LOS analysis for this intersection under unsignalized conditions shows a LOS of E during the AM peak hour and a LOS of D during the PM peak hour. The preliminary signal warrant analysis for this intersection indicates that no warrants are currently met at this location.

The vast majority of traffic at this intersection occurs along MT Highway 35. Turn-lanes are not currently provided along any of the intersection legs. As traffic volumes increase, turn lanes off of MT Highway 35 may be needed.

There were eight crashes at this location during the three-year crash analysis period. The crash analysis period occurred while the intersection was unsignalized. Five of these crashes resulted in injuries, one of which resulted in incapacitating injuries. It is unknown if the crash rate of this intersection has changed since its recent signalization.

It should be noted that extensive public comment was received regarding the safety and traffic control at this intersection. A petition to "reinstall traffic light, add left turn lane and lower speed limit" was received during the public comment period. The petition was signed by approximately 450 people at the time it was received.

Identified Issues:

- Vast majority of traffic occurs along MT Highway 35
- Historically high rate of crashes
- Potential for turn lanes along MT Highway 35
- Traffic signal is temporary
- Failing unsignalized intersection LOS during peak hours

7. Helena Flats Road and East Evergreen Drive

The intersection of Helena Flats Road and East Evergreen Drive is located in Evergreen, just east of Kalispell. Helena Flats Road is a two-lane paved roadway classified as a minor arterial. Helena Flats Road connects to MT Highway 35 and provides an alternate north/south corridor to LaSalle Road / US Highway 2. East Evergreen Drive is a two-lane paved roadway and is classified as a minor arterial west of the intersection with Helena Flats Road. Evergreen Drive is a major east/west corridor and connects to Whitefish Stage. A bike/pedestrian path exists along the north side of East Evergreen Drive.

Photo 2.34: Helena Flats Road / East Evergreen Drive Intersection; from top to bottom: looking west; looking south; looking east; looking north.

The intersection of Helena Flats Road and East Evergreen Drive is a four-legged intersection with stop control along East Evergreen Drive. East Evergreen School is located along East Evergreen Drive near the intersection with Helena Flats Road. A crosswalk is provided across the northern leg of this intersection.

There were two reported crashes at this intersection during the three-year study period. Both crashes involved two vehicles, one of which resulted in a non-incapacitating injury. A LOS analysis completed for this intersection shows that it currently functions at a LOS of B during AM and PM peak hours. The vast majority of traffic occurring at this intersection occurs along Helena Flats Road as straight through movements. One concern regarding this intersection is the amount of vegetation present at the corners of the intersection. Care should be taken to trim vegetation so that sight distance and traffic control signs are not obstructed.

It is expected that this intersection, particularly along Helena Flats Road, will see an increase in traffic volumes due to its use as a "bypass" to LaSalle Road / US Highway 2. At this time, the intersection functions adequately; however, if traffic volumes increase, or traffic patterns change, this intersection should be analyzed in more detail to determine if a change in traffic control devices, or the addition of turn-lanes, may be needed.

Identified Issues:

- Majority of intersection traffic occurs along Helena Flats Road
- Vegetation obstructs sight distance and/or traffic signs
- East Evergreen School is located near the intersection
- Increasing use as a "bypass" to LaSalle Road / US Highway 2
- Likely increasing ADT may result in intersection performance issues

8. Helena Flats Road and East Reserve Drive

Photo 2.35: Helena Flats Road / East Reserve Drive; from top to bottom: looking east; looking west; looking south; looking north.

The intersection of Helena Flats Road and East Reserve Drive is located in Evergreen, northeast of Kalispell. Helena Flats Road is a two-lane paved roadway classified as a minor arterial. Helena Flats Road connects to MT Highway 35 and provides an alternate north/south corridor to LaSalle Road / US Highway 2. East Reserve Drive is a two-lane paved roadway classified as a minor arterial west of Helena Flats Road and as a minor collector east of Helena Flats Road. The intersection of Helena Flats Road and East Reserve Drive is a four-way stop-controlled intersection. It should be noted that the four-way stop-controlled intersection is the most restrictive form of intersection traffic control and often results in increased delay and vehicle emissions.

There were no reported crashes at this intersection during the three-year study period. The LOS analysis performed for this intersection shows that the intersection currently functions at a LOS of A during AM and PM peak hours. The traffic distribution at this intersection shows that the southern leg sees the most use, while the eastern leg experiences the least amount of traffic. In general, the majority of the traffic is traveling south to west through the intersection during the AM peak hour, while during the PM peak hour traffic is fairly well distributed along all legs.

One concern regarding this intersection is that there are some sight distance issues along the northwest corner. There is a large fence along the northwest corner at this location that obstructs the view along the northern and western approach legs.

It is expected that this intersection will experience an increase in traffic volumes as development occurs in the area and as these corridors see an increase in use as a "bypass" to MT Highway 35 and LaSalle Road / US Highway 2. While this intersection presently functions at an acceptable LOS, the performance should be monitored as development pressures are realized and as traffic volumes ultimately grow.

Identified Issues:

- Limited sight distance along northwest corner
- Increasing traffic volumes
- Four-way stop control

9. Hodgson Road and Whitefish Stage

The intersection of Hodgson Road and Whitefish Stage is located between Kalispell and Whitefish. Whitefish Stage is a two-lane paved roadway classified as a minor arterial and serves as an alternate north/south corridor to US Highway 93 which runs between Whitefish and Kalispell. Hodgson Road is a two-lane paved major collector roadway which runs between US Highway 93 and US Highway 2. Hodgson Road generally serves local traffic and residential neighborhoods in addition to providing east/west connection between the two highways.

The intersection of Hodgson Road and Whitefish Stage is a four-legged intersection with stop control along Hodgson Road. Nine crashes were reported at this intersection during the three-year study period. Of the nine crashes, five resulted in injuries, two of which were incapacitating. The intersection has a crash rate of 2.54 crashes per million entering vehicles. This intersection had the second highest number of crashes and the highest crash rate of the study intersections over the three-year analysis period.

A performance analysis completed for this intersection indicates that the intersection performs at a LOS of B during the AM and PM peak hours. The traffic volumes are fairly evenly distributed along all four intersection legs. No proportionally heavy traffic movements are apparent at this intersection.

The main concern with this intersection is the skewed western approach leg. The geometrics of this leg are awkward and restrict sight distance.

Identified Issues:

- High rate of crashes
- Skewed western approach leg
- Limited sight distance

Photo 2.36: Hodgson Road / Whitefish Stage; from top to bottom: looking west; looking south; looking east; looking north.

10. Kila Road and US Highway 2

Photo 2.37: Kila Road / US Highway 2; from top to bottom: looking south; looking west; looking north.

The intersection of Kila Road and US Highway 2 is located in Kila, west of Kalispell. Kila Road is a two-lane paved roadway classified as a major collector. This corridor is used to access the small community of Kila off of US Highway 2. Kila School is also accessed via Kila Road. US Highway 2 is a two-lane paved highway classified as a principal arterial.

The intersection of Kila Road and US Highway 2 is a three-legged intersection with stop control along Kila Road. This intersection is very skewed and as a result has limited sight distance. Three crashes were reported at this location during the three-year analysis period. Of the three crashes, two resulted in injuries, none of which were incapacitating. This intersection had the third highest number of crashes and the third highest crash rate of the study intersections.

A performance analysis of this intersection shows that the intersection functions at a LOS of B during the AM peak hour and at a LOS of A during the PM peak hour. A look at the turning movement counts performed at this intersection shows that almost all of the traffic accessing US Highway 2 at this location is turning right off of Kila Road. The counts also show that almost all of the traffic accessing Kila Road from US Highway 2 at this location is turning left from US Highway 2.

An initial look at the "Volume Guidelines for Left-Turn Lanes at Unsignalized Intersections on 2-Lane Highways" contained in MDT's *Traffic Engineering Manual* indicates that a westbound left-turn lane should be considered at this location based on current traffic volumes. Currently, vehicles stopping to turn left onto Kila Road are interrupting US Highway 2 traffic flow.

Identified Issues:

- High rate of crashes
- Skewed eastern approach leg
- Limited sight distances
- Westbound left-turn lane may be needed

11. <u>West Springcreek Road and US Highway 2</u>

The intersection of West Springcreek Road and US Highway 2 is located west of Kalispell. West Springcreek Road is a two-lane paved minor arterial roadway that serves local and regional traffic along the western edge of Kalispell. US Highway 2 is a two-lane paved highway classified as a principal arterial.

The intersection of West Springcreek Road and US Highway 2 is a four-legged intersection with stop control along West Springcreek Road and Dern Road. A flashing signal currently exists at this location which provides a flashing red light for the West Springcreek Road and Dern Road legs and flashes yellow for the US Highway 2 legs. Poor sight distance currently exists at the southwest corner of this intersection. This intersection has a high percentage of truck traffic which utilizes West Sringcreek Road to connect to Reserve Drive and US Highway 93 in order to "bypass" the City of Kalispell.

There were eleven reported crashes at this intersection during the three-year study period. Of these eleven crashes, eight resulted in injuries, four of which were incapacitating. This intersection had the highest number of crashes, the second highest severity index, and the second highest crash rate, resulting in the highest composite rating.

The performance analysis conducted for this intersection indicates that it performs at a LOS of F during the AM peak hour and at a LOS of D during the PM peak hour. The poor performance of the intersection can largely be attributed to the inability of traffic along West Springcreek Road and Dern Road to access US Highway 2 due to the high traffic volumes along the highway. A preliminary signal warrant analysis performed for this intersection indicates that signal warrants were met for the 4-hour and peak hour traffic volumes. This intersection should be analyzed in more detail to determine if a traffic signal and/or other improvements are appropriate for this location.

Photo 2.38: West Springcreek Road / US Highway 2; from top to bottom: looking east; looking west; looking south; looking north.

<u>Identified Issues:</u>

- Highest composite crash rating
- Limited sight distance along southwestern corner
- Failing LOS during AM and PM peak hours
- Preliminary signal warrant analysis indicates a signal may be warranted
- High percentage of truck traffic
- Steep grade along Dern Road

12. West Valley Drive and Three Mile Drive

Photo 2.39: West Valley Drive / Three Mile Drive; from top to bottom: looking east; looking south; looking north.

The intersection of West Valley Drive and Three Mile Drive is located west of Kalispell. West Valley Drive is a two-lane paved major collector roadway that serves local traffic in the area. Three Mile Drive is a two-lane paved roadway classified as a minor collector west of West Valley Drive and as a major collector east of West Valley Drive. Three Mile Drive generally serves local traffic in the region.

This intersection is a four-legged intersection with yield signs along West Valley Drive. There was one reported crash at this intersection during the three-year analysis period. This crash resulted in no injuries or fatalities. This intersection has the highest crash rate and fourth highest severity index, resulting in the second highest composite rating among the study intersections.

The performance analysis conducted for this intersection indicates that it functions at a LOS of A during both the AM and PM peak hours. A look at the traffic patterns indicate that a vast majority of the traffic entering this intersection occurs along West Valley Drive. It would seem better suited to move the traffic control signs from West Valley Drive and place them along the Three Mile Drive approaches.

In general this intersection performs quite well. There is minimal traffic delay and the sight distance seems adequate along all corners. Despite the low traffic volumes and minimal delay, this intersection did have a high crash rate resulting in 1.92 crashes per million entering vehicles. This high crash rate may at least partially be due to the traffic control signs being placed along the higher volume legs of the intersection instead of being placed along the lower volume legs.

Identified Issues:

- High rate of crashes
- Yield signs placed along higher volume legs

13. Whitefish Stage and Granrud Lane

The intersection of Whitefish Stage and Granrud Lane is located north of Kalispell. Granrud Lane is a two-lane paved roadway classified as a minor collector and serves local and residential traffic in the area. Whitefish Stage is a two-lane paved roadway and is classified as a minor arterial. Whitefish Stage serves local and regional traffic in the area and also provides an alternate north/south route to US Highway 93 and US Highway 2.

This intersection is a three-legged intersection with stop control along Granrud Lane. There were two reported crashes during the three-year analysis period, one of which resulted in an incapacitating injury. A performance analysis of this intersection indicates that the intersection performs at a LOS of B during the AM and PM peak hours. Granrud Lane has relatively low traffic volumes at the intersection with Whitefish Stage.

Overall, this intersection performs adequately for the amount of traffic that it handles. The relatively limited use along Granrud Lane contributes to the high performance level of the intersection. This intersection is geometrically sound and has good sight distance in all directions. If traffic volumes continue to rise in the future, this intersection should be monitored to determine if turn lanes along Whitefish Stage are justified.

One concern regarding this intersection is the treatment of the shared-use path which crosses the Granrud Lane leg of the intersection. There are no pavement markings or signs indicating that pedestrians and/or bicyclists may be crossing at this location.

Photo 2.40: Whitefish Stage / Granrud Lane; from top to bottom: looking north; looking east; looking south.

Identified Issues:

- One incapacitating injury occurred during the analysis period
- Lack of treatment for the shared-use path crossing
- Turn lanes off of Whitefish Stage may be needed in the future

14. Whitefish Stage and Mission Trail


Photo 2.41: Whitefish Stage / Mission Trail; from top to bottom: looking south; looking west; looking north.

The intersection of Whitefish Stage and Mission Trail is located north of Kalispell. Mission Trail is a two-lane paved roadway and is used primarily for residential access. Whitefish Stage is a two-lane paved roadway and is classified as a minor arterial. Whitefish Stage serves local and regional traffic in the area and also provides an alternate north/south route to US Highway 93 and US Highway 2.

This intersection is a three-legged intersection with stop control along Mission Trail. There were no reported crashes during the three-year analysis period. A performance analysis of this intersection indicates that the intersection performs at a LOS of C during the AM and PM peak hours. The vast majority of the vehicles traveling along Mission Trail are turning left at the intersection to head south towards Kalispell. Similarly, the majority of vehicles turning onto Mission Trail are right-turns off of Whitefish Stage.

Overall, this intersection performs adequately for the amount of traffic that it handles. The relatively limited use along Mission Trail contributes to the high performance level of the intersection. This intersection is geometrically sound and has good sight distance in all directions. If traffic volumes continue to rise in the future, this intersection should be monitored to determine if turn lanes off of Whitefish Stage are justified. In the future, as the LOS decreases, additional traffic control device may be needed.

One concern regarding this intersection is that there is a crosswalk across the northern leg of the intersection which connects to the shared-use path along Whitefish Stage. The crosswalk leads directly to the shoulder and ditch along Mission Trail as there is no sidewalk or trail provided at this location. This could lead to pedestrians and/or bicyclists sharing the narrow roadway along Mission Trail with motorists.

Identified Issues:

- Crosswalk across Whitefish Stage does not connect to a path or sidewalk along Mission Trail
- Monitor to determine if traffic control device and/or turn lanes are needed in the future

15. <u>Whitefish Stage and West Evergreen Drive</u>

The intersection of Whitefish Stage and West Evergreen Drive is located north of Kalispell. West Evergreen Drive is a two-lane paved roadway classified as a minor arterial. West Evergreen Drive serves local and regional traffic in the area. Whitefish Stage is a two-lane paved roadway and is classified as a minor arterial. Whitefish Stage serves local and regional traffic in the area and also provides an alternate north/south route to US Highway 93 and US Highway 2.

This intersection is a three-legged intersection with stop control along West Evergreen Drive. There were two reported crashes at this intersection during the three-year analysis period. Of these crashes, one resulted in injuries, none of which were incapacitating. The Village Plaza Shopping Center is located at the northeast corner of this intersection. Edgerton School is also located nearby.

A performance analysis of this intersection indicates that the intersection performs at a LOS of C during the AM peak hour and at a LOS of F during the PM peak hour. The poor performance of the intersection indicates that some form of traffic control measure and/or intersection improvement may be needed at this intersection. Currently, there are no designated turn-lanes off of Whitefish Stage at this intersection. The high number of turning vehicles and poor LOS may indicate a need to add a right and/or left-turn bay(s) off of Whitefish Stage. A preliminary signal warrant analysis for this intersection indicates that warrants may be met for the peak hour traffic warrant. This intersection should be analyzed in more detail to determine if a traffic signal or other traffic control device is appropriate for this location.

Photo 2.42: Whitefish Stage / West Evergreen Drive; from top to bottom: looking west; looking south; looking north.

<u>Identified Issues:</u>

- Poor PM peak hour LOS
- High volume of vehicles turning from Whitefish Stage
- Preliminary signal warrant analysis indicates a signal may be warranted
- School and area businesses located nearby

16. Whitefish Stage and Winchester Street

Photo 2.43: Whitefish Stage / Winchester Street; from top to bottom: looking north; looking west; looking east; looking south.

The intersection of Whitefish Stage and Winchester Street is located north of Kalispell. Winchester Street is a two-lane paved roadway which is primarily used to access residential areas. Whitefish Stage is a two-lane paved roadway and is classified as a minor arterial. Whitefish Stage serves local and regional traffic in the area and also provides an alternate north/south route to US Highway 93 and US Highway 2.

This intersection is a four-legged intersection with the western leg being an access to the Buffalo Hill Golf Club. Stop control is provided along the Golf Club access road and along Winchester Street. There was one reported crash during the three-year analysis period. This crash resulted in no injuries or fatalities. A performance analysis of this intersection indicates that the intersection performs at a LOS of C during the AM and PM peak hours.

Overall, this intersection performs adequately for the amount of traffic that it handles. If traffic volumes continue to rise in the future, this intersection should be monitored to determine if turn lanes or other traffic control measures are justified. Another concern regarding this intersection is that there is no signing for the crosswalk across the northern leg of the intersection.

Identified Issues:

- No signing for the crosswalk across Whitefish Stage
- Increasing traffic volumes may necessitate additional traffic control measures

CHAPTER 3

Socioeconomic Analysis and Growth Projections

Chapter 3: Socioeconomic Analysis and Growth Projections

3.1 INTRODUCTION

The method and process developed to predict growth in Flathead County up to the year 2030 is described in this chapter. Using population, employment and other socioeconomic trends as aids, the future transportation requirements for Flathead County can be defined. Socioeconomic information and future growth projections ultimately aid in the development of the transportation demand model developed for Flathead County.

3.2 SOCIOECONOMIC TRENDS

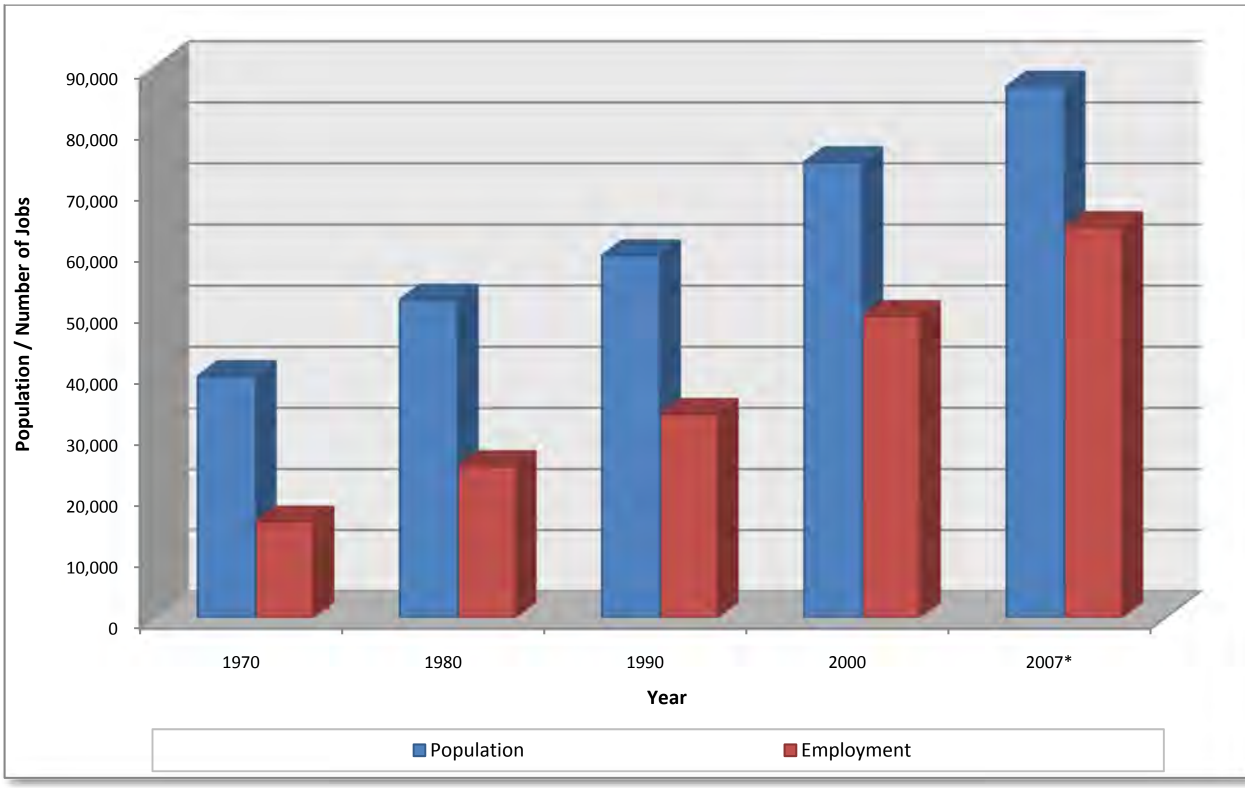
There is a direct correlation between motor vehicle travel growth and population and economic growth. Flathead County has seen its population grow over the past century, with a significant increase over the past thirty-five years. **Table 3.1** shows that from 1970 through 2007, the County population has more than doubled, increasing by an estimated 47,384 people. Likewise, the County's employment data shows an increase of 48,180 jobs between 1970 and 2007. Between 1990 and 2000 a population increase of over 25% and an employment increase of nearly 50% occurred in Flathead County. **Figure 3.1** shows the Flathead County population and employment trends between 1970 and 2007 (estimated) in a graphical format.

Table 3.1: Flathead County Population and Employment Trends

Year	Population	Employment[1]
1970	39,460	15,627
1980	51,966	24,705
1990	59,218	33,258
2000	74,471	49,278
2007[2]	86,844	63,807

Source: US Bureau of the Census, Census of Population; US Department of Commerce, Bureau of Economic Analysis, REIS Data Series
[1]Employment data is the number of jobs, not the number of employed people.
[2]Population and employment data for 2007 are estimates.

Figure 3.1: Flathead County Population and Employment Trends



*Population and employment data for 2007 are estimates.

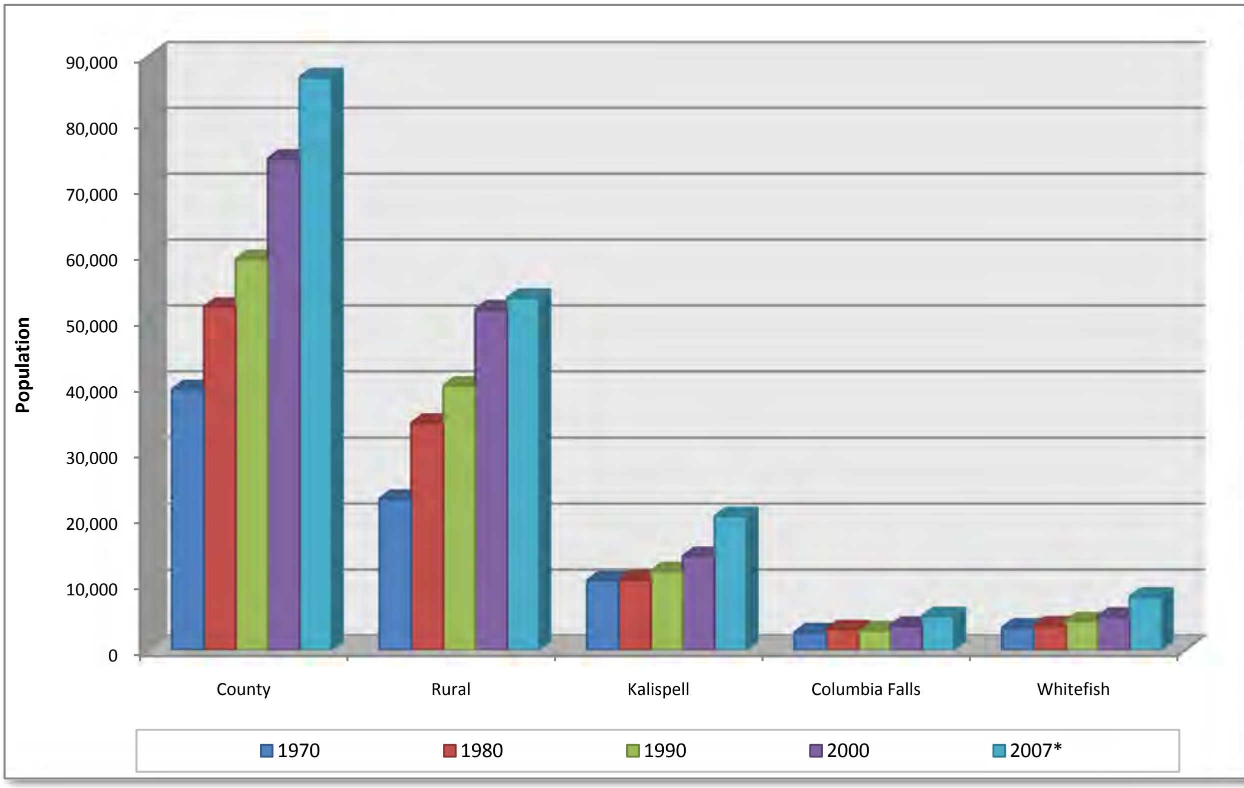
These population trends can further be analyzed by examining the population trends within the incorporated cities in Flathead County (i.e. Kalispell, Columbia Falls and Whitefish) in comparison to the total population trends of Flathead County. **Table 3.2** shows the historic population trends for Flathead County from 1970 through 2007 as well as for the incorporated areas in Flathead County. **Figure 3.2** presents this information graphically. This information shows that the majority of residents (approximately 61%) live outside of the incorporated areas within Flathead County. It should be noted that intercensal population estimates are often weak at the urban scale and may be significantly revised in the 2010 Census. This information should be viewed tentatively, pending the 2010 Census data.

Table 3.2: Incorporated Cities in Flathead County Historic Population Trends

Year	County	Rural	Kalispell	Columbia Falls	Whitefish
1970	39,460	22,933	10,526	2,652	3,349
1980	51,966	34,462	10,689	3,112	3,703
1990	59,218	39,991	11,917	2,942	4,368
2000	74,471	51,571	14,223	3,645	5,032
2007[1]	86,844	53,347	20,298	5,116	8,083

Source: US Bureau of the Census, Census of Population
[1]Population data for 2007 are estimates

Figure 3.2: Incorporated Cities in Flathead County Historic Population Trends



*Population data for 2007 are estimates.

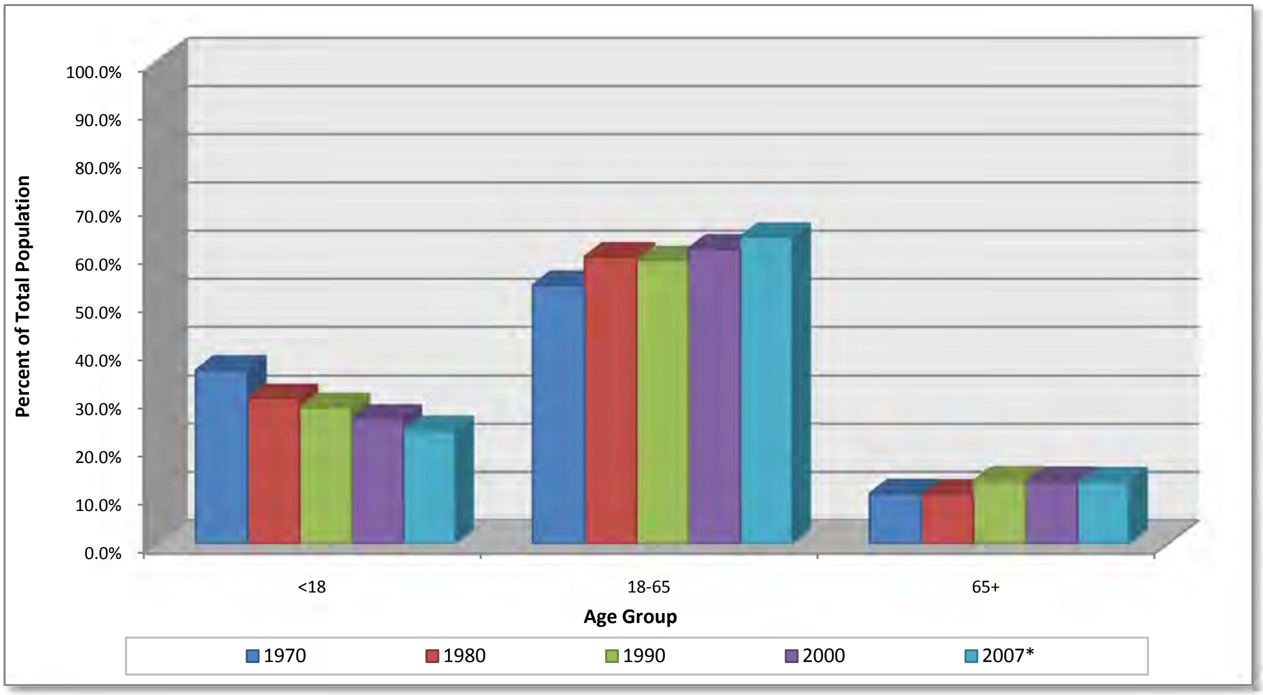
In recent decades there were other notable changes in Flathead County's population. In Flathead County, and elsewhere in Montana and the nation, the population's age profile got older. In 1970, approximately 36% of the population in Flathead County was under the age of 18, compared to approximately 24% being under the age of 18 in 2007. The percentage of people under the age of 18 has decreased steadily since 1970, while the percentage of people between the ages of 18 and 65 has steadily increased. This trend is reflected in **Table 3.3** and **Figure 3.3**.

Table 3.3: Comparison of County Resident Age Distribution

Year	Age			Total
	<18	18-65	65+	
1970	14,310	21,289	4,136	39,735
1980	15,693	30,897	5,376	51,966
1990	16,749	34,753	7,716	59,218
2000	19,287	45,528	9,656	74,471
2007[1]	20,471	55,174	11,199	86,844
Change (1970-2007)	6,161	33,885	7,063	47,109

Source: US Bureau of the Census, Census of Population
[1]Population data for 2007 are estimates.

Figure 3.3: Comparison of County Resident Age Distribution



*Population data for 2007 are estimates.

In 2000, the Flathead County economy supported an estimated 49,278 jobs. From 1970 to 2000, the number of jobs in Flathead County more than tripled, from 15,627 jobs in 1970 to 49,278 jobs in 2000. **Table 3.4** displays countywide employment by economic sector from 1970 through 2000. This information is shown graphically in **Figure 3.4**.

Table 3.4: Flathead County Employment Trends by Economic Sector

Economic Sector	1970	1980	1990	2000	Change (1970-2000)
Farm Employment	730	975	994	1,124	394
Agricultural Services & Forestry	169	273	501	1,223	1,054
Mining	40	17	95	227	187
Construction	674	1,626	1,925	4,183	3,509
Manufacturing	3,345	4,095	4,127	5,106	1,761
Transportation & Public Utilities	1,327	1,928	1,803	2,205	878
Wholesale Trade	501	862	971	1,198	697
Retail Trade	2,831	4,634	6,443	9,873	7,042
Finance, Insurance & Real Estate	1,115	1,821	2,428	3,850	2,735
Services	2,484	4,969	9,832	15,600	13,116
Federal, Civilian Government	461	743	865	851	390
Military	416	318	459	389	-27
State Government	307	420	495	551	244
Local Government	1,227	2,024	2,320	2,898	1,671
Total Employment	**15,627**	**24,705**	**33,258**	**49,278**	**33,651**

Source: US Department of Commerce, Bureau of Economic Analysis, REIS Data Series, 2000.

Figure 3.4: Flathead County Employment Trends by Economic Sector

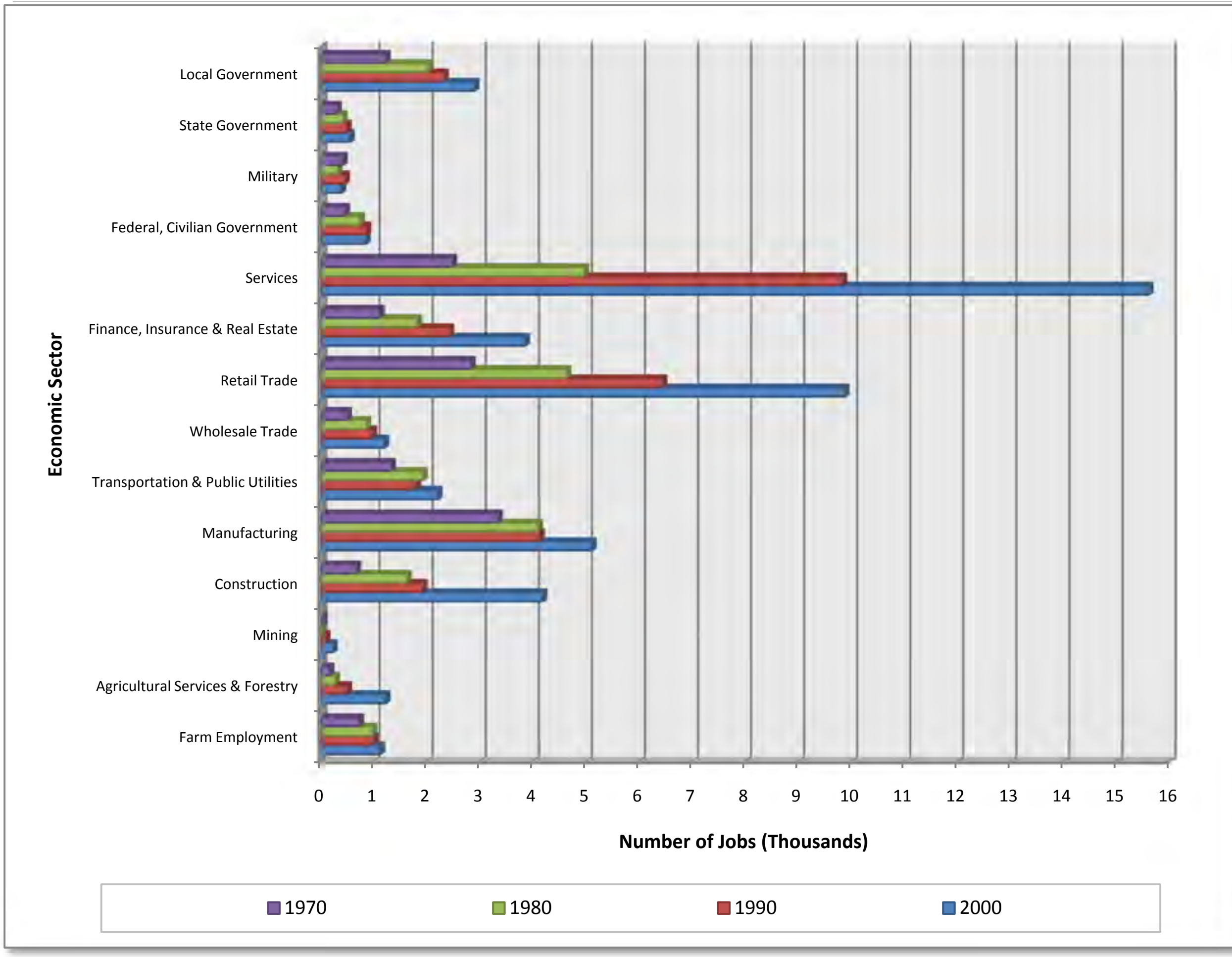
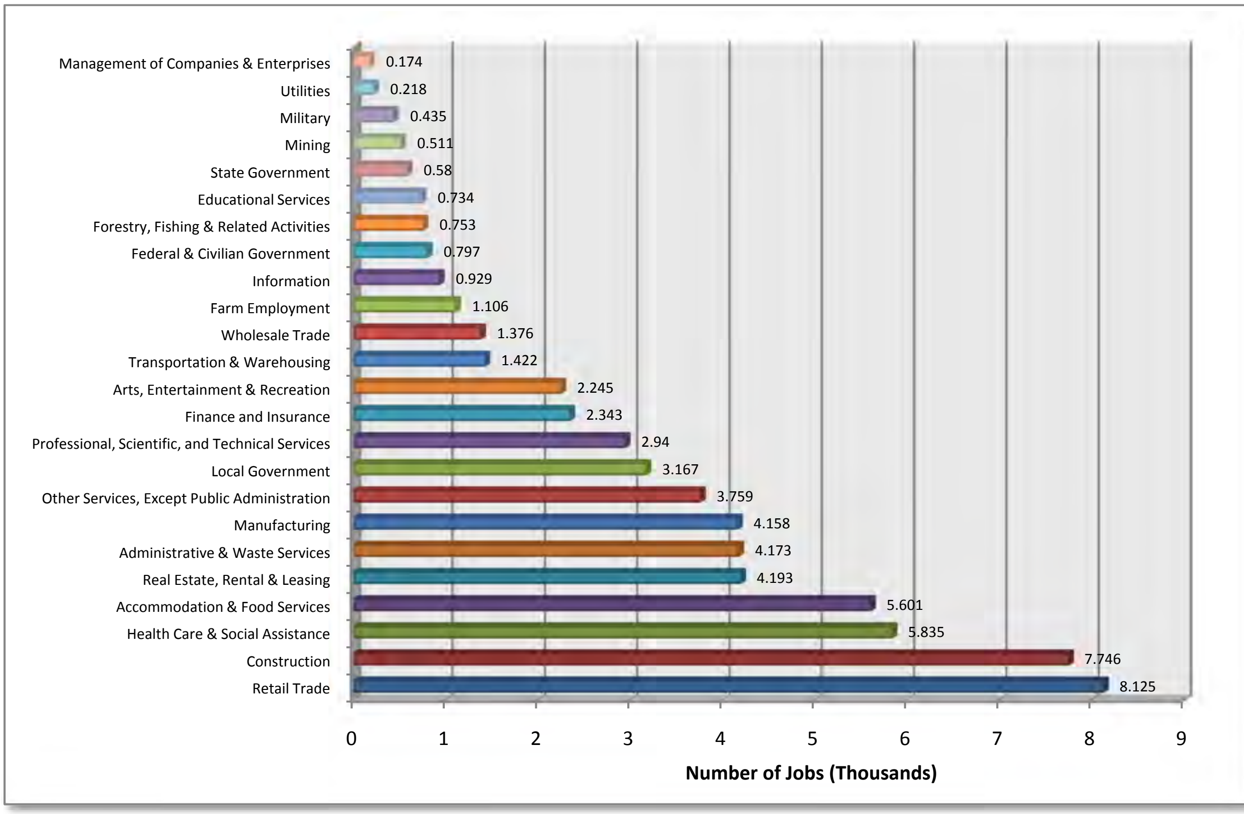


Figure 3.5 on the following page shows the breakdown of employment sectors in Flathead County. This graphic presents the Flathead County 2007 Employment, by economic center, as classified by the North American Industry Classification System (NAICS). This type of classification is the standard for all employment figures after 2000 and is a more detailed approach to showing employment figures than the economic sector approach. According to NAICS, the highest employment sector in the county is retail trade, followed by the construction industry, health care & social assistance, and accommodation & food services.

Figure 3.5: Flathead County Employment Trends By NAIC Sector (2007)



Source: US Department of Commerce, Bureau of Economic Analysis

The economic trend data presented in **Figure 3.4** and **Figure 3.5** is not surprising, given the amount of growth in Flathead County and the fact that the retail and tourism sectors are large attractions to the Flathead Valley. Many of the top ten economic sectors are types of business that benefit from and/or are directly dependent on retail and tourism. The healthcare industry is also a booming industry. This trend is seen all over Montana, and is likely to continue. The boom in the healthcare industry especially is a "high-growth" sector both in the state of Montana and nationally. This is partly due to the aging of our population. The employment data presented in this section includes both full-time and part-time jobs. An interesting nuance over the past thirty years has been the change in workforce participation. There are many more women in the workforce now than there were thirty years ago. This relates partly to the change in demographics (families are having fewer children than thirty years ago) and also the availability of part-time jobs. Many part-time jobs include retail and tourism centered jobs, and these positions have attracted a greater proportion of women desiring part-time positions. In some cases, several part-time jobs are held. The fundamental importance of understanding economic trends is that eventually, the numbers and types of jobs equate to vehicle travel on our transportation system.

3.3 POPULATION AND EMPLOYMENT PROJECTIONS

Population and economic projections are used to predict future travel patterns, and to analyze the potential performance capabilities of the Flathead County transportation system. Projections of the study area's future population and employment are developed from past Flathead County trends (regression line projections,) Growth Policy information, and Census Bureau projections. Three projection scenarios are provided through the year 2030 (the planning horizon).

The basic scenario, or "Moderate Growth" scenario, is the scenario that is most likely to occur, based on past population trends. This scenario was selected as the basis for the transportation modeling, and represents a continuation of the current population and growth trends as presented earlier, such that adequate services and infrastructure will be planned for if the current levels of development continue. It assumes that the Flathead County population and economy will continue to grow to the numbers specified by the Census Bureau. If this growth rate pattern does not develop further, or is not sustained, then demand will not occur as planned for in this Transportation Plan, and projects may be delayed or avoided.

A second scenario was also developed and is referred to as the "Low Growth" scenario. It builds from much of the population and employment trends that were realized in the 1980's, when economic growth was fairly flat due to many different circumstances. Lastly, a third growth scenario, referred to as a "High Growth" situation, was developed to reflect a more aggressive growth pattern in both population and employment. This growth trend is patterned after population and employment trends that were realized between 2000 and 2007, when economic growth was considerably higher than past years. A breakdown of the population and employment projections produced in each scenario for Flathead County are presented in **Table 3.5** and shown graphically in **Figure 3.6** and **Figure 3.7**.

Table 3.5: Flathead County Population and Employment Projections

Year	Low Growth (1.31%)		Moderate Growth (1.63%)		High Growth (2.32%)	
	Population	Employment	Population	Employment	Population	Employment
2007	86,844	63,807	86,844	63,807	86,844	63,807
2010	90,315	66,357	91,162	66,979	93,025	68,348
2015	96,411	70,836	98,841	72,621	104,320	76,647
2020	102,919	75,618	107,166	78,738	116,986	85,953
2025	109,866	80,722	116,193	85,371	131,190	96,389
2030	117,281	86,170	125,980	92,561	147,118	108,092

It should be noted that the population and employment projections discussed in this Chapter and those shown in **Table 3.5** are used for reference and analysis purposes to describe general growth trends for Flathead County. It is highly unlikely that actual growth will exactly follow the rates discussed herein. Actual future population and employment numbers are unlikely to precisely correspond to the years shown in the previous table. If the projections are met at different times than those shown in this table, the analysis contained in this Plan remains unchanged, however; only the timeframe will shift. The key relationship is that facility improvements will be needed as growth and development occurs. It is difficult to accurately predict the future, and as such, no specific dates for project implementation is provided. As with all Transportation Plans, it is recommended that an updated Plan be conducted within 5-8 years to reanalyze the conclusions and recommendations made in this Plan.

Figure 3.6: Flathead County Population Projections

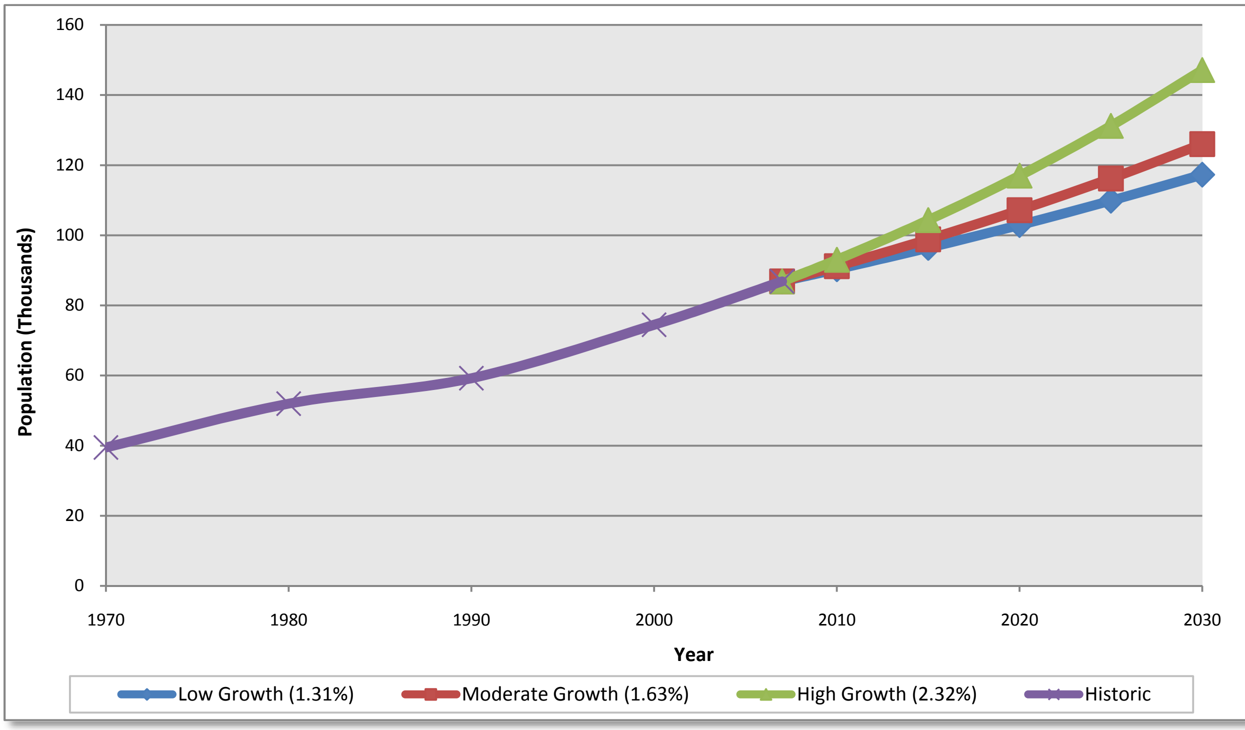
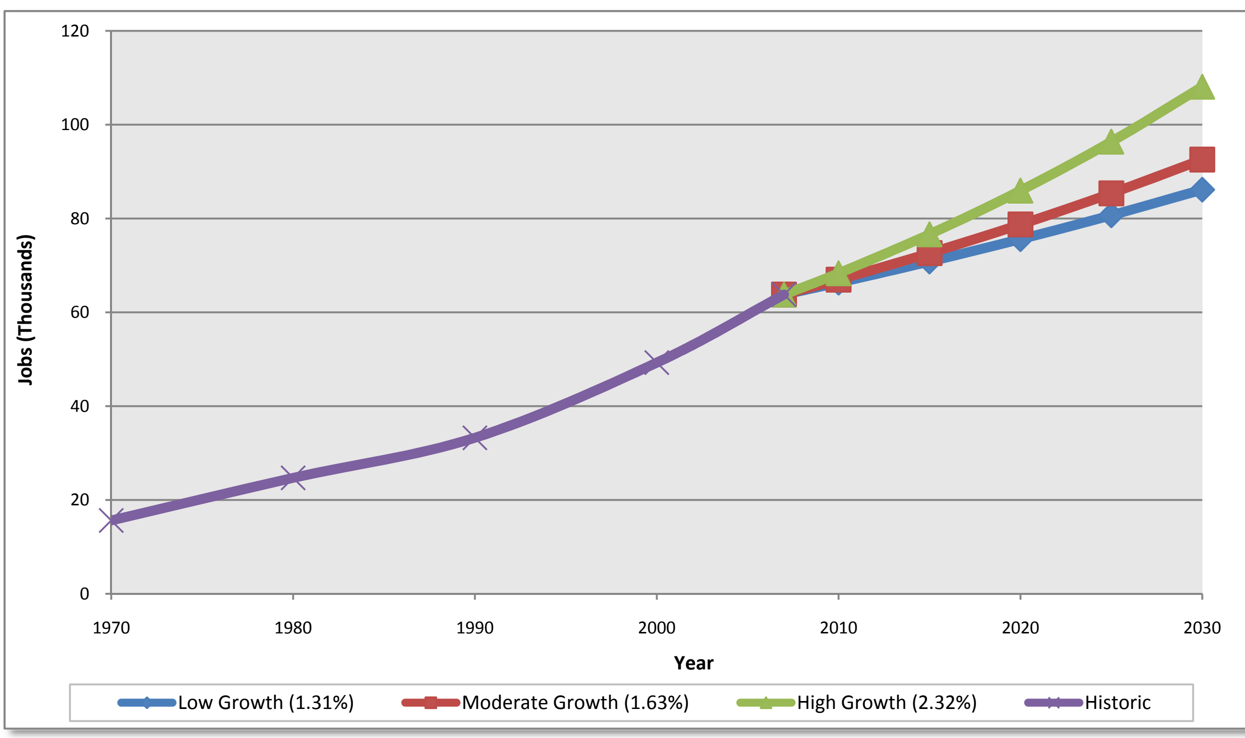


Figure 3.7: Flathead County Employment Projections



3.4 ALLOCATION OF GROWTH WITHIN THE STUDY AREA

Montana Department of Transportation's modeling of future traveling patterns out to the year 2030 planning horizon required identification of future socioeconomic characteristics within each census tract and census block. To accomplish this task, a "Land Use Advisory Committee" was formed to discuss and reach consensus on the distribution of future housing and employment growth in the planning area. The committee's membership was recruited from the staff of public agencies and utilities familiar with ongoing development trends in Flathead County. The committee's work considered recent land use trends, land availability and development capabilities, land use regulations, planned public improvements, and known development proposals.

3.4.1 FUTURE DWELLING UNITS

The number of dwelling units is a key component in the traffic model. Dwelling units distribute people throughout the network at given locations. They represent the population and act as a hub for traffic within the network. Having an accurate value for the number of people per dwelling unit helps distribute the traffic more accurately. However, it is often quite difficult to accurately represent the population through dwelling units. This is partly because the number of people per dwelling unit varies based on location and can change at any time. The best that can be done is to take an average for the entire network and apply that value to the model.

In the year 2007, the population in Flathead County was estimated to be 86,844 people according to the Census Bureau estimates. The traffic model developed for Flathead County uses 38,062 total dwelling units which is based on Census and Department of Revenue information. This computes to approximately 2.28 people per dwelling unit. Based on a value of 2.28 people per dwelling unit, there will be approximately 55,215 total dwelling units in the year 2030 resulting in 17,153 additional units compared to 2007 numbers. The yearly estimation to the year 2030 can be found in **Table 3.6**. This table represents the estimated projected dwelling units based on 2.28 people per dwelling unit using the population projections from **Table 3.5**.

Table 3.6: Flathead County Projected Dwelling Units

Year	Population	Dwelling Units[1]	
		Total	Additional
2007	86,844	38,062	0
2010	91,162	39,954	1,892
2015	98,841	43,320	5,258
2020	107,166	46,969	8,907
2025	116,193	50,925	12,863
2030	125,980	55,215	17,153

[1]Dwelling unit projection based on 2.28 people per dwelling unit.

3.4.2 Future Employment

Employment numbers are used in the traffic model to help distribute vehicle traffic as accurately as possible. Places with high levels of employment will tend to generate high levels of vehicle traffic. The traffic generated is based in part on the employment type: either retail or non-retail jobs.

The "Moderate Growth" scenario presented in **Table 3.5** shows an estimated 92,561 total jobs available in the year 2030. This computes to 28,754 new jobs between 2007 and 2030. Of the 28,754 new jobs in the year 2030, 9,194 (or 32%) are expected to be retail and 19,560 (or 68%) are expected to be non-retail. A summary of the projected additional jobs can be found in **Table 3.7** below.

Table 3.7: Flathead County Projected Jobs

		Additional Jobs		
Year	**Total Jobs**	**Retail**	**Non-Retail**	**Total**
2007	63,807	0	0	0
2010	66,979	1,014	2,158	3,172
2015	72,621	2,818	5,996	8,814
2020	78,738	4,774	10,157	14,931
2025	85,371	6,895	14,669	21,564
2030	92,561	9,194	19,560	28,754

CHAPTER 4

FUTURE TRANSPORTATION SYSTEM

Chapter 4: Future Transportation System

4.1 INTRODUCTION

A summary of the traffic modeling effort conducted to project anticipated future travel conditions for Flathead County is provided in this chapter. The anticipated future travel conditions are used to identify potentially deficient areas within the transportation system.

The impacts of transportation system changes and land development scenarios can be evaluated with the traffic model. The results can be analyzed to determine what effects the changes made have on the surrounding transportation system. From this analysis, project merit can be determined based on the performance of a given project.

4.2 TRAFFIC MODEL DEVELOPMENT

All of the characteristics of the various areas throughout Flathead County are combined to create the traffic patterns present today. To build a model to represent this, the population information collected from the 2000 census, and the most recent employment information gathered by the Montana Department of Labor and Industry was carefully examined by County officials and MDT Modeling staff.

TransCAD software used to develop the model uses the population census information, employment information and relative GIS information as input data. TransCAD has been developed by the Caliper Corporation of Newton, Massachusetts, and version 4.0 was used as the transportation modeling software for this project. TransCAD performs a normal modeling process of generating, distributing and assigning traffic in order to generate traffic volumes. These traffic volumes are then compared to actual ground counts and certain adjustments are made to "calibrate", or ensure the accuracy of the model. These adjustments are described below.

Trip Generation – Trip generation consists of applying nationally developed trip rates to land use quantities by the type of land use in the area. The trip generation step actually consists of two individual steps: trip production and trip attraction. Trip production and trip attraction help to "explain" why the trip is made. Trip production is based on relating trips to various household characteristics. Trip attraction considers activities that might attract trip makers, such as offices, shopping centers, schools, hospitals and other households. The number of productions and attractions in the area is determined and is then used in the distribution phase.

Trip Distribution – Trip distribution is the process in which a trip from one area is connected with a trip from another area. These combined trips are referred to as trip exchanges.

Mode Split – Mode choice is the process by which the amount of travel will be made by each available mode of transportation. There are two major types: automobile and transit. The automobile mode is generally split into drive alone and shared ride modes. For this travel demand model, there were no "mode split" assignments (i.e. all trips are assumed to be automobile mode).

Trip Assignment – Once the trip distribution element is completed, the trip assignment tags those trips to the Major Street Network (MSN). The variables that influence the street or location tagged are travel time, length, and capacity.

Due to the inherent characteristics of a traffic model, it is easy to add a road segment, or "link", where none exists now or widen an existing road and see what affect these changes will have on the transportation system. Additional housing and employment centers can be added to the system to model future conditions, and moved to different parts of the model area to see what affect different growth scenarios have on the transportation system. Thus the land use changes anticipated between now and 2030 can be added to the transportation system, and the needed additions to the transportation system can then be identified. Additionally, different scenarios for how the Flathead Valley may grow between now and 2030 can be examined to determine the need for additional infrastructure depending upon which one most accurately represents actual growth.

Also necessary in the development of a transportation model is the establishment of the modeling area. The modeling area is, by necessity, much larger than the Study Area. Traffic generated from outlying communities or areas contributes to the traffic load within the Study Area, and is therefore important to the accuracy of the model. Additionally, it is desirable to have a large model area for use in future projects.

The future year model was developed specifically for the year 2030 planning horizon. The future model is used in this document to evaluate future traffic volumes. The information contained in **Chapter 3** was used to determine the additions and changes to the traffic volumes in 2030.

The modeling area was subdivided by using census tracts and census blocks, as previously described in **Chapter 3**. The census blocks & census tracts were used to distribute the population and employment growth that is anticipated to occur between now and 2030.

Built into the traffic model are assumptions about traffic characteristics. The model assumes that traffic characteristics in the future will be similar to those seen today. Changing factors such as fuel costs, technological advances, and other unknown issues may affect the amount and type of traffic on the road network in the future. The model also assumes that the socio-economic information contained in **Chapter 3** will be realized in the year 2030. While this may be a conservative assumption, it does give an indication of potential problem areas within the transportation system that may need to be addressed in the future. The future 2030 model is a useful planning tool to help predict how traffic might behave in the future.

4.3 TRAFFIC VOLUME PROJECTIONS AND CORRIDOR CAPACITY

Roadway capacity and resultant volume to capacity (v/c) ratio can be used as comparison tools when looking at the growth of a community or of traffic within a transportation system. As traffic volumes increase, the vehicle flow deteriorates. As traffic volumes consume available capacity, the road may begin to experience problems. For this reason, it is important to look at the size and configuration of the current roadways to determine if these roads need to be expanded to accommodate the existing or future traffic needs.

The appropriate size of a roadway is based on a number of factors including the anticipated traffic demand and function. It is generally desirable to size the arterial network to comfortably accommodate the traffic demand that is anticipated to occur 20 years from the time it is constructed. The selection of a 20-year design period represents a desire to receive the most benefit from an individual construction project’s service life within reasonable planning limits. The design, administration, mobilization, and repair to affected adjacent properties can consume a significant portion of an individual project budget. Frequent projects to make minor adjustments to a roadway can therefore be prohibitively expensive. As roadway capacity generally is provided in large increments, a long term planning horizon is necessary. The collector and local street network are often sized to meet the local needs of the adjacent properties.

There are two ways to measure a roadway’s capacity, Annual Average Daily Traffic (AADT) and Peak Hour. AADT measures the average number of vehicles a given roadway carries over a 24-hour period. Since traffic does not usually flow continuously at the maximum rate, AADT is not a statement of maximum capacity. Peak Hour measures the number of vehicles that a roadway or intersection can physically accommodate during the busiest hour of the day. It is therefore more of a maximum traffic flow rate measurement than AADT. When the Peak Hour is exceeded, the traveling public will often perceive the roadway as “broken” even though the street’s AADT is within the expected volume. Therefore, it is important to consider both elements during design of corridors and intersections.

Typical width and lane configuration of the roadway and the required right-of-way are functions of the land use that will occur along the roadway. These uses will dictate the vehicular traffic characteristics, travel by pedestrians and bicyclists, and need for on-street parking. The right-of-way required should be based upon the ultimate facility size.

For planning purposes, it is necessary to develop volume to capacity ratios to compare traffic on similar type roadways. As such, planning level capacities were developed based on functional classification and number of lanes. These capacities are not the same as the physical roadway capacity and should only be used for comparison purposes. Actual physical roadway capacity is determined on a case-by-case basis and is based on roadway geometrics and other design factors as identified in the *Highway Capacity Manual*. The planning level capacities are shown in **Table 4.1** on the following page. These values are for modeling and comparison purposes only and are not intended to be used to set any type of volume thresholds. In general, a higher v/c ratio typically results in a lower LOS. Refer to **Chapter 2** for more detail about corridor volumes, capacity and levels of service.

Using the traffic model that was developed for this Plan, it was possible to project the traffic volumes on all major roads within the study area. These roads were analyzed and compared against each other under existing (2007) and future (2030) conditions. The traffic volumes and v/c ratios were analyzed to assist in determining potential corridor deficiencies.

Table 4.1: Planning Level Daily Roadway Capacity

Roadway Type	Capacity (vehicles / day)[1]		
	Rural Collector	Minor Arterial / Urban Collector	Principal Arterial
Two Lane Road	6,000	9,000	12,000
Three Lane Road	-	13,500	18,000
Four Lane Road	-	-	24,000
Five Lane Road	-	-	35,000

[1]Values represent planning level capacities developed for this Transportation Plan and are used for comparison purposes only. Actual physical roadway capacity can vary greatly depending on access control, geometry, cross-street volumes, roadway geometrics and peaking characteristics.

Figure 4.1 and **Figure 4.2** show existing average daily traffic (ADT) volumes for the major roadways inside the study area boundary. The volumes shown in this graphic represent actual ADT counts conducted by the Montana Department of Transportation and Flathead County. The traffic model was calibrated based on these known ADT volumes. Existing v/c values were calculated based on the known ADT volumes and the planning level capacities and are shown in **Figure 4.3** and **Figure 4.4**.

Future (2030) condition traffic volumes are shown in **Figure 4.5** and **Figure 4.6**. The anticipated future traffic volumes shown in these graphics were determined by applying the change in volume from the traffic model between existing and future conditions to known existing ADT counts. **Figure 4.7** and **Figure 4.8** show the resultant anticipated future v/c values. It is important to recognize that the volumes shown on **Figure 4.5** and **Figure 4.6** along with the v/c ratios shown on **Figure 4.7** and **Figure 4.8** are based on the “Existing plus Committed” (E+C) roadway network. In other words, these are the volumes and v/c ratios if no changes to the transportation system are made other than those currently committed to. Note that the capacities used to develop the v/c ratios are planning level and may differ from the actual physical roadway capacities. Similar graphics are presented in **Chapter 7** that show future values based on a “recommended” transportation system network developed for comparison purposes.

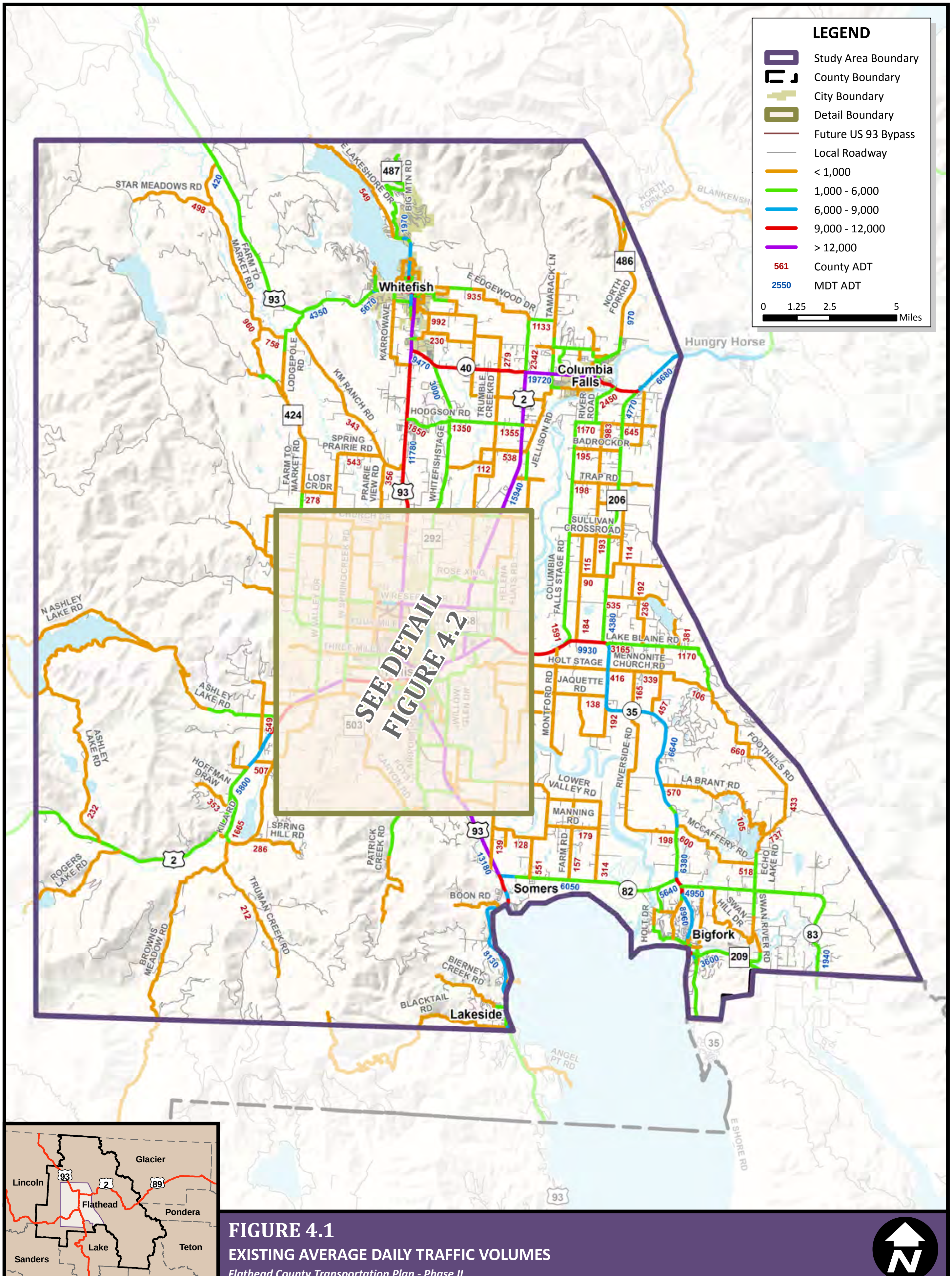


FIGURE 4.1
EXISTING AVERAGE DAILY TRAFFIC VOLUMES
Flathead County Transportation Plan - Phase II

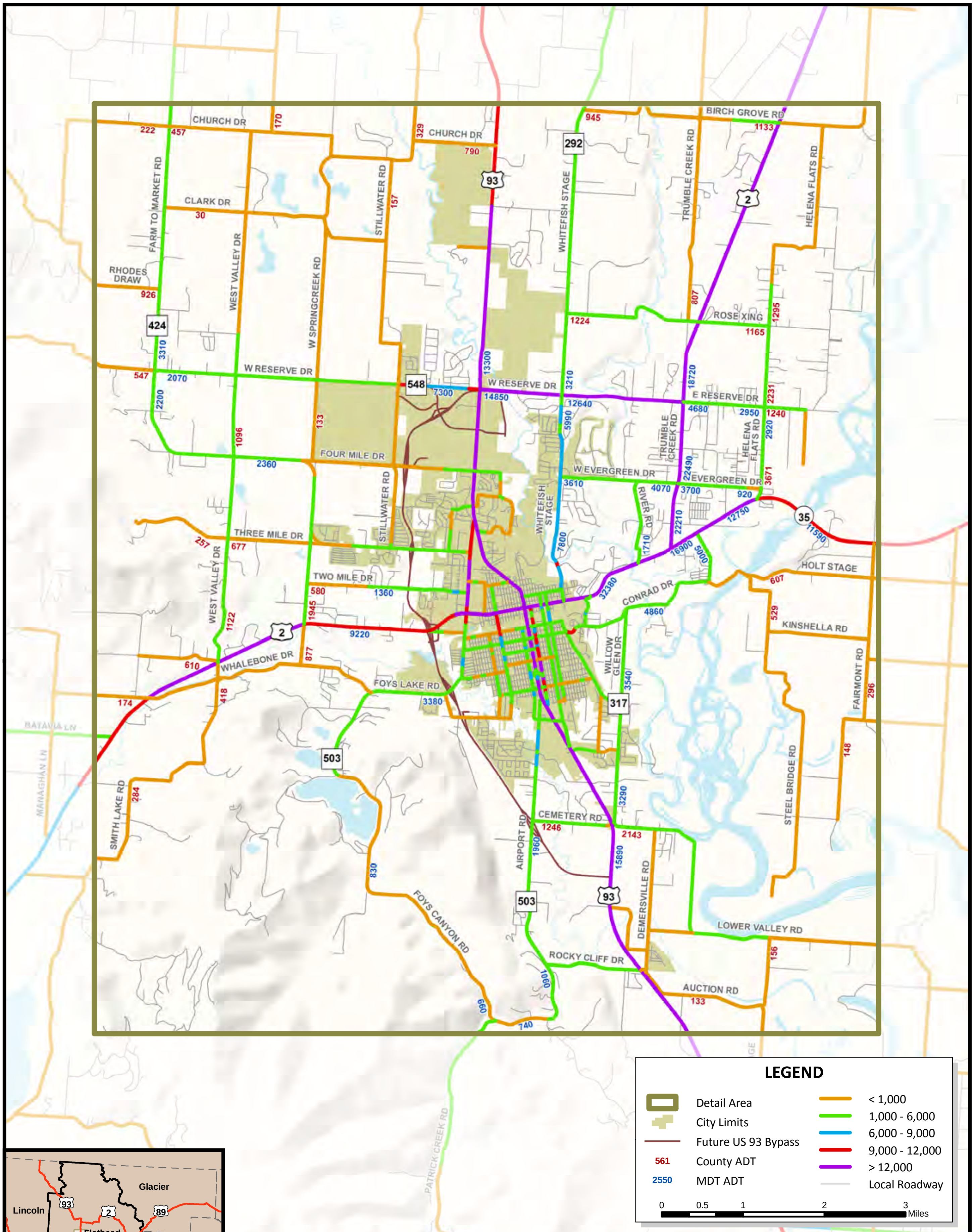
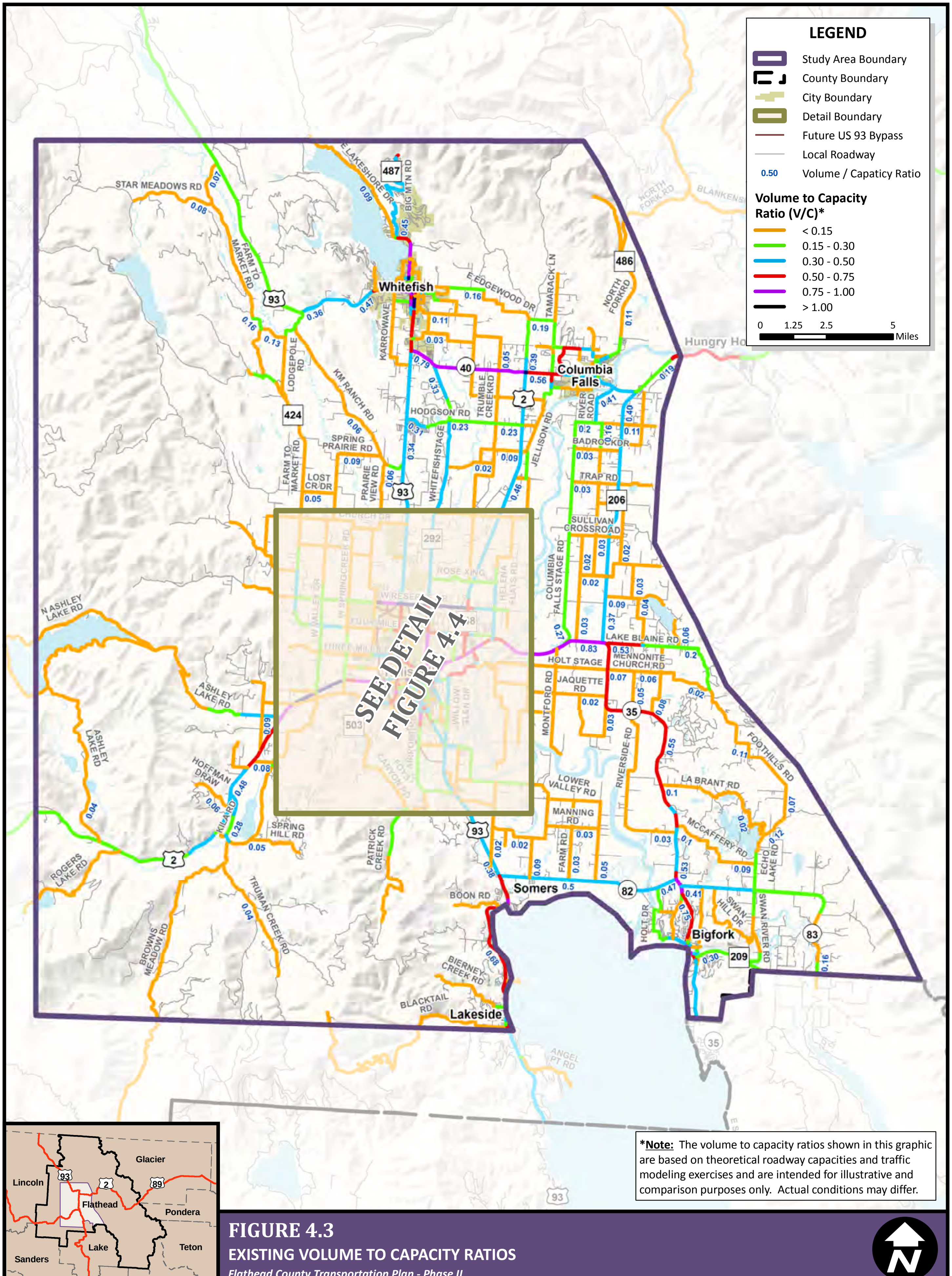


FIGURE 4.2

EXISTING AVERAGE DAILY TRAFFIC VOLUMES - DETAIL

Flathead County Transportation Plan - Phase II



*Note: The volume to capacity ratios shown in this graphic are based on theoretical roadway capacities and traffic modeling exercises and are intended for illustrative and comparison purposes only. Actual conditions may differ.

FIGURE 4.3

EXISTING VOLUME TO CAPACITY RATIOS

Flathead County Transportation Plan - Phase II

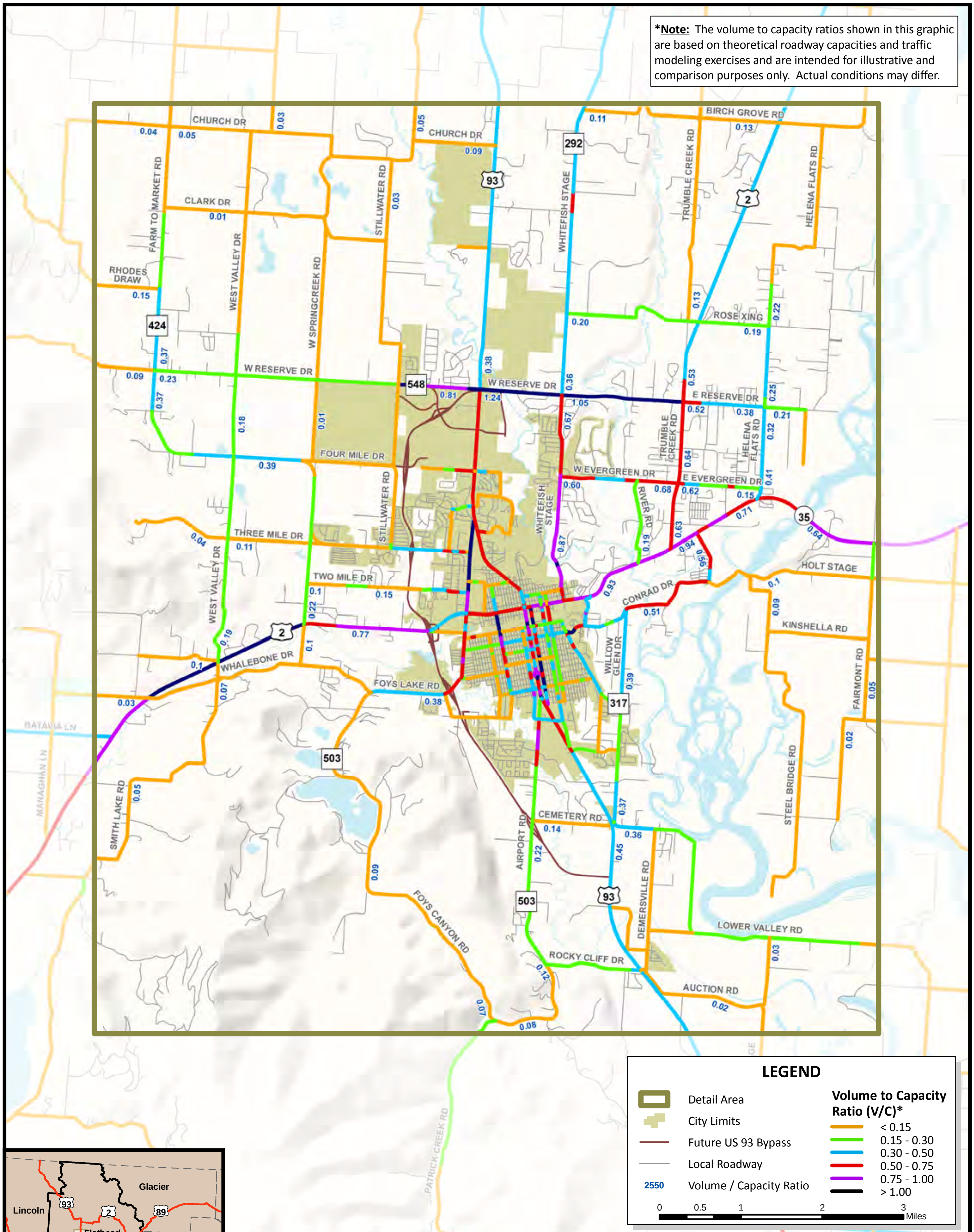


FIGURE 4.4

EXISTING VOLUME TO CAPACITY RATIOS - DETAIL

Flathead County Transportation Plan - Phase II

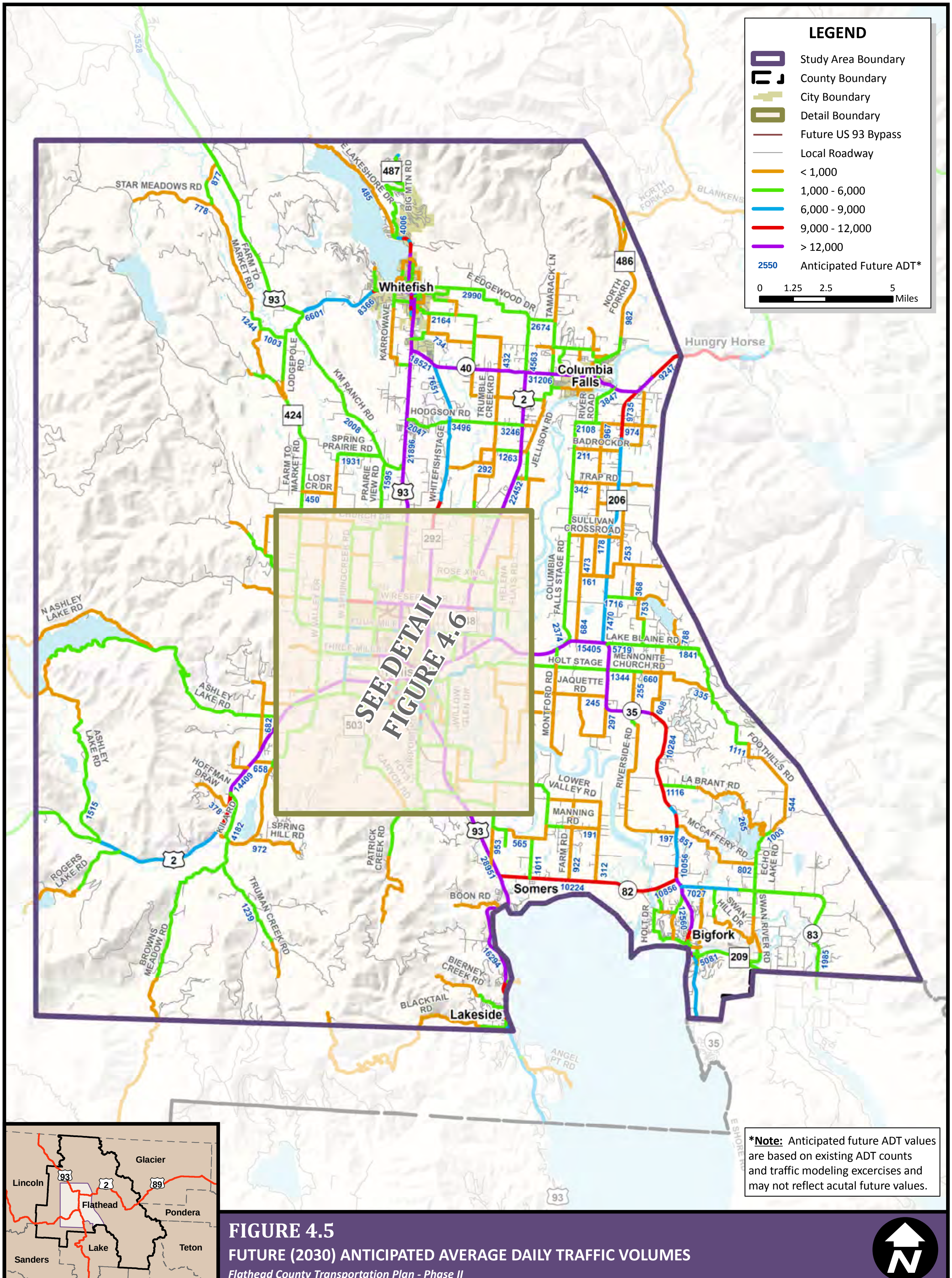
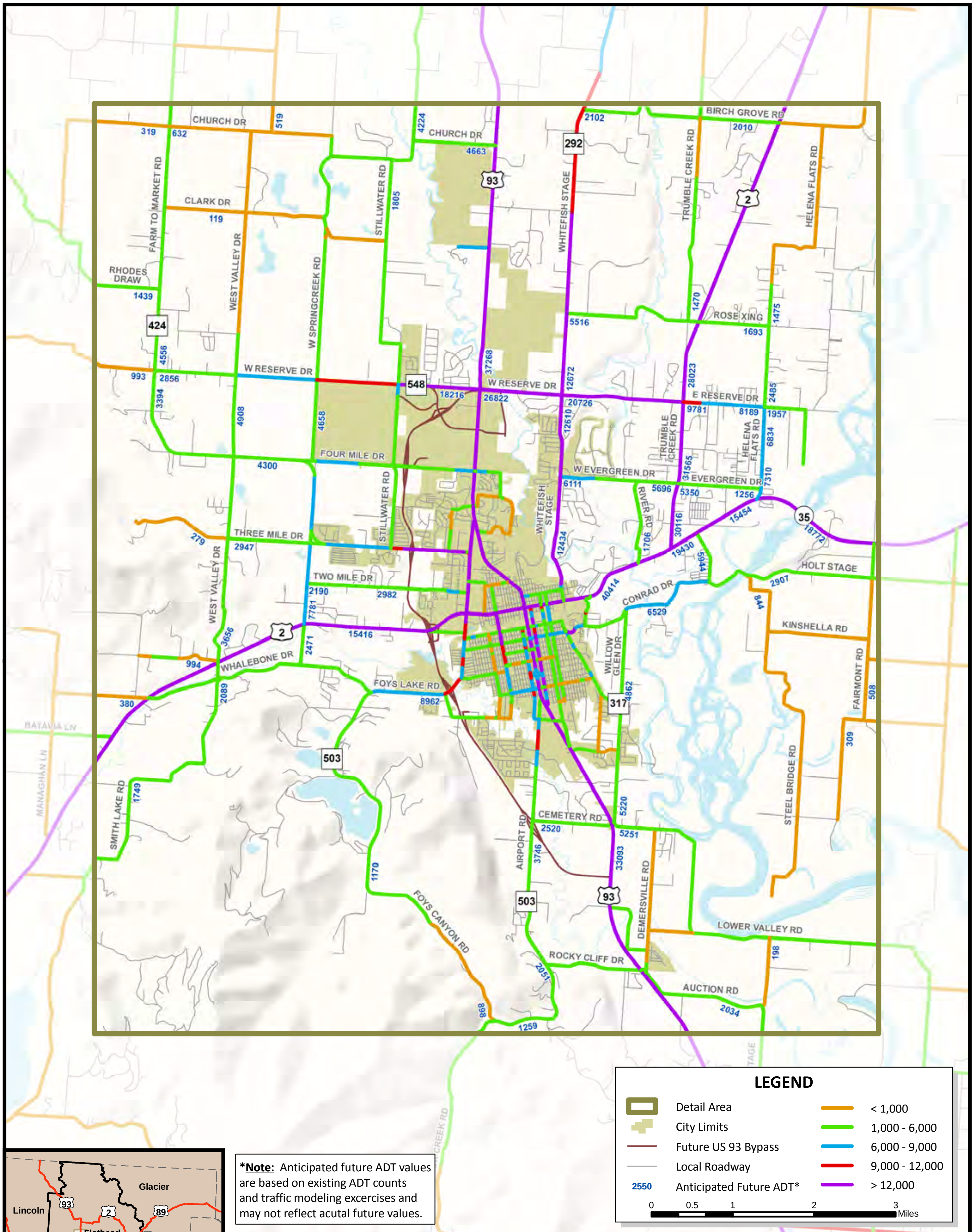


FIGURE 4.5

FUTURE (2030) ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES

Flathead County Transportation Plan - Phase II

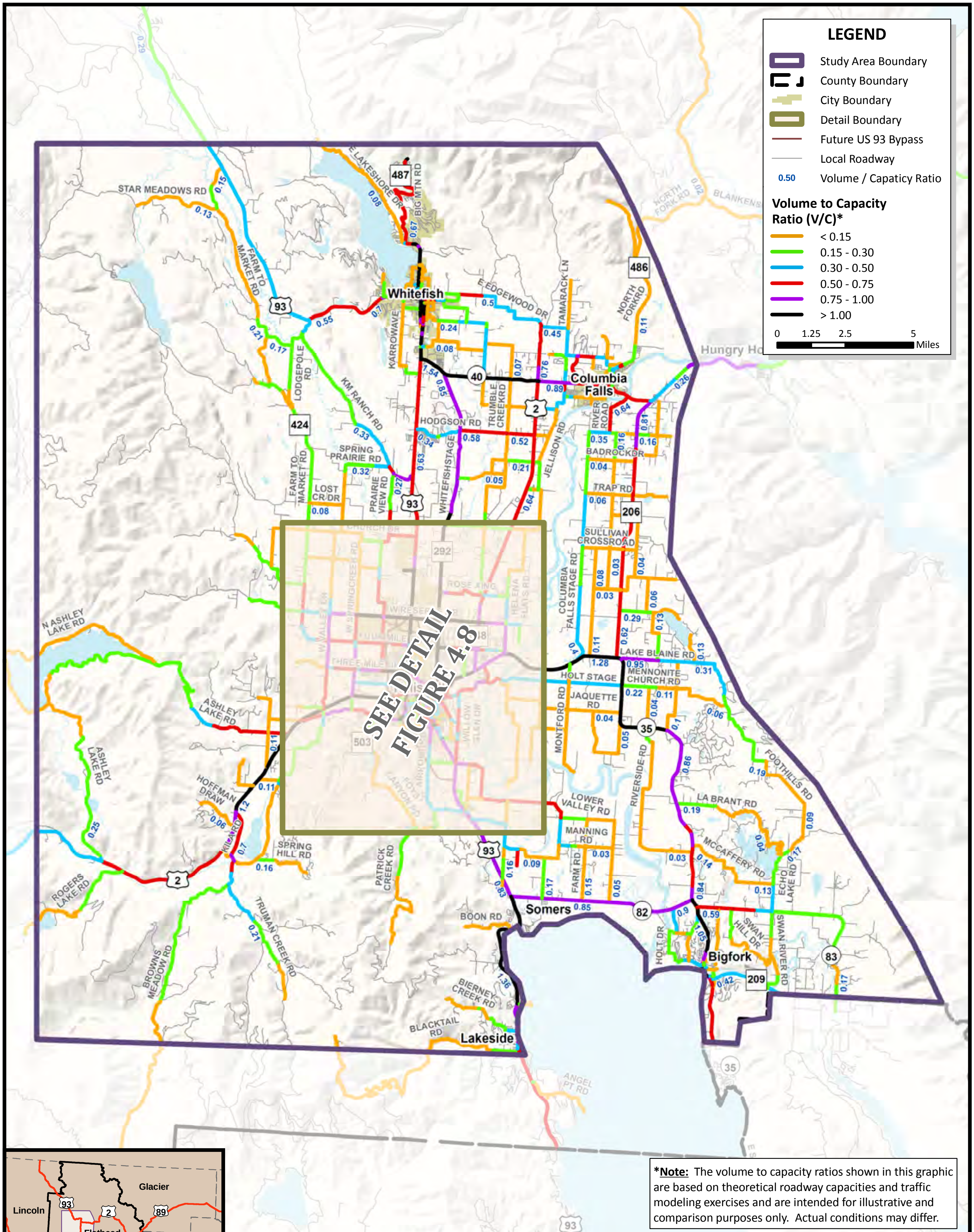


Note: Anticipated future ADT values are based on existing ADT counts and traffic modeling excercises and may not reflect acutal future values.

FIGURE 4.6

FUTURE (2030) ANTICIPATED ADT TRAFFIC VOLUMES - DETAIL

Flathead County Transportation Plan - Phase II



*Note: The volume to capacity ratios shown in this graphic are based on theoretical roadway capacities and traffic modeling exercises and are intended for illustrative and comparison purposes only. Actual conditions may differ.

FIGURE 4.7

FUTURE (2030) ANTICIPATED VOLUME TO CAPACITY RATIOS

Flathead County Transportation Plan - Phase II

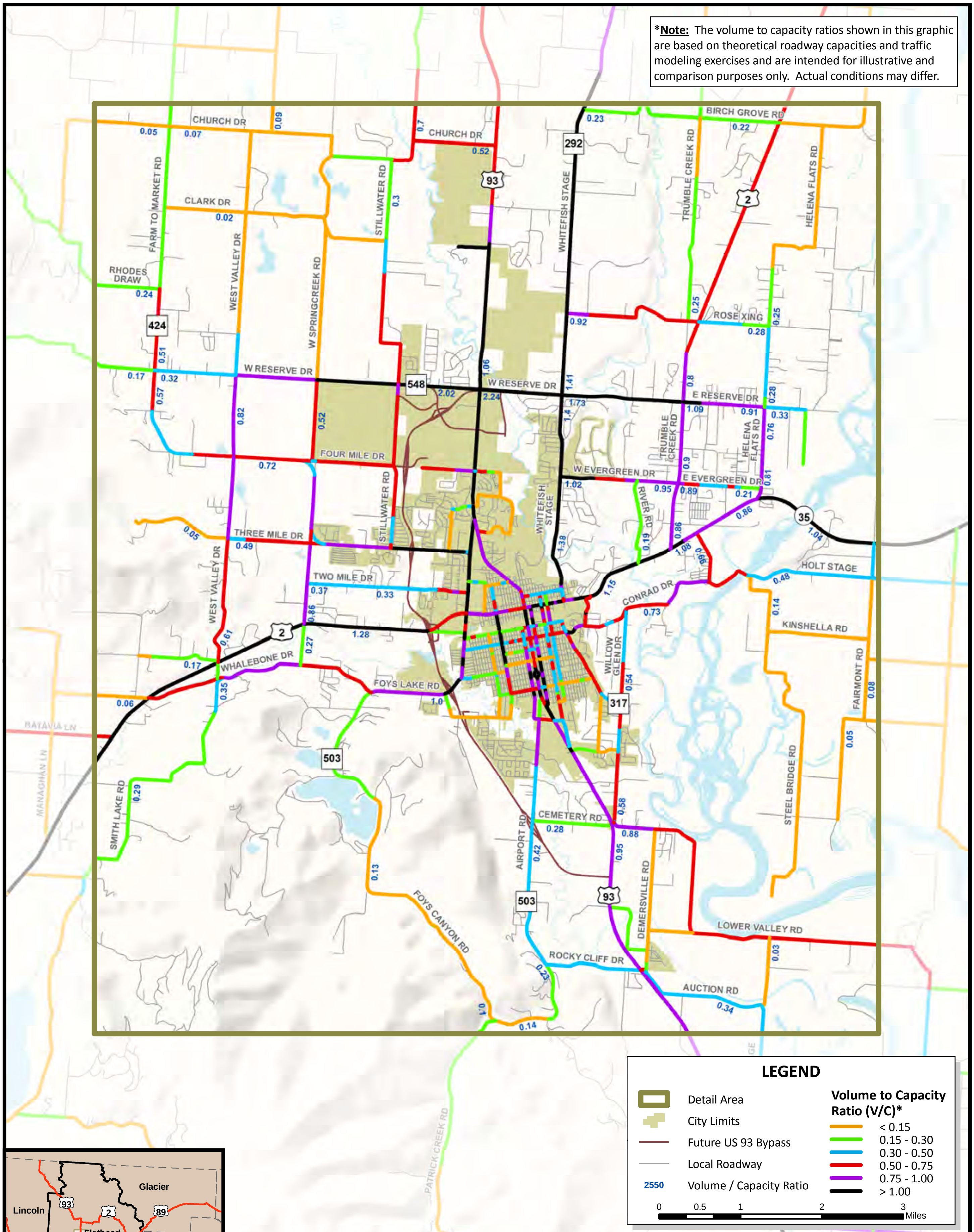


FIGURE 4.8

FUTURE (2030) ANTICIPATED VOLUME TO CAPACITY RATIOS - DETAIL

Flathead County Transportation Plan - Phase II

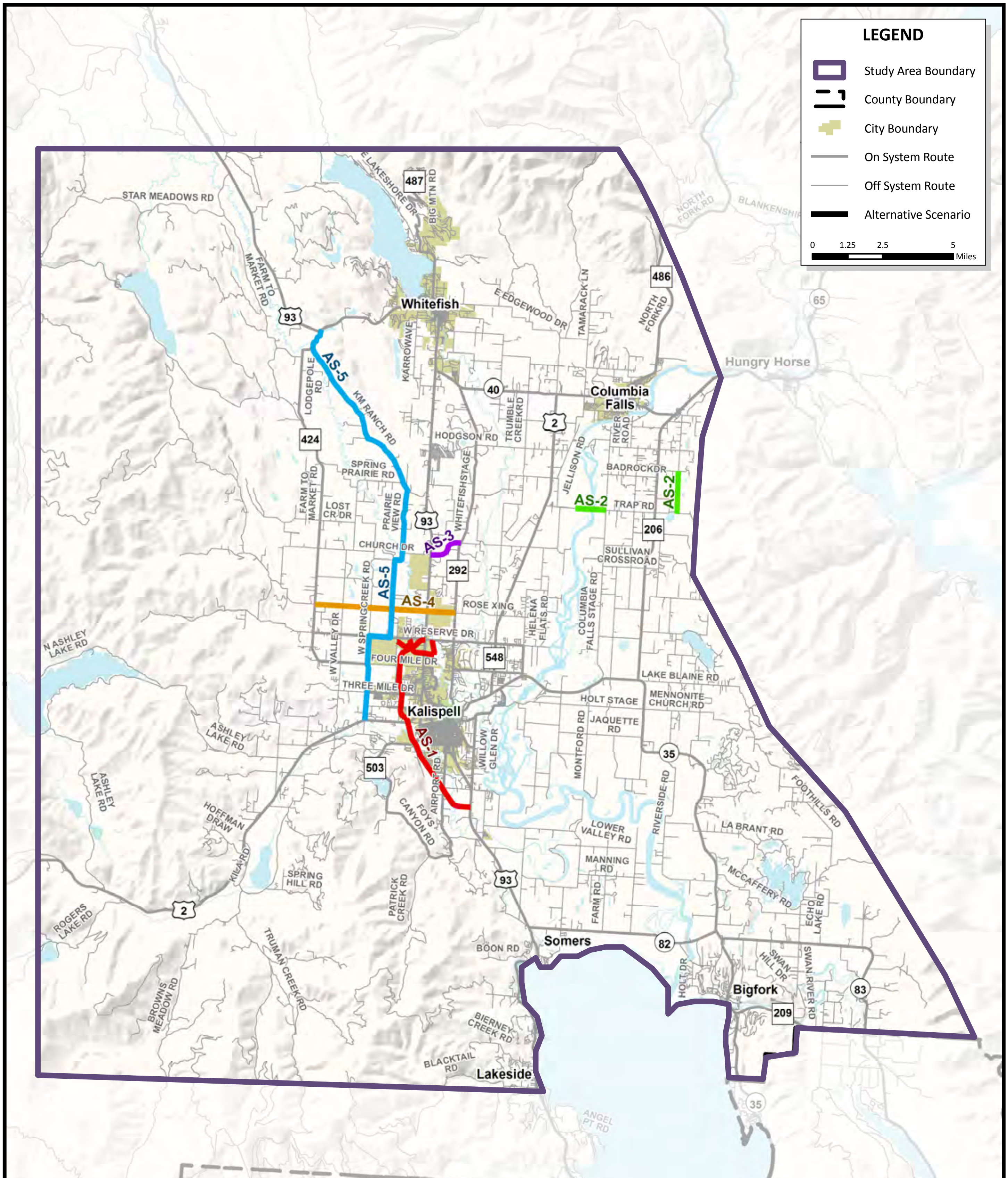
4.4 NETWORK ALTERNATIVES SCENARIO ANALYSIS

The traffic model developed for this Plan was utilized to analyze the effects that various network improvements would have on the traffic network. Five modeling scenarios were developed for the purposes of this exercise and are discussed in the following sections. Each of the five scenarios that were developed involve roadway capacity additions in areas where transportation needs presently exist, or in areas where future investment may be needed as a result of expected population/employment growth. **Figure 4.9** gives a graphical representation of the five alternative modeling scenarios.

The alternative scenarios are generally localized and create new links or expand existing facilities in a particular study subarea. The affect of each scenario on the network generally occurs most noticeably along a small portion of the study area near the project. Because all scenarios involve new links and/or roadway capacity additions, the scenario analysis is focused on how traffic volumes are shifted on key facilities throughout the major effected area.

The alternatives presented in this section are for modeling purposes only and do not represent actual project recommendations at this time. The analysis of these alternatives was made to give a theoretical idea of how certain network modifications made to the transportation system affect the overall network and surrounding area. Should projects arise in the future along these corridors, design alternatives to those discussed in this section will need to be analyzed to determine the appropriate configuration of the roadways.

The modeling of each alternative scenario was completed under future (2030) conditions assuming that no other modifications to the existing traffic network were made. For comparison purpose, the future (2030) E+C modeling results discussed previously were used for baseline conditions. The results of each alternative scenario run under future (2030) conditions were compared to the baseline future (2030) E+C model. The main attribute used for determining the affect that the alternative scenario has on the transportation system is the percent change in ADT compared to the baseline traffic model.



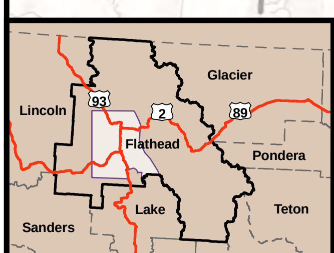


FIGURE 4.9

ALTERNATIVE MODELING SCENARIOS

Flathead County Transportation Plan - Phase II

4.4.1 Alternative Scenario 1 – US Highway 93 Bypass

This scenario includes the full US Highway 93 Bypass between US Highway 93 South and Reserve Drive. The bypass will construct a new, four-lane limited-access route designed to relieve travel demand and congestion on US Highway 93 and US Highway 2 through Kalispell.

The new corridor will start at US Highway 93 south of Kalispell and will head west before curving northerly to follow along the abandoned Burlington Northern Road. The Bypass will then cross under Airport Road and head northwest over Foys Lake Road and US Highway 2. The Bypass continues north, crossing under Two Mile Drive, Three Mile Drive, and Four Mile Drive east of Stillwater Road. The corridor will then continue north, paralleling a power transmission line then head northeast to connect back to US Highway 93 at the intersection with West Reserve Drive.

Limited access to the Bypass at full build-out will be provided via six grade-separated interchanges (located at the intersections with Airport Road, Foys Lake Road, US Highway 2, Three Mile Drive, Four Mile Drive, and Reserve Loop), two at-grade intersections (located at the northern and southern intersections with US Highway 93), and one exit only ramp (at the intersection with Sunnyside Drive).

As is shown in **Table 4.2** below, this alternative scenario draws considerable amounts of traffic from the Kalispell Area. In general, most of the benefits realized from this scenario occur within the Kalispell city limits; however, this alternative does affect a number of county roads. Whitefish Stage, West Valley Drive, West Reserve Drive, Farm to Market Road, West Springcreek Road, and Stillwater Road all benefit from large reductions in traffic volumes. Three Mile Drive and Four Mile Drive both see large increases in traffic volumes due to the alternative scenario.

Table 4.2: Alternative Scenario 1 Traffic Impacts

Location	Before Network Modifications (vpd)	After Network Modifications (vpd)	Net Change in Volume (vpd)	Percent Change in Volume (%)
US Highway 93 South (north of Bypass)	34,933	24,989	-9,944	-28.5%
US Highway 93 North (south of Bypass)	36,459	26,857	-9,602	-26.3%
US Highway 2 West (east of Bypass)	27,555	28,937	1,382	5.0%
Three Mile Drive (west of Bypass)	9,340	12,379	3,039	32.5%
Four Mile Drive (west of Bypass)	4,551	6,962	2,411	53.0%
Whitefish Stage (south of W Evergreen Drive)	10,207	7,631	-2,576	-25.2%
W Valley Drive (north of US Highway 2)	2,981	1,805	-1,176	-39.4%
W Reserve Drive (west of Bypass)	19,597	16,287	-3,310	-16.9%
Farm to Market Road (north of Three Mile Drive)	8,300	5,107	-3,193	-38.5%
W Springcreek Road (south of W Reserve Drive)	4,617	1,989	-2,628	-56.9%
Stillwater Road (south of Four Mile Drive)	6,355	4,596	-1,759	-27.7%
Bypass (southern end)	0	16,729	16,729	N/A
Bypass (south of US Highway 2)	0	22,895	22,895	N/A
Bypass (northern end)	0	18,715	18,715	N/A

It should be noted that an interim bypass project has been undertaken. A portion known as the "Reserve Loop" has already been constructed and connects Stillwater Road to US Highway 93 just south of Reserve Street. Construction on the US Highway 2 South portion of the project is expected to begin in 2010. This project plans to construct the interim two-lane Bypass between US Highway 93 to US Highway 2. Roundabouts will provide at-grade access at the future Siderius Commons, Airport and Foys Lake roads. The US Highway 2 North portion of the Bypass is expected to be completed as an interim two-lane project extending from US Highway 2 to US Highway 93. The interim project calls for at-grade intersections with roundabouts or traffic signals providing traffic control.

4.4.2 Alternative Scenario 2 – Flathead River Connection

This scenario includes an extension of Trap Road to the west across the Flathead River to connect to Pioneer Road. Also included under this scenario is an extension of Jensen Road to the south to connect to Michels Slough Road. This scenario serves to provide an alternate east west connection across the Flathead River and was developed based on recommendations made in the Flathead County Growth Policy.

The effects this scenario has on the local network are shown in **Table 4.3** below. The traffic model shows that the new link across the Flathead River would draw over 4,000 ADT. Most of the traffic would be diverted from Columbia Falls Stage Road, MT Highway 206, and US Highway 2. While this alternative appears likely to provide benefits from a traffic standpoint, it was ultimately not carried forward as a project recommendation due to disproportionately high project costs.

Table 4.3: Alternative Scenario 2 Traffic Impacts

Location	Before Network Modifications (vpd)	After Network Modifications (vpd)	Net Change in Volume (vpd)	Percent Change in Volume (%)
Columbia Falls Stage (north of Trap Road)	1,424	2,212	788	55.3%
Columbia Falls Stage (north of MT Highway 35)	2,691	1,696	-995	-37.0%
MT Highway 206 (south of Trap Road)	7,492	7,393	-99	-1.3%
MT Highway 206 (north of MT Highway 35)	8,066	7,654	-412	-5.1%
Kelley Road (west of MT Highway 206)	1,282	1,510	228	17.8%
Kelley Road (east of MT Highway 206)	2,469	1,784	-685	-27.7%
Trap Road (east of Columbia Falls Stage)	880	2,170	1,290	146.6%
Pioneer Road (west of Helena Flats Road)	363	4,573	4,210	1159.8%
US Highway 2 E (west of River Road)	22,759	20,731	-2,028	-8.9%
Trap Road Extension (west of Columbia Falls Stage)	0	4,334	4,334	N/A

4.4.3 Alternative Scenario 3 – Church Drive Connection

This scenario includes the construction of a new road connecting Church Drive and Birch Grove Road. The new road would provide an additional link between US Highway 93 and Whitefish Stage and would ultimately serve as a major east/west corridor connecting development north of Kalispell.

Table 4.4 shows the effects that this scenario has on the surrounding network. The traffic model shows that the Church Drive Extension would draw more than 6,000 ADT. This traffic is drawn from a mix of roads in the area, most notably US Highway 93 and Whitefish Stage. Traffic volumes along Birch Grove Road and Church Road would ultimately increase as a result of the new connection.

Table 4.4: Alternative Scenario 3 Traffic Impacts

Location	Before Network Modifications (vpd)	After Network Modifications (vpd)	Net Change in Volume (vpd)	Percent Change in Volume (%)
US Highway 93 (north of Church Road)	27,422	25,424	-1,998	-7.3%
US Highway 93 (south of Church Road)	28,275	28,824	549	1.9%
Whitefish Stage (north of Birch Grove Drive)	9,064	8,222	-842	-9.3%
Whitefish Stage (south of Birch Grove Drive)	9,190	8,912	-278	-3.0%
US Highway 2 E (north of Birch Grove Road)	19,694	21,405	1,711	8.7%
Birch Grove Road (east of Whitefish Stage)	1,652	3,906	2,254	136.4%
Birch Grove Road (west of US Highway 2 E)	2,296	4,438	2,142	93.3%
Church Drive Extension	0	6,088	6,088	N/A

4.4.4 Alternative Scenario 4 – Rose Crossing Extension

This alternative scenario consists of extending Rose Crossing west from the intersection with Whitefish Stage to intersect with Farm to Market Road. This extended route would serve developments in the area as well as providing an additional east/west corridor just north of Kalispell.

Table 4.5 shows the anticipated effects that the Rose Crossing extension would have on the surrounding transportation network. The traffic model indicates that the construction of the Rose Crossing Extension would draw upwards of 8,700 ADT between Whitefish Stage and US Highway 93, and between 6,800 and 2,000 ADT west of Whitefish Stage. This traffic is mostly drawn from Whitefish Stage, Stillwater Road, Farm to Market Road, W Reserve Drive, and Church Drive. It is anticipated that Rose Crossing, US Highway 93 and Stillwater Road (north of the Rose Crossing Extension) would see the largest increases in ADT resulting from the change in traffic patterns.

Table 4.5: Alternative Scenario 4 Traffic Impacts

Location	Before Network Modifications (vpd)	After Network Modifications (vpd)	Net Change in Volume (vpd)	Percent Change in Volume (%)
Whitefish Stage (north of Rose Crossing)	12,539	11,224	-1,315	-10.5%
US Highway 93 (north of Rose Crossing Extension)	41,578	45,005	3,427	8.2%
Stillwater Road (north of Rose Crossing Extension)	3,830	4,798	968	25.3%
Stillwater Road (south of Rose Crossing Extension)	3,830	2,083	-1,747	-45.6%
Farm to Market Road (north of Rose Crossing Extension)	2,664	2,888	224	8.4%
Farm to Market Road (south of Rose Crossing Extension)	4,407	3,492	-915	-20.8%
Church Drive (west of US Highway 93)	5,374	5,161	-213	-4.0%
W Reserve Drive (west of Whitefish Stage)	25,039	21,647	-3,392	-13.5%
Rose Crossing (east of Whitefish Stage)	4,581	7,869	3,288	71.8%
Rose Crossing Extension (west of Whitefish Stage)	0	8,791	8,791	N/A
Rose Crossing Extension (west of US Highway 93)	0	6,812	6,812	N/A
Rose Crossing Extension (east of US Highway 2)	0	2,022	2,022	N/A

4.4.5 Alternative Scenario 5 – Alternative US Highway 93 Bypass

This alternative scenario consists of creating an alternative to the US Highway 93 Bypass (Alternative Scenario 1) by upgrading existing facilities west of Kalispell. The following roads received increased capacity and speed limits for this modeling exercise:

- W Springcreek Road – *US Highway 2 to W Reserve Drive*
- W Reserve Drive – *W Springcreek Road Stillwater Road Extension*
- Stillwater Road – *W Reserve Drive to Church Drive*
- Church Drive – *Stillwater Road to Prairie View Road*
- Prairie View Road – *Church Drive to KM Ranch Road*
- KM Ranch Road – *Prairie View Drive to Twin Bridges Road*
- Twin Bridges Road – *KM Ranch Road to US Highway 93*

The traffic model shows that this alternative scenario results in an increase of approximately 4,000 to 9,000 ADT along the alternative bypass corridor. The highest increases in traffic volumes are found along W Springcreek Road and Stillwater Road. The majority of the additional traffic along this scenario is being taken from US Highway 93, Whitefish Stage, US Highway 2, West Valley Drive, and Farm to Market Road. The effects of this scenario are most notable along the northwestern portion of the transportation system. See **Table 4.6** for more details.

While this scenario does draw traffic off of US Highway 93, the total percent decrease in ADT is less than 9% between Church Drive and West Reserve Drive and even smaller in other locations. This scenario serves as more of a regional route for development areas northwest of Kalispell and has little effect on the major highways in the area or on Kalispell itself. Alternative Scenario 1 has a much greater effect on reducing traffic along US Highway 93 and other roads in the Kalispell city limits.

Table 4.6: Alternative Scenario 5 Traffic Impacts

Location	Before Network Modifications (vpd)	After Network Modifications (vpd)	Net Change in Volume (vpd)	Percent Change in Volume (%)
US Highway 2 (east of W Springcreek Road)	19,771	19,778	7	0.0%
US Highway 93 (north of W Reserve Drive)	41,729	38,194	-3,535	-8.5%
Whitefish Stage (north of W Reserve Drive)	13,179	10,951	-2,228	-16.9%
US Highway 2 E (north of W Reserve Drive)	27,051	25,768	-1,283	-4.7%
West Valley Drive (north of US Highway 2)	2,981	1,047	-1,934	-64.9%
Farm to Market Road (north of Church Drive)	1,986	1,190	-796	-40.1%
Church Drive (west of US Highway 93)	5,374	4,778	-596	-11.1%
Church Drive (west of Stillwater Road)	1,829	2,528	699	38.2%
W Springcreek Road (north of US Highway 2)	8,454	17,351	8,897	105.2%
W Reserve Drive (east of W Springcreek Road)	14,318	19,257	4,939	34.5%
Stillwater Road (south of Church Drive)	1,919	11,383	9,464	493.2%
Prairie View Road (south of KM Ranch Road)	1,434	7,514	6,080	424.0%
KM Ranch Road (east of Prairie View Road)	5,552	7,178	1,626	29.3%
KM Ranch Road (south of Twin Bridges Road)	1,410	5,367	3,957	280.6%

4.5 ALTERNATIVE GROWTH SCENARIOS

In addition to modeling alternate transportation scenarios, alternative land use growth scenarios can be modeled to determine the effects that development can have on the transportation system. Two alternative growth scenarios were developed for the purposes of this exercise and are discussed in the following sections. These scenarios were based from the socioeconomic data presented in **Chapter 3**.

4.5.1 LOW GROWTH SCENARIO

The low growth scenario was developed to determine the effects of slower than anticipated growth in Flathead County would have on the transportation system. This scenario was based on historic low growth trends experienced in Flathead County during the 1980's. An annual growth rate of 1.31% was used to represent this scenario.

Analysis of the low growth scenario results in a daily future anticipated trip reduction of approximately 8.3% along the major street network as compared to the moderate growth scenario. The low growth scenario resulted in an increase of approximately 47.7% trips along the major street network between the years 2007 and 2030. The moderate growth scenario, for comparison, resulted in an increase of approximately 61.0% trips along the major street network during the same time period.

4.5.2 HIGH GROWTH SCENARIO

The high growth scenario was developed to determine the effects higher than anticipated development in Flathead County would have on the transportation system. This scenario was based on historic high growth trends experienced in Flathead County during the early 21st century. An annual growth rate of 2.32% was used to represent this scenario.

Analysis of the high growth scenario shows a daily future anticipated trip increase of approximately 20.7% along the major street network as compared to the moderate growth scenario. The high growth scenario resulted in an increase of approximately 94.3% trips along the major street network between the years 2007 and 2030. As was stated earlier, the moderate growth scenario, for comparison, resulted in an increase of approximately 61.0% trips along the major street network during the same time period.

4.5.3 ALTERNATIVE GROWTH SCENARIO CONCLUSIONS

The analysis of alternative growth scenarios provides information regarding how development affects travel trips within the transportation system. By limiting the amount of development occurring in the county, the number of additional future vehicle trips is lower than if a higher rate of development occurs. The main point to understand is that development is directly tied to vehicle trips which ultimately effects roadway performance and when/if infrastructure projects are needed.

CHAPTER 5

TRAFFIC CALMING

Chapter 5: Traffic Calming

5.1 INTRODUCTION

Photo 5.1: Various physical traffic calming measures installed in a residential neighborhood.

The *Institute of Transportation Engineers (ITE)* defines traffic calming as the "combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users." While *ITE* defines traffic calming as a combination of "physical measures", a number of passive traffic calming measures also exist. In simple terms, traffic-calming techniques, either physical or passive, are typically aimed at lowering vehicle speeds, decreasing truck volumes, and/or reducing the amount of cut-through traffic in a given area.

Traffic calming has been proven to reduce vehicle speeds which ultimately results in an increase in safety for motorists, bicyclists, and pedestrians. If applied properly, these techniques result in a more pleasant environment for pedestrians and bicyclists while increasing the overall safety of a roadway or road network.

The goals of traffic calming are to:

- Apply measures to cause drivers to slow down
- Reduce cut-through traffic
- Implement self-enforcing rather than regulatory measures
- Increase safety for motorists, pedestrians, and bicyclists
- Promote walking and biking
- Reduce negative environment impacts of traffic

Traffic calming implementation is generally the result of the concerns of residents in the area. Complaints from parents and citizens about speeds and cut-through traffic, particularly on residential streets near schools and parks, commonly spur traffic calming discussions. In many communities, citizens have conveyed their traffic-related concerns to local leaders who, in turn, have sought direction from transportation experts to implement traffic calming measures.

Traffic calming not only affects the roadway where the techniques are applied, but it can also affect the surrounding roadway network. Traffic calming measures applied to local streets may cause an increase in traffic volumes and speeds along other nearby streets often creating identical problems along other roadways. Speeding and cut-through traffic on local streets can be an indicator that the arterial network is not functioning properly. Improvements to the arterial network may be a more effective solution than active traffic calming on smaller streets.

Although many traffic calming techniques benefit pedestrians and bicyclists due to the speed reduction, some traffic calming techniques can be problematic especially if certain needs are not addressed during the planning process. For example, vertical deflection measures, such as speed humps or bumps, may be difficult for pedestrians and bicyclists to navigate. Some narrowing may force pedestrians and bicyclists to travel uncomfortably close to vehicles if proper facilities do not exist or are not properly incorporated into the design. To best serve the needs of all users, including bicyclists and pedestrians, care needs to be taken when implementing any traffic calming technique.

The following guidelines should be considered in traffic calming installations:

- Traffic calming planning should include adequate public involvement.
- Involve experts familiar with the latest traffic calming resources and design standards.
- Planners should consider a variety of traffic calming devices, rather than relying on a single type, such as speed humps or rumble strips.
- Traffic calming projects should support multiple objectives, including enhanced street aesthetics, improved walking and cycling conditions, as well as controlling traffic speeds.
- Stop signs should not be used as traffic calming devices.
- Maintenance of new traffic calming devices should be included in planning and design phases, for example, snow plowing, minimizing painting and upkeep, etc.
- Devices that are new to an area should be implemented on a trial basis with adequate signing. For example, the first traffic circles in an area should have signs showing the path vehicles should follow. After a few years such signs become unnecessary.
- Delays to emergency vehicles should be minimized by the appropriate placement and design of traffic calming devices. In some cases, certain traffic calming devices may not be appropriate.
- Traffic calming installations should not divert traffic to other local residential streets. Traffic calming installations should support the street classifications established in community plans. Traffic may be diverted from residential streets to classified through streets. The potential impacts of traffic diversion should be evaluated for all traffic calming installations.
- Traffic calming should not impair the mobility of non-motorized users of the street.
- Traffic calming installations must address drainage, sight distance, and location of utilities.

The traffic calming discussion contained herein is generally aimed at the urban interface area. The use of traffic calming techniques should be determined on a case-by-case basis. This chapter is intended to provide a general overview of commonly used traffic calming measures.

5.2 TYPES OF TRAFFIC CALMING MEASURES

Traffic calming measures typically fit into one of two categories: 1) passive measures; and 2) physical measures. Several traffic calming examples that fall into these categories are described in the following sections. Regardless of which traffic calming measure is implemented, the benefit to a community is greatest when measures are coupled with visual enhancements like landscaping and other amenities.

The traffic calming techniques contained in this section can be effective in a variety of ways. However, while a specific tool may work for some applications, it may not work under every circumstance. Some tools are most effective if used in combination with each other, while others may create hazards in locations where proper bicycle and pedestrian facilities do not exist. The right use for each technique depends on the existing conditions along the roadway in addition to the desired outcomes.

5.2.1 PASSIVE MEASURES

There are several passive techniques that produce a calming effect on traffic. Passive traffic calming measures include those treatments that do not physically change or obstruct the path of a vehicle. Passive measures are intended to slow vehicle speeds by changing driver behavior without actually restricting or interfering with the flow of traffic. These measures can be ineffective if not supported, monitored, or enforced to ensure compliance. The best results are usually obtained when two or more of these techniques are used in combination. Some examples of passive traffic calming measures are described in this section.

- **Pavement Markings** – Pavement markings are generally used to either direct traffic or narrow the travel lane. They can alert the driver to changes in traffic conditions while increasing

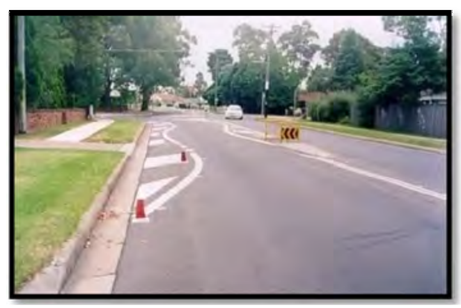


Photo 5.2: Pavement markings used to create the illusion of a small chicane.

  Pavement markings used to direct traffic provide the illusion that the driver needs to behave in a manner dictated by the markings. This form of traffic calming is easily disobeyed, but the effectiveness may be increased by incorporating it with other traffic calming devices.

  Narrower travel lanes, or at least the appearance of a narrower travel lane, can be achieved by installing pavement markings to indicate shoulder areas, turn lanes, or bike lanes.

Photo 5.3: Pavement markings used to stripe a bike lane, creating a narrower travel lane.

  Pavement markings can also be used to accentuate an existing feature, such as a crosswalk, speed hump, or other traffic calming device. This method helps increase the overall effectiveness of the existing traffic calming device. For example, a speed hump can be striped in such a manner that it may appear bigger providing advanced warning to drivers, which may help reduce travel speeds.

Pavement markings can also be used to alert the driver to change their driving behavior. Messages such as “SLOW” or “SCHOOL ZONE” can be placed on the roadway to let the driver know they are entering an area with changing traffic characteristics.

In general, pavement markings are not overly effective on vehicle speed reduction unless they create the impression of a narrowed roadway. Pavement markings and signage are often used in conjunction to have the maximum effect. While pavement markings don’t force drivers to act, they do give them guidance on how to act.

- **<u>Road Narrowing</u>** – These measures are built into the design of the street. Some examples are tree-lined streets, streets with boulevards separating the sidewalks, streets with raised center medians, on-street parking, highly visible pedestrian crossings, and relatively short building set-back distances. Each of these elements has the tendency to slow vehicle speeds without restricting access or physically interfering with the flow of traffic.

  Road narrowing achieves a traffic calming effect by disrupting driver comfort due to the visibly narrower travel lanes. The roads may actually be physically narrower under this technique, or they may just appear to be narrower due the close proximity of objects near the roadway. It is common to find tree-lined streets in older neighborhoods, while many downtown areas incorporate boulevards and have short building set-back distances. The downtown areas of Whitefish and Kalispell, for example, each incorporate some of these traffic calming techniques. The results are slower vehicle travel speeds and an increase in overall safety for drivers, pedestrians, and bicyclists.

Photo 5.4: US Highway 93 in Whitefish incorporates road narrowing.

Photo 5.5: A residential street in Kalispell with visibly narrow width.

- **<u>Education and Enforcement</u>** – Education and enforcement techniques can help increase public awareness about traffic calming and the dangers of speeding. Increasing the level of police enforcement on streets that are prone to speeding problems can be an effective way to reduce the number of speeding vehicles. The speed reduction, however, usually is only reduced for a short period of time or as long as the enforcement is maintained. In order to have a long term effect on speeding, police enforcement must be

Photo 5.6: Police enforcement can temporarily help decrease vehicle speeds.

enforced on a repetitive, non-routine basis while having signage and/or brochures in the area to indicate that enforcement will be increased in the area. There can be significant budget and manpower constraints to having continual police enforcement. Using police personnel to enforce speed limits is typically a low priority for police departments. The cost of enforcing speed limits on a continual basis can be unjustifiable. Increasing police enforcement works best when coupled with traffic calming features.

Education techniques can also help aid in traffic calming, especially when used in addition to traffic calming features. Neighborhood traffic safety campaigns are an educational program consisting of meetings, newsletters, etc., with the purpose of informing residents of the neighborhoods' particular traffic issues and outlining safety recommendations. Neighborhood speed watch programs are speed-monitoring programs in which residents of a neighborhood measure vehicle speeds with a radar unit and record license plate numbers of those exceeding the speed limit. The registered owners are sent letters explaining the safety concerns in the neighborhood and asking them to reduce their speeds. Variable speed display boards also serve as education tools for speeding drivers.

- **Signage** – Signs can help provide warning of changes in the traffic characteristics of the roadway. They can be used in conjunction with other traffic calming devices to help call attention to traffic calming features. Installing signs, however, does not guarantee compliance; they merely aid the driver in their decision making process. They should generally be used to call attention to existing features or changing conditions. Additional signing should not be used in place of sound engineering. All signing should be installed in accordance with the MUTCD and local policy. It should be noted that regulatory and advisory signs by themselves are generally not considered traffic calming devices.

Photo 5.7: Advisory sign calling attention to a traffic circle.

Decreased speed limits can be used in areas such as school zones, residential areas, or urban areas. Decreasing speed limits in school zones is common and does tend to have some effect on speeding. However, it is recommended that other speed control measures be used in conjunction with decreased speed limits to have the maximum effect. Simply reducing the speed limit, especially outside of school zones, may have little effect on speeding vehicles when used alone. Decreased speed limits are not considered a standalone traffic calming measure and should only be used in accordance with the MUTCD and local policy.

Photo 5.8: Portable variable speed display board.

Variable speed display boards are commonly placed in areas that are prone to high levels of speeding. The boards display the speed limit for the road to the driver and also have built in speed sensors that detect and display their actual speed. Their current speed is then displayed on the board to alert the driver to how fast they are going compared to the actual speed limit in hopes that they will keep their speeds at or below the speed limit. Computerized boards can be used to detect what time of day the most number of people are speeding in an area so that additional enforcement can be placed there if needed. The boards basically run themselves and can be powered off of batteries or by solar power. The portable boards work well for moving to different areas where speed is of concern. Permanent boards can also be installed at problematic locations. One concern with these boards is that it may encourage certain groups of drivers to speed if not monitored.

Vehicle Activated Traffic Calming Signs (VATCS) are electronic LED signs which are intended to lower vehicle speeds. VATCS are similar to variable display boards in that they display information to speeding drivers in an attempt to slow them down. VATCS are targeted only at the motorist exceeding the threshold speed and remains blank until a vehicle exceeding the target speed approaches. Unlike variable speed display boards, VATCS do not display the actual vehicle speed but only alerts the speeding vehicle that they are exceeding the speed limit and should slow down. This difference can help deter possible drivers trying to see how high they can get the sign to read. Recent studies have shown a 4-7 mph decrease in average speed and a 1/3 reduction in expected accidents over a 3 year period as a result of the VATCS.

Photo 5.9: VATCS used to display warning signs to speeding drivers.

Advance warning signs provide information to motorists about an upcoming change in traffic conditions. Advance warning signs are installed to aid motorists in being alerted ahead of areas with changes in traffic conditions. They help increase compliance and attention to the area. Advance warning signs are commonly used to provide advance warning for railroad crossings, intersections, curves, speed limit changes, school zones, crosswalks, or any other change in traffic conditions. Advance warning signs are not standalone traffic calming measures and should only be installed in accordance with the MUTCD and local policy.

Photo 5.10: Advance warning sign for a traffic signal.

5.2.2 Physical Measures

Descriptions of a wide variety of physical traffic calming measures are presented in this section. Physical traffic calming techniques can be broken out into one of three categories: 1) deflection; 2) narrowing; and 3) restriction / diversion.

A general magnitude cost range is shown for a basic installation of each measure. These costs can increase significantly with the addition of irrigation systems and street lighting, or the acquisition of right-of-way. Beautification amenities, such as brick pavers or extensive landscaping, can also dramatically impact project costs.

When implementing these types of physical traffic calming measures, several guidelines should be taken into consideration:

1) Attempt less restrictive measures before resorting to road closures and other route modifications;
2) Space devices 300 to 500 feet apart in order to contain speeds to a 20 to 25 mile per hour range; and
3) Make the appropriate accommodations for drainage and snow removal, as well as considering the needs of emergency vehicles, pedestrians, and bicyclists. Road closure or obstruction, for example, can often be achieved through the use of traversable barriers that allow for the passage of bicycles, pedestrians, and emergency vehicles.

With any traffic calming measure, maintenance efforts should be considered when determining if physical traffic calming measures are appropriate. Snow removal, effects on emergency vehicles, drainage, lighting, and other considerations all need to be taken into account before traffic calming is implemented.

5.2.2.1 Deflection

Deflection traffic calming methods slow vehicle speeds by causing either a vertical or horizontal deflection. If vehicles travel too fast through these various traffic calming devices, the driver will experience discomfort due to their excessive speed.

- **Rumble Strips –** Rumble strips are grooved patterns placed in the pavement perpendicular to the direction of travel. When a vehicle passes over a rumble strip, the driver receives an audible warning (rumbling sound) and feels a vibration. Rumble strips are used to alert the driver to use caution in the area or to alert them to changes in traffic characteristics. They can be painted a different color or be made of a different material than the road surface so that they stand out to the driver. The installation of any type of rumble strip should be done in accordance with local standards.

Photo 5.11: Thermoplastic transverse rumble strips.

  Rumble strips are classified into three types as defined by the Federal Highway Administration (FHWA):

1. **Shoulder rumble strips (SRS)** are the most common type and are located on the road shoulder of expressways, interstates, parkways, and rural roadways. They are intended to alert the drive when they encroach onto the shoulder. This type of rumble strip is a design feature and is used as a safety device and is not generally considered a traffic calming technique.
2. **Centerline rumble strips (CRS)** are located along the centerline of the roadway and are often used on two-lane rural roadways. They alert the driver that they are encroaching into the centerline. As with shoulder rumble strips, these are design features and are not generally considered traffic calming devices.
3. **Transverse rumble strips (TRS)** can be installed on approaches to intersections, toll plazas, horizontal curves, and work zones. They alert the driver that they are approaching an area of concern and that they should use caution. These should not be used in the place of sound engineering.

- <u>**Speed Bumps, Humps, Tables, and Cushions**</u> **–** These types of traffic calming measures are all physical design features that are raised above the roadway. The difference between the four types generally lies in their geometry. **Speed bumps** are the smallest and are generally 3 to 6 inches high and 1 to 3 feet long. They are typically used in parking lots and low speed residential areas.

  Speed humps are larger than speed bumps and range from 3 to 4 inches high and 10 to 14 feet long. They generally can slow vehicles down to approximately 15 mph.

  Speed tables are essentially lengthened speed humps with a flat top. The design of speed tables allows for higher speeds than those of speed humps, but creates a smoother ride for larger vehicles.

  A **speed cushion** is a series of speed humps installed across the width of the roadway with spaces between them. The spaces are constructed so that emergency vehicles can pass between them without being affected by the humps. Ordinary cars with smaller axles will need to travel over the hump with at least one side of the car.

  Any of these traffic calming measures should be placed at spaces ranging from 250 feet to 800 feet to gain a continuous effect on slowing vehicle speeds. If they are placed at distances greater than 800 feet, there may be enough room between them to allow the driver to speed up between the devices, which will limit their effectiveness.

Photo 5.12: Traffic calming devices; from top to bottom: speed bump; speed hump; speed table; speed cushion.

- **Traffic Circles and Roundabouts** – Traffic circles and roundabouts are both forms of circulatory traffic calming devices. **Traffic circles** are raised circular islands placed in the center of an intersection about which drivers must navigate around. They cause vehicles to slow down through the intersection because drivers are forced to make turning movements. In general, they are very effective at slowing vehicle speeds down. Large vehicles may have trouble navigating around traffic circles, especially when making left-hand turns. Traffic circles work well for low volume intersections where speeding is a common problem.

Photo 5.13: Traffic circle installed in a neighborhood

  Roundabouts are essentially larger traffic circles with splitter islands and yield signs at each entryway. They are intended for larger intersections with higher traffic volumes. Roundabouts provide refuge areas on the splitter islands that al low crossing pedestrians a place to refuge so that they only have to cross one direction of traffic at a time. Large trucks can navigate around properly designed roundabouts often through the use of mountable islands or aprons aimed at accommodating the larger turning movements. Roundabouts and traffic circles both slow drivers down and decrease the number of conflict points from the 32 present in a standard four-legged intersection to only 8 conflict points. The decrease in speed and number of conflict points results in roundabouts having 90% fewer fatal intersection crashes compared to signalized intersections.

Photo 5.14: Pedestrians crossing at a roundabout.

- **Raised Crosswalks** – Raised crosswalks are speed tables that have crosswalk signage and marking to allow for pedestrians to cross the roadway. The raised level increases the visibility of the crosswalk, increasing driver awareness and creating a safer pedestrian crossing. Raised crosswalks are ideal in locations where there is heavy pedestrian traffic and high vehicle speeds. This form of traffic calming not only slows vehicles down, but also alerts vehicles to possible pedestrian traffic in the area.

Photo 5.15: Raised crosswalk located near a school.

- **Intersection Realignment** – This traffic calming method changes the alignment of a standard "T" intersection with a straight approach into curving streets that connect at right angles. This traffic calming approach forces vehicles in all directions to slow down. While this method generally can slow vehicles down, it may cause some confusion regarding vehicle priority.

Photo 5.16: Realignment of a standard "T" intersection.

- **<u>Chicane</u> –** Chicanes are offset curb extensions that form "S" shaped curves which cause a deviation in the vehicle's path of travel. The horizontal road realignment forces the driver to alter their path causing them to slow down. Chicanes can also be created by alternating parking between each side of the road.

Photo 5.17: Chicane installed to force vehicle deflection.

5.2.2.2 Narrowing

Narrowing traffic calming methods reduce vehicle speeds by creating driver discomfort due to narrowed travel lanes. Driver discomfort generally leads to a decrease in travel speeds.

- **<u>Bulb-Outs</u> –** Bulb-outs, also known as curb extensions or neckdowns, are the most common form of street narrowing and are primarily used to make intersections more pedestrian friendly. Bulb-outs are installed to reduce the roadway width from curb to curb at an intersection. The reduced roadway width causes vehicles to slow down. In addition to slowing vehicle travel speed, bulb-outs also reduce pedestrian crossing distance and increase the visibility of the pedestrian crossings. The most common place for a bulb-out is in an area where there is substantial pedestrian traffic and vehicle speed is of concern. It is also common to combine this traffic calming measure with a raised crosswalk to increase the overall effectiveness.

Photo 5.18: Intersection with curb bulb-outs.

- **<u>Refuge Islands</u>** – Refuge islands are raised islands located at the center of the street that narrow the overall width of the travel lanes. Refuge islands have an opening that allows a crosswalk to pass through them. Without the openings, they are often called center island narrowings. The islands create a refuge so crossing pedestrians only have to cross one direction of traffic at a time. In addition to creating shorter crossing distances for pedestrians, refuge islands generally narrow the travel lanes, or at least give the appearance of a narrower travel lane. Islands also can be constructed to cause vehicles to deviate from a straight path in order to travel around them. All of these elements can help to reduce vehicle speed in the area.

Photo 5.19: Refuge Island installed at a crosswalk.

- **Choker** – Chokers are essentially bulb-outs placed at midblock locations rather than at intersections. As with bulb-outs, chokers narrow the travel lanes by increasing the length of sidewalks or by increasing landscape areas. Chokers also provide protected parking areas and can add additional area for landscaping. Chokers are commonly used as pedestrian amenities in locations where a trail crosses a roadway at a midblock location.

Photo 5.20: Choker installed to connect a trail at a midblock location.

- **Gateway** – A gateway is an entry treatment along the roadway or surrounding area that creates a sense of passage or change in traffic conditions to the area. Gateways can consist of vertical elements such as posts, trees, bushes, signs, poles or columns. They can also be formed using curb extensions, changes in surface color or material type, or any other method that creates a sense of entry into an area. Gateways alert drivers to changes in traffic conditions resulting in increased attentiveness and decreased vehicle speeds. Gateways are commonly used to transition to residential neighborhoods or community developments. As with other traffic calming devices, gateway designs should be checked to assure that an adequate intersection sight triangle is preserved.

Photo 5.21: Gateway identifying a residential neighborhood.

5.2.2.3 Restriction / Diversion

Restriction and diversion techniques are traffic calming methods intended to reduce vehicle volumes by restricting vehicle access. It should be noted, however, that restricting vehicles from one area will ultimately increase traffic volumes in another area, often times pushing the problem onto another location.

- **Road Closures** – Road closures are very effective on lowering traffic volumes on the roadway. Cut through traffic can be greatly reduced through the use of road closures. It is common to use closures to limit the amount of traffic on a residential street that is connected to a main street. By closing the connection to the main street, the traffic that previously used the residential street to connect to the main street would diminish, thereby decreasing the overall traffic on that road. This does, however, create more traffic on other roads in the area since those vehicles would still have to access the main street via another street. There are two types of road closures: half closures and full closures.

  Half closures block a single lane of traffic. Vehicles are prevented from entering a road but are still allowed to exit the road. This is an effective means of limiting

Photo 5.22: A half closure installed near a school.

traffic on a roadway and also limiting turns from the intersecting roadway. Half closures are generally made by extending the curb or by placing a barrier to block entry. Ample signage must be put into place to alert drivers to the partial closure.

Full closures are created by placing barriers at an existing intersection. Full closures can be constructed to create a dead end or a cul-de-sac style road. An opening or trail can be placed to connect pedestrians and bicycles to the abutting road. The type of barrier used to create the closures can range from a bollard style to a full landscaped closure. A landscaped style is more aesthetically pleasing to the area, but is also much more expensive than placing bollards to stop vehicle traffic. Another method commonly used to create road closures is installing curb extensions on the roadway.

Photo 5.23: Full closure installed in a residential neighborhood.

- **<u>Median Barriers</u>** - Median barriers are placed in the middle of intersections to restrict cut-through movements at a cross street. They also restrict left-turns onto the cross streets from the main street. Putting a median barrier in place will reduce the number of conflict points and therefore increase the safety of the intersection. The barrier can be used as a pedestrian refuge for people wanting to cross the main street. This, along with the reduction in left-turns, increases pedestrian safety at the intersection. Median barriers also reduce traffic volumes on the side streets while increasing the traffic flow on the major street due to the restriction in left turns. This type of barrier can work well in areas where the side street has turned into a popular cut-through street or in areas where there are problems with people stopping to make left-turns. The median barrier does restrict all vehicles, including emergency vehicles. However, barriers can be designed that emergency vehicles can navigate if needed.

Photo 5.24: Median barrier that still allows emergency vehicle access.

- **<u>Diagonal Diverters</u>** - Diagonal diverters consist of a barrier being placed diagonally across a four-legged intersection which interrupts the traffic flow across the intersection. The traffic is diverted away from and is not allowed to drive straight through the intersection. The diverter reduces conflict points caused by thru traffic and turning movements within the intersection. They also discourage non-local traffic flow in the area, but still allow for local traffic. This method is effective in areas where there are problems with cut through traffic. The diverter needs to be visible enough to alert the driver to slow down and make the turn.

Photo 5.25: Diagonal diverter which still allows emergency vehicle access.

- **<u>Forced Turn Islands</u>** – Forced turn islands, also known as "pork chops", are small traffic islands placed at intersections to restrict and channelize turning movements. They are generally put in place to block left-turn and through movements while still allowing for right-turn movements. This method is commonly used where smaller side streets intersect with a larger major street. Heavy left-turn or through traffic from side streets can cause safety and traffic problems for the area. Restricting the movements from the side streets can increase the safety and decrease traffic at the intersection. Forced turn islands are common place for parking lots or similar areas that have multiple entrances and exits. The islands encourage people wanting to turn left or go straight out of the area to use the designated intersections that don't have the forced turn islands; the designated intersections are generally larger safer intersections.

Photo 5.26: Forced turn island allowing right-in / right-out movements.

5.3 RURAL AREA TRAFFIC CALMING

Traffic calming is typically used in rural areas to help reduce vehicle speeds and increase driver awareness when entering neighborhoods or other populated areas. The transition zone between rural and urban communities can also be a difficult place to control vehicle speeds. Implementing traffic calming measures along county roadways can be a challenging task.

Techniques that work along high-volume low-speed city roadways may not work along rural routes. Special care must be given to the type of traffic calming measures installed along rural routes. For instance, installing speed bumps along a straight road with a high design speed may cause vehicles to slow down to cross the bumps, however drivers may increase speeding between the bumps to make up for lost time.

A list of suggested traffic calming measures and design techniques for rural routes along with a short description of each is found below. This list is intended to be used for informational purposes only and is not intended to provide any specific project recommendations. Appropriate traffic calming measures should be determined on a case-by-case basis.

- **Transverse Rumble Strips** are groves cut into the roadway perpendicular to centerline that provide an audible sound and vibration that is felt inside the vehicle. They are used to alert the driver to use caution in the area or to alert them of changes in the traffic characteristics. Transverse rumble strips are often installed to warn the driver about approaches to intersections or of an upcoming crosswalk.

- **Variable Speed Display Boards** can be used to help deter speeding. These boards display the posted speed limit and the actual speed of the vehicle. The effectiveness of these boards is greatest when used with other speed control measures, such as increased police enforcement. Using the variable speed display boards alone generally has an initial effect on speeding vehicles; although this tends to diminish the longer the signs are in place.

- **Pavement Markings** can be used to call attention to existing features or can be used to create new features. Pavement markings can be used to create on-street parking or bike lanes or to make a visually narrower lane. They can also be used to call attention to existing features, making them look bigger or providing advance warning. Generally pavement markings and signage are used in conjunction to have the maximum effect.

- **Gateways** can be used to help provide a sense of transition when entering residential areas or rural communities. Gateways can consist of vertical elements such as posts, trees, bushes, signs, poles or columns. They can also be formed using curb extensions, changes in surface color or material type, or any other method that creates a sense of entry into an area. Gateways alert drivers to changes in traffic conditions resulting in increased attentiveness and decreased vehicle speeds.

5.4 INCORPORATING INTO NEW ROADWAY DESIGN


Photo 5.27: Traffic circle installed on a new residential street.

Roadway designs for new development should be appropriate for the intended function of each roadway or roadway segment. Those designed to function as part of the major roadway system (major collectors and arterials), should be designed primarily to move traffic in as efficient, convenient, and safe a manner as possible. Local roadways and residential collectors, on the other hand, should be designed to provide access to properties while discouraging through-traffic and higher travel speeds that often accompany it. As a result, new developments should include traffic calming strategies to reinforce the appropriate functions of local roads. These would include layout and connectivity of street systems and pedestrian/bicycle facilities, intersection treatments, and basic design standards for width, curvature, parking, and landscaping. Specific traffic calming features which are easily incorporated into the design phase include: gateway treatments; street narrowing; short block lengths; small corner radii; surface valley gutters; “T” intersections; roundabouts; and landscaping to create a “closed-in” environment.

Traffic calming design characteristics should be incorporated into the County’s development review process. Proposed developments would be reviewed by staff to determine whether or not traffic-calming improvements are appropriate for any given location, what strategies are best suited, and what design details are appropriate. The process should be designed to pro-actively assist developers in utilizing traffic strategies to improve quality of life in their developments, while minimizing or eliminating costs for retrofit efforts. Because of the long-term effects of original roadway layout and construction, the County may wish to coordinate with the City to incorporate traffic calming into its development review and annexation process.

In some cases, traffic problems may be located near a City/County line, or may be caused by conditions inside the City limits, on the State highway system, or at the State complex. For these reasons, it is desirable for the County to have cooperative agreements with the City and the State government. Cooperative agreements would enable this process to cross jurisdictional boundaries. Other agencies would take an active role in the traffic calming process and participate in financing permanent solutions when deemed appropriate.

5.5 TRAFFIC CALMING PROGRAM FOR EXISTING ROADWAYS

Traffic Calming programs are usually implemented by local engineering departments. These programs involve educating planners and traffic engineers about Traffic Calming strategies, establishing policies and guidelines for implementing Traffic Calming projects, and developing funding sources. Specific Traffic Calming projects may be initiated by neighborhood requests, traffic safety programs, or as part of community redevelopment. Street Reclaiming is initiated and organized by neighborhood residents.

Photo 5.28: Raised Crosswalk installed near a school.

The Traffic Calming Program for Flathead County should provide a regular and ongoing opportunity for neighborhoods to nominate, test, and implement improvements to address problems with the local street network. The process should be standardized to minimize administrative effort and cost, while ensuring that improvements are necessary, effective and safe. The process should be repeated as necessary to ensure that resident concerns are addressed with reasonable timeliness, and that projects are advanced in an orderly and efficient manner.

Traffic calming measures are designed to reinforce the perceived need for caution by the user of the transportation system. The primary responsibility for safe use of the streets lies with the individual driver, cyclist, or pedestrian. The need for physical traffic calming devices indicates a consistent occurrence of failure by the transportation user to appropriately interact with their surroundings.

Traffic calming projects depend on the strong support of residents in the immediate area. Traffic calming methods should also be used only to address real, rather than perceived, problems. For these and other related reasons, traffic calming projects should meet several criteria before being considered for implementation.

5.5.1 SAMPLE TRAFFIC CALMING PROGRAM

This section provides a sample three-phase procedure for implementing traffic calming measures on existing facilities. In order to accommodate seasonal changes, special events or any other irregular circumstances, the process may be altered or accelerated at the discretion of Flathead County. This sample procedure is intended to apply to residential neighborhoods and as such may be altered for use by Flathead County.

This sample Traffic Calming Program is a three-phase process consisting of 12 individual steps. The main activities of each of the phases are as follows: Phase I) identification and verification of a traffic problem; Phase II) selection and implementation of educational activities and enforcement techniques; and Phase III) selection and implementation of physical traffic calming measures. Each phase requires the participation of the neighborhood residents and Flathead County.

In the first phase, the residents are responsible for contacting the County, identifying their concerns, and submitting a project application. At this point the County will make initial contacts with the residents, and conduct informal meetings to better understand the nature of the problem. The County will then perform preliminary studies to validate the perceived problem, and determine whether or not the process should advance.

During Phase II, the County will facilitate a neighborhood meeting at which they will present a range of appropriate educational activities and enforcement alternatives. The County will work with the neighborhood residents to identify a preferred solution. The residents will then be responsible for circulating a petition and fostering support for the identified solution.

Phase III responsibilities will be divided similarly to those in Phase II, although the solutions being discussed at this point will be applicable physical devices. When a permanent solution is selected, the County will determine the appropriate funding sources based on the nature of the problem. Traffic calming projects will be financed on a case-by-case basis. Residents should expect to pay some portion of the cost of installing permanent traffic calming devices in their neighborhood.

Phase I

- **Step 1 –** A Citizen contacts the County about a traffic problem. The County responds by sending the Citizen information about the Traffic Calming Program and an Investigation Request Form.

- **Step 2 –** The Citizen completes the "Investigation Request Form" and returns it to the County. The form should include a description of the problem and location, as well as the signatures of 10 other neighborhood residents from separate households who agree that the problem exists. A Neighborhood Contact is also identified on the form. After receipt of the form, the County contacts neighborhood residents to discuss the nature of the perceived problem. The information gathered in this step helps determine the types of studies needed to be performed in Step 3.

- **Step 3 –** The County conducts a field review of the location, and collects the appropriate data in order to determine whether or not the perceived problem actually exists. In most cases, accident records should be reviewed, and traffic volumes measured. Depending upon the nature of the complaint, a speed study, truck count, or cut-through study may also be appropriate. In order to be considered for a traffic calming project, the location must have traffic volumes of at least 800 vehicles per day and meet at least one of the following criteria: three or more accidents in a 12-month period; an 85th percentile speed that is at least five (5) miles per hour over the posted speed limit; or truck volumes exceeding 10 percent of the total traffic volume.

After the field data is collected and reviewed, the County informs the Neighborhood Contact of the results. If the location does not meet the above criteria, the County meets with neighborhood residents to review the study results and discuss other options. At this point, the Traffic Calming Program is concluded. If the problem location meets the required criteria, the County reviews the Phase II process with the Neighborhood Contact.

Phase II

- **Step 4 –** The County determines the boundaries of the affected area. Area boundaries will typically follow arterial streets or other natural breaks. The County schedules a neighborhood meeting to discuss possible Phase II solutions to the problem. The County gives the Neighborhood Contact a map of the designated boundaries so he/she can inform area residents of the meeting. At the meeting, the County presents a range of appropriate measures. Potential Phase II measures will emphasize the least intrusive measures, consisting of enforcement, educational activities, and/or minor physical changes (brush trimming, and sign or pavement marking installation).

- **Step 5 –** The Neighborhood Contact circulates a Phase II Petition within the defined boundaries. The petition identifies the proposed education and enforcement techniques, and asks residents to indicate their approval. If the petition is not signed by 40 percent of the property owners within the defined neighborhood, the process is terminated. If the petition is signed by at least 40 percent of the property owners, the County and/or Neighborhood will then implement the Phase II measures.

- **Step 6 –** Approximately 90 days after implementation of the Phase II measures, the County repeats the data collection efforts. (This 90-day period may be modified by the County to accommodate seasonal conditions and other factors.) If the problem has been resolved, the education and enforcement activities can be tapered off and the process concluded. If the situation arises again at a later date, as confirmed by data, the process can begin again at Step 6.

PHASE III

- **Step 7 –** If the traffic problem has not been resolved by the Phase II measures, the County conducts an engineering study to determine a range of appropriate physical improvements to the location. Initially, less restrictive measures are preferable to roadway obstruction techniques.

- **Step 8 –** The County schedules a neighborhood meeting to review the Phase III improvement options. The Neighborhood Contact is responsible for notifying area residents about the meeting. The County facilitates the neighborhood meeting. Based on resident input, a preferred solution is selected from the range of possible solutions. If a temporary version of this traffic-calming device is not practical, proceed to Step 11.

- **Step 9 –** If a temporary traffic-calming device is suitable, the Neighborhood Contact circulates a Phase III Petition for Temporary Measures. The process ends if the petition is not signed by 50 percent of the property owners within the defined boundaries. If at least 50 percent of the property owners sign the petition, the County constructs a temporary version of the preferred traffic-calming device.

- **Step 10 –** After one year, the County repeats the data collection process to determine whether or not the temporary device is effective. If it is found to not be effective, the County notifies the Neighborhood Contact, and the device is removed. The process can then be repeated from Step 7.

- **Step 11 –** If the temporary device is effective, the County develops a preliminary design and cost estimate for a permanent traffic calming device(s), and determines who will finance the permanent solution. The County then provides Neighborhood Contact with this information and indicates that the area property owners are receptive to a Petition for Permanent Measures.

- **Step 12 –** The Neighborhood Contact circulates a Phase III Petition for Permanent Measures, which includes a copy of the preliminary design and cost estimate, as well as an explanation of financial responsibility. If the petition is not signed by 70 percent of the area property owners, the process is terminated and any temporary devices removed. If at least 70 percent of the property owners sign the petition, the County performs a final design, and constructs a permanent traffic-calming device.

There are numerous points at which the traffic calming implementation process can be terminated due to lack of neighborhood support. Should neighborhood sentiment change at a later date, the process may be resumed at the same step where it left off.

PROJECT COSTS

Traffic problems on existing streets are usually caused by one of the following situations: poor initial street design; inadequacy of the major street network; or commercial and/or residential development adjacent to the neighborhood. The cost of financing traffic calming projects to resolve such problems should be distributed accordingly. As part of the initial investigation, the nature and cause of the traffic problem will be identified. The County will use this information to determine the appropriate division of project costs and identify who (the County, neighborhood residents, developers, other parties) may be involved in paying for the traffic calming measures.

The costs of Steps 1 through 11 will be borne by the County. Permanent Phase III construction (Step 12) will be financed by some combination of neighborhood contributions, development fees, and funds from other sources.

CHAPTER 6

Miscellaneous Transportation System Considerations

Chapter 6: Miscellaneous Transportation System Considerations

6.1 URBAN AND SECONDARY HIGHWAY DESIGNATIONS

It is appropriate when completing a regional Transportation Plan to discuss the state system in place in the study area. The formal system in place in Flathead County includes both urban roadways and secondary roadways. These roadways are designated through existing Montana statute, the Montana Transportation Commission, and MDT guidelines. Because these roads are Montana systems, the Federal government has no direct involvement in the designations.

Urban and secondary routes are designated by the Montana Transportation Commission, in cooperation with local governing authorities. When revisions to the system are proposed, the Transportation Commission may require that when adding mileage a reasonably equal amount of mileage be removed. This is not an absolute, and situations do exist where mileage is added without a corresponding reduction. With that in mind, to meet eligibility requirements for placement on a system of urban and secondary highways, the following criteria must be met:

- **Secondary Highways** – Highways that have been functionally classified by the Department as either minor arterials or major collectors and have been selected by the Transportation Commission, in cooperation with the boards of county commissioners, to be placed on the Secondary Highway System [MCA 60-2-125(4)]. A list of the secondary routes located in Flathead County can be found in **Table 6.1**.

Table 6.1: Secondary Routes in Flathead County

Secondary Route ID	Roadway Common Designation	Location
S-206	Secondary 206	County
S-209	Secondary 209	Bigfork / County
S-292	Whitefish Stage	Kalispell / County
S-317	Willow Glen Drive / Conrad Drive / Shady Lane	Kalispell
S-424	Twin Bridges Road / Lodgepole Road / Farm to Market Road / Three Mile Drive	Kalispell / County
S-486	North Fork Road / Nucleus Avenue / Railroad Street	Columbia Falls / County
S-487	Big Mountain Road	Whitefish / County
S-503	Foys Lake Road / Foys Canyon Road / Airport Road	Kalispell / County
S-548	W Reserve Drive	Kalispell / County
S-556	Thompson River Road	County

- **Urban Highways** – Highways and streets in and near incorporated cities with populations over 5,000 and within urban boundaries established by the Department, that have been functionally classified as either urban arterials or collectors and have been selected by the Transportation Commission, in cooperation with local government authorities, to be placed on the Urban Highway System [MCA 60-2-125(6)]. A list of the urban routes located in Flathead County can be found in **Table 6.2** on the following page.

Table 6.2: Urban Routes in Flathead County

Urban Route ID	Roadway Common Designation	Location
U-6701	Meridian Road	Kalispell
U-6702	Two Mile Drive	Kalispell
U-6703	Northern Lights Boulevard / Northridge Drive	Kalispell
U-6704	Sunnyview Lane / Grandview Drive	Kalispell
U-6706	Three Mile Drive	Kalispell / County
U-6708	E Reserve Drive	County
U-6710	Evergreen Drive	County
U-6712	Helena Flats Road	County
U-6713	Meridian Road	Kalispell
U-6714	Center Street	Kalispell
U-6715	Conrad Rive / 2nd street	Kalispell
U-6716	4th Street W/E	Kalispell
U-6718	11th Street W/E	Kalispell
U-6719	Oregon Street	Kalispell
U-6720	7th Avenue W	Kalispell
U-6721	5th Avenue W/WN	Kalispell
U-6722	1st Avenue W	Kalispell
U-6723	1st Avenue EN/E	Kalispell
U-6724	3rd Avenue EN/E	Kalispell
U-6725	4th Avenue E / 14th Street E	Kalispell
U-6726	Woodland Avenue	Kalispell
U-6728	Whitefish Stage / 7th Avenue EN	Kalispell
U-6729	Flathead Drive	Kalispell
U-6730	Airport Road	Kalispell / County
U-6731	7th Street W	Kalispell / County
U-6732	W Wyoming Street	Kalispell
U-6733	18th Street	Kalispell
U-6734	Willow Glen Drive	Kalispell
U-12001	Big Mountain Road / Lakeshore Drive / Wisconsin Avenue / Baker Avenue	Whitefish / County
U-12002	Baker Avenue	Whitefish

As outlying growth and travel characteristic shifts change conditions in the study area, it is advisable to revisit the urban and secondary highway classifications from time to time. To add or delete a route from the system, a very specific "six-step" process is in place and must be adhered to. This process is as follows:

Step 1 – Requests for new route designations or changes in existing designations are initiated by the local government. Requests must have the support of local elected officials and local transportation committees (if applicable).

Step 2 – MDT staff reviews the requests to determine whether the routes meet eligibility requirements.

Step 3 – If a route does not meet functional classification eligibility requirements, MDT staff advises the local government about the process for requesting a formal review of the route's functional classification.

Step 4 – If necessary, MDT staff advises the local government about the Montana Transportation Commission policy that requires no significant net changes in secondary and urban highway mileage within the affected county or urban area as a result of designation changes. Local governments may have to adjust their original request to comply with this requirement.

Step 5 – If the proposal meets all eligibility requirements and complies with Transportation Commission policy, MDT staff asks the Transportation Commission to approve the request.

Step 6 – If the Transportation Commission approves the request, MDT staff notifies the affected local governments and makes appropriate changes in MDT records.

6.2 ACCESS MANAGEMENT

Photo 6.1: Multiple close proximity access points along East Reserve Drive.

The population growth experienced by much of Montana has been accommodated in large part by the development of new residential subdivisions on large parcels of rural land. The result has often been a cyclical development pattern where the new development occurs adjacent to established urban areas, which then increases traffic volumes outside the urban area and creates a market for further development to provide for retail and other common services.

Oftentimes, parcels of the new developments are served by individual driveways or systems of cul-de-sacs and dead-end streets connecting directly to the adjacent arterial or collector highway. The result is a large increase in access points along the highway. Allowing this type of access to proliferate can change the function of the adjacent roadways, generally causing a reduction in capacity and an increase in both delay and crashes. In addition, the new developments are often allowed to extend right up to the existing roadway right-of-way limits, resulting in costly complications if the roadway facility is ever to be widened or upgraded in the future. A common practice to limit these safety and encroachment issues is to adopt access management and corridor preservation regulations.

Access management involves systematically controlling the location, spacing, design, and operation of access points such as driveways, minor street connections, median gaps, interchanges, etc. The adoption of access management guidelines provides two major benefits to the transportation system: the preservation of highway capacity and improved safety. Each access point along a facility creates potential conflict points between turning vehicles and through traffic. The fundamental ideas behind access management include limiting the number, spacing, and location of vehicle-to-vehicle conflict points, limiting the speed differentials between turning vehicles and through traffic, and requiring proof of necessity for access. Access management techniques can control the number and location of potential conflicts for drivers, bicyclists, and pedestrians. Reducing the frequency of conflicts should result in fewer crashes, smoother traffic flow, less delay, reduced congestion, and more capacity.

Developers and business owners often fight access control on the basis that restriction of access will drive down property values and reduce the number of available customers. However, studies have shown that the reduced congestion, decreased delay, and increased capacity resulting from responsible access management can actually increase the number of available customers and improve or maintain a positive view of the affected properties. Six basic principles of access management are used to achieve the desired outcome of safer and efficient roadways:

- Maintain a hierarchy of roadways by function.
- Limit direct access on higher function roads.
- Limit the number of conflict points.
- Separate the different conflict points.
- Separate turning volumes from through movements.
- Locate traffic signals to facilitate traffic movement.

6.2.1 Common Access Management Techniques

Access management techniques work to reduce the frequency of potential conflicts for vehicles, pedestrians, and bicyclists. One common approach to access management is to develop minimum design standards that control the location, spacing, and design of access points. Other common access management techniques include limiting access locations, denying access requests, using auxiliary lanes to separate through traffic from vehicles slowing down or accelerating, and restricting some turning movements at intersections and driveways, usually by using non-traversable medians. Standards are generally specified based on the functional classification of roadway, adjacent land use and context. Standards may differ based on functional classification due to the difference in speeds, traffic volumes and intended function. The access control required also differs depending on whether the roadway facility is within an area intended for urban or rural land use. This section contains a list and description of common access management techniques used to establish access control.

- **Access Relocation / Removal** – Common techniques to reduce the number of conflict points include denying, removing, relocating, and consolidating access points. Adding an access to a high-volume, high-speed, major roadway will measurably affect traffic flow and safety. Adding an access onto a low-volume, low-speed, local street will have minimal impact on capacity and a low probability of crashes. If proof of necessity cannot be adequately demonstrated for a proposed access unto a major roadway, then the access permit request may be denied and alternate means of access pursued.

  Existing access points along a major roadway can be removed and relocated to lower-speed, lower-volume roadways where the potential conflict is minimized. Consolidation of access points along a major roadway into a single access point also benefits safety and traffic flow. Common methods to relocate or consolidate accesses include connecting adjacent parking lots, providing internal access for lots fronting major roadways, consolidating multiple driveways into one access, relocating driveways to minor streets, and providing frontage roads adjacent to major roadways.

  Many legal issues can arise when relocating or consolidating accesses, so the use of access management techniques will need to be evaluated carefully on a case-by-case basis. The county would need to work with property owners to come up with an alternate access plan acceptable to both parties. Redevelopment of property and roadway reconstruction projects also provides opportunities to renegotiate access.

- **Access Spacing Standards** – Implementing access spacing standards establishes the minimum distance between access points with the intent of separating potential conflict points involving turning vehicles and through-moving vehicles. Access spacing standards govern the distance between driveways, between unsignalized intersections, and between intersections and the nearest driveway. Access spacing standards will vary based on the functional classification of the adjacent roadway, the desired land use, and the type of access.

  The minimum spacing is sometimes set by calculating the stopping sight distance for the speed of the adjacent roadway. Since this can be a simplistic model of traffic behavior, further studies have calculated the minimum spacing standard by incorporating other factors in addition to stopping distance, such as intersection sight distance, number of right turn movements, spillback rate caused by a turning vehicle, and the ability of vehicles to enter the traffic flow from an access point.

  Setting minimum access spacing is an effective access control technique but can still have its drawbacks. Using the minimum spacing for every consecutive access point can have a cumulative effect of increasing traffic conflict. Any minimum spacing requirement should be exceeded wherever possible. An indirect method to reinforce the minimum access spacing requirements is to require an increased minimum lot frontage on major roadways for all new development.

- **Frontage Roads** – Frontage roads can serve as an access control technique by reducing the frequency and severity of conflicts along the main travel lanes of high volume roadways. Direct access to adjoining property is provided from the frontage road and is generally restricted or prohibited from the main roadway. The restricted access along the main roadway allows for fewer access points with increased spacing. The frontage road then serves to access local land. One drawback of frontages roads is that they may require more circuitous access to developed land and may also complicate the operations at signalized intersections. Special consideration must be given to the design of frontage roads to ensure that the desired results are achieved.

- **Median Alternatives** – Medians are often utilized as access management strategies to create space between full-movement access points, restrict some turning movements at access points, and facilitate auxiliary lanes for turning vehicles. A non-traversable median can be installed along a roadway facility to limit the location and spacing of full access points. Access locations can be establishes through the use of median gaps at desired locations.

Photo 6.2: Raised median restricts access at desired locations.

  Controlling the location of median gaps is an effective way to limit disruptive left-turn movements into and out of access points to only those spots designed for turning vehicles. All other mid-block access points would be restricted to right-turn only movements, reducing dangerous cross-traffic movements. Eliminating mid-block left-turn movements forces traffic to use the nearest median gap or intersection for an alternate access route or U-turn movement. Utilizing non-traversable medians to discourage turns into or out of access points can greatly increase safety and enhance traffic flow, but is often an unpopular access control technique in business areas. Coordination with property owners may be needed to ensure an alternate access route is available for those properties whose turning movements are being restricted.

Medians can also be used to provide for protected left-turn movements. The type of median used to protect left-turn movements can either be traversable (usually two-way left-turn lanes) or non-traversable (usually raised medians). Providing left-turn lanes removes the vehicles slowing and turning into access points from the through traffic, thereby reducing the risk of crashes, decreasing delay, and improving traffic flow. Further discussion of turn lanes is included in this section.

- **<u>Property Access Restriction</u>** – Often, regulating access location is accomplished by restricting each parcel to a specific number of access points, typically one. Once access control is established, additional accesses are prohibited. If a parcel is further subdivided, the new lots would have to share the single permitted access point. Denying major roadway access would force developments to provide internal lot access and utilize minor street networks or other pre-approved access roads. Doing so would encourage a connected street system with residential access served by low-volume neighborhood streets rather than major arterials or collectors. Restricting major roadway access promotes the construction of shared driveways, frontage roads, and connected neighborhood streets, and would help to limit the number of cul-de-sacs, single driveways, and dead-end streets. The higher speeds and traffic volumes on major roadways amplify the effects of adding access points.

  Another common access management technique is to restrict the type of access allowable. Typically, a full-movement access allows for left and right-turn movements both into and out of the access. Limiting access to instead be restricted-movement, allowing for right-turn movements only, reduces the number of disruptive left-turn movements and improves safety. Restricted-movement accesses are often required where medians are utilized and in between traffic signals in high-volume urban areas. They can also be required for any secondary access point, where a full-movement access already exists or has been relocated to a minor roadway. On any MDT controlled facility attention needs to be given to the statutory process in implementing access control.

- **<u>Turn Lanes</u>** – The addition of turn lanes can be an effective access management technique as it provides auxiliary lanes, normally left or right-turn lanes, which separate through traffic from vehicles slowing and turning. Separating traffic turning from through traffic reduces the speed differentials that can increase the risk of crashes and increase delay, thereby improving safety and increasing capacity.

Photo 6.3: Two-way left-turn lanes remove turning vehicles from the main travel lane thereby reducing speed differentials and potential conflicts.

  Turn lanes alone do not serve to limit or restrict access, but work to remove the speed differentials and traffic flow impacts caused by access points. Turn lanes are often managed as a separate lane or traversable median, such as a two-way left-turn lane, or are incorporated as turning bays within non-traversable medians, which allow for turning movements only at specific locations and restrict movements at all other access points. Refer to the discussion of median alternatives for more information.

- **Traffic Signal Spacing** – The spacing and design of traffic signals can play a role in access management. Signalized intersections should generally be designed to favor through movements and be spaced uniformly to maintain optimal signal timing and progression. The installation of traffic signals can assist access management by establishing the location and spacing of major access points. The signalized access points allow for protected movements to and from these accesses. Signal design and timing operation often incorporate access management techniques involving turn lanes and medians to efficiently remove potential conflicts between turning and through traffic.

  The intermediate access points between signalized accesses are regularly required to be restricted-movement accesses, with non-traversable medians or right-turn only medians forcing left-turn movements to the signalized locations only. Where possible, attempts can also be made to relocate the mid-block access points to provide access onto the signalized cross street rather than the adjacent roadway. In situations where relocation is not a viable option, efforts should instead be made to consolidate mid-block accesses to reduce the potential conflict points.

6.2.2 Rural vs. Urban Access Management

Appropriate access management techniques may differ greatly based on whether the area in consideration is an urban area or a rural area. Urban areas experience high traffic volumes and often have densely packed developments directly adjacent to the roadway. If access control regulations do not currently exist for established urban areas, then the bulk of the access management techniques adopted will be techniques to reduce the effects of closely-spaced existing access points, such as adding turn lanes and medians or restricting, relocating, and consolidating access. The potential legal issues involved with relocating or closing an existing access point can be substantial and can make accomplishing the goals of the new access management regulations a long and drawn-out process.

Photo 6.4: Columbia Falls Stage has multiple access points in close proximity to each other.

Generally, rural areas have lower traffic volumes and less dense development patterns. In most situations, this allows for access management techniques that deal more with preventing the closely-spaced access points seen regularly in urban areas rather than mitigating the effects of such dense development. Regulations governing the spacing, location, number, and operation of access points along a facility can usually be established before extensive development has occurred to limit the addition of new access points.

Establishing access management standards in rural areas will force new developments to implement shared driveways, frontage roads, and driveways connected to minor street networks to gain access. However, in those rural areas where properties are closely-spaced or development has already occurred, techniques involving turn lanes and relocating or consolidating access points may still be necessary for effective access management.

Extensive development can quickly turn a rural area into an urban area. Having access management regulations in place before such development occurs can preserve traffic flow and prevent legal battles over relocating or consolidating access points. The need for access management techniques involving turn lanes, medians, and traffic signals will often increase as the rural area begins to see traffic flows of an urban setting.

6.2.3 Corridor Preservation Measures

Corridor preservation is the process of preventing or minimizing development along a defined transportation corridor through the use of building setback standards and local guidelines. The primary function of a transportation corridor is to serve the needs of through traffic, with a secondary importance of addressing potential future land development and transportation improvements along the corridor. The corridors, both existing and future, may house a wide array of transportation improvements including roadways, bikeways, multi-use trails, equestrian paths, high occupancy vehicle lanes, fixed-rail lines and more. Access management helps to preserve the safety and efficiency of transportation facilities while corridor preservation measures ensure that new development along planned transportation corridors is located and designed to accommodate potential future transportation facilities. Corridor preservation is important because it helps to ensure that a transportation system will effectively and efficiently serve existing and future traffic needs while minimizing costly and difficult land acquisitions. Corridor preservation policies, programs and practices provide numerous benefits to communities, taxpayers, and the public at large.

Some common corridor preservation benefits include, but are not limited to, the following:

- **Reducing transportation costs by preservation of future corridors in an undeveloped state.** By acquiring or setting aside right-of-way well in advance of construction, the high cost to remove or relocate private homes or businesses is eliminated or reduced.

- **Enhancing economic development by minimizing traffic congestion and improving traffic flow, saving time and money.** Reducing traffic congestion can have many beneficial impacts to both businesses and consumers, such as improved travel time, lower fuel costs, and reduced pollution levels.

- **Increasing information sharing so landowners, developers, engineers, utility providers, and planners understand the future needs for developing corridors.** An effective corridor preservation program ensures that all involved parties understand the future needs within a corridor and that state, local, and private plans are coordinated.

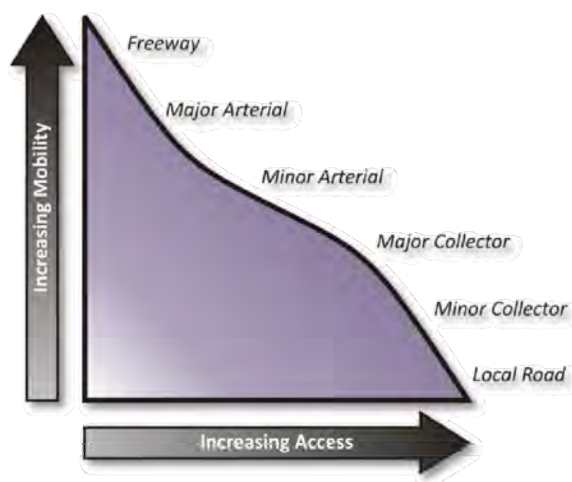
- **Preserving arterial capacity and right-of-way in growing corridors.** The use of appropriate access management techniques to reduce traffic conflicts can improve traffic flow and preserve or increase capacity along arterial facilities. When it is necessary, arterial capacity can be added before it becomes cost prohibited by preserving right-of-way along growing transportation corridors.

- **Minimizing disruption of private utilities and public works.** Corridor preservation planning allows utilities and public works providers to know future plans for their transportation corridor and plan accordingly.

- **Promoting urban and rural development compatible with local plans and regulations.** The state and local agencies must work together closely to coordinate their efforts. Effective corridor preservation will result in development along a transportation corridor that is consistent with local policies.

6.2.4 Recommendations

It is recommended that local government adopt a set of *Access Management Regulations* through which the need for access control can be evaluated on a case-by-case basis. Transportation systems for communities, regions, and states are made up of networks of many different roadway types that perform different functions, ranging from freeways to local residential streets. The access control guidelines developed should reflect and maintain this hierarchy of roadway facilities. Access should be granted based on necessity and roadway function. Normally, a higher functional classification of roadway will result in limited access with greater spacing requirements between access points, while a lower classification allows for more densely packed access points.



Graphic 6.1: Functional Highway Hierarchy

For roadways on the State system and under the jurisdiction of the Montana Department of Transportation (MDT), an access control plan which defines minimum access point spacing, access geometrics, etc., is developed by MDT for each controlled access roadway project based on roadway function and adjacent land use. MDT and the Transportation Commission may implement appropriate engineering standards and procedures to manage access on highways to help protect public health, safety, and welfare on state highways.

For other roadways (non-State), the adoption of an access management system based upon the functional classification and adjacent land use of the roadway may be desirable. These local regulations should serve to govern the location, minimum spacing, and operation of driveways, minor street connections, median openings, and other access points along a given roadway in an effort to fit the roadway into the context of the adjacent land uses and roadway purpose. The preparation and adoption of a local *Access Management Ordinance* should be pursued that can adequately document the local government's desire for minimum standards.

It is also recommended that a *Corridor Preservation Ordinance* be adopted as well. Such an ordinance would serve to establish criteria for new corridor preservation policies to protect future transportation corridors from development encroachment by structures, parking areas, or drainage facilities (except as may be allowed on an interim basis). The ordinance could establish criteria for providing right-of-way dedication and acquisition while mitigating adverse impacts on affected property owners.

6.3 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) measures came into being during the 1970s and 1980s in response to a desire to save energy, improve air quality, and reduce peak-period congestion. TDM strategies focused on identifying alternates to single occupant vehicle use during commuting hours. Therefore, such things as carpooling, vanpooling, transit use, walking and bicycling for work purposes are most often associated with TDM. Many of these methods were not well received by the commuting public and therefore, provided limited improvement to the peak-period congestion problem. Due to the experiences with these traditional TDM measures over the past few decades, it became clear that the whole TDM concept needed to be changed. TDM measures that have been well received by the commuting public include flextime, a compressed workweek, and telecommuting. In addition to addressing commute trip issues, managing demand on the transportation system includes addressing traffic congestion associated with special events and other large cultural or sporting events. A definition of TDM follows:

> *TDM programs are designed to maximize the people-moving capability of the transportation system by increasing the number of persons in a vehicle, or by influencing the time of, or need to, travel. (FHWA, 1994)*

Since 1994, TDM has been expanded to also include route choice. A parallel arterial with excess capacity near a congested arterial can be used to manage the transportation system to decrease congestion for all transportation users. In Montana, an excellent model for TDM strategies can be found by examining the Missoula Ravalli Transportation Management Association (MRTMA).

Although growth trends have slowed, population in Flathead County is projected to grow over the next 20 years. The accompanying expansion of transportation infrastructure is expensive and usually lags behind growth. Proper management of demand now will maximize the existing infrastructure usability and delay the need to build more expensive additional infrastructure. TDM is an important and useful tool to extend the useful life of a transportation system. It must be recognized that TDM strategies aren't always appropriate for certain situations and may be difficult to implement. As areas such as Flathead County grow, the increase in number of vehicles and travel demand may be accommodated by a combination of road improvements; transit service improvements; bicycle and pedestrian improvements; and a program to reduce travel (vehicle trips and the vehicle miles traveled) via transportation demand management in conjunction with appropriate land use planning. This section of the Transportation Plan describes a variety of common TDM measures.

TDM measures can also be applied to non-commuter traffic and are especially easy to adapt to tourism, special events, emergencies, and construction. The benefits to these traffic users are similar to those for commuters, and are listed as follows:

- Better transportation accessibility;

- More transportation reliability;
- More, and timelier, information;
- A range of route choices; and
- Enhanced transportation system performance.

These changes allow the same amount of transportation infrastructure to effectively serve more people. They acknowledge and work within the mode and route choices that motorists are willing to make, and can encourage a sense of community. Certain measures can also increase the physical activity of people getting from one place to another. Alerting the traveling public of disruptions in the transportation system caused by construction or vehicle crashes can manage demand and provide a valuable service to the traveling public. Overall, congestion can be avoided or managed on a long-term basis through the use of an integrated system of TDM strategies.

6.3.1 List of TDM Strategies

TDM strategies, which are being used at other locations in the United States, include:

- **Flextime** – When provided by employers, flextime allows workers to adjust their commuting time away from the peak periods. This means that employees are allowed some flexibility in their daily work schedules. For example, rather than all employees working 8:00 to 4:30, some might work 7:30 to 4:00, and others 9:00 to 5:30. This provides the workers with a less stressful commute, allows flexibility for family activities and lowers the number of vehicles using the transportation system during peak times. This in turn can translate into reduced traffic congestion, support for ride sharing and public transit use, and benefits to employees. Flextime allows commuters to match their work schedules with transit and ride share schedules, which can significantly increase the feasibility of using these modes. Costs for implementing this type of TDM strategy can include increased administrative and management responsibilities for the employer, and more difficulty in evaluating an employee's productivity.

- **Alternate Work Schedule** – A related but more expansive strategy is to provide an alternate work schedule. This strategy involves using alternate work hours for all employees. It would entail having the beginning of the normal workday start at a time other than 8:00 a.m. For example, starting the workday at 7:30 a.m. would allow all employees to reach the work site in advance of the peak commute time. Additionally, since they will be leaving work at 4:30 p.m., they will be home before the peak commute time, and have more time in the evening to participate in family or community activities. This can be a very desirable side benefit for the employees. This has a similar effect on traffic as flextime, but does not give individual employees as much control over their schedules.

- **Compressed Work Week** – A compressed work week is different from offering "flextime" or the "alternate work schedule" in that the work week is actually reduced from the standard "five-days-a-week" work schedule. A good example would be employers giving their workers the opportunity to work four ten-hour days a week. A compressed work week reduces commute travel (although this reduction may be modest if employees take additional car trips during non-work days or move farther from worksites). Costs for implementing this type of TDM strategy may be a reduction in productivity (employees become less productive at the end of a long day), a reduction in total hours worked, and it may be perceived as wasteful by the public (for example, if staffing at public agencies is low on Fridays).

- **<u>Alternate School Schedule</u>**– Opportunities exist to reduce congestion by altering the schedules of local schools. Staggering school start/end times to miss peak travel periods, going to four day school weeks, and providing bus service to small rural schools can all be considered TDM strategies that help to lower the number of vehicles using the transportation system during peak times.

- **<u>Telecommuting</u>** – Telecommuting in the work place offers a good chance to reduce the dependence to travel to work via car or bus. This is especially true in technical positions and some fields in the medical industry (such as medical transcription). Telecommuting is usually implemented in response to an employee request, more so than instigated by the employer. Since telecommuting reduces commute trips, it can significantly reduce congestion and parking costs. It is highly valued by many employees and tends to increase their productivity and job satisfaction. Costs associated with this TDM strategy include increased administrative and management responsibilities, and more difficult evaluation of employee productivity. Some employees find telecommuting difficult and isolating. Telecommuting also may reduce staff coverage and interaction, and make meetings more difficult to schedule. Many employers in Montana have tried and currently allow some form of telecommuting.

- **<u>Ride Sharing (carpooling)</u>** – Carpooling is traditionally one of the most widely considered TDM strategies. The idea is to consolidate drivers of single occupancy vehicles (SOV's) into fewer vehicles, with the result being a reduction in congestion. Ride sharing is generally limited to those persons whose schedules are rigid and not flexible in nature. Studies have shown that ride sharing is most effective for trips greater than ten miles in each direction. Aside from the initial administrative costs of set-up and marketing, ride sharing would a fairly inexpensive strategy. However, it may encourage urban sprawl by making longer-distance commutes more affordable.

  Transit agencies sometimes consider ride sharing as competition that reduces transit ridership. Ride sharing is a strategy that would work within the Flathead County area, especially if set up through the larger employers. An extensive public awareness campaign describing the benefits of this program would help in selling it to the general public.

- **<u>Vanpooling</u>** – Vanpooling is a strategy that encourages employees to utilize a larger vehicle than the traditional standard automobile to arrive at work. Vanpooling generally does not require the high levels of subsidy usually associated with a fixed-route or demand-responsive transit service. The van is typically provided by the employer, or a vanpool brokerage agency, that provides the insurance. The upfront costs of a vanpooling program include any marketing or set-up expenses, the van, and the insurance. Routes and fees can often times be designed to be self-sufficient.

- **<u>Bicycling</u>** – Bicycling can substitute directly for automobile trips. Communities that improve cycling conditions often experience significant increases in bicycle travel and related reductions in vehicle travel. Even a one percent shift in travel modes from vehicle trips to bicycle trips can be viewed as a positive step for Flathead County. Although this may not be a measurable statistic pertinent to reducing congesting, providing increased bicycling opportunities can help and can also contribute to quality of life issues. Bicycling characteristics within the Flathead County area are primarily recreational in nature; however, a gradual shift to bicycling as a commuter mode of travel is being realized throughout the nation and western Montana. Actions needed to increase bicycle usage as a TDM strategy may include: construction improvements to bike paths and bike lanes; correcting specific roadway hazards (potholes, cracks, narrow lanes, etc.); development of a more connected bikeway street network; development of safety education, law enforcement, and encouragement programs; and the solicitation and addressing of bicycling security/safety concerns. Potential costs of this TDM strategy are expenses associated with creating and maintaining the bikeway network, potential liability, accident risks (in some cases), and increased stress to drivers.

- **Walking** – Walking as a TDM strategy has the ability to substitute directly for automobile trips. A relatively short non-motorized trip often substitutes for a longer car trip. For example, a shopper might choose between walking to a small local store versus driving a longer distance to shop at a supermarket. Actions to encourage walking in a community can include: making improvements to sidewalks, crosswalks, and paths by designing transportation systems that accommodate special needs (including people using wheelchairs, walkers, strollers and hand carts); providing covered walkways, loading, and waiting areas; improving pedestrian accessibility by creating location-efficient, clustered, mixed land use patterns; and soliciting and addressing pedestrian security/safety concerns. Costs are similar to that of bicycling and are generally associated with program expenses and facility improvements.

- **Park & Ride Lots** - Park and ride lots are effective for areas with substantial suburb to downtown commute patterns. Park and rides consist of parking facilities at transit stations, bus stops, and highway on-ramps, particularly at the urban fringe, to facilitate transit and ride share use. Parking is generally free or significantly less expensive than in urban centers. Costs are primarily associated with facility construction and operation.

- **Car Sharing** – Car sharing is a demand reducing technique that allows families within a neighborhood to reduce the number of cars they own and share a vehicle for the limited times when an additional vehicle is absolutely essential. Costs are primarily related to creation, startup, and administrative costs of a car sharing organization.

- **Traditional Transit** – Traditional transit service is an effective TDM strategy, especially in urban environments. Several methods to increase transit usage within the community are to improve overall transit service (including more service, faster service, and more comfortable service), reduce fares and offer discounts (such as lower rates for off-peak travel times or certain groups), and improved rider information and marketing programs. The costs of providing transit depend on many factors, including the type of transit service, traffic conditions, and ridership. Transit service is generally subsidized, but these subsidies decline with increased ridership because transit services tend to experience economies of scale (a 10% increase in capacity generally increases costs by less than 10%). TDM strategies that encourage increased ridership can be very cost effective. These strategies may include offering bicycle carrying components on the transit vehicle, changing schedules to complement adjacent industries, etc.

- **Express Bus Service** – Express bus service as a TDM strategy has been used by larger cities in the nation as a means to change driver vehicle characteristics. The use of an express bus service is founded on the idea that service between two points of travel can either be done faster or equal to the private automobile (or a conventional bus service that is not "express").

- **Installing/Increasing Intelligent Transportation Systems (ITS)** – The use of ITS (Intelligent Transportation System) methods to alert motorists of disruptions to the transportation system will be well received by transportation users and is a highly effective tool for managing transportation demands.

- **Ramp Metering** – Ramp metering has been used by some communities and consists of providing a modified traffic signal at on-ramps to interstate highway facilities. The use of this TDM strategy would not be applicable to Flathead County.

- **Traffic Calming** – Traffic calming refers to various design features and strategies intended to reduce vehicle traffic speeds and volumes on a particular roadway. Traffic calming projects can range from minor modifications of an individual street to comprehensive redesign of a road network. Certain traffic calming measures can serve as TDM strategies in that they can alter and/or deter driver characteristics. Costs of this TDM strategy include construction expenses, problems for emergency and service vehicles, potential increase in drivers' effort and frustration, and potential problems for bicyclists and visually impaired pedestrians. Refer to **Chapter 5** for a discussion on traffic calming measures.

- **Identifying and Using Special Routes and Detours for Emergencies or Special Events** – This type of TDM strategy centers around modifications to driver patterns during special events or emergencies. Alternate routes and detours for emergencies can typically be completed with intensive temporary signing or traffic control personnel. Temporary traffic control via signs and flaggers could also be implemented to provide a swift and safe exit after special events.

- **Linked Trips** – This strategy entails combining trips into a logical sequence that reduces the total miles driven on the surrounding transportation system. These trips are generated by facilities within a mixed-use development or within an area where adjacent land uses are varied, and offer services that would limit the need to travel large distances on the transportation system.

- **Higher Parking Costs for Single Occupant Vehicles (SOV)** – Intuitively, free parking provided by employers is a tremendous incentive for driving alone. If the driver of a SOV is not penalized in some form, there is no perceived reason not to drive to the workplace. One way to counter this reality is to charge a higher price for parking for the SOV user. This implementation is not likely to have much of an impact to the frequency of SOV users on the transportation system.

- **Preferential Parking for Rideshare/Carpool/Vanpools** – This concept ties into the discussion above regarding parking of the SOV user. Preferential parking, such as delineating spaces closer to an office for riders sharing their commute or reduced/free parking, can be an effective TDM strategy.

- **Subsidized Transit by Employers** – A subsidized transit program, typically offered by employers to their employees, consists of the employer either reimbursing or paying for transit services in full as a benefit to the employee. This usually comes in the form of a monthly or annual transit pass. Studies show that once a pass is received by an employee, the tendency to use the system rises dramatically.

- **<u>Guaranteed Ride Home (GRH) Programs for Transit Riders</u>** –The guaranteeing of a ride home for transit users is a wise choice for all transit systems, since it gives the users a measure of calm knowing that they will be able to get home. A GRH program provides an occasional subsidized ride to commuters who use alternative modes, for example, if a bus rider must return home in an emergency, or a carpooler must stay at work later than expected. This addresses a common objection to the use of alternative modes. GRH programs may use taxies, company vehicles, or rental cars. GRH trips may be free or they may require a modest co-payment. The cost of offering this service tends to be low because it is seldom actually used.

- **<u>Mandatory TDM Measures for Large Employers</u>** – Some areas encourage large employers (typically with at least 50 to 100 employees) to mandate TDM strategies for their employees. This is a control that can be required by local governments of developers, employers, or building managers. The regulatory agencies often times provide incentives for large employers to make TDM strategies more appealing, such as reduced transit fares, preferred parking, etc.

- **<u>Required Densification / Mixed Use Elements for New Developments</u>** – Requiring new developments to be dense and contain mixed-use elements will ensure that these developments are urban in character and have some services that can be reached by biking, walking or other non-automobile methods. As new developments are proposed, local and regional planners have the opportunity to dictate responsible and effective land use to encourage "shared" trips and reduce impacts to the surrounding transportation system.

- **<u>Transit Oriented Development (TOD)</u>** – Transit Oriented Development (TOD) refers to residential and commercial areas designed to maximize access by transit and non-motorized transportation, and with other features to encourage transit ridership. A TOD usually consists of a neighborhood with a rail or bus station, surrounded by relatively high-density development, with progressively lower-density spreading outwards. Transit Oriented Development generally requires about seven residential units per acre in residential areas and twenty-five employees per acre in commercial centers to adequately justify transit ridership. Transit ridership is also affected by factors such as employment density and clustering, demographic mix (students, seniors, and lower-income people tend to be heavy transit users), transit pricing and rider subsidies, and the quality of transit service. Features could be built into a given development to encourage transit use from the start, and at the same time could be incorporated into the funding source available to Eagle Transit to help offset costs associated with new service.

- **<u>Alternating Directions of Travel Lanes</u>** – This method of TDM is similar to that of traffic calming in that it strives to change driver characteristics. It can serve to relieve a corridor during particularly heavy times of the day or during special events by switching the direction of travel in specified lanes so that they coincide to the direction that the majority of traffic is headed.

By capitalizing on the use of these options, the existing vehicular infrastructure can be made to function at acceptable levels of service for a longer period of time. Ultimately, this will result in lower per year costs for infrastructure replacement and expansion projects, not to mention less disruption to the users of the transportation system.

While some of these options may work well in Flathead County, it is clear that some may be inappropriate. Some of these options are more effective than others. To provide a TDM system that is effective in managing demand, a combination of these methods will be necessary. The voluntary employer programs, bicycle/pedestrian improvements, transit system development, and land use strategies are insufficient to completely avoid the need for key roadway capacity expansion projects, but may help defer the need for construction for a period of time. The highest priority should be the implementation of the non-motorized improvements. Non-motorized transportation is limited in Montana by our climate, but even a modest reduction in vehicle trips during certain times of the year would avoid the need for certain capacity enhancements. Supportive of congestion relief, air quality improvement, and regional mobility goals, TDM should be implemented on an incremental basis to test and evaluate the effectiveness and acceptability of the strategies analyzed in this Plan.

6.3.2 County-Specific TDM Strategies

Most of the TDM strategies listed previously were primarily developed for urban traffic conditions and many may not be appropriate for countywide application due to the rural nature of much of Flathead County. Travel distances are often longer than what would be encountered in a larger urban area. Flathead County has a large amount of rural commuter traffic into cities such as Kalispell, Whitefish, and Columbia Falls. A limited number of TDM strategies, such as ride sharing, telecommuting, and park and ride lots could be implemented to help save energy, improve air quality, and reduce peak-period congestion resulting from commuter traffic.

The application of TDM strategies to non-commute trips, however, is somewhat problematic. For example, one cannot really telecommute to the grocery store or walk long distances to go to dinner. There are some TDM strategies, such as parking taxes and bicycle improvements, which can influence all travel markets. Normally, the most successful TDM programs are considered those that are employer-supported. Employer-based transit incentives would not be applicable to most of Flathead County. Transit strategies would mainly be confined to urban centers and cities, although some form of transit or ride sharing strategy could possibly be developed for those who travel between the cities (i.e. Kalispell to Whitefish) regularly. Employers offering ride sharing and vanpooling incentives would also be a feasible strategy, but the spread-out nature of most the rural communities may make its application undesirable to some employees.

Of the TDM strategies defined previously, those most applicable to Flathead County are:

- Ride Sharing (carpooling)
- Vanpooling
- Park & Ride Lots
- Telecommuting
- Bicycling
- Installing/Increasing Intelligent Transportation Systems (ITS)
- Higher Parking Costs for Single Occupant Vehicles (SOV)
- Flextime
- Alternate Work Schedule
- Compressed Work Week
- Alternate School Schedule

6.4 COMPLETE STREETS

A complete street is one that is designed and operated to safely accommodate all users, including but not limited to: motorists, pedestrians, bicyclists, transit, and people of all ages and abilities. A complete streets philosophy encourages transportation agencies to encompass users of all types and to promote safe access and travel for the users. Complete streets ensure that the streets are safe for all users.

Photo 6.5: Complete street accommodating all users.

A complete street is comprised of many different elements. These elements may include, but are not limited to: sidewalks, bike lanes, crosswalks, wide shoulders, medians, bus pullouts, special bus lanes, raised crosswalks, audible pedestrian signals, sidewalk bulb-outs, and more. The elements that are used can vary from project to project, but the end result is still to achieve a connected network that is safe and effective for all modes of travel.

Traditional planning and design projects typically begin with vehicle related problems: high ADT's, increased delay, deteriorating LOS, etc. The performance or function of bicyclists, pedestrians, or transit often is not measured or analyzed. In addition, the functional classification of a roadway is also aimed toward vehicles and their mobility. The standard functional classification system is traditionally used to help dictate the design features for each roadway. The design of arterials, for example, emphasizes operating speed, flow, and vehicle capacity. This approach leads to other design requirements that stress access management, wider lane widths, increased turning radii and minimum interference with traffic movements. The result may create large urban roadways which divide neighborhoods, destroy local businesses, and promote urban sprawl.

Photo 6.6: The shared-use path along Whitefish Stage helps accommodate non-motorized users.

While the concept of complete streets seems to relate mostly to urban road designs, the philosophy can also be applied to rural roadways. It may be unlikely that a rural roadway will experience the same amount of bike/ped traffic that is seen along urban roads, care should still be taken to provide appropriate non-motorized accommodations along rural roads. It may not be necessary to install sidewalks and bike lanes along rural roads; however, providing additional shoulder width or constructing a shared-use path can serve as lower cost alternatives to accommodating non-motorized users.

The idea of complete streets is a large-scale philosophy that focuses on road users and multimodal accommodations. The intent is to change the thought processes of transportation agencies by ensuring that multimodal transportation considerations are included in every stage of the planning and design process. The ultimate aim is to create a complete and safe transportation network for all modes of travel.

6.4.1 CONTEXT SENSITIVE SOLUTIONS

While the idea of complete streets applies to an entire transportation system, context sensitive solutions (CSS) is a project specific process aimed at designing a road that fits into the context of that area. This is achieved by involving all stakeholders and the public in the earliest phases of the project. Context sensitive designs incorporate a multidisciplinary design team. Residents, business owners, local institutions, city officials, and designers all have a part in the design and implementation of CSS. Addressing these needs in the early stages can save valuable time and money in the development process and can help to achieve a widely accepted product.

CSS balance safety, mobility, community, and environmental goals. The idea is to achieve a design that works for all of the users and for the area. CSS focus not only on moving traffic, but also on pedestrians, bicycles, transit, and aesthetic issues. A properly constructed road will be safe for all users, regardless of their mode of travel which allows flexibility for its users when choosing their travel type.

Under CSS, projects would also be designed with the context of the area in mind. Areas with historical value would see projects that utilize aesthetic touches to help preserve the historic feel and look. Areas with dense foliage would have the same types of trees and bushes planted in the area. Design flexibility is another key component to CSS. Road designers are allowed to have flexibility to tailor the design to the specific context. CSS help blend roadways and networks into the area giving them a more natural appeal.

Below is an example of CSS being applied to Lyndale Avenue on US Highway 12 in Helena. The before photo shows a deteriorating roadway with a raised median, sidewalk, limited shoulder space, and poor aesthetic appeal. The after photo shows a context sensitive roadway that implements a landscaped raised median, larger shoulder area, sidewalk, updated guardrail, bicycle and pedestrian underpass, and updated lighting. This roadway now adds greater aesthetic value to the Great Northern Town Center area of Helena.

Photo 6.7: Lyndale Avenue before reconstruction.

Photo 6.8: Lyndale Avenue after CSS reconstruction.

6.5 GRAVEL TO PAVEMENT PROGRAM

The goal of a road management system is to improve all roads and streets as possible with the funds available by using good management practices. A particular road is only one of many in the road system. Careful evaluation of each roadway and the countywide road system as a whole is important in ensuring funds are used to the fullest advantage.

Paved and unpaved roads each have their advantages and disadvantages. The following list of benefits of both paved and unpaved roads apply to properly constructed and maintained roads:

Paved Roads:

- Protect the subgrade by transporting all water off of the surface
- Eliminate dust and spring mud
- Accommodate heavy trucks and higher ADT
- Improve winter surface
- Provide a smoother and safer ride
- Long-term lower maintenance cost

Unpaved Roads:

- Have a lower construction cost for very low volume roads
- Generate lower vehicles speeds
- Can usually be maintained and repaired within the county Road Department's capabilities

The decision to pave a County roadway, or to leave the gravel surfacing, is a function of several issues. In addition to the actual roadway capacity of paved versus unpaved facilities, other issues such as air quality, sediment control, cost, travel speeds and safety all can affect recommendations to pave a roadway. Below is a discussion of factors to consider when evaluating paving a road.

- **Roadway Capacity** – Upon researching other counties' and states' policies, no clear cut guidance on when to pave a gravel road was found. The average daily traffic volumes (ADT) used to justify paving a roadway generally ranged from 50 vehicles per day to 400 vehicles per day. The type and weight of the vehicles should be considered along with the traffic volumes. As ADT and truck use increases, the maintenance of the gravel road may become more costly and less effective than paving the road.

- **Air Quality** – The Environmental Protection Agency (EPA) defines an emissions factor as "a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant". Under the Clean Air Act of 1970, EPA developed primary and secondary National Ambient Air Quality Standards (NAAQS) for seven criteria, two of which are particulate matter and fine particulate matter. These standards establish acceptable emissions levels. Monitoring devices have been placed at specific locations to measure specific airborne pollutants and to determine if standards are being exceeded. Montana has also adopted their own state air quality standards, the Montana Ambient Air Quality Standards (MAAQS), to establish statewide standards of acceptable amounts of ambient air pollution.

Photo 6.9: Vehicles create dust along unpaved county roads.

The term "fugitive dust" refers to particulate matter (PM) consisting of very small liquid and solid particles that is suspended in the air by wind or human activities. Particles between 2.5 microns (PM-2.5) and 10 microns (PM-10) are usually associated with fugitive dust from wind-blown sand and dirt from roadways, field, and construction sites. Areas that violate federal air quality standards are designated non-attainment areas. Montana has thirteen official non-attainment areas and eleven of these non-attainment areas are under state jurisdiction. Flathead County has three of these non-attainment areas for particulate matter: Kalispell, Columbia Falls and Whitefish.

From 1998 to 2007, Flathead County received 53 complaints concerning dust from unpaved roads, twice as many as any other county in the state. While paving a roadway would eliminate the fugitive dust emissions, this may not be a cost effective way to deal with the problem. Paving a low volume gravel roadway is ultimately more expensive than simple good maintenance. One way to reduce fugitive dust emissions is to lower speed limits on unpaved roadways. Another is the use of dust control stabilizers such as salts (Calcium Chloride, Magnesium Chloride and Sodium Chloride). However, if traffic volumes are too low, the cost of dust control is difficult to justify.

- **Sediment** – Erosion along unpaved roadways can result in sediment being transported into streams, channels and ditches. While paving the roadway limits the sediment entering the waterways, this may be more cost prohibitive then simple erosion control measures. Paved surfaces prevent water infiltration into the roadway subgrade; therefore, paving over a gravel surface changes the drainage characteristics of a roadway. Accordingly, modifications to the roadway and roadside ditches need to be undertaken to accommodate these new drainage patterns and to eliminate possible erosion and sediment problems.

- **Travel Speeds** – Unpaved roads are intended to operate at low to moderate speeds. According to the American Association of State Highway and Transportation Officials (AASHTO) Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400), the design speed for unpaved roads should be 35 mph or less, but may be as high as 50 mph in appropriate situations. Reducing speeds on unpaved roads to 25 mph will reduce fugitive dust emissions, erosion and increase safety. However, reducing speed limits is only effective if the new limits are complied with or enforced.

- **Safety & Design** – There are no specific guidelines that indicate the maximum traffic volume level for which unpaved roads are appropriate. According to AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400), the safety of unpaved roads was researched in the NCHRP Report 362 and established that crash rates are generally higher for unpaved roads than paved roads for traffic volumes of 250 vehicles per day or more. The NCHRP Project 20-7(75) found that paving roads in rural areas that have a traffic volume ranging from 300 to 350 vehicles would be expected to result in one less severe crash every 10 to 15 years.

  Whether paved or unpaved, roads must have adequate sight distance, alignments, lane width, superelevaton, and roadside section. As paved roads are often subject to higher speeds, geometric features that were adequate for an unpaved road might be inadequate for a paved road. Roadway and bridge widths may need to be increased. Often the gravel base of an unpaved road will need improved before paving. Gravel road bases are often thinner than paved, and the gravel road surface needs to have more fines and plasticity to bind the materials and create a hard riding surface. Such material is inferior as a paving base. These design and safety factors need to be considered in evaluating the most economical and appropriate roads to pave.

- **Vehicle Restrictions** – Limiting the weight and number of vehicles on a road has a direct impact on reducing emissions. Although it isn't always possible to limit use of a roadway, in some circumstances, truck usage could be restricted or banned, or alternate routes could be required for through traffic to limit dust problems on a problematic roadway.

6.5.1 Rating System

A rating system was developed in order to rank the priority of paving a gravel road using roadway capacity, travel speeds, safety, and air quality as criteria as well as other pertinent issues including maintenance costs, residential density, school locations, gathering place locations (i.e. churches, ballparks, etc.), and emergency/snow routes. The criteria should be weighted with the highest level of significance receiving the highest score. Below is a description of each category and the points assigned to each.

- **Roadway Capacity** – Maintaining a road with a higher ADT may eventually become more costly and less effective than paving the road. For roadway capacity the ADT (vehicles per day) along the roadway is the criteria for ranking in this category.

ADT	Points
<50	*0*
51-200	*10*
201-350	*15*
>351	*20*
Total	**20**

- **Travel Speeds** – Travel speeds along unpaved roads should not typically exceed 35 mph. Slower travel speeds on unpaved roads reduced dust emissions and increase the safety of the roadway. The travel speed (mph) along the roadway is the ranking criteria for this category.

Travel Speed	Points
<15	*0*
15-25	*5*
25-35	*10*
>35	*15*
Total	**15**

- **Safety** – Unpaved roads with higher ADT typically have a greater crash rate than unpaved roads with lower ADT. Speed is typically a safety factor on unpaved roads as well. The number of accidents over 10 year period is the ranking criteria for this category.

Accidents	Points
0	*0*
1-5	*5*
6-10	*10*
>10	*15*
Total	**15**

- **Maintenance Cost** – Maintenance cost (per mile) of the roadway including any dust control methods is the ranking criteria for this category. Flathead County is currently developing the Roadway Management Plan that will develop costs associated with maintaining county roads including the gravel roads.

Annual Cost	Points
<$1,000	*0*
$1,000 - $2,000	*5*
$2,001 - $3,000	*10*
$3,001 - $4,000	*15*
>$4,000	*20*
Total	**20**

- **Truck Traffic** – An unpaved roadway that experiences a high truck traffic percent may see a greater amount of dust emission and may have a higher maintenance cost associated with it due to the constant heavy truck load. The percentage of truck traffic that is experienced on the roadway is the ranking criteria for this category.

Truck Traffic	Points
<2%	*0*
3-5%	*3*
>5%	*5*
Total	**20**

- **Schools** – Accounting for schools in the area of an unpaved road is related to safety concerns as well as the high amount of dust emissions the school may experience. Whether or not a school is located within 1000 feet of the roadway is the ranking criteria for this category.

School Present	Points
No	*0*
Yes	*5*
Total	**5**

- **Emergency/Snow Travel Route** – Emergency/Snow routes are considered the best route for a driver to take in an emergency situation or severe winter weather. These roads must be maintained and easy to travel on. Whether or not the roadway is considered an emergency/snow route is the ranking criteria for this category.

Route	Points
No	*0*
Yes	*5*
Total	**5**

- **Gathering Place** – Gathering places such as churches and ball parks in the area of an unpaved road is related to safety concerns as well as the high amount of dust emissions that may be experienced. Whether or not a gathering place such as a church or ball park is located within 1000 feet of the roadway is the ranking criteria for this category.

Gathering Place	Points
No	*0*
Yes	*5*
Total	**5**

- **Residential Density** – Number of homes surrounding the unpaved road related to the maintenance required for the road as well as safety concerns and dust emissions that may experienced in the area. The number of homes per mile within 1000 feet of the roadway is the ranking criteria for this category.

Homes	Points
<5	*0*
6-10	*5*
11-15	*10*
>15	*20*
Total	**20**

A roadway that receives the highest number of points should be given the highest level of importance in determining whether or not to pave. It should be noted that although this method is a consistent way to rank the importance in which a gravel road should be paved, it is ultimately the County's financial stance that will determine whether or not paving will be accomplished. An example spreadsheet that shows the method of assigning points to each roadway is shown in **Table 6.3** on the following page.

The South Dakota Department of Transportation conducted a two-year process to develop the Local Road Surfacing Criteria Study in June of 2004. A computerized tool developed from this study is available through the South Dakota Local Technical Assistance Program (SDLTAP). The ranking process is similar to that described above except the process provides for evaluating different surfacing materials (hot-mix asphalt, blotter, gravel and stabilized gravel) in a computerized program. The program evaluates the agency cost and the user cost of a segment of roadway, then considers other non-economic factors such as political issues, growth rates, mail routes and housing concentration. Should the County desire a computerized rating system, this program might be considered.

Table 6.3: Example Rating Criteria for Paving a Gravel Roadway

Criteria	Point System						
	0 points	3 points	5 points	10 points	15 points	20 points	Total
Roadway Capacity (ADT)	**< 50**			**51-200**	**201-300**	**> 301**	
Points Assigned				*10*			*10*
Travel Speeds (MPH)	**< 15**		**15-25**	**25-35**	**>35**		
Points Assigned			*5*				*5*
Safety (No. Accidents/10 yrs)	**0**		**1-5**	**6-10**	**> 10**		
Points Assigned			*5*				*5*
Maintenance Cost ($)	**< 1,000**		**1,001-2,000**	**2,001-3,000**	**3,001-4,000**	**> 4,000**	
Points Assigned					*15*		*15*
Truck Traffic (%)	**< 2**	**3-5**	**> 5**				
Points Assigned		*3*					*3*
Schools (within 1000')	**NO**		**YES**				
Points Assigned			*5*				*5*
Emergency/Snow Route	**NO**		**YES**				
Points Assigned			*5*				*5*
Gathering Place (within 1000')	**NO**		**YES**				
Points Assigned	*0*						*0*
Residential Density (No. per mile within 1000')	**< 5**		**6-10**	**11-15**		**>15**	
Points Assigned			*5*				*5*
ROADWAY TOTAL							**53**

CHAPTER 7

Facility Recommendations

Chapter 7: Facility Recommendations

7.1 INTRODUCTION

This chapter provides a list of recommendations for facility improvements to the transportation system aimed at addressing current and anticipated future transportation needs. The recommendations are categorized based on the scale of the project determined by the estimated cost. Each section contains a planning level description of the proposed project in addition to a preliminary project cost estimate. These preliminary project cost estimates are "planning level" estimates and do not include allowances for right-of-way, utility, traffic management, or other heavily variable costs.

Photo 1: US Highway 93 south of Kalispell

A number of project recommendations were made in the recently completed Whitefish and Kalispell area Transportation Plans. The Flathead County Transportation Plan does not attempt to recreate or reanalyze those project recommendations made in these recently completed plans. While there is some general overlap between plans, the Flathead Plan attempts to deal with problematic areas specific to Flathead County. The project recommendations made as part of this Plan were specifically aimed at improving issues identified along the twelve study corridors or at the sixteen study intersections described in **Chapter 2**. While some recommendations occur in other areas, this Plan focused on the areas expected to be most affected by future growth.

It should be noted that in general, most county roads are in need of upgrades, maintenance, or reconstruction activities. A number of county roads are deteriorating, in need of paving, lack ideal alignment, or lack adequate capacity. As future development occurs, developmental impact fees should be collected and used to upgrade the affected roads. All future construction and improvements should conform to the latest standards set forth by Flathead County.

7.2 COMMITTED PROJECTS

Committed projects are typically only listed if the project will affect capacity and/or delay characteristics of a roadway facility and/or intersection. This distinction is necessary since some committed improvement projects that are likely to be undertaken within the next five years are not necessarily listed here since they will not have an effect on the traffic model. Committed improvements are only considered if they are likely to be constructed within a five-year timeframe and a funding source has been identified and is assigned to the specific project.

At the time of the preparation of the travel demand model and draft Transportation Plan, there were no identified committed projects that would have a positive or negative effect on the model. However, after publication of the draft Transportation Plan, a portion of the US Highway 93 Bypass was deemed "committed" with construction likely to begin in 2010. This project plans to construct the interim two-lane Bypass between US Highway 93 (south of Four Corners) to US Highway 2 (near Appleway Drive). The interim project will build two-lanes of the future four-lane road. At-grade access at the future Siderius Commons, Airport and Foys Lake roads will be provided through roundabouts.

This portion of the US Highway 93 Bypass project was not included in the existing conditions model due to the uncertainty of available funds at the time the traffic model was created. The completed bypass is shown as an alternate scenario and is included in the future Major Street Network model, however.

7.3 RECOMMENDED TRANSPORTATION SYSTEM MANAGEMENT IMPROVEMENTS

For the purposes of this Plan, an improvement project was classified as a Transportation System Management (TSM) project if the estimated cost of the project was less than $500,000. TSM projects generally include most intersection improvement projects including signalization, turn-lanes, sight distance improvements, and intersection realignments. The location of each TSM project is shown on **Figure 7-1** and **Figure 7-2**.

7.3.1 TSM Recommendations from the Kalispell Area Transportation Plan (2006 Update)

Table 7.1 provides a summary of the recommended TSM projects contained in the *Kalispell Transportation Plan (2006 Update)*. These projects are listed for reference purposes only and are not necessarily considered recommendations as part of this Plan. The project recommendations made in **Section 7.3.2** generally occur along the study corridors and intersections discussed previously in this Plan. The project recommendations made in the Kalispell Plan and other Transportation Plans in Flathead County area were not specifically reanalyzed as part of the *Flathead County Transportation Plan*.

Table 7.1: TSM Recommendations from the Kalispell Area Transportation Plan (2006 Update)

Project ID	Location	Description
KTSM-1	Evergreen Drive / LaSalle Road	▪ Re-align east and west legs of Evergreen Drive ▪ Construct designated eastbound and westbound left-turn lanes ▪ Install curb bulb-outs ▪ Incorporate proper turning radii around all intersection corners
KTSM-2	LaSalle Road / US Highway 2	▪ Add a second designated southbound right-turn lane ▪ Include southbound left-turn phasing ▪ Add designated westbound right-turn lane ▪ Include pedestrian crossings
KTSM-3	Indian Trail Road / US Highway 93 North	▪ Complete a signal warrant study every three years to determine when/if a traffic signal is needed

Project ID	Location	Description
KTSM-4	MT Highway 35 / Helena Flats Road	▪ Restrict southbound left-turns through a channelization island and signing to help reduce "cut-thru" traffic ▪ Sign for "No truck traffic allowed" ▪ Implement after KTSM-2
KTSM-5	3rd Avenue / 4th Avenue Couplet	▪ Change the one-way couplet that currently exists to two-way directional flow on each roadway ▪ Before the modification takes place, study traffic volumes and conduct a neighborhood survey ▪ If problems arise, implement more active traffic calming ▪ Explore the removal of this couplet from the "urban aid system" under the hope of adding a suitable replacement length for newly developing roads in other more pressing areas of the community
KTSM-6	Reserve Drive / Stillwater Road	▪ Construct a modern roundabout ▪ *Completed Summer of 2007*
KTSM-7	US Highway 2 / Woodland Park Drive	▪ Lengthen the westbound left-turn storage bay to accommodate heavy AM peak hour turning movements ▪ Stripe the eastbound shoulder to accommodate a right-turn bay
KTSM-8	Conrad Drive / Willow Glen Drive	▪ Construct a modern urban compact roundabout
KTSM-9	US Highway 93 North / Home Depot Signal	▪ Add westbound and eastbound left-turn lanes ▪ Modify signal timing to include protected eastbound and westbound left-turns
KTSM-10	2nd Street East / Woodland Avenue	▪ Construct a modern urban compact roundabout ▪ Install a temporary roundabout to test the effects before constructing a full-fledged permanent roundabout
KTSM-11	Willow Glen Drive / Woodland Avenue	▪ Remove sight distance obstacles along northwest corner ▪ Provide a pedestrian crossing along the north leg
KTSM-12	18th Street / Airport Road	▪ Re-align intersection to remove the offset currently present
KTSM-13	Main Street (between 9th and 12th Street)	▪ Remove on-street parking and restripe to incorporate four travel lanes ▪ May require minor widening
KTSM-14	US Highway 93 / Northridge Drive	▪ Modify signal phasing to include a designated northbound left-turn phase
KTSM-15	4th Avenue East / 2nd Street East	▪ Modify to incorporate all-way stop-control
KTSM-16	Whitefish Stage Road / West Evergreen Drive	▪ Modify to incorporate all-way stop-control ▪ Construct separated left-turn and right-turn lanes along the eastern leg
KTSM-17	2nd Street East / Conrad Drive / Woodland Park Drive	▪ Install a modern roundabout
KTSM-18	Foys Lake Road / Valley View Drive	▪ Install a modern urban compact roundabout
KTSM-19	N/A	▪ *Not identified*
KTSM-20	South Meridian Road / 7th Street West	▪ Install a modern urban compact roundabout
KTSM-21	South Meridian Road Corridor (Appleway Drive to Center Street)	▪ Construct designated northbound and southbound left-turn lanes ▪ Construct a northbound right-turn lane ▪ Monitor for potential future signalization
KTSM-22	South Meridian Road / 2nd Street West	▪ Install an urban compact roundabout if KMSN-11 is not implemented

Project ID	Location	Description
KTSM-23	Four Mile Drive / W Springcreek Road	▪ Modify as a more conventional four-legged intersection
KTSM-24	Traffic Signal Synchronization (US Highway 93 and US Highway 2)	▪ Revisit traffic signal synchronization and timing plans for US Highway 93 and US Highway 2 at least every three years
KTSM-25	Traffic Impact Study Requirements	▪ Implement standards for developments generating more than 300 vpd to submit a Traffic Impact Study
KTSM-26	Transportation Plan Update Schedule	▪ Conduct a Transportation Plan Update on a five year cycle
KTSM-27	Community-Wide Opticom System Review	▪ Troubleshoot the existing Opticom system and update and revise areas that are inadequate
KTSM-28	County Land Development Issues / Geometric Considerations	▪ Coordinate with developers to identify future corridors, right-of-way needs, and potential mitigation measures

7.3.2 Recommended Transportation System Management Projects

During the preparation of this Plan, a number of TSM projects were identified. The following list of TSM projects are not in any particular order with respect to priority. These projects are recommended to provide capacity, safety, connectivity, traffic control, and/or geometric improvements. An estimated range for project costs is included for each recommended project. These project costs provide "planning level" estimates and do not include allowances for additional right-of-way, utilities, traffic management, or any other heavily variable costs.

TSM-1: **Auction Road / Demersville Road** – Realign this intersection to create a standard three-legged intersection. Auction Road should be reconfigured to intersect Demersville Road at a 90-degree angle. Stop control should be provided along Auction Road. This intersection currently experiences low traffic volumes; however, it is expected that traffic volumes will increase in the future. The current configuration of this intersection creates sharp corners and has limited sight distance. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $50k – $100k

TSM-2: **Batavia Lane / US Highway 2** – The preliminary signal warrant analysis completed for this intersection indicates that a traffic signal may be warranted. It is therefore recommended that this intersection should be analyzed in more detail to determine if a traffic signal or other traffic control device is appropriate. This intersection should also be reconfigured so that Batavia intersects US Highway 2 at a 90-degree angle. Any intersection improvement needs to include appropriate pedestrian accommodations. The shoulder along the southbound lane should be restriped to accommodate a right-turn lane. This intersection currently experiences a failing LOS. Smith Valley School is located along the southwest corner of this intersection and a number of students cross US Highway 2. This project recommendation aims to address safety concerns and the failing LOS at this location. The intent of the project is to increase safety, function, and capacity of this intersection.

Estimated Cost: $350k – $500k (traffic signal and turn-lanes)

TSM-3: **Beach Drive / Holt Drive** – Realign the southern Beach Drive approach leg to intersect Holt Drive at a 90-degree angle. Increase the sight distances and remove the separated right-turn lane to create a standard southern approach leg. This intersection is presently very skewed and ill-defined. Unique challenges exist due to the steep grade of the southern approach along Beach Drive. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $150k – $250k

TSM-4: **Best Way / Truck Route** – This intersection should be modified to ensure that large trucks can be accommodated along all four corners. As traffic volumes increase, this intersection should be analyzed in more detail to determine if the stop control currently being provided along all four legs is still necessary, or if other traffic control measures are needed. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $40k – $60k

TSM-5: **Church Drive / Prairie View Road** – Realign this intersection to flatten the corner along Church Drive and to create a 90-degree intersection with Prairie View Road. Provide stop control along Prairie View Road. The primary movement at this intersection should be along Church Drive. The sight distance, particularly along the southeast corner, should be improved to help increase the visibility at this intersection. This intersection realignment would allow for unobstructed movements for the majority of traffic. An interim project would be to install an advance intersection warning sign along the southern leg of Church Drive. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $200k – $300k (intersection realignment)

TSM-6: **Columbia Falls Stage / Hellman Lane** – Realign this intersection to flatten the southeast corner along Columbia Falls Stage. The northern leg of Hellman Lane should be realigned to intersect Columbia Falls Stage at a 90-degree angle. Provide stop control along Hellman Lame. Trim vegetation along the northeast corner of this intersection to increase the sight distance. This project could be constructed as part of the **MSN-3** recommendation. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $150k – $250k

TSM-7: **Columbia Falls Stage / Kelley Road** – Realign this intersection to flatten the northwest corner along Columbia Falls Stage. The eastern leg of Kelly road should be realigned to intersect Columbia Falls Stage at a 90-degree angle. Stop control should be provided along the eastern leg of Kelley Road. The yield sign that currently exists along the northern leg of Columbia Falls Stage should be removed. The primary movement at this intersection should be along Columbia Falls Stage. This intersection realignment would allow for unobstructed movements for the majority of traffic at this intersection. This project could be constructed as part of the **MSN-3** recommendation. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $150k – $250k

TSM-8: **Columbia Falls Stage / River Road** – It is recommended that this intersection be realigned to flatten the corner along Columbia Falls Stage. The northern leg should be realigned to intersect at a 90-degree angle. Stop control should be provided along the northern leg of Columbia Falls Stage. This intersection has seen a high number of crashes resulting from the sharp curve and high speeds along Columbia Falls Stage / River Road. This project could be constructed as part of the **MSN-3** recommendation. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $100k – $150k

TSM-9: **East Reserve Drive / US Highway 2** – This intersection should be analyzed to determine if turn-lanes are needed along the eastern and western approach legs. Appropriate signal phasing should also be implemented. A high number of crashes have occurred at this location. The close proximity of the Town Pump gas station entrance along the eastern leg likely contributes to the high number of crashes and high congestion levels at this location. Access consolidation should also be considered near this intersection. This project recommendation aims to improve traffic control and capacity at this location. The intent of the project is to increase safety, function, and capacity of this intersection.

Estimated Cost: $350k – $450k

TSM-10: **Fairmont Road / MT Highway 35** – An unsignalized level of service analysis shows that this intersection currently has a failing LOS during the AM and PM peak hours. Recent completion of the Old Steel Bride may affect traffic patterns at this intersection. Therefore, an intersection analysis should be completed to determine if a traffic signal, roundabout or other traffic control device is appropriate. Associated appropriate advance warning signs along MT Highway 35 should be installed as needed based on the traffic control device chosen. This intersection should also be analyzed to determine if turn-lanes along MT Highway 35 are needed and/or can serve as an interim project at this location. It should be noted that during the public comment period of this Plan, a petition to "reinstall traffic light, add left turn lane and lower speed limit" at this intersection was received from the public. The petition consisted of approximately 450 signatures. This project recommendation aims to address safety concerns and the failing LOS at this location. The intent of the project is to increase safety, function, and capacity of this intersection.

Estimated Cost: $400k – $500k (traffic signal and appropriate turn-lanes)

TSM-11: **Foothills Road / Bachelor Grade Road** – Realign the western approach leg of Bachelor Grade Road to intersect Foothills Road at a 90-degree angle. Replace the yield sign that currently exists along Bachelor Grade Road with a stop sign. The yield sign, coupled with the current approach angle of Bachelor Grade Road, gives a false sense of priority to drivers accessing Foothills Road. It is also recommended that appropriate advance intersection warning signs be installed along Foothills Road. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $50k – $100k

TSM-12: **Foothills Road / Jewel Basin Road** – It is recommended that this intersection be realigned to flatten the corner along Foothills Road. The eastern leg of Jewel Basin Road should be realigned to intersect Foothills Road at a 90-degree angle. Vegetation should be trimmed and/or removed along the northwest corner to increase the sight distance. Jewel Basin Road currently intersects Foothills Road along a blind curve creating dangerous conditions. Appropriate advance intersection and curve signs should also be installed along Foothills Road to provide adequate warning for the change in traffic conditions. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $50k – $100k

TSM-13: **Helena Flats Road / East Evergreen Drive** – The vegetation along all corners of this intersection should be kept from restricting sight distance and obstructing traffic control signs. This project recommendation increases sight distance, the intent of which is to increase the safety and function of this intersection.

Estimated Cost: < $15k (general maintenance)

TSM-14: **Helena Flats Road / East Reserve Drive** – The fence along the northwest corner of this intersection should be modified or relocated so that it does not restrict sight distance. The current location of the fence obstructs sight distances for eastbound and southbound vehicles. This project recommendation increases sight distance, the intent of which is to increase the safety and function of this intersection.

Estimated Cost: < $15k (private property)

TSM-15: **Helena Flats Road / MT Highway 35** – It is ultimately recommended that an intersection analysis be completed to determine if a traffic signal, roundabout or other traffic control device is appropriate for this location. This intersection has a high rate of southbound left-turning movements and currently has poor traffic operating characteristics. An interim step, as suggested by the Kalispell Transportation Plan (KTSM-4) might be to restrict southbound left-turns through a channelization island and appropriate signing. This interim project would add traffic to LaSalle Road and should only be completed after a southbound left-turn phase at the intersection of LaSalle Road and US Highway 2 is completed as described in KTSM-2. This project recommendation aims to address safety concerns and the failing LOS at this location. The intent of the project is to increase safety, function and capacity of this intersection.

Estimated Cost: $300k – $450k (traffic signal)

TSM-16: **Hodgson Road / US Highway 93** – This intersection is very difficult to see when traveling west along Hodgson Road due to a steep vertical curve restricting sight distance. It is recommended that as an interim step, advance intersection warning signs be installed along Hodgson Road and US Highway 93. Ultimately, it is recommended that the vertical curve along Hodgson Road be flattened as much as possible to help increase the visibility of the intersection. This project can be completed in conjunction with the **MSN-7** recommendation. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: < $20k (advance intersection warning signs)

TSM-17: **Hodgson Road / Whitefish Stage** – The western leg of Hodgson Road should be realigned to intersect Whitefish Stage at a 90-degree angle. This intersection has experienced a high crash rate. The current skewed configuration causes sight distance constraints and creates a safety hazard. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $50k – $100k

TSM-18: **Kila Road / US Highway 2** – The northern approach of Kila Road should be realigned to intersect US Highway 2 at a 90-degree angle. A westbound left-turn lane should also be installed along US Highway 2 due to the high number of left-turns along this leg. This intersection is currently skewed along Kila Road and presently suffers from a lack of definition and sight distance. Kila School is accessed off of Kila Road in this location. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety, function, and capacity of this intersection.

Estimated Cost: $350k – $500k

TSM-19: **Lake Blaine Road / Foothills Road** – The northeastern corner of this intersection should be flattened and modified to increase the stopping compliance at this intersection. In addition, the yield sign along Lake Blaine Road should be replaced with a stop sign to ensure that drivers along the northern leg stop at this intersection. There is presently a large corner radius along the northwest corner. This, coupled with the yield sign along the northern leg of Lake Blaine Road gives a false sense of priority to drivers traveling south wishing to take a right-turn. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $25k – $50k

TSM-20: **Lower Valley Road / Foys Bend Lane** – The western leg of Foys Bend Lane should be realigned to intersect Lower Valley Road at a 90-degree angle. A stop sign should be installed along Foys Bend Lane in addition to appropriate advance intersection warning signs along Lower Valley Road. A high number of crashes have occurred at or near this intersection. This project recommendation aims to improve geometric conditions and traffic control at this location. The intent of the project is to increase safety and function of this intersection.

Estimated Cost: $50k – $100k

TSM-21: **West Springcreek Road / US Highway 2** – It is recommended that this intersection be analyzed in more detail to determine if a traffic signal, roundabout and/or other improvements are appropriate. This intersection currently has a failing LOS during AM and PM peak hours. A preliminary signal warrant analysis indicates that a traffic signal may be warranted. Appropriate advance intersection warning signs should also be installed as needed dependent upon the traffic control device installed. It should be noted that substantial grading work may also be needed due to the vertical alignments for all legs of this intersection which is not included in the provided planning level cost estimate. This project recommendation aims to address safety concerns and the failing LOS at this location. The intent of the project is to increase safety, function and capacity of this intersection.

Estimated Cost: $350k – $500 (traffic signal)

TSM-22: **West Valley Drive / Three Mile Drive** – Remove existing yield signs along West Valley Drive approach legs and install traffic control signs along Three Mile Drive approach legs. The traffic control signs are presently placed along West Valley Drive which experiences the vast majority of traffic at this intersection. It would be better suited to install traffic control signs along the approach legs experiencing the least amount of traffic. This project recommendation is intended to improve traffic control and function at this intersection.

Estimated Cost: < $15k

TSM-23: **Whitefish Stage / West Evergreen Drive** – It is ultimately recommended that an intersection analysis be completed to determine if a traffic signal, roundabout or other traffic control device is appropriate for this location. This intersection currently has a LOS of F during PM peak hours. A preliminary signal warrant analysis indicates that a traffic signal may be warranted. The Kalispell Transportation Plan (KTSM-16) recommends that "three-way stop-control" be implemented as a traffic control device in addition to constructing dedicated left-turn and right-turn lanes on the east leg of West Evergreen Drive. It should be noted that stop signs are the most restrictive traffic control measure due to the fact that they require all motorists to come to a complete stop. This intersection should be analyzed to determine if additional turn-lanes are needed and/or can serve as an interim project at this location. This project recommendation aims to address safety concerns and the failing LOS at this location. The intent of the project is to increase safety, function and capacity of this intersection.

Estimated Cost: $300k – $450k (traffic signal)

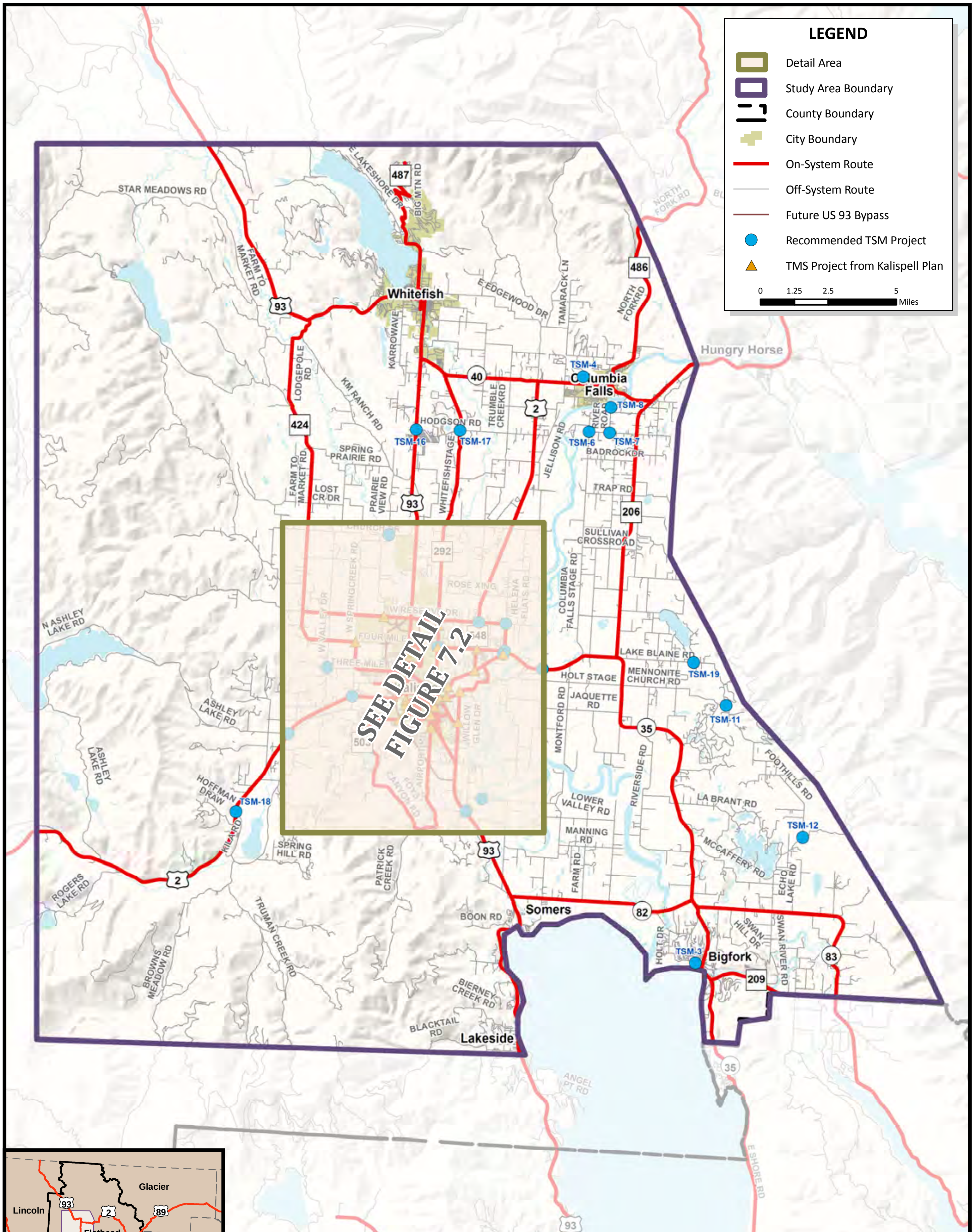


FIGURE 7.1

RECOMMENDED TRANSPORTATION SYSTEM MANAGEMENT PROJECTS

Flathead County Transportation Plan - Phase II

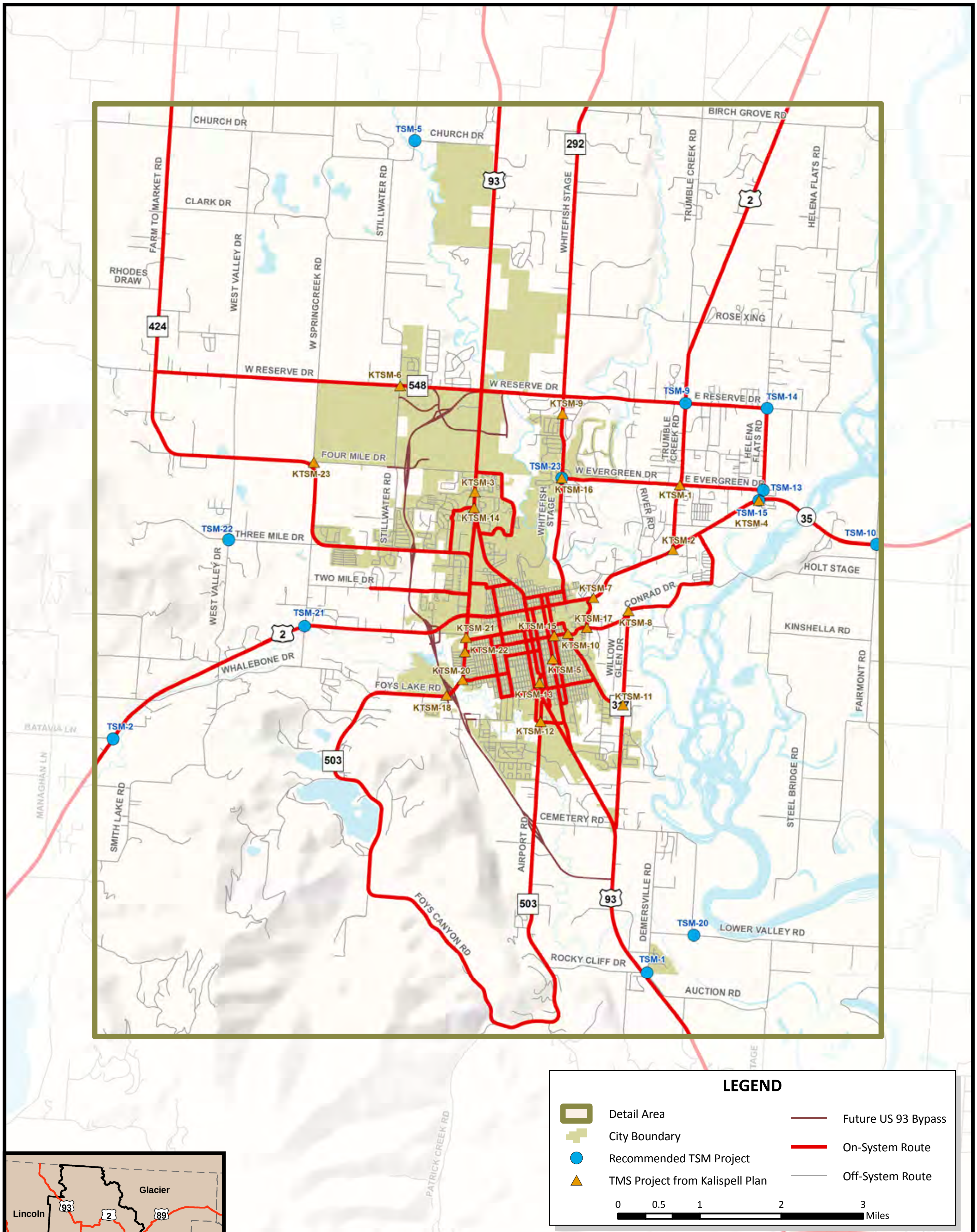


FIGURE 7.2

RECOMMENDED TRANSPORTATION SYSTEM MANAGEMENT PROJECTS - DETAIL

Flathead County Transportation Plan - Phase II

7.4 RECOMMENDED MAJOR STREET NETWORK IMPROVEMENTS

For the purposes of this plan, an improvement project was classified as a Major Street Network (MSN) project if the estimated cost of the project was greater than $500,000. MSN projects generally include large scale projects such as corridor reconstruction, new roadway construction, and paving projects. The location of each MSN project is shown on **Figure 7-3** and **Figure 7-4**.

7.4.1 MSN RECOMMENDATIONS FROM THE KALISPELL AREA TRANSPORTATION PLAN (2006 UPDATE)

Table 7.2 provides a summary of the recommended MSN projects contained in the *Kalispell Transportation Plan (2006 Update)*. These projects are listed for reference purposes only and are not necessarily considered project recommendations as part of this plan. The project recommendations made in **Section 7.4.2** generally occur along the study corridors and intersections discussed previously in this Plan. The project recommendations made in the Kalispell Plan and other Transportation Plans in Flathead County area were not specifically reanalyzed as part of the *Flathead County Transportation Plan*.

Table 7.2: MSN Recommendations from the Kalispell Area Transportation Plan (2006 Update)

Project ID	Location	Description
KMSN-1	West Reserve Drive – Stillwater Road to West Springcreek Road	▪ Reconstruct to a five-lane minor arterial section
KMSN-2	Four Mile Drive – Stillwater Road to US Highway 93	▪ Construct to a three-lane minor arterial section
KMSN-3	Grandview Drive Extension – Existing Bend to Whitefish Stage Road	▪ Extension of Grandview Drive to connect to Whitefish Stage at intersection with Evergreen Drive
KMSN-4	Whitefish Stage – Reserve Drive to Rose Crossing	▪ Reconstruct to an urban minor arterial standard
KMSN-5	Whitefish Stage – Rose Crossing to Birch Grove Road	▪ Reconstruct to an urban minor arterial standard ▪ Implement access control
KMSN-6	Helena Flats Road – MT Highway 35 to Rose Crossing	▪ Reconstruct to an urban minor arterial standard
KMSN-7	Foys Lake Road – Whalebone Drive to Valley View Drive	▪ Reconstruct to an urban minor arterial standard
KMSN-8	Four Mile Drive – West Springcreek Road to Stillwater Road	▪ Reconstruct to a three-lane minor arterial standard
KMSN-9	Rose Crossing Extension – Farm to Market Road to Whitefish Stage	▪ Construct a new east/west corridor along Rose Crossing between Farm to Market Road and Whitefish Stage ▪ Construct to an urban minor arterial facility
KMSN-10	Stillwater Road – Four Mile Drive to West Reserve Drive	▪ Reconstruct to a three-lane minor arterial standard
KMSN-11	New Roadway Connection – Foys Lake Road to US Highway 2	▪ Construct a new north/south connection somewhere between Greenbriar Drive and Appleway Drive which would connect Foys Lake Road to US Highway 2 ▪ Construct to an urban collector standard
KMSN-12	West Springcreek Road – US Highway 2 to West Reserve Drive	▪ Reconstruct to a three-lane minor arterial standard

Project ID	Location	Description
KMSN-13	Willow Glen Drive – Conrad Drive to Woodland Avenue	▪ Reconstruct to an urban minor arterial standard
KMSN-14	Church Drive Extension – Farm to Market Road to Whitefish Stage	▪ Construct / reconstruct Church Drive between Farm to Market Road and Whitefish Stage ▪ Construct to an urban minor arterial standard
KMSN-15	Trumble Creek Road – Rose Crossing to Birch Grove Road	▪ Reconstruct to a three-lane minor arterial standard
KMSN-16	Conrad Drive – Willow Glen Road to Shady Lane	▪ Reconstruct to an urban minor arterial standard
KMSN-17	Shady Lane – Conrad Drive to MT Highway 35	▪ Reconstruct to an urban minor arterial standard
KMSN-18	Reserve Drive – US Highway 93 to Whitefish Stage	▪ Reconstruct to a five-lane minor arterial standard
KMSN-19	Reserve Drive – Whitefish Stage to LaSalle Road	▪ Reconstruct to a three-lane principal arterial standard
KMSN-20	Reserve Drive – LaSalle Road to Helena Flats Road	▪ Reconstruct to a three-lane minor arterial standard
KMSN-21	Evergreen Drive – Whitefish Stage to LaSalle Road	▪ Reconstruct to a three-lane minor arterial standard
KMSN-22	Whitefish Stage – Oregon Street to Reserve Drive	▪ Reconstruct to a three-lane minor arterial standard
KMSN-23	18th Street West / Sunnyside Drive Extension	▪ Construct to an urban collector standard
KMSN-24	LaSalle Road / Conrad Drive Extension	▪ Construct a new extension between LaSalle Road and Conrad Drive
KMSN-25	MT Highway 35 – LaSalle Road to MT Highway 206	▪ Reconstruct to a four-lane facility
KMSN-26	US Highway 2 East – LaSalle Road to Woodland Park Drive	▪ Reconstruct to a six-lane section ▪ Add dual eastbound lefts and dual southbound lefts at the intersection with LaSalle Road
KMSN-27	N/A	▪ *Not identified*
KMSN-28	7th Avenue East North – East California Street to Whitefish Stage	▪ Reconstruct to a minor arterial standard
KMSN-29	Three Mile Drive – West Springcreek Road to Meridian Road	▪ Reconstruct to a two-lane urban collector standard
KMSN-30	Two Mile Drive – West Springcreek Road to Meridian Road	▪ Reconstruct to a two-lane urban collector standard
KMSN-31	US Highway 93 North – Reserve Drive to Birch Grove Road	▪ Construct a "junior interchange" at the intersection with Rose Crossing – KMSN-31(a) ▪ Provide an unsignalized three-quarters access at-grade at the intersection with Tronstad Road (northbound left-in; southbound right-in and right out) – KMSN-31(b) ▪ Construct a "junior interchange" at the intersection with Church Drive – KMSN-31(c) ▪ Complete an "access control plan" or "Pre-NEPA Corridor Study" – KMSN-31(d)

7.4.2 Recommended Major Street Network Projects

During the preparation of this Plan, a number of MSN projects were identified. The following list of MSN projects are not in any particular order with respect to priority. These projects are recommended to address existing and anticipated future conditions and provide capacity, safety, connectivity, traffic control, and/or geometric improvements. An estimated range for project costs is included for each recommended project. These project costs provide "planning level" estimates and do not include allowances for additional right-of-way, utility, traffic management, or any other heavily variable costs.

MSN-1: **Ashley Lake Road (US Highway 2 to North Ashley Lake Road) –** Pave when ADT values exceed the paving threshold of 400 vpd. Existing traffic volumes along this corridor indicate and ADT of approximately 200 vpd; however, future modeling indicates that ADT's will continue to rise to above 400 vpd in the future. This project is intended to address increasing traffic volumes along this corridor. As traffic volumes approach the paving threshold of 400 vpd, problems associated with this road being unpaved are likely to increase.

Estimated Cost: $2M – $4M

MSN-2: **Church Drive (Farm to Market Road to Whitefish Stage Road) –** Upgrade to the geometric standards for a minor arterial roadway. It is expected that a minimum of two travel lanes, one in each direction, shoulder / bike lane, and appropriate turn bays will be required. The sharp corners currently present along this corridor should be flattened as part of this reconstruction. A new connection should also be made between Whitefish Stage and US Highway 93 connecting Church Drive and Birch Grove Road. This project is intended to address increasing traffic volumes and changing traffic patterns in the area. This recommendation will ultimately increase safety, provide additional capacity, and increase connectivity in the area.

Estimated Cost: $8M – $12M

MSN-3: **Columbia Falls Stage / River Road (MT Highway 35 to US Highway 2) –** Upgrade to the geometric standards for a rural major collector roadway. It is expected that a minimum of two travel lanes, one in each direction, shoulder / bike lane, and appropriate turn bays will be required. Consideration should be given to implementing some form of access management or consolidation of access along Columbia Falls Stage in the future. This project is intended to address safety and geometric concerns along this corridor.

Estimated Cost: $12M – $15M

MSN-4: **East Reserve Drive (US Highway 2 to Helena Flats Road) –** Upgrade to the geometric standards for an urban minor arterial roadway. It is expected that a minimum of two travel lanes, one in each direction, shoulders / bike lanes, sidewalk / path, and appropriate turn bays will be required. Consideration should be given to implementing some form of access management or consolidation of access along East Reserve Drive. This project is intended to address existing traffic flow concerns and anticipated future growth. Ultimately, this project is aimed at improving safety, capacity, traffic flow, and corridor function.

Estimated Cost: $2M – $4M

MSN-5: **Helena Flats Road (MT Highway 35 to East Reserve Drive) –** Upgrade to the geometric standards for an urban minor arterial roadway. It is expected that a minimum of two travel lanes, one in each direction, shoulders / bike lanes, sidewalk / path, and appropriate turn bays will be required. Consideration should be given to implementing some form of access management or consolidation of access along Helena Flats Road. This project is intended to address existing traffic flow concerns and anticipated future growth. Ultimately, this project is aimed at improving safety, capacity, traffic flow, and corridor function.

Estimated Cost: $2M – $4M

MSN-6: **Hodgson Road (US Highway 93 to US Highway 2) –** Upgrade to the geometric standards for a rural major collector roadway. It is expected that a minimum of two travel lanes, one in each direction, shoulder / bike lane, and appropriate turn bays will be required. Consideration should be given to consolidating the number of access points along Hodgson Road, particularly along the western section. This project is intended to address existing safety and traffic issues as well as anticipated future growth. Ultimately, this project is aimed at improving safety, capacity, traffic flow, and corridor function.

Estimated Cost: $3M – $5M

MSN-7: **Holt Stage (MT Highway 35 to Steel Bridge Road) –** Upgrade to the geometric standards for a rural major collector roadway. It is expected that a minimum of two travel lanes, one in each direction, shoulder / bike lane, and appropriate turn bays will be required. The sharp corners currently present along this corridor should be flattened as part of this reconstruction. Guardrail should be installed at appropriate locations along the corridor where warrants are met and where hazards cannot otherwise be addressed. This project is intended to address safety and geometric concerns along this corridor.

Estimated Cost: $4M – $6M

MSN-8: **Kila Road (northern intersection with US Highway 2 to Smith Lake Road) –** Upgrade to the geometric standards for a rural major collector roadway. It is expected that a minimum of two travel lanes, one in each direction, shoulder / bike lane, and appropriate turn bays will be required. A school zone with appropriate signing and decreased speed limit should also be implemented near Kila School. This project is intended to address safety and geometric concerns along this corridor.

Estimated Cost: $2M – $4M

MSN-9: **Lake Blaine Road (MT Highway 35 to Foothills Road) –** Upgrade to the geometric standards for a rural major collector. It is expected that a minimum of two travel lanes, one in each direction, shoulder / bike lane, and appropriate turn bays will be required. Consideration should be given to implementing some form of access management or consolidation of access along Lake Blaine Road. Potential traffic calming techniques should also be looked at. A school zone with appropriate signing and decreased speed limit should also be implemented near Cayuse Prairie School. This project is intended to address existing safety and traffic concerns as well as anticipated future growth. This project is aimed at improving safety, capacity, traffic flow, and corridor function.

Estimated Cost: $2M – $4M

MSN-10: **LaSalle Road / Conrad Drive Connection (Conrad Drive to MT Highway 35 / US Highway 2 Intersection) –** This project consists of constructing a new connection between Conrad Drive and the MT Highway 35 / US Highway 2 intersection. This project is contained in the *Kalispell Area Transportation Plan (2006 Update)* and would create an alternate north/south route east of Kalispell. This is a long-term project and should be designed with sensitivity to the adjacent neighborhoods along Willow Glen Drive and Conrad Drive. This project is intended to address increasing traffic volumes and changing traffic patterns in the area. This recommendation is aimed at improving safety, capacity, traffic flow, connectivity in the area.

Estimated Cost: $2M – $4M

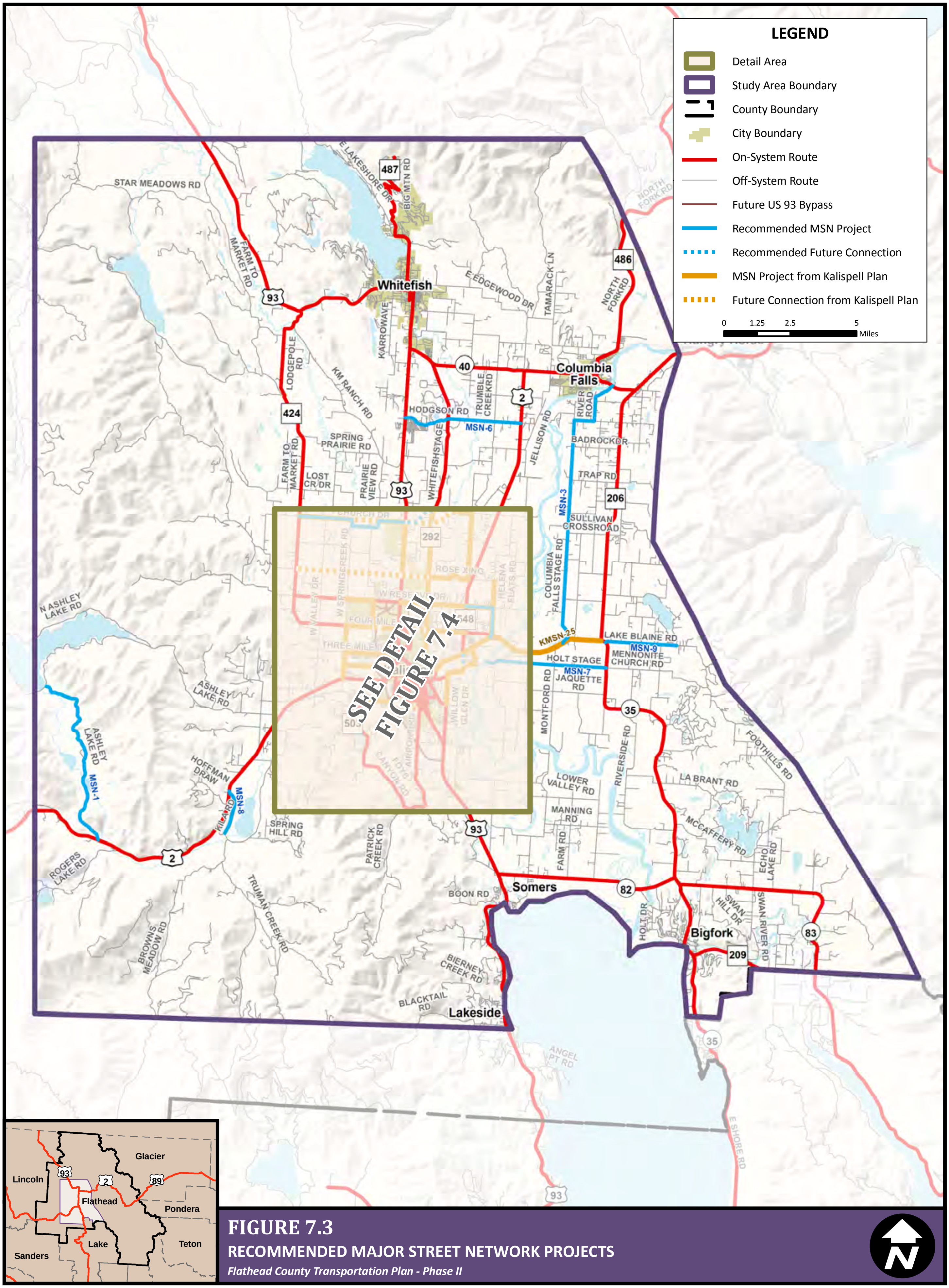


FIGURE 7.3

RECOMMENDED MAJOR STREET NETWORK PROJECTS

Flathead County Transportation Plan - Phase II

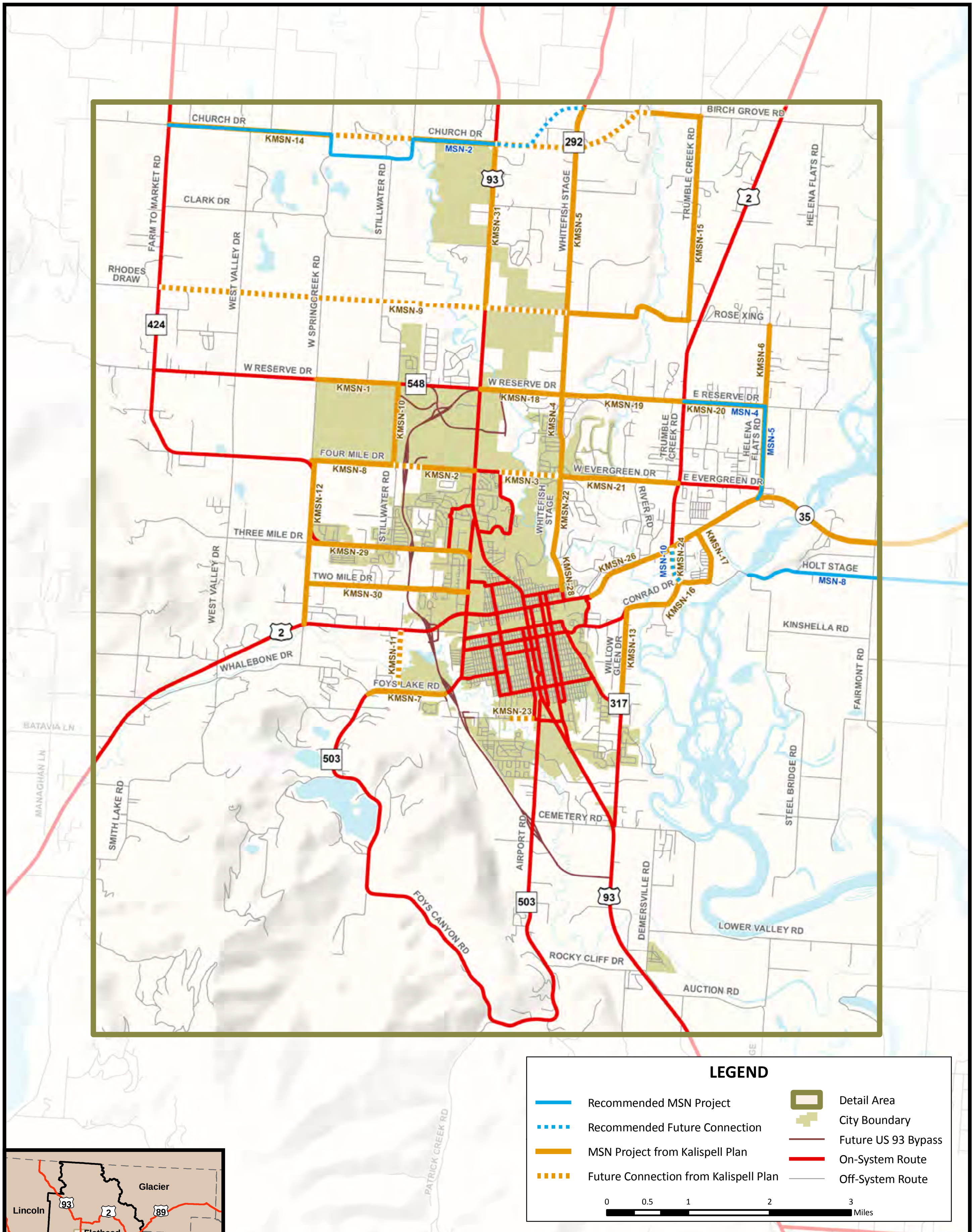


FIGURE 7.4

RECOMMENDED MAJOR STREET NETWORK PROJECTS - DETAIL

Flathead County Transportation Plan - Phase II

7.5 RECOMMENDED MAJOR STREET NETWORK

The major street network consists of all principal arterial, minor arterial, major collector, and minor collector routes. Unclassified roads are not included on the major street network. The existing functional classification system in place within Flathead County was used as a basis, or starting point, in developing the major street network for this Transportation Plan. Note that this is different than the "Federally Approved Functional Classification" system.

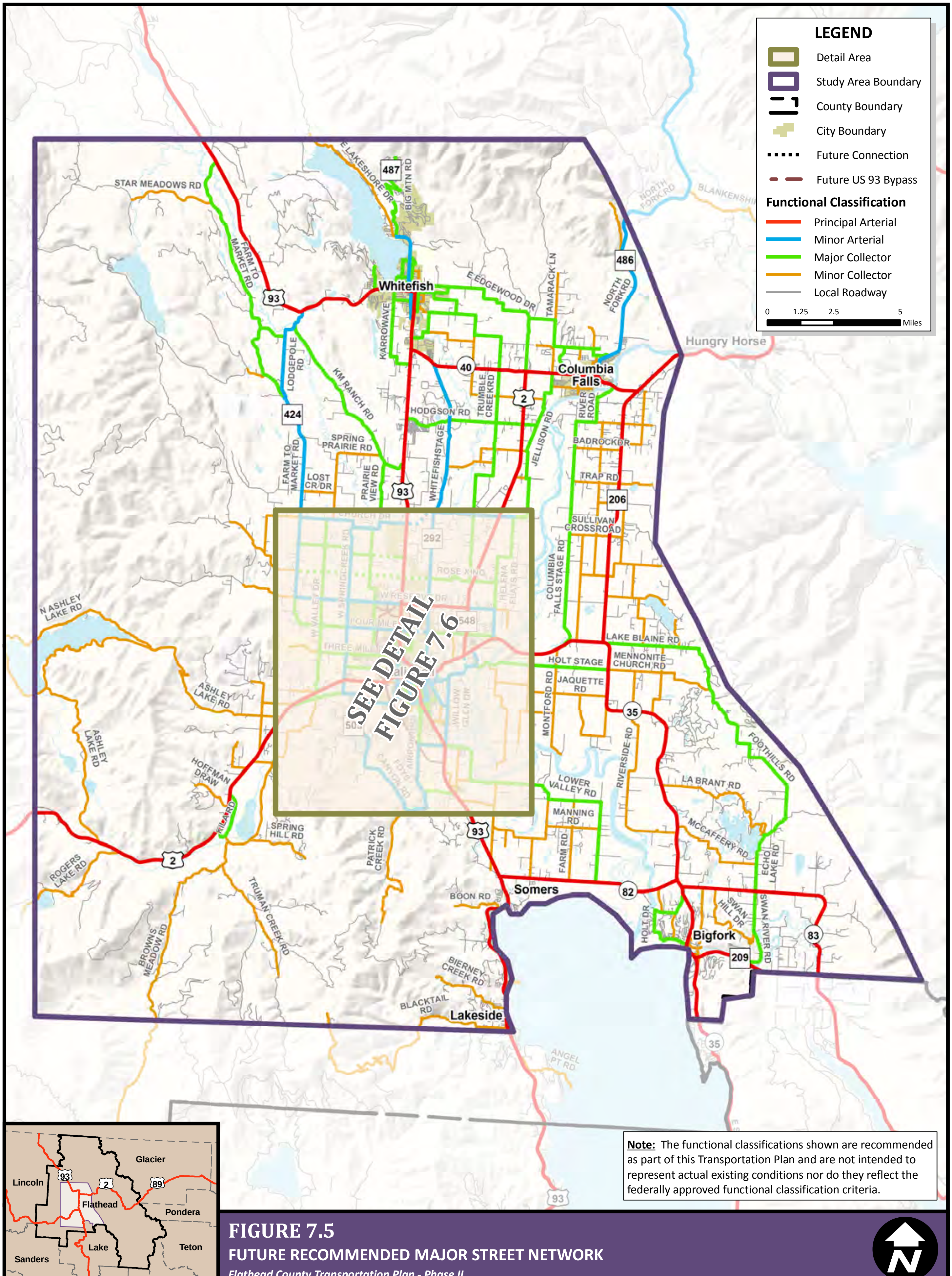
Establishing a plan for a county's future roadway layout is essential to proper land development and community planning. It is important that planners, landowners, and developers know where the future road network should be located to assist in anticipating right-of-way needs, and appropriate land-uses. The study area was examined to determine the most appropriate placement for the future major street network, based on projected traffic volumes and likely development patterns.

The recommended existing and future major street networks are shown in **Figure 7.5** and **Figure 7.6**. The future alignments shown are conceptual in nature and may vary based on factors such as topography, wetlands, land ownership, and other unforeseen factors. The purpose of these figures is to illustrate the anticipated network at full build-out. It is likely that many of the route corridors shown will not be developed into roads for many decades to come. On the other hand, if development is proposed in a particular area, the recommended major street network will insure that the arterial corridors will be established in a fashion that produces an efficient and logical future road network. Presenting the major street network at this time is not intended to control or influence development. It is presented in an effort to help plan for the future development of the road system in the community.

In general, projects proposed in the Kalispell and Whitefish Transportation Plans have been included for reference in the development of the Major Street Network and the associated transportation modeling. Although the recommendations in this plan do not duplicate those in the Kalispell and Whitefish plans there is some overlap.

Most of the routes are not recommended for construction at this time. The development of these conceptual routes will take decades to become reality, and will only become roads if traffic needs materialize as a result of development in the area. The future road network figures show how the street network should develop over time and is intended to be used as a planning tool. It will assist in the evaluation of long-term traffic needs when planning future development.

In addition, a final "travel demand model" run of the recommended improvements has been made. **Figure 7.7** thru **Figure 7.10** show the future year (2030) travel demand model estimated traffic volumes and v/c ratios based on the recommended improvements discussed earlier and the Major Street Network.



Note: The functional classifications shown are recommended as part of this Transportation Plan and are not intended to represent actual existing conditions nor do they reflect the federally approved functional classification criteria.

FIGURE 7.5

FUTURE RECOMMENDED MAJOR STREET NETWORK

Flathead County Transportation Plan - Phase II

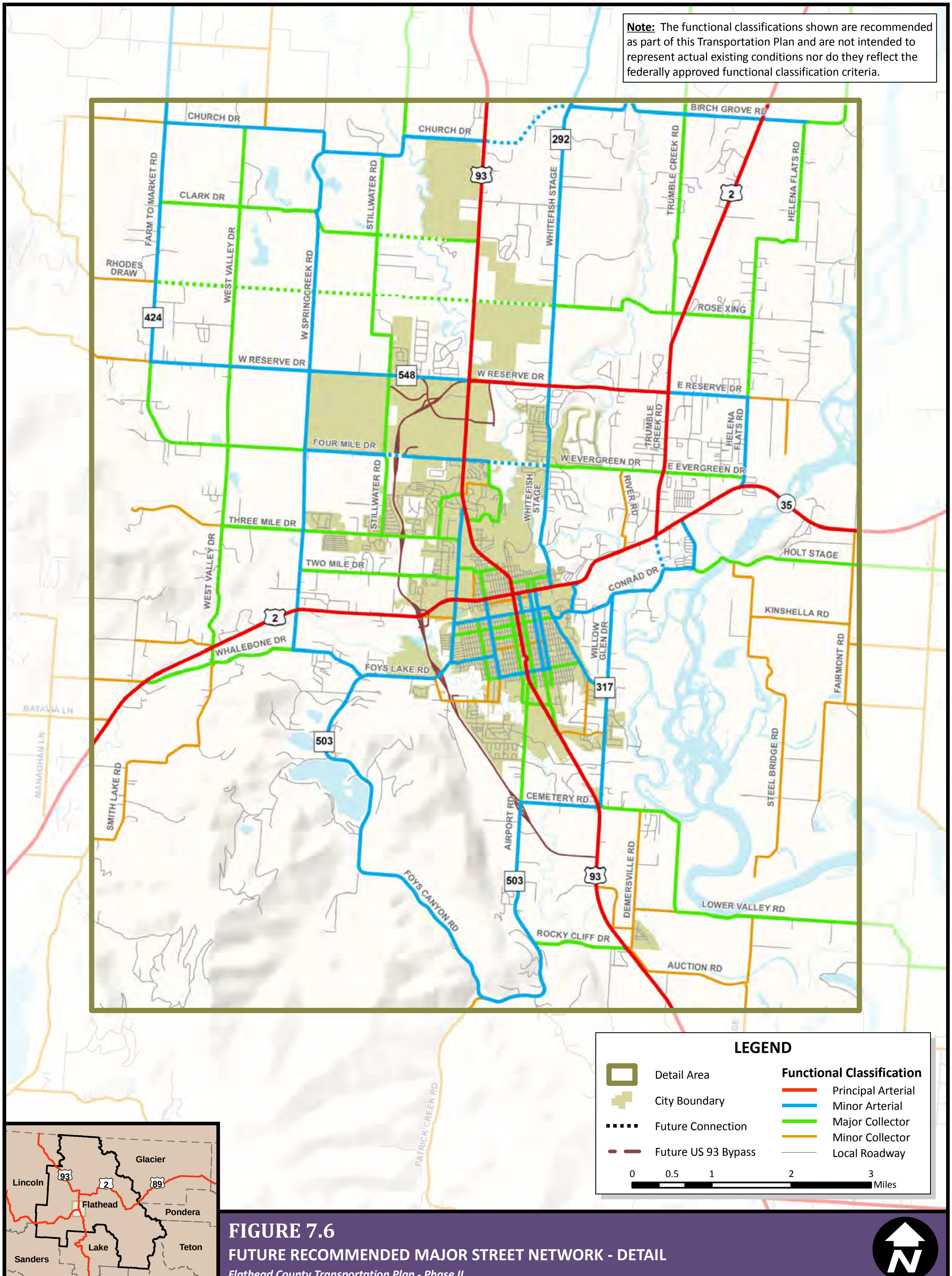


FIGURE 7.6

FUTURE RECOMMENDED MAJOR STREET NETWORK - DETAIL

Flathead County Transportation Plan - Phase II

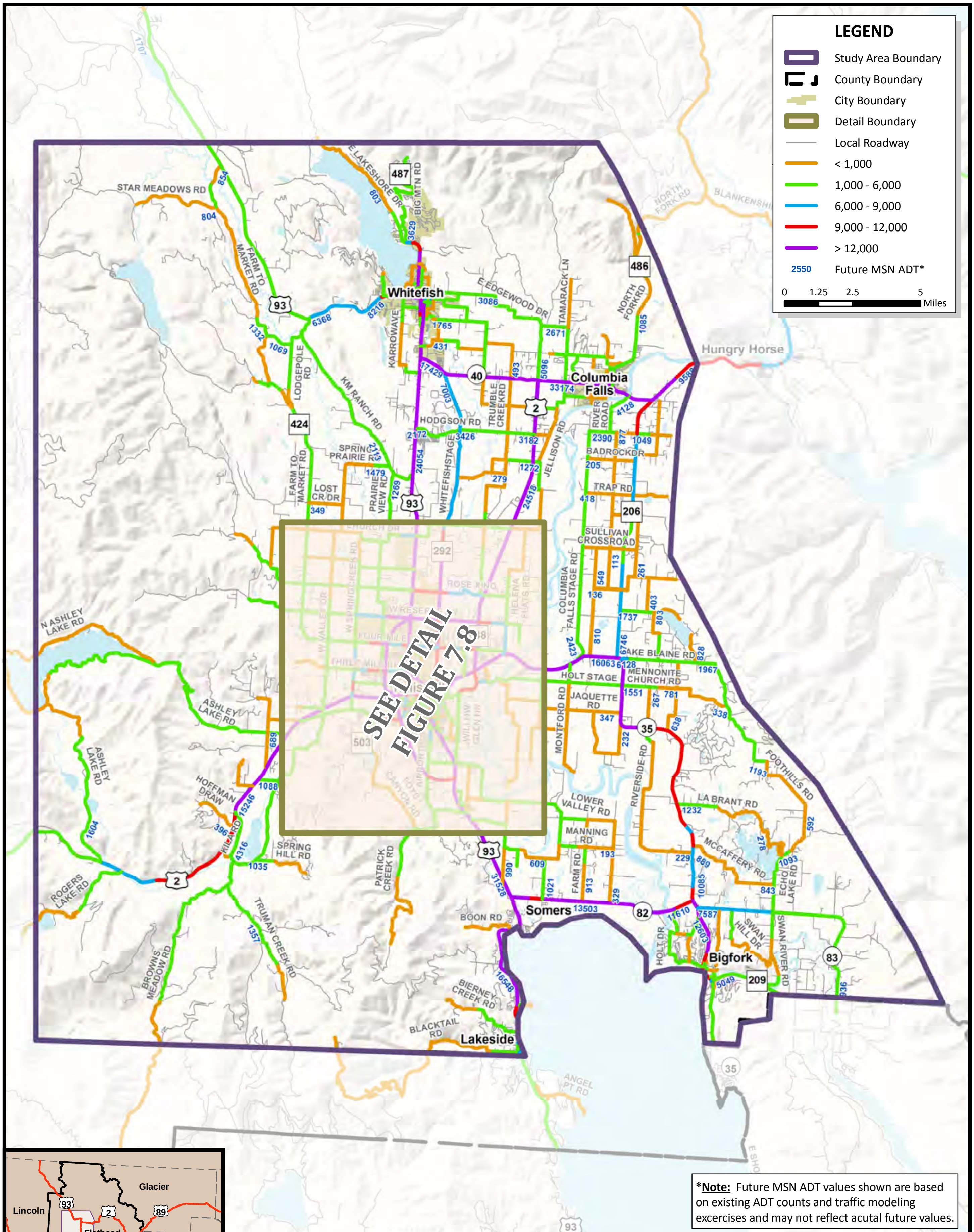
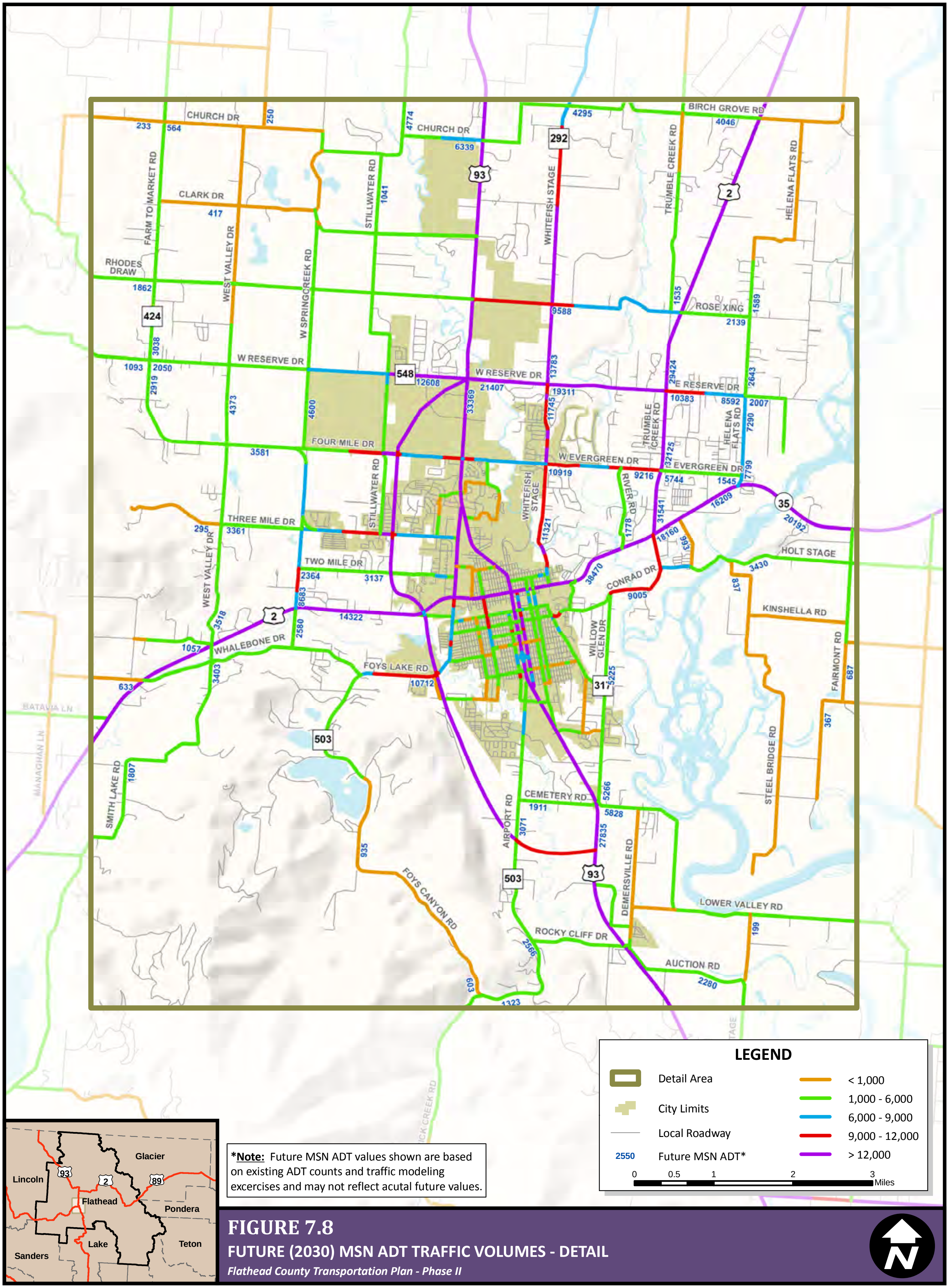


FIGURE 7.7

FUTURE (2030) MSN AVERAGE DAILY TRAFFIC VOLUMES

Flathead County Transportation Plan - Phase II

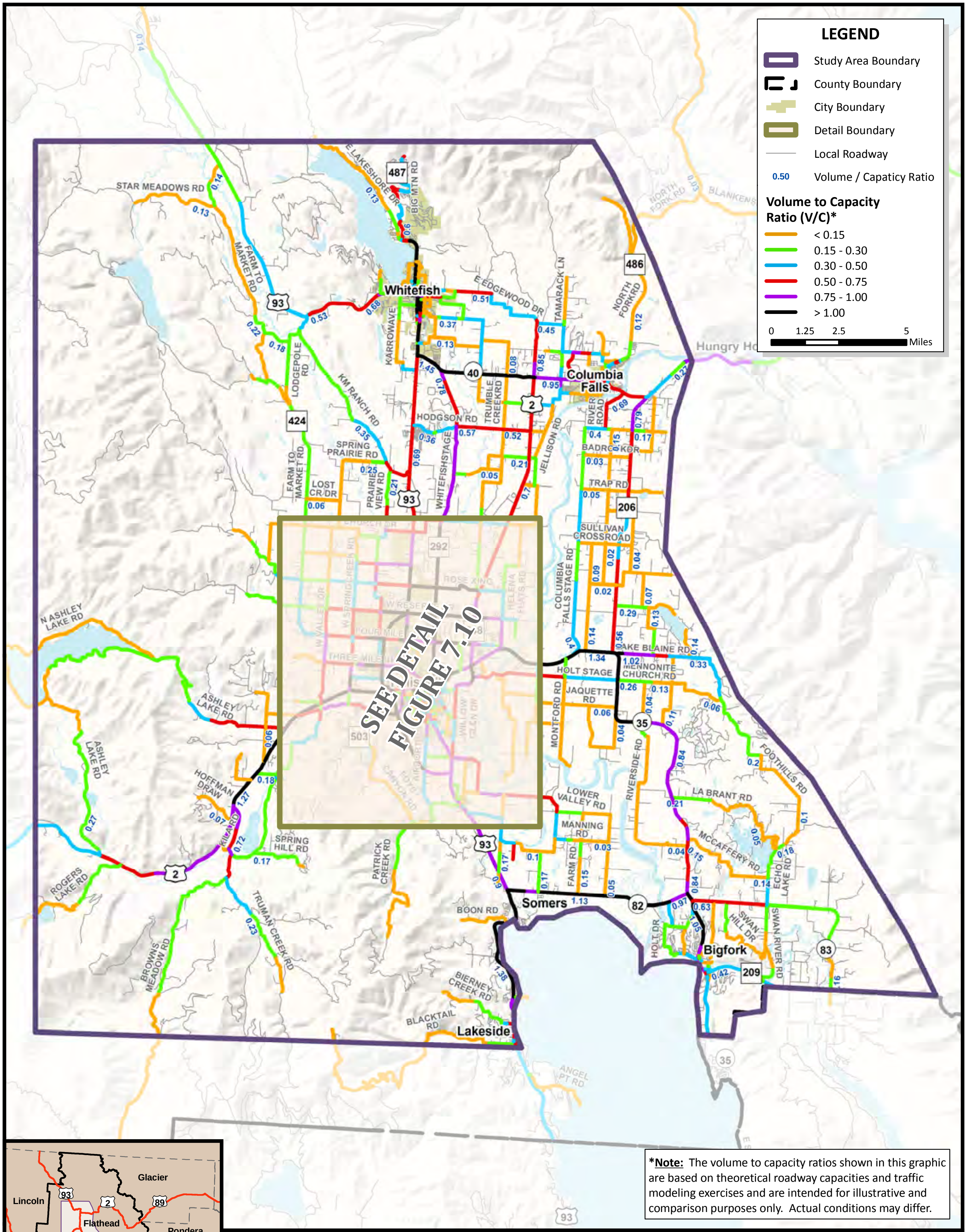


*Note: Future MSN ADT values shown are based on existing ADT counts and traffic modeling excercises and may not reflect acutal future values.

FIGURE 7.8

FUTURE (2030) MSN ADT TRAFFIC VOLUMES - DETAIL

Flathead County Transportation Plan - Phase II



*Note: The volume to capacity ratios shown in this graphic are based on theoretical roadway capacities and traffic modeling exercises and are intended for illustrative and comparison purposes only. Actual conditions may differ.

FIGURE 7.9

FUTURE (2030) MSN VOLUME TO CAPACITY RATIOS

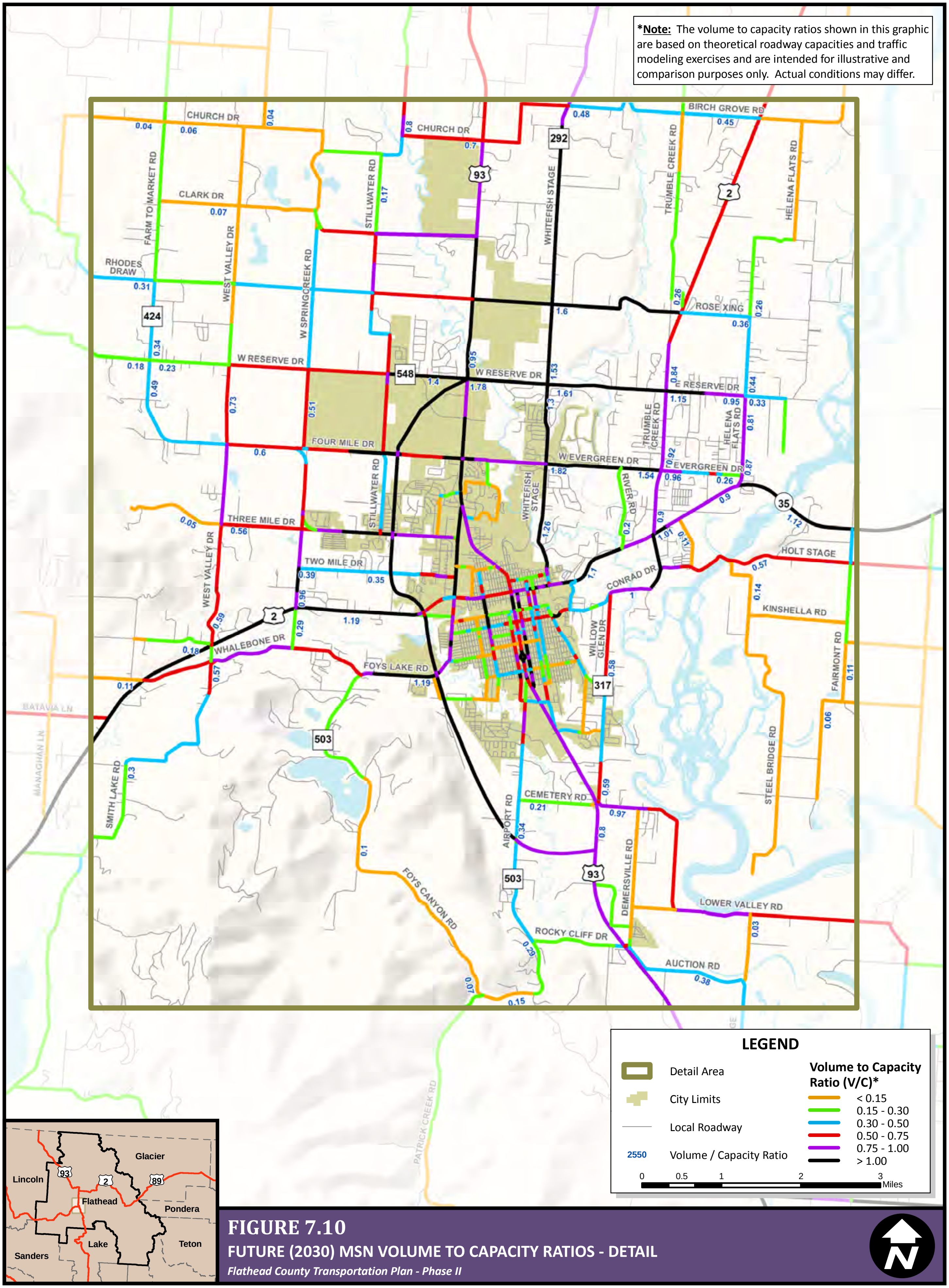


FIGURE 7.10

FUTURE (2030) MSN VOLUME TO CAPACITY RATIOS - DETAIL

Flathead County Transportation Plan - Phase II

CHAPTER 8

Alternative Travel Modes

Chapter 8: Alternative Travel Modes

8.1 INTRODUCTION

Alternate travel modes, including pedestrian, bicycle and transit travel can play a significant role in a transportation system by providing alternatives to driving. This chapter will provide an overview of existing facilities and will discuss the importance of each mode of transportation.

Photo 8.1: Alternative travel modes being utilized.

There is limited data available concerning pedestrian and bicycle activity in Flathead County. There are only a few designated bicycle routes in the county outside of the cities. County residents have shown considerable interest in developing new routes, particularly in association with the Rails to Trails program. The Rails to Trails program has developed planning strategies and route development goals to further expand the trails system.

Photo 8.2: Shared-use path along a highway.

The Flathead County Parks and Recreation Board is currently developing a proposed system of pathways to connect all of the major population centers as well as Flathead Lake, Glacier National Park, state and county parks and the Flathead National Forest. The People for Athletics, Travel, Health and Safety (PATHS) Advisory Committee was formed and is developing the master plan for county trails. In addition, several neighborhood plans in the county also have stated goals of improving pedestrian and bicycle facilities. As such, recommendations set forth by these documents and committees will be carried forward into this Transportation Plan.

Additionally, planning efforts have recently been completed regarding transit facilities. The *Eagle Transit Transportation Development Plan Update (2007-2012)* prepared by LSC Transportation Consultants, Inc. contains relevant information regarding existing conditions of the transit system as well as future system recommendations. As these recommendations are current and have been subject to public review, they have been incorporated into this Transportation Plan.

Photo 8.3: Alternate travel modes existing long a busy corridor.

8.2 BICYCLE FACILITIES

Well-designed non-motorized transportation facilities are safe, attractive, convenient and easy to use. Poorly designed or inadequate facilities can discourage users and waste valuable money and resources. In rural areas, non-motorized vehicles are often expected to use the roadway shoulder or compete for space with the motorized traffic. This places bicyclists and pedestrians in harm's way, posing a risk to themselves and a distraction and hazard to motorists. Proper planning incorporates new non-motorized facilities into a transportation system in a manner that can best accommodate the needs of the anticipated users.

Photo 8.4: Bicycle facilities provide road users alternative travel options.

Montana statutes (**61-8-602 M.C.A.**) make bicycle riders legitimate road users. They are, however, slower, less visible and more vulnerable than motorists. Well-designed bicycle facilities guide cyclists of various skill levels to ride on the roadway in a safe manner that conforms to the uniform vehicle code.

The creation of new trailways and bike pathways was ranked the most important improvement to the area's parkways in a Flathead County Parks and Recreation Department survey conducted in 2008. 76.6% of the survey respondents report using the existing county pathways. The Flathead County Trails Plan being developed by PATHS will be a comprehensive plan defining trailway terms, identifying existing paths, proposing future improvements and trailways, and determining maintenance solutions. As the trails plan is not complete at the time of publish of this document, this transportation plan will discuss the concepts of non-motorized transportation, but defer to the Flathead County Trails Plan for specific planning conclusions.

The following definition for the term "bikeway" from the *Guide for the Development of Bicycle Facilities* published by the American Association of State Highway and Transportation Officials (AASHTO) in 1999 is presented. It should be noted that in Montana, bicycles are allowed on roadways, and as such the AASHTO definition presented below is not applicable in its entirety.

> *"**Bikeway** - A generic term for any road, street, path, or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes."*

The type of bikeway most appropriate for a given situation depends on the traffic volume, speed, vehicle mix, sight distance, the amount of on-street parking, and the types of bicyclists (advanced riders, basic riders, and children) on the road or street segment. The system of bikeways to be developed in the Flathead County will include bike paths, bike lanes, and shared roadways.

Many bicyclists and potential bicyclists who lack significant experience riding on roadways express a preference for separated bike paths over on-street bike lanes. However, while the physical separation of bicycles and motor vehicles surely reduces the likelihood of rear-end and same-direction sideswipe accidents, these types of collisions usually constitute only a small percentage of bicycle-motor vehicle accidents. Crossing traffic presents a much greater risk to bicyclists than traveling in the same direction as motor vehicles on the same pavement.

8.2.1 Shared-Use Paths / Bike Paths

Shared-use paths are generally physically separated from motorized vehicular traffic by an open space or barrier. Shared-use paths are located either within the right-of-way of the adjacent roadway or are located within an independent right-of-way. Separated trails usually are paved, but unpaved trails wide and smooth enough to serve bicycle trips may be proposed as well. While thin-wheeled bicycles are better accommodated on paved shared-use paths, unpaved trails are suitable for wide-tired bicycles like mountain bikes and other users such as walkers, equestrians or cross-country skiers. In Montana, design of shared-use facilities should follow guidance in the AASHTO Guide for the Development of Bicycle Facilities.

Photo 8.5: Shared-use path along US Highway 93.

Shared-use paths facilitate two-way off-street traffic and may be used by bicyclists, pedestrians, skaters and other non-motorized users. In general, shared-use paths are desirable for transportation and cycling by slower cyclists, families and children, or anyone who prefers physical separation from the roadway. These paths provide recreation and alternate transportation opportunities for non-motorized users. Given this mix of uses, there is the potential for conflicts on heavily-used shared-use facilities, necessitating lower bicycle speeds on these paths. Shared-use paths are ideally suited for corridors along waterways, rail corridors, or utility corridors where there are few intersections or crossings, to reduce the potential for conflicts with motor vehicles.

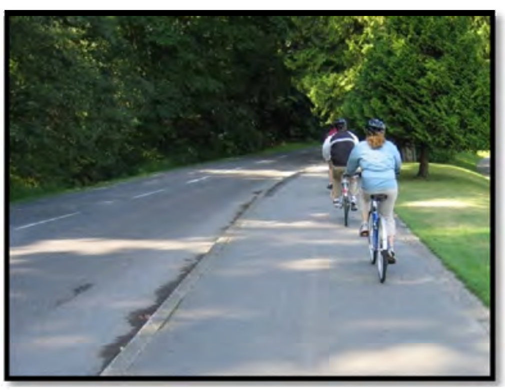


Photo 8.6: If improperly constructed, sidepaths can create dangerous conditions for motorists and bicyclists.

Shared-use facilities located immediately adjacent to roadways are often referred to as “sidepaths”. Both the Federal Highway Administration and the AASHTO Guide for the Development of Bicycle Facilities generally recommend against the development of shared-use paths directly adjacent to roadways. Sidepaths create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in bicyclists going against traffic when either entering or exiting the path. This can also result in an unsafe situation where motorists entering or crossing the roadway at intersections and driveways do not notice bicyclists coming from their right, as they are not expecting traffic coming from that direction. Stopped cross-street motor vehicle traffic or vehicles exiting side streets or driveways may frequently block path crossings. Even bicyclists coming from the left may go unnoticed, especially when sight distances are poor. Because of these operational challenges, sidepaths should be provided on both sides of the roadway to reduce the numbers of bicyclists travelling against vehicle traffic.

Shared-use paths may be considered along roadways under the following conditions:

- The path will generally be separated from all motor vehicle traffic.
- Bicycle and pedestrian use is anticipated to be high.

- In order to continue an existing path through a roadway corridor.
- The path can be terminated at each end onto streets with good bicycle and pedestrian facilities, or onto another safe, well-designed path.
- There is adequate access to local cross-streets and other facilities along the route.
- Any needed grade separation structures do not add substantial out-of-direction travel.
- The total cost of providing the proposed path is proportionate to the need.
- The paths are provided on both sides of the roadway or appropriate crossing opportunities are provided.

8.2.2 BIKE LANES

Photo 8.7: Bike lane installed along a three-lane roadway.

Bike lanes are defined as a portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes help to define the road space for bicyclists and motorists, reduce the chance that motorists will stray into the cyclists' path, discourage bicyclists from riding on the sidewalk, and remind motorists that cyclists have a right to the road. In addition to the considerable benefits to bicyclists, bike lanes provide some important safety benefits to vehicles. Bike lanes create a visibly narrower roadway for drivers (even though the driving lane width is standard) creating a traffic calming effect by causing slower average speeds.

Most commuter bicyclists would argue that on-street facilities are the safest and most functional facilities for bicycle transportation. Bicyclists have stated their preference for marked on-street bicycle lanes in numerous surveys. Many bicyclists, particularly less experienced riders, are far more comfortable riding on a busy street if it has a striped and signed bike lane.

Photo 8.8: This bicyclist prefers to ride on the roadway rather than along the adjacent path.

On streets with low traffic volumes and speeds (usually defined as under 5,000 vehicles per day and under 30 mph vehicle speeds), striped bike lanes may not be needed at all for cyclists to comfortably share the road with low risk of conflicts. On these types of low-traffic neighborhood streets, designated and signed bike routes can serve as important connectors to schools and recreational areas such as parks. Signed bike routes may also be desirable on certain commute routes where installing bike lanes is not possible, provided that appropriate signage is installed to alert motorists to the presence of bicycles on the roadway. Bike route signing should also include "Share the Road" signs.

8.2.3 Shared Roadway

Photo 8.9: Signs warning of potential bicyclists exist along Columbia Falls Stage.

Any roadway upon which a bicycle lane is not designated and which may be legally used by bicycles, regardless of whether such facility is specifically designated as a bikeway, is labeled a shared roadway. Typical examples of shared roadways include low-volume residential streets or rural roads and urban streets with wide outside (curb) lanes. Shoulder bikeways are typically found in rural areas and often include signage alerting motorists to expect bicycle travel along the roadway. If a rumble strip is present or found to be necessary, it should be placed as close to the white line as possible with ample room for bicyclists to the right and have regular breaks to facilitate bicycle entry and exit to the shoulder. A "bike route" is officially designated with signs and route markers and appropriately marked on bike maps as a segment of a network of "bikeways," but is open to motorized vehicle travel and has no designated bike lane.

8.2.4 Design Considerations

Similar to pedestrian facilities, the overall safety and usability of the bicycle network lies in the details of design. The following guidelines provide useful design considerations that fill in the gaps from the standard manuals such as the MUTCD and the AASHTO Guide for the Development of Bicycle Facilities.

Photo 8.10: On-street bike crossing.

- **At Grade Crossings** – When a grade-separated crossing cannot be provided, the optimum at-grade crossing has either light traffic or a traffic signal that trail users can activate. If a signal is provided, signal loop detectors may be placed in the shared-use path pavement to detect bicycles. This feature can be combined with or replaced by a pedestrian-actuated button (placed such that cyclists can press it without dismounting.) At unsignalized crossings, a trail sized stop sign (R1-1) or yield sign (R1-2) should be placed about 5 feet before the intersection with an accompanying stop line. Direction flow should be treated either with physical separation or a centerline approaching the intersection for the last 100 feet. Additional design considerations can slow bicyclists as they approach the crossing include chicanes, bollards, and pavement markings.

  If the street is above four or more lanes or two/three lanes without adequate gaps, a median refuge should be considered in the middle of the street crossed. The refuge should be 8 feet at a minimum, 10 feet is desired. Another potential design option for street crossings is to slow motor vehicle traffic approaching the crossing through such techniques as speed bumps in advance of the crossing, or a painted or textured crosswalk.

- **Grade Separated Crossings** – When the decision to construct an off-street multi-use path has been made, grade separation should be considered for all crossings of major thoroughfares. At-grade crossings introduce conflict points. The greatest conflicts occur where paths cross roadway driveways or entrance and exit ramps. Motor vehicle drivers using these ramps are seeking opportunities to merge with other motor vehicles; they are not expecting bicyclists and pedestrians to appear at these locations. However, grade-separated crossings should minimize the burden for the user, and not, for example, require a steep uphill and/or winding climb.

Photo 8.11: Undercrossing along a shared-use path.

  Undercrossings should be lighted if in high use areas or if longer than 75 feet in length. Groundwater infiltration may be a significant issue and should be considered early in the decision making process when any undercrossing is considered.

- **Bicycle Friendly Rumble Strips** – Rumble Strips can hamper bicycling by presenting obstacles through trapped debris on the far right of the road shoulder and the rumble strip to the left. Consequently, special care needs to be exercised for bicyclists when this treatment for motorist safety is planned and built, with a robust maintenance schedule put into place. The rumble strip design and placement are also important; placing the rumble strip as close to the fog line as possible leaves the maximum shoulder area available for cyclists. Certain rumble strip designs are safer for bicyclists to cross, and still provide the desired warning effect for motorists.

Photo 8.12: Bicycle friendly rumble strip construction.

  The Federal Highway Administration performed a study on the design of rumble strips in 2000, reviewing different techniques of installation and studies performed by ten state DOTs from the point of view of motorists and bicyclists. Based on the information provided in the FHWA study, the recommended design for a rumble strip should be of a milled design rather than rolled that is 1 foot (300mm) wide with 5/16 ± 1/16 in (8 ± 1.5 mm) in depth. Rumble strips are recommended to be installed only on roadways with shoulders in excess of 5 feet (1.5 m). A shallow depth of the milled portions of the rumble strips are preferred by bicyclists. Since the roadway shoulder can become cluttered with debris it is recommended to include a skip (or gap) in the rumble strip to allow bicyclists to cross from the shoulder to the travel lane when encountering debris. This skip pattern is recommended to be 12 feet (3.7 m) in length with intervals of 40 or 60 feet (12.2 or 18.3 m) between skips.

8.2.5 Bicycle Network

Photo 8.13: Bicycles are permitted on all public roads in Montana.

It is important to note that bicycles are permitted on all public roads in the State of Montana and in the Flathead Valley. As such, the county's entire street network is effectively the region's bicycle network, regardless of whether or not a bikeway stripe, stencil, or sign is present on a given street. The designation of certain roads as having bike lanes or shared roadway signage is not intended to imply that these are the only roadways intended for bicycle use, or that bicyclists should not be riding on other streets. Rather, the designation of a network of bike lane and shared roadway on-street bikeways recognizes that certain roadways are optimal bicycle routes, for reasons such as directness or access to significant destinations, and allows the county to then focus resources on building out this primary network. A connected, comprehensive network of shared-use paths, bike lanes, and shared roadways is the best approach to increasing bicycle use.

8.2.6 Available Resources and Publications

AASHTO's "*Guide for the Development of Bicycle Facilities*" is the principal resource for bicycle facility design and has been adopted by many state and local governments. AASHTO published an update of the Guide in 1999. The Guide discusses general design characteristics of roadway improvements for bicycles and identifies design standards for bicycle paths (width and clearance, design speed, alignment and grade, sight distance, intersection treatments, signing and markings, pavement structure, requirements for structures and drainage, lighting, etc.). The Guide is comprehensive but does not set strict standards for bicycle facilities. Instead, it presents sound design guidelines for attaining designs sensitive to the needs of bicyclists and other users. Minimum design values are provided only where further deviation from desirable "standards" would result in unacceptable safety compromises.

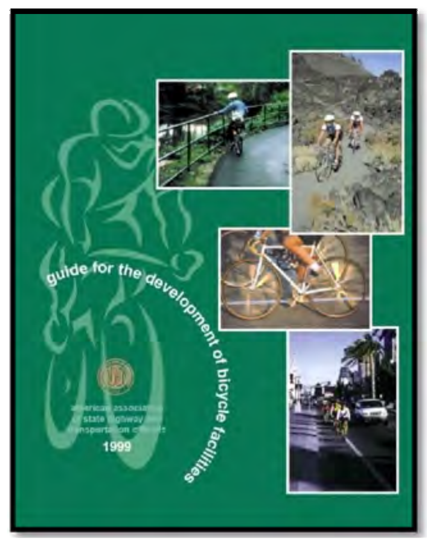


Photo 8.14: AASHTO's *"Guide for the Development of Bicycle Facilities"*.

Signing and marking of bikeways and paths must be uniform and consistent to command the respect of the public and provide safety to the users of these facilities. Signing and marking must be warranted by use and need. Signing and markings of bikeways and paths should conform to the most current edition of the FHWA's *Manual on Uniform Traffic Control Devices (MUTCD)*.

8.3 PEDESTRIAN FACILITIES

Photo 8.15: Pedestrian path in a rural community.

The design of the pedestrian environment will directly affect the degree to which people enjoy the walking experience. If designed appropriately, the walking environment will not only serve the people who currently walk, but also be inviting for those who may consider walking in the future. Therefore, when considering the appropriate design of a certain location, designers should not just consider existing pedestrian use, but how the design will influence and increase walking in the future. Additionally, designers must consider the various levels of walking abilities and local, state, and federal accessibility requirements. Although these types of requirements were specifically developed for people with walking challenges, their use will result in pedestrian facilities that benefit all people.

Pedestrians prefer greater separation from traffic and are slower than bicyclists. They need extra time for crossing roadways, special consideration at intersections and traffic signals, and other improvements to enhance the walking environment. Pedestrians are particularly vulnerable roadway users, as significant numbers are often small children, handicapped individuals, or the elderly.

8.3.1 CROSSWALKS

Photo 8.16: Multiple marked crosswalks exist along Columbia Falls Stage.

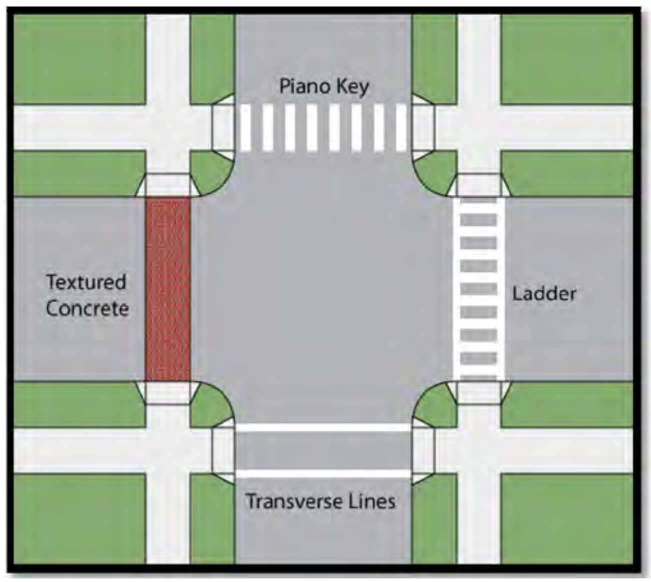
Crosswalks are a critical element of the pedestrian network. It is of little use to have a complete sidewalk system if pedestrians cannot safely and conveniently cross intersecting streets. Safe crosswalks support other transportation modes as well. Transit riders, motorists, and bicyclists all may need to cross the street as pedestrians at some point in their trip.

In general, whatever their mode, people will not travel out of direction unless it is necessary. This behavior is observed in pedestrians, who will cross the street wherever they feel it is convenient. The distance between comfortable opportunities to cross a street should be related to the frequency of uses along the street that generate crossings (shops, high pedestrian use areas, etc.). In areas with many such generators, like high pedestrian use areas, opportunities to cross should be very frequent. In areas where generators are less frequent, good crossing opportunities may also be provided with less frequency. In general, most locations within the county outside of the urban centers have limited pedestrian traffic and few pedestrian use areas. Road crossings in rural areas should have sufficient sight distance and adequate forewarning.

8.3.1.1 Crosswalk Pavement Markings

Marked crosswalks indicate to pedestrians the appropriate route across traffic, facilitate crossing by the visually impaired, and remind turning drivers of potential conflicts with pedestrians. Crosswalk pavement markings should generally be located to align with the through pedestrian zone of the sidewalk corridor. Care should be taken when deciding when to install crosswalk pavement markings. Installing crosswalk pavement markings alone may not be enough to provide adequate protection for crossing pedestrians and may actually result in less safe conditions than unmarked locations due to the false sense of security they provide crossing pedestrians. In general, crosswalks should be marked at all signalized intersections as well as at select unsignalized intersections depending on the number of travel lanes, vehicle ADT, speed limit, and other factors.

There are three common types of crosswalk striping currently used in the United States: the Piano Key, the Ladder, and the standard Transverse crosswalk. Of these, the Piano Key and the Transverse Lines crossings are typically used in Montana. Other types of textured or colored concrete surfacing may be used in appropriate locations where it helps establish a sense of place such as shopping centers and schools.



Graphic 8.1: Crosswalk crossing types.

Ladder or piano key crosswalk markings are considered 'high-visibility' markings and are recommended for most crosswalks in the urban interface areas where heavy pedestrian traffic exists, including school crossings, across arterial streets at pedestrian-only signals, at mid-block crosswalks, and where the crosswalk crosses a street not controlled by signals or stop signs. A piano key pavement marking consists of 2-ft (610 mm) wide bars spaced 2-ft apart and should be located such that the wheels of vehicles pass between the white stripes. A ladder pavement marking consists of 2-ft (610 mm) wide bars spaced 2-ft apart and located between 1-ft wide parallel stripes that are 10-ft apart.

8.3.1.2 Alternate Crossing Treatments

- **Curb Extensions** – Curb extensions (sometimes called curb bulbs or bulb-outs) have many benefits for pedestrians. They shorten the crossing distance, provide additional space at the corner (simplifying the placement of elements like curb ramps), and allow pedestrians to see and be seen before entering the crosswalk. Curb extensions can also provide an area for accessible transit stops and other pedestrian amenities and street furnishings.

  Curb extensions may be useful for local or collector roadways and may be used at any corner location, or at any mid-block location where there is a marked crosswalk, provided there is a parking lane into which the curb may be extended. Curb extensions are not generally used where there is no parking lane because of the potential hazard to bicycle travel. Under no circumstances should a curb extension block a bike lane if one exists.

Photo 8.17: Curb extensions installed in downtown Kalispell create shorter pedestrian crossing distances.

Curb extensions are appropriate in high pedestrian use areas such as near schools. Although potentially useful in urban interface areas, curb extensions may not be suitable for more rural locations.

Curb extensions can be compatible with snow removal operations provided that they are visibly marked for crews. Where drainage is an issue, curb extensions can be designed with storm drain inlets, or pass through channels for water.

- **Refuge Islands** – Refuge islands allow pedestrians to cross one segment of the street to a relatively safe location out of the travel lanes, and then continue across the next segment in a separate gap. At unsignalized crosswalks on a two-way street, a median refuge island allows the crossing pedestrian to tackle each direction of traffic separately. This can significantly reduce the time a pedestrian must wait for an adequate gap in the traffic stream.

Photo 8.18: Refuge islands allow pedestrians to cross one segment at a time.

- **Mid-Block Crossings** – Mid-block crossings are installed where there is a significant demand for crossing and no nearby existing crosswalks. Mid-block crossings should use high visibility crosswalk markings either as a concrete pad contrasting with the asphalt or as a ladder or piano key crossing using thermoplastic markings for durability. Six-inch vehicle stop lines should be placed 20 feet in advance of the crossing with MUTCD W11-2 signage at the crossing. Higher volume local streets may need a second warning sign in advance of the crossing. On-street parking should be prohibited within 40 feet of the crossing, and if being constructed as part of a new roadway, curb extensions should be considered where parking is allowed to shorten the crossing distance.

Photo 8.19: Mid-block crossings may be needed where no nearby crosswalks exist.

8.4 MULTI-MODAL ALTERNATIVE TYPICAL SECTIONS

It is important to have established standards that identify the overall character of various roads within a roadway network. These standards should identify the anticipated amount of right-of-way necessary at full build-out. They should also include all of the design elements necessary such as sidewalks, bicycle facilities, landscaping, and space for utilities and snow storage. The standards should reflect the uses for each type of road, and the applicable traffic volumes anticipated. There should be standards for both urban and rural street designs.

Rural Street Standards have been developed and are contained in the *Minimum Standards for Design and Construction Manual* developed by the Flathead County Road and Bridge Department. All roadway improvements including approaches, pavement, curbs, gutters, traffic control devices, and drainage systems are required to be designed and constructed in accordance with all applicable provisions contained in this manual.

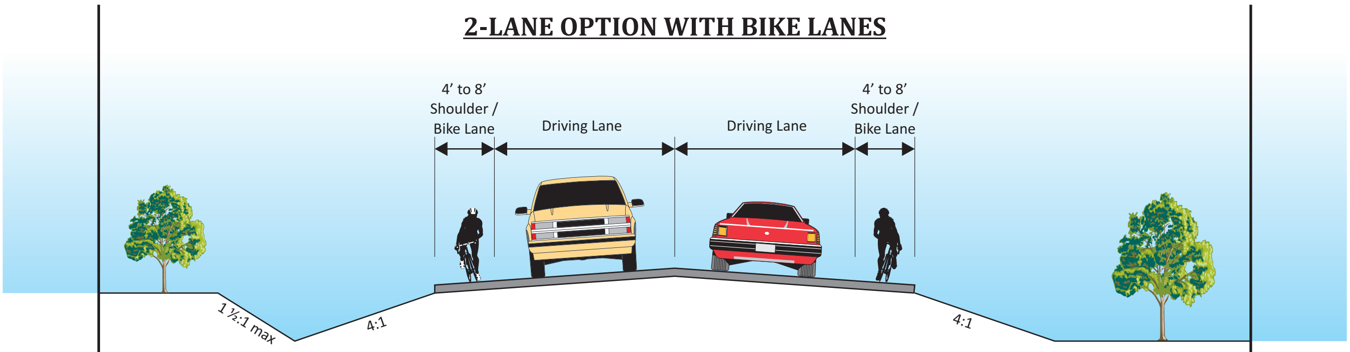
While the minimum standards have already been developed as part of *Minimum Standards for Design and Construction Manual*, this section provides information for suggested alternative roadway typical sections specifically dealing with multi-modal transportation. These alternative typical sections are not intended to supersede the currently established standards for Flathead County, nor are they intended to establish new requirements for roadway construction and design. The purpose of these alternative typical sections is to provide the County and developing communities suggested options for roadway design and construction particularly for areas with anticipated multi-modal use. Two typical sections have been included and vary on how they handle vehicular and non-motorized traffic.

Figure 8.1 on the following page shows the alternative roadway typical sections developed as part of this Transportation Plan. This plan has taken a multi-modal approach to the provision of transportation services. Therefore, it is important that the pedestrian and bicycle facilities depicted on the street standards illustrated in this chapter be constructed as a basic component of the initial facility rather than being considered as an optional add-on.

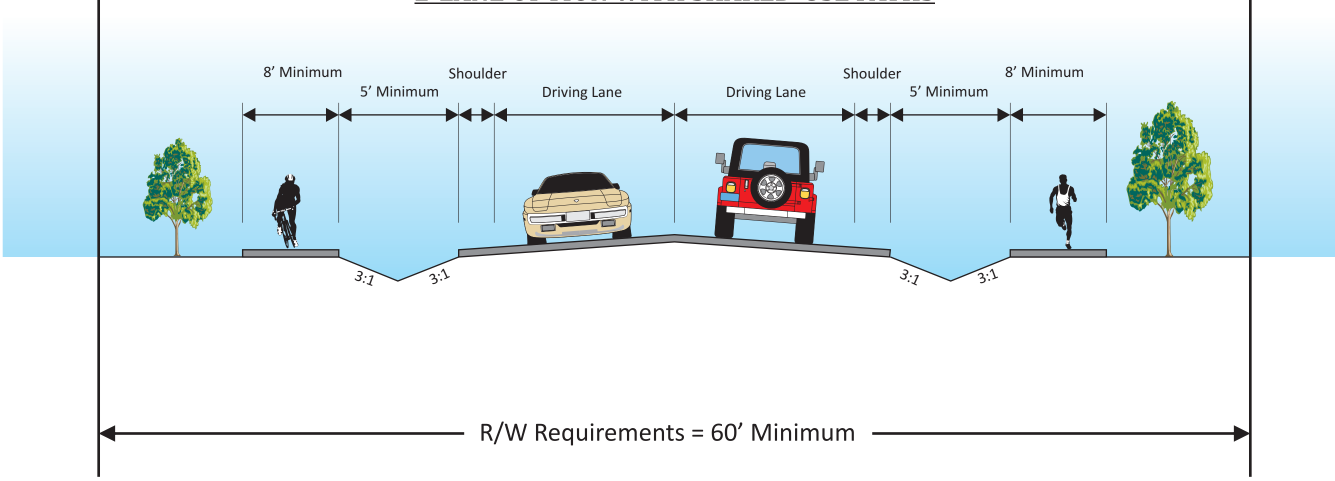
The principal focus of this plan is the arterial and collector roadway network. A wide variety of acceptable local road alternatives exist and may integrate well with the larger scale roads depicted in this Plan. For full information on local roads, interested parties are referred to Flathead County's subdivision regulations.

It is appropriate to note that there will always be special circumstances that must be considered as roadway improvements are contemplated. Context sensitive solutions and designs, as initially described in **Chapter 6**, suggests that roadway improvements can be done in harmony with local community objectives and public interest. The roadway typical section used should be determined on a case-by-case basis by county leaders and will ultimately depend on a number of factors including, but not limited to, functional classification, ADT, context, use, community desire, speed limit, and surrounding development.

2-LANE OPTION WITH BIKE LANES



2-LANE OPTION WITH SHARED-USE PATHS



NOTES:

- Recommended street standards depicted in this graphic are multi-modal concepts for the County's rural roadway system. They may not match the currently utilized roadway geometrics as per the "Minimum Standards for Design and Construction" by Flathead County and serve as desirable multi-modal alternatives.
- MDT routes will need to meet MDT design standards which may not be represented in this graphic.

DRAWING NOT TO SCALE

FIGURE 8.1

MULTI-MODAL ALTERNATIVE TYPICAL SECTIONS

8.5 EXISTING POLICIES AND GOALS

This section summarizes past planning efforts and establishes a policy framework to guide future non-motorized transportation decisions and capital improvement programming. This undertaking is intended to promote regional planning, offer opportunities to coordinate infrastructure improvements and to incorporate past planning efforts into the current Plan. It is important to acknowledge the Flathead County Trails Plan. The Trails Plan was in development stages at the time of publication of this transportation plan. Any bicycle/pedestrian pathway policies and goals in this transportation plan need to support and complement the final Trails Plan.

Flathead County Growth Policy (2007) – The Flathead County Growth Policy, adopted March 19, 2007, focuses on limiting residential development in rural areas and encouraging new development in existing developed areas. The Growth Policy acknowledges the importance of non-motorized transportation modes, as pedestrian and bicycle commuting reduces traffic congestion and fuel consumption. Part 3 of the Growth Policy specifically discussed bicycle and pedestrian paths, not only as a mode of transportation but as a beneficial recreational activity as well. Specific policies and goals related to walking and bicycling include:

- Encourage developments that provide functional alternative modes or travel such as bicycle and pedestrian paths.
- Identify and prioritize areas for a predictable regional and interconnected bicycle path network and require pedestrian/bicycle easements on both sides of identified county roads. Encourage developments that aid and/or connect to this network.
- Determine and prioritize areas for bike path easement acquisition and construction, prioritize use of funds, guide grant applications, identify roads that should have bicycle lanes, determine maintenance funding mechanisms, and set county-wide bicycle path/lane construction standards.
- Prepare a comprehensive Parks and Recreation Master Plan to guide the expansion of the park system to meet the needs and expectations of the growing public. Utilize the work completed by the LRPTF to identifying bike path routes and the work of the three cities and Rails to Trails.
- Create a Flathead County Bicycle Transportation Advisory Committee to determine and prioritize areas for bike path easement acquisition and construction, prioritize use of funds, guide grant applications, identify roads that should have bicycle lanes, determine maintenance funding mechanisms, and set county-wide bicycle path/lane construction standards.

Helena Flats Neighborhood Plan – The plan referenced a list of issues associated with the public roads in Helena Flats as identified by the Supervisor of the Flathead County Roads Department. This plan identified that there was a lack of pedestrian facilities and bicycle trails due in part to the lack of adequate right-of-way along the roads. The plans goals specifically related to bicycle trials and pedestrian activities include:

- To improve pedestrian safety by constructing a pedestrian and bicycle pathway and mitigating unnecessary traffic through the Helena Flats neighborhood.
- To expand the bike trail, once constructed, first to areas south of Helena Flats/Eid Road, and then to areas further to the north within the Helena Flats neighborhood.

Riverdale Neighborhood Plan – According to the Riverdale Neighborhood Plan, residents of Riverdale have expressed a strong desire to establish bicycle and pedestrian paths and trails during planning processes. The following policies were included in the plan to assist in realizing this goal:

- Require bicycle and pedestrian trails in residential development and promote connectivity within the neighborhood.
- Require bicycle and pedestrian trails abutting the frontage road.

The Canyon Plan – Landowners in the planning area ranked issues to determine what goals and policies should be included in the plan. The following goal resulted from the landowner involvement:

- Provide for a connecting bike path system between Columbia Heights and West Glacier.

8.5.1 Goals

An overriding goal for non-motorized transportation in Flathead County to be considered should be as follows:

> *To develop a living plan for the greater Flathead County area in cooperation with all encompassed communities to create and maintain corridors for cyclists and other non-motorized modes of travel and recreation that are safe and effective for their transportation and enjoyment, and to inform and educate motorists, cyclists, and pedestrians in how to safely and respectfully share roads and other corridors as citizens transport themselves about the region.*

Additional goals can be summarized as follows:

- **Planning** – Consider pedestrian bicycle facilities as a routing part of transportation system planning. Integrate and coordinate non-motorized needs into planning activities to improve pedestrian and bicycle access.

- **Network & Facilities** – Develop a safe, convenient, and connected network of non-motorized facilities that serves the needs of the citizens. Connect major population hubs with each other via direct arterial trails.

- **Education & Safety** – Improve non-motorized safety through pedestrian, bicyclist and motorist education and enforcement.

- **Promotion** – Increase non-motorized transportation "mode share" by increasing public awareness of the benefits of non-motorized transportation and available related programs.

- **Implementation** – Secure sufficient resources from all available sources to fund ongoing non-motorized improvements and education.

8.5.2 Existing Non-Motorized Facilities

Although many of the communities within Flathead County have successfully implemented bikeway systems, there are currently a limited number of pathways outside of Whitefish, Kalispell and Columbia Falls. The current trail development efforts identified in the Draft Flathead County Trails Plan are as follows:

- **Great Northern Rail-Trail** – Flathead County Rails to Trails has developed paved pathway along the old rail line from Somers north along US Highway 93 to Ashley Creek south of Kalispell, and from Meridian Road in Kalispell west along US Highway 2 to just south of Kila. Two bridges over Ashley Creek east of Kila were constructed in the fall of 2008, bringing the goal of a paved path from Kila to Somers one step closer to fruition.

- **A Trail Runs Though It** – The Montana Department of Natural Resources and Conservation, Flathead Gateway Partners, the City of Whitefish, USDA Forest Service, and a private landowner have been working for the past 5 years on an innovative plan to establish approximately 75 miles of singletrack recreational trail around Whitefish Lake, as part of a larger land protection effort.

- **Kalispell Bypass Road** – Bicycle and pedestrian facilities are included in the design of this proposed roadway. This arterial trail will provide a key non-motorized transportation route around the city.

- **Rotary Trail near Bigfork** – The Bigfork Rotary Club has been working to establish a pathway along the Swan River Road between State Highways 83 and 209 to connect the existing pathway along Swan River/Echo Lake Roads with the town of Bigfork. Recently, the Rotary has been trying to activate a trail easement along this route that was recently donated to the county.

- **Sam Bibler Trail** – The Sam Bibler Commemorative Trails Project, a 501(c)(3) tax-exempt corporation, has been working to establish pathways along roads near the Flathead River and Owen Sowerwine Natural Area. The pathways would parallel Willow Glen Drive, Conrad Road, Woodland Avenue and Shady Lane, connecting to Lawrence Park.

- **Stillwater River Trail and Bridge** – The Flathead Valley Community College, in partnership with a citizens group is spearheading this effort to create a pathway from Reserve Street in Kalispell south along the Stillwater River to connect with the existing pathway in Lawrence Park. Part of the Old Steel Bridge has been purchased and is intended for use on this project to provide a crossing over the Stillwater River.

8.5.3 Proposed Non-Motorized Facilities

In deference to the developing Flathead County Trails Plan, no specific non-motorized facilities will be proposed with this plan, excepting those proposed along with new transportation corridors. However, in general, bicycle facilities should be considered and incorporated in any new construction or roadway rehabilitation projects as appropriate.

8.6 TRANSIT CONSIDERATIONS

Note that the majority of the information contained in this section has been taken directly from the recent *Eagle Transit Transportation Development Plan Update (2007-2012)* prepared by the consulting firm of LSC Transportation Consultants, Inc. and the *Kalispell Area Transportation Plan (2006 Update).*

8.6.1 INTRODUCTION

This section the Transportation Plan is intended to provide a "snapshot" of current transit service and operations in the Flathead County area. Transit operations are evaluated in the Flathead County area on a five-year cycle through the development of "Transit (or Transportation) Development Plan (TDP)" updates. The most recent TDP Update was completed during the calendar year 2006 by the consulting firm of LSC Transportation Consultants, Inc. Accordingly, the next TDP Update will occur during the year 2011. Transit development plans are generally intended to analyze current transit system operations and determine how well the transit systems are meeting the needs of the county citizens. Projecting future growth patterns and future transit needs are also examined in great detail. Within the Flathead County planning area, there are a variety of different transportation providers. These providers include public, private, and nonprofit operations. Most of these organizations serve a specific segment of the City of Kalispell and Flathead County's population.

It is important to recognize that transit service in the county is for some citizens the only mode of transportation utilized. This is especially true for many of the community's elderly and disabled citizen population. The primary goal of the transit system should be to provide reliable service to its users and make that service available to all members of the public. A secondary goal is to make mass transit work for the county, by reducing parking demand, traffic congestion, and the need for roadway expansion wherever possible. Wherever possible, planners & elected officials should consistently evaluate opportunities to heighten transit awareness and usage in the county and its' communities. This can be as simple as requiring consideration of park-and-ride facilities with new developments along major roadways (if appropriate) to ensuring that the needs of disabled pedestrians are examined to ensure that they have well connected routes of travel.

8.6.2 GOALS OF EAGLE TRANSIT SERVICE IN FLATHEAD COUNTY

The mission of Eagle Transit is to "…promote transportation education and to provide transportation in a safe, economical, and efficient manner for the transportation-disadvantaged and general public of Flathead County." To achieve the mission statement, a set of goals and objectives were defined during the TDP Update process. Four (4) goals with corresponding objectives were developed in the TDP Update. These goals addressed mobility, performance, customer orientation, and land use planning.

8.6.3 Description of Transportation Services

Eagle Transit is available to all persons within Flathead County. Two types of primary service are available to local residents and are listed below:

- **Kalispell City Bus Route** – The City Bus Route operates year-round Monday through Friday in Kalispell, and the hours of operation are from 9:15 a.m. to 5:30 p.m. A variety of fare options are available for the checkpoint service. Elderly riders provide donations for the transportation service.

- **Countywide "Door-to-Door" Service** – These services vary within each community and also have varied operating hours and days of service. The different services are described below. Much of this service is provided only if there are a certain number of riders scheduled for the trips. Many times this does not occur. New service put in place in October 2004 attempts to reach into those areas which previously had not had service. The service is designed to meet the need of the elderly and disabled and is available within a 20-mile radius of Columbia Falls, Kalispell, and Whitefish on Tuesday and Thursday.

    - **Columbia Falls "Curb-to-Curb" Service** – The service is offered Monday through Friday from 9:00 a.m. to 1:00 p.m. The curb-to-curb service in Columbia Falls is expanded to the Canyon with two round-trips on Tuesdays and Thursdays when at least five passengers schedule a ride. This service provided 2,800 annual trips for 2004-2005, approximately six percent of the total Eagle Transit ridership. This service also provides transportation to and from the Montana Veterans Home.

    - **Columbia Falls/Canyon/Kalispell Service** – This service is provided on the first and third Tuesdays of the month only. There must be a minimum of five riders for the service to operate. This service is virtually non-existent and only provided occasionally. Service is provided using the conversion van. The service historically provided service five days per week; however, service was changed to reflect the decrease in demand from Canyon into Columbia Falls. Ridership decreased 21 percent and service hours were reduced by 9 percent. The primary users of this service are the elderly.

    - **Kalispell/Evergreen "Curb-to-Curb" Service** – This curb-to-curb service is offered Monday, Wednesday, and Friday at 8:00 a.m., 10:00 a.m., 12:00 noon, and 3:00 p.m. This service provided the most trips in 2004-2005, providing more than 12,700 trips, or 27 percent of the total system wide ridership. This service provides more trips than the Kalispell City Bus.

    - **Evergreen Express Service** – The Express Service is provided on Wednesdays only with two round-trips scheduled—one at 10:00 a.m. and the second at 12:00 noon. This route provides direct service to the shopping areas, such as Wal-Mart, Shopko, and Kmart.

    - **Whitefish/Kalispell Service** – This curb-to-curb service is provided on Tuesdays providing five riders or more have requested the trip. The scheduled service provides one round-trip, leaving Whitefish at 2:00 p.m. and returning at approximately 6:00 p.m. Again, this service in nonexistent due to the policy of having five or more riders scheduled three days in advance.

- **Kalispell/Whitefish Service** – This curb-to-curb service is offered Monday, Wednesday, and Friday with one round-trip scheduled each day. The route leaves Kalispell at 9:00 a.m. and returns at 2:45 p.m.

- **Whitefish Service** – This curb-to-curb service is also offered Monday, Wednesday, and Friday from 10:00 a.m. to 2:00 p.m. This service provided approximately 3,300 annual trips for 2004-2005, or approximately seven percent of the total Eagle Transit ridership. This service averages approximately 400 trips per month.

- **SPARKS Service** – The Sparks service is an after-school program for children through The Summit, a part of the Regional Medical Center. Children are provided transportation from school to this program. The service provided approximately 4,800 rides in FY 2004-2005.

8.6.4 Other Transportation Providers

- **Kalispell Taxi** – Kalispell Taxi, also known as Flathead Area Custom Transportation, is a full-service, private transportation provider. Kalispell Taxi's current service area extends 50 miles from Kalispell in all directions. Kalispell Taxi provides demand-response, scheduled, and non-ambulatory (wheelchair) service. Service is available 24 hours a day, seven days a week.

  - **Airport Shuttle Service** – Shuttle services from the Flathead Valley to and from the airport are provided year-round. Kalispell Taxi previously had two contracts for the transportation of airline crews to and from the airport to the hotel. Approximately 900 rides were supplied to airline crews annually and approximately 4,000 rides to the general public from scheduled shuttle operations. This service is no longer active due to the hotels purchasing vans for their clients and operating the service themselves. However, in January 2000, Kalispell Taxi began a contract with Amtrak to transport crews to and from the train station. This service generates approximately 3,000 to 4,000 annual trips.

  - **General Taxi Services** – Kalispell Taxi offers taxi service to passengers within a 50-mile radius of Kalispell. The service is based out of Kalispell. The company has from one to seven drivers on shift at any given time, based on the demand for service. Approximately 35,000 passengers per year are transported with the general service.

  - **Specialized Taxi Services** – Kalispell Taxi provides non-ambulatory and medical transportation to passengers with disabilities year-round. The service is provided at the same rate as used for Medicaid and for the Eagle Transit program. Approximately 1,500 non-ambulatory rides per year are provided and approximately 5,000 annual rides to others with disabilities.

  - **Expedited Courier Service** – The final service offered by Kalispell Taxi provides immediate delivery of courier items 24 hours/day year-round to points and places in Montana and Idaho. Approximately two trips per day of this type are provided. Current contracts for this service are with Sky Courier, Network, Sonic, Federal Express, and other small courier companies.

- **<u>Buffalo Hill Terrace</u>** – Buffalo Hill Terrace is a residential community for the elderly located at 40 Claremont Street in Kalispell. Buffalo Hill Terrace has one 17-passenger bus providing transportation for its residents only. In general, transportation services are provided seven days per week with Tuesday and Thursday afternoons reserved for Kalispell-area appointments. Commonly, there are shopping trips on Saturdays and trips to area churches on Sundays. The bus is reserved for activities scheduled at other times during the week. The bus is driven either by the director, maintenance, or recreation person for Buffalo Hill Terrace as part of their regular full-time work. Transportation services are provided at no extra cost other than resident rent.

- **<u>Immanuel Lutheran Home</u>** – Immanuel Lutheran Home is a residential care facility which has a 13-passenger, lift-equipped mini-bus available to provide transportation. On Tuesdays and Thursdays, the vehicle is reserved to accommodate scheduled medical appointments for the residents. Resident families are encouraged to accompany residents to these appointments. On Mondays, Wednesdays, and Fridays, the vehicle is used by the Activities Department for group outings. Resident families, as well as volunteers and staff members, accompany residents to assist in providing necessary care. On Sundays, the vehicle is used to transport residents of Buffalo Hill Terrace and Immanuel Lutheran Home to Sunday morning church services. The vehicle is available as needed for medical emergencies if it is not in use for group outings.

- **<u>Heritage Place</u>** – Heritage Place, at 171 Heritage Way, provides residential care for elderly persons. It owns and maintains one van. Transportation services for residents are provided to and from appointments with doctors, dentists, and other medical practitioners. Other transportation services include recreational activities, such as lunches, trips to parks, and parades. Transportation is generally provided in the Kalispell area. Services are usually operated from 8:30 a.m. until 4:00 p.m. on Mondays, Tuesdays, and Wednesdays. Special trips are made on Thursdays and Fridays. Emergency trips can be made on Saturdays and Sundays. Residents' rent covers all transportation costs.

- **<u>Flathead Industries</u> –** Flathead Industries is a community rehabilitation agency. It operates four group homes, each of which has a van. There are four additional vans not assigned to a group home, for a total of eight vans. Flathead Industries also operates services for disabled persons living independently. Transportation services are provided seven days a week and virtually 24 hours a day. The majority of trips are made within the Kalispell area, but trips have been made as far north as Libby. Several fixed schedule services are run to enable disabled persons to get to work. That service takes disabled persons to work at 9:00 a.m. and picks them up again at 3:00 p.m. The remainder of the transportation services operate much like a family vehicle, taking clients on demand where they need to go. Peak transportation periods are generally between the hours of 7:00 and 9:00 a.m., and again in the afternoon from 2:00 to 4:00 p.m.

  Flathead Industries has a total of 74 full-time employees and 60 part-time employees. Of the total 134, a core of 28 persons, primarily the group home staff, does most of the driving. All driving is part of other regular staff duties. Flathead Industries provides 40,000 one-way passenger-trips per year. Their eight vans travel approximately 85,000 total vehicle-miles per year. That represents about 8,000 miles per year per van, plus an additional 20,000 miles for service in Whitefish. The trip totals and mileage totals translate to nearly 7,500 vehicle-hours of service.

Regarding trends for the future, Flathead Industries is similar to many other agencies across the United States—focusing on disabled persons getting their own jobs rather than working in “sheltered workplaces.” The result of this trend is the increasing breadth of services throughout the community. As service broadens, increased coordination between Flathead Industries, Eagle Transit, and other transportation providers will be necessary.

- **Kalispell Regional Hospital –** Kalispell Regional Hospital operates two vans for its patients. One van is used solely for transporting nursing home patients and psychiatric patients. The other van is used for general patient transportation. In general, transportation services are provided to and from other doctor appointments, dialysis, rehabilitation, recreational therapy, and psychiatric appointments. The services are provided on an as-needed basis. Kalispell Hospital estimates that each van travels approximately 10,000 miles per year. The general patient van provides approximately 3,000 passenger-trips per year.

  The general patient 1995-van has room for two wheelchairs, three ambulatory patients, and one driver, for a total of six. The hospital applied for DOT grants several years in a row, as was done in Missoula. Unlike Missoula, Kalispell Hospital was denied the grant each time, making it necessary for Kalispell Hospital to purchase the van without any assistance.

- **S.N.O.W. (The Shuttle Network of Whitefish) BUS** – The S.N.O.W. Bus service operates only during the ski season. This free service is funded by the member businesses of the Big Mountain Commercial Association (BMCA). The service provides convenient, comfortable, and free transportation to and from the Town of Whitefish and Big Mountain Village. The agency reported approximately 40,000 trips for the 2004-2005 ski season. Possible coordination for summer operations in the future between S.N.O.W. Bus and Eagle Transit have been discussed. S.N.O.W. Bus also showed interest in coordination with the Glacier Park Project.

- **Colonial Manor Nursing Home of Whitefish –** The Colonial Manor Nursing Center operates a dual-purpose van. One of those purposes is to provide residents transportation to and from medical office visits. The nursing center service area is approximately 20 miles in any direction from Whitefish. The transportation service runs by appointment. Appointments are set by nursing staff and the van is used at those times. Some additional outside trips are scheduled.

  There is no fare for this service. The transportation fees are included in the resident room rate. Several employees do the driving for this service as part of their overall responsibilities. Service is provided generally between the hours of 9:00 a.m. and 7:00 p.m.

  Colonial Manor staff estimate approximately 400 one-way trips are made annually. Those trips require approximately 2,000 vehicle-miles and 300 vehicle-hours of service. The operating cost of the service is estimated at $1,000. The van operates more than twice per week. In general, the current resident transportation needs are being met. The number of trips made per year has decreased slightly in recent years due to increasing Eagle Transit service.

- **Rocky Mountain Transportation** – Rocky Mountain Transportation is the largest transportation provider in Flathead County. Rocky Mountain Transportation (RMT) consists of three divisions: school bus operation in Whitefish, charter services including convention and athletic trips, and a Hertz franchise. As mentioned elsewhere, some of Rocky Mountain Transportation’s charter services include the Whitefish Mountain Ski Area. Contract fees are charged for all services based on the cost of providing those services. As a private transportation provider, it does not receive government subsidies. RMT has a substantial fleet, consisting of 7 coaches, 15 school buses, five 12-passenger vans, and 200 automobiles (Hertz). RMT has been providing transportation services in the Whitefish area since 1946.

- **Whitefish Golden Agers, Inc.** – Whitefish Golden Agers, Inc. owns and operates a 12-passenger van. Transportation services are provided free of charge to residents of the Golden Agers community. Transportation services are generally provided on Tuesdays, taking senior walkers to the mall. Other special trips are made as needed. The Whitefish Golden Agers community coordinates with Eagle Transit, which provides service on Monday, Wednesday, and Friday to and from nutrition sites. All drivers for the Golden Agers service are volunteers.

- **State Veterans Home** – The Montana State Veterans Home is located approximately one mile outside of the Columbia Falls city limits. The State Veterans Home currently maintains several vehicles for transportation services. However, many of the clients use Eagle Transit for transportation. Eagle Transit stops by the Veterans Home daily for passenger pickup or drop off.

  The Veterans Home provides bus service to Columbia Falls on Monday, Wednesday, and Friday mornings. Demand-response service is also available. There is no fee charged to residents of the Veterans Home for in-house transportation services. Several full-time maintenance employees do the driving as part of their overall responsibilities.

  The State Veterans Home estimates that they provide approximately 600 one-way passenger-trips on an annual basis. This represents approximately 14,000 vehicle-miles and 600 vehicle-hours of service per year. Funding for their transportation is provided by the federal Veterans Administration, by State of Montana cigarette tax, and when possible, third parties such as insurance companies pay for residents of the home.

- **Lake View Care Center** – The Lake View Care Center is a nursing home with an 83-bed capacity. It currently operates one lift-equipped van for resident transportation needs. Transportation services are provided from 8:00 a.m. until 5:00 p.m. Tuesday through Friday, with Monday lunch and outing trips. The majority of the trips Tuesday through Friday are to doctors and dentists in the Kalispell area.

  Two employees of Lake View Care Center drive the 1987 van as part of their other full-time duties. The Lake View Care Center estimates that the van travels 10,000 miles per year. The budgeted operating cost for the transportation services is approximately $1,500 per year. Operating costs come directly out of resident rent. No federal or state grants are available.

  There are two issues to consider for the Lake View Care Center. One is that the Lake View Care Center staff are only able to provide transportation Monday through Friday 8:00 a.m. to 5:00 p.m. Evening and weekend service needs are not currently met. Additionally, some of the ambulatory residents desire to get out and about more often. Some sort of public transit service, such as Eagle Transit, would be great if available.

- **Rimrock Stage/Rimrock Trailways** – Rimrock is an intra- and interstate transportation provider. Service operates daily between Whitefish and Missoula. Stops are made in Kalispell and numerous other locations along the west shore of Flathead Lake. Service departs Missoula at

12:15 p.m. and arrives in Whitefish at 4:35 p.m. Return service departs Whitefish at 4:35 p.m. and terminates in Missoula at 8:05 p.m. Connecting bus service beyond Missoula is made aboard the Greyhound Bus lines.

8.6.5 TDP Update (2007-2011) Recommendations

Eagle Transit shows limited expansion of the existing services as the plan for the next six years, due to local funding constrains. The major assumptions used in developing revenue and cost projections are sources currently dedicated to Eagle Transit or to be realized over the short planning horizon. Currently FTA has allocated a large amount of FTA Section 5311 funding for general transportation providers; however, this funding requires a local match for both operating and capital, and it is this local match which is in short supply. Unless innovative funding mechanisms become realized by Eagle Transit, service will likely remain unchanged except for minor improvements; however, a plan is also designed to incorporate “what if” scenarios, such as increased local funding sources. This Plan attempts to be both realistic, as well as optimistic. The Preferred Transit Plan (i.e. recommendations) incorporates ten elements as shown below:

- Route-deviation service in Kalispell;
- ADA service in Kalispell;
- Increased service in Columbia Falls;
- Increased service in Whitefish;
- Limited commuter service;
- Downtown Kalispell shuttle system;
- Operations Manager Position;
- Marketing program;
- Capital improvements; and
- Countywide Dial-a-Ride and South Valley expansion.

Each of these service options is presented below with a brief description and operating measures.

Kalispell Route-Deviation System – This service component will be operated with two vehicles from 7:00 a.m. until 6:00 p.m. Two deviated fixed-routes are designed to run both generally north/south and east/west with a timed transfer point at the Kalispell Center Mall in downtown Kalispell. Buses would be dispatched to pick up passengers off the route using computer-aided schedule and dispatch software. These passengers would be charged 2.0 times the route stop fare

ADA Service in Kalispell – ADA service in Kalispell will be provided to subscription or certified riders only. This service would be done with one small body-on-chassis vehicle or a small van with a lift. Only passengers within the city limits of Kalispell are eligible for ADA service. Passengers outside who are ADA certified will continue to be served with the County Dial-A-Ride service.

Columbia Falls Service – Columbia Falls will be served with one vehicle five days per week from approximately 8:00 a.m. until 5:00 p.m. Multiple “tripper” runs could be done out of Columbia Falls between either Kalispell or Whitefish daily or Hungry Horse/Canyon. These would be published runs and occur for any one passenger.

Whitefish Service – Service in Whitefish would be provided Monday, Wednesday, and Friday from 8:00 a.m. until approximately 5:15 p.m. This service would provide two "trippers" to Kalispell daily, one scheduled in the mid-morning and one in the mid-afternoon. This service would also provide the limited commuter service discussed in the next section. Service would be provided on these days until an average of 5 passengers per hour is reached, at which point, service should be increased to five days per week.

Limited Commuter Service – Commuter service would be incorporated into each of the options listed above. Commuter service is envisioned to operate from Kalispell to Hungry Horse and back twice per day as well as between Whitefish and back twice per day.

Downtown Kalispell Shuttle Service – A downtown shuttle has been discussed with local Kalispell business leaders. This shuttle would serve the downtown area during normal business hours and be free to patrons. The shuttle would help alleviate downtown congestion and allow downtown patrons to travel around the area without having to drive their car. This will be developed further as discussions progress with business leaders who have expressed a willingness to fund this type of service.

Operations Manager Position – An Operations Manager Position should be formed. This position should be formed from the existing Driver Supervisor/Scheduler position. Once computer-aided scheduling is in place, the current supervisor/scheduler should take over more of a role of operations manager. This position would continue to oversee the driver's schedules, training, and other administrative duties as well as assist in operations management, tracking of records, and overall maintenance functions. While this is actually being done by the scheduler, these scheduling duties would be replaced by such functions as marketing of the system, tracking ridership, on-time performance monitoring, grant preparation, and planning. No significant cost is assumed to be incurred by this position; however, significant training may be required on grant writing, report preparation, and other duties as seen fit by the Transit Manager.

Marketing Program – An aggressive marketing campaign and program should be established. As step one, a Marketing Plan should be prepared detailing plans for one fiscal year of marketing strategies and efforts. As system changes occur in the near future, increased public awareness is a priority. This ranges from newspaper advertisement, radio spots, television appearances, the formation of an education and speaker forum, all under the direction and responsibility of the Transit Manager. This is likely to cost from $15,000 to $20,000 per year for elements such as schedule printing, advertisement, travel costs, and other promotional material.

Additional Capital Improvements – Additional capital is likely to be needed to make Eagle Transit more effective and efficient. Several items include the following:

- Computer-aided dispatching and scheduling hardware/software;
- New fare boxes;
- Communication equipment for drivers and dispatchers;
- Office equipment such as color printer/copier;
- Bike racks;
- General maintenance equipment;
- On-sight wash bay/rack; and
- Passenger amenities such as fixed-stop shelters.

While all of these elements may not be needed, vehicles are a must and therefore must be planned for if a transit system is to operate. Some of these items, such as dispatching software, will allow Eagle Transit to more effectively serve passengers as the system progresses to more of a deviated fixed-route system.

8.7 ALTERNATIVE TRAVEL MODE CONCLUSIONS

During the development of this Transportation Plan, additional non-motorized locations and thoughts were developed to "piggy-back" on the routes and ideas developed in the Comprehensive Parks and Recreation Master Plan. These are listed below:

- Continue support of and explore funding for the Sam Bibler Commemorative Trail. This facility was identified as project T-15 in the Comprehensive Master Plan, however did not extend north on Willow Glen Drive past Woodland Avenue. The entire segment would be in place between US Highway 93 South and Conrad Drive, with eventual connection to Shady Lane via Conrad Drive.

- Explore feasibility of a recreation trail in the Slough area between Woodland Avenue and Kelly Drive, with potential connections to the Sam Bibler Memorial Trail. There is currently an informal trail around most of the northern part of the slough area.

- Encourage on-street bicycle facilities for all new minor arterials, and/or reconstruction projects on existing minor arterials.

- Require new developments annexing into the City to provide non-motorized facilities and ensure connectivity to appropriate key features (parks, schools, etc.).

CHAPTER 9

Financial Analysis

Chapter 9: Financial Analysis

9.1 BACKGROUND

The previous chapters of this Plan identified problems with the transportation system and recommended appropriate corrective measures. This chapter focuses on the financial mechanisms that are traditionally used to finance transportation improvements. Transportation improvements can be implemented using federal, state, local and private funding sources. Considering the current funding limits of these traditional programs, and the anticipated road development needs of the community, it is apparent that a greater amount of the financing will be required from local and private sources if these needs are to be met.

Much of the following information concerning the federal and state funding programs was assembled with the assistance of the Statewide and Urban Planning Section of the Montana Department of Transportation (MDT). The intent is to identify the traditional federal, state and local sources of funds available for funding transportation related projects and programs in Flathead County. A narrative description of each potential funding source is provided including: the source of revenue; required match; purpose for which funds are intended; means by which the funds are distributed; and the agency or jurisdiction responsible for establishing priorities for the use of the funds.

9.2 FUNDING SOURCES

The following list includes federal and state funding sources developed for the distribution of Federal and State transportation funding. This includes Federal funds the State receives under Federal Transportation Legislation and State law.

Federal Funding Sources

- National Highway System (NHS)
- Surface Transportation Program (STP)
    - *Primary Highway System (STPP)**
    - *Secondary Highway System (STPS)**
    - *Urban Highway System (STPU)**
    - *Community Transportation Enhancement Program (CTEP)**
- Highway Safety Improvement Program (HSIP)
    - *High Risk Rural Roads Program (HRRR)*
- Highway – Railway Crossing Program (RRX)
- Highway Bridge Replacement and Rehabilitation Program (HBRRP)
    - *On-System Bridge Replacement and Rehabilitation Program*
    - *Off-System Bridge Replacement and Rehabilitation Program*
- Congestion Mitigation & Air Quality Improvement Program (CMAQ)
    - *CMAQ (formula)*
    - *Montana Air & Congestion Initiative (MACI)–Guaranteed Program (flexible)**
    - *Montana Air & Congestion Initiative (MACI)–Discretionary Program (flexible)**
    - *Urban High Growth Adjustment (flexible)**

- Urban Highway Preservation (UHP) (Equity Bonus)*
- Safe Routes To School (SRTS)
- Federal Lands Highway Program (FLHP)
    - *Public Lands Highways (PLH)*
    - *Parkways and Park Roads*
    - *Indian Reservation Roads (IRR)*
    - *Refuge Roads*
- Congressionally Directed Funds
    - *High Priority Projects (HPP)*
    - *Transportation Improvements Projects*
- Transit Capital & Operating Assistance Funding
    - *Discretionary Grants (Section 5309)*
    - *Capital Assistance for the Elderly and Persons with Disabilities (Section 5310)*
    - *Financial Assistance for Rural General Public Providers (Section 5311)*
    - *New Freedoms Program (5317)*
    - *Job Access Reverse Commute (JARC) (5316)*

State Funding Sources

- State Funded Construction (SFC)
- TransADE

Local Funding Sources

- City Funds
- County Road Funds
- Future Potential Funds

9.3 FEDERAL AID FUNDING SOURCES

The following summary of major Federal transportation funding categories received by the State through the Federal Transportation Legislation and State law includes state developed implementation/sub-programs. In order to receive project funding under these programs, projects must be included in the State Transportation Improvement Program (STIP).

National Highway System (NHS)

The purpose of the National Highway System (NHS) is to provide an interconnected system of principal arterial routes which will serve major population centers, international border crossings, intermodal transportation facilities and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel. The National Highway System includes all Interstate routes, a large percentage of urban and rural principal arterials, the defense strategic highway network, and strategic highway connectors.

Allocations and Matching Requirements – NHS funds are Federally apportioned to Montana and allocated based on system performance by the Montana Transportation Commission. The Federal share for NHS projects is 86.58% and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account.

Eligibility and Planning Considerations – Activities eligible for the National Highway System funding include construction, reconstruction, resurfacing, restoration, and rehabilitation of segments of the NHS. Operational improvements as well as highway safety improvements are also eligible. Other miscellaneous activities that may qualify for NHS funding include research, planning, carpool projects, bikeways, and pedestrian walkways. The Transportation Commission establishes priorities for the use of National Highway System funds and projects are let through a competitive bidding process.

Surface Transportation Program (STP)

Surface Transportation Program (STP) funds are Federally apportioned to Montana and allocated by the Montana Transportation Commission to various programs including the Surface Transportation Program Primary Highways (STPP), Surface Transportation Program Secondary Highways (STPS), and the Surface Transportation Program Urban Highways (STPU).

- *Primary Highway System (STPP)**

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Primary Highway System. The Primary Highway System includes highways that have been functionally classified by the MDT as either principal or minor arterials and that have been selected by the Transportation Commission to be placed on the Primary Highway System [MCA 60-2-125(3)].

Allocations and Matching Requirements – Primary funds are distributed statewide [MCA 60-3-205] to each of five financial districts, including the Missoula District. The Commission distributes STPP funding based on system performance. Of the total received, 86.58% is Federal and 13.42% is State funds from the Highway State Special Revenue Account.

Eligibility and Planning Considerations – Eligible activities include construction, reconstruction, rehabilitation, resurfacing, restoration and operational improvements. The Transportation Commission establishes priorities for the use of Primary funds and projects are let through a competitive bidding process.

- *Secondary Highway System (STPS)**

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Secondary Highway System. The Secondary Highway System highways that have been functionally classified by the MDT as either rural minor arterials or rural major collectors and that have been selected by the Montana Transportation Commission in cooperation with the boards of county commissioners, to be placed on the secondary highway system [MCA 60-2-125(4)].

Allocations and Matching Requirements – Secondary funds are distributed statewide (MCA 60-3-206) to each of five financial districts, including the Missoula District, based on a formula, which takes into account the land area, population, road mileage and bridge square footage. Federal funds for secondary highways must be matched by non-federal funds. Of the total received 86.58% is Federal and 13.42 % is non-federal match. Normally, the match on these funds is from the Highway State Special Revenue Account.

Eligibility and Planning Considerations – Eligible activities for the use of Secondary funds fall under three major types of improvements: Reconstruction, Rehabilitation, and Pavement Preservation. The Reconstruction and Rehabilitation categories are allocated a minimum of 65% of the program funds with the remaining 35% dedicated to Pavement Preservation. Secondary funds can also be used for any project that is eligible for STP under Title 23, U.S.C.

MDT and county commissions determine Secondary capital construction priorities for each district with final project approval by the Transportation Commission. By state law the individual counties in a district and the state vote on Secondary funding priorities presented to the Commission. The Counties and MDT take the input from citizens, small cities, and tribal governments during the annual priorities process. Projects are let through a competitive bidding process.

- *Urban Highway System (STPU)**

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Urban Highway System. The Urban Highway System is described under MCA 60-2-125(6), as those highways and streets that are in and near incorporated cities with populations of over 5,000 and within urban boundaries established by the MDT, that have been functionally classified as either urban arterials or collectors, and that have been selected by the Montana Transportation Commission, in cooperation with local government authorities, to be placed on the Urban Highway System.

Allocations and Matching Requirements – State law [MCA 60-3-211] guides the allocation of Urban funds to projects on the Urban Highway System in the fifteen urban areas through a statutory formula based on each area's population compared to the total population in all urban areas. Of the total received, 86.58% is Federal and 13.42% is non-federal match typically provided from the Special State Revenue Account for highway projects.

Eligibility and Planning Considerations – Urban funds are used primarily for major street construction, reconstruction, and traffic operation projects on the 390 miles on the State-designated Urban Highway System, but can also be used for any project that is eligible for STP under Title 23, U.S. C. Priorities for the use of Urban funds are established at the local level through local planning processes with final approval by the Transportation Commission.

Because the Urban Highway System includes transportation infrastructure that crosses the line between incorporated and unincorporated areas, it is important that city and county governments work together to identify and address urban highway needs. Consideration of cooperative efforts between city and county governments to address urban highways (roads and bridges) should be incorporated into the planning and implementation of the county CIP as appropriate.

Kalispell's FFY 2009 urban funding balance is currently negative $437,188. The annual allocation of urban funds for Kalispell is $600,055 (total dollars, Federal plus State match). We assume this allocation will remain constant through the life of the plan. It is anticipated the City of Kalispell will have a positive Urban funding balance and be able to program a new project in 2011.

Whitefish's FFY 2009 urban funding balance is currently $1,133,818. The annual allocation of urban funds for Whitefish is $171,074 (total dollars, Federal plus State match). We assume this allocation will remain constant through the life of the plan. It is anticipated the City of Whitefish will have a positive Urban funding balance and be able to program a new project in 2010.

- *Community Transportation Enhancement Program (CTEP)**

Federal law requires that at least 10% of STP funds must be spent on transportation enhancement projects. The Montana Transportation Commission created the Community Transportation Enhancement Program in cooperation with the Montana Association of Counties (MACO) and the League of Cities and Towns to comply with this Federal requirement.

Allocations and Matching Requirements – CTEP is a unique program that distributes funding to local and tribal governments based on a population formula and provides project selection authority to local and tribal governments. The Transportation Commission provides final approval to CTEP projects within the State's right-of-way. The Federal share for CTEP projects is 86.58% and the Local and tribal governments are responsible for the remaining 13.42%.

Eligibility and Planning Considerations – Eligible CTEP categories include:

- Pedestrian and bicycle facilities
- Historic preservation
- Acquisition of scenic easements and historic or scenic sites
- Archeological planning and research
- Mitigation of water pollution due to highway runoff or reduce vehicle-caused
- Wildlife mortality while maintaining habitat connectivity
- Scenic or historic highway programs including provisions of tourist and welcome center facilities
- Landscaping and other scenic beautification
- Preservation of abandoned railway corridors (including the conversion and use for bicycle or pedestrian trails)
- Control and removal of outdoor advertising
- Establishment of transportation museums
- Provisions of safety and educational activities for pedestrians and bicyclists

Projects addressing these categories and that are linked to the transportation system by proximity, function or impact, and where required, meet the "historic" criteria, may be eligible for enhancement funding.

Projects must be submitted by the local government to the MDT, even when the project has been developed by another organization or interest group. Project proposals must include evidence of public involvement in the identification and ranking of enhancement projects. Local governments are encouraged to use their planning boards, where they exist, for the facilitation of public participation; or a special enhancement committee. The MDT staff reviews each project proposal for completeness and eligibility and submits them to the Transportation Commission and the federal Highway Administration for approval.

The City of Kalispell has a current balance of $107,632 and the estimated 2010 allocation is $83,415 (Federal). The City of Whitefish has a current balance of $266,349 and the estimated 2010 allocation is $29,511 (Federal). Flathead County is allocated approximately $302,455 annually (Federal). There is currently a balance of $918,511 for this program. The balances represent funds not obligated towards a selected project.

**State funding programs developed to distribute Federal funding within Montana*

Highway Safety Improvement Program (HSIP)

Allocations and Matching Requirements – HSIP is a new core funding program established by SAFETEA-LU. HSIP funds are Federally apportioned to Montana and allocated to safety improvement projects identified in the strategic highway safety improvement plan by the Commission. Projects described in the State strategic highway safety plan must correct or improve a hazardous road location or feature, or address a highway safety problem. The Commission approves and awards the projects which are let through a competitive bidding process. Generally, the Federal share for the HSIP projects is 91.24% and the State is responsible for 8.76%.

Eligibility and Planning Considerations – There are two set aside programs that receive HSIP funding: the Highway – Railway Crossing Program and the High Risk Rural Roads Program.

- *High Risk Rural Roads Program (HRRR)*

Funds are set aside from the Highway Safety Improvement Program funds apportioned to Montana for construction and operational improvements on high-risk rural roads. These funds are allocated to HRRRP projects by the Commission. If Montana certifies that it has met all of the needs on high risk rural roads, these set aside funds may be used on any safety improvement project under the HSIP. Montana's set aside requirement for HRRRP is approximately $700,000 per year.

Highway – Railway Crossing Program (RRX)

Funds are Federally apportioned to Montana and allocated by the Commission for projects that will reduce the number of fatalities and injuries at public highway-rail grade crossings; through the elimination of hazards and/or the installation/upgrade of protective devices.

Highway Bridge Replacement and Rehabilitation Program (HBRRP)

Allocations and Matching Requirements – HBRRP funds are Federally apportioned to Montana and allocated to two programs by the Montana Transportation Commission. In general, projects are funded with 86.58% Federal and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process.

- *On-System Bridge Replacement and Rehabilitation Program*

The On-System Bridge Program receives 65% percent of the Federal HBRRP funds. Projects eligible for funding under the On-System Bridge Program include all highway bridges on the State system. The bridges are eligible for rehabilitation or replacement. In addition, painting and seismic retrofitting are also eligible under this program. MDT's Bridge Bureau assigns a priority for replacement or rehabilitation of structurally deficient and functionally obsolete structures based upon sufficiency ratings assigned to each bridge. A structurally deficient bridge is eligible for rehabilitating or replacement; a functionally obsolete bridge is eligible only for rehabilitation; and a bridge rated as sufficient is not eligible for funding under this program.

- *Off-System Bridge Replacement and Rehabilitation Program*

The Off-System Bridge Program receives 35% percent of the Federal HBRRP funds. Projects eligible for funding under the Off-System Bridge Program include all highway bridges not on the State system. Procedures for selecting bridges for inclusion into this program are based on a ranking system that weighs various elements of a structures condition and considers local priorities. MDT Bridge Bureau personnel conduct a field inventory of off-system bridges on a two-year cycle. The field inventory provides information used to calculate the Sufficiency Rating (SR).

Coordinated Border Infrastructure Program (CBI)

CBI funds are Federally apportioned to Montana and allocated by the Commission based on system performance and project eligibilities. These funds may be used on projects within 100 miles of the international border to improve transportation, safety, regulation, or improved planning/coordination to streamline international motor vehicle and cargo movements. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process. The Federal share is 86.58% and the State is responsible for 13.42%.

Congestion Mitigation & Air Quality Improvement Program (CMAQ)

Federal funds available under this program are used to finance transportation projects and programs to help improve air quality and meet the requirements of the Clean Air Act. Montana's air pollution problems are attributed to carbon monoxide (CO) and particulate matter (PM^{10} and $PM^{2.5}$).

Allocations and Matching Requirements – CMAQ funds are Federally apportioned to Montana and allocated to various eligible programs by formula and by the Commission. As a minimum apportionment state a Federally required distribution of CMAQ funds goes to projects in Missoula since it is Montana's only designated and classified air quality non-attainment area. The remaining, non-formula funds, referred to as "flexible CMAQ" is directed to areas of the state with emerging air quality issues through various state programs. The Transportation Commission approves and awards both formula and non-formula projects on MDT right-of-way. Infrastructure and capital equipment projects are let through a competitive bidding process. Of the total funding received, 86.58% is Federal and 13.42% is non-federal match provided by the state for projects on state highways and local governments for local projects.

Eligibility and Planning Considerations – In general, eligible activities include transit improvements, traffic signal synchronization, bicycle pedestrian projects, intersection improvements, travel demand management strategies, traffic flow improvements, and public fleet conversions to cleaner fuels. At the project level, the use of CMAQ funds is not constrained to a particular system (i.e. Primary, Urban, and NHS). A requirement for the use of these funds is the estimation of the reduction in pollutants resulting from implementing the program/project. These estimates are reported yearly to FHWA.

As transportation projects are developed in these areas, designers should carefully consider if the proposed projects and programs will contribute to the attainment of the National Ambient Air Quality Standards (NAAQS) and not be detrimental to these standards. Transportation projects that are eligible for CMAQ funds must demonstrate an air quality emission benefit. The availability of CMAQ funding for eligible projects would be determined as these projects are developed.

- *CMAQ (formula)*

  Mandatory CMAQ funds that come to Montana based on a Federal formula and are directed to Missoula, Montana's only classified, moderate CO non-attainment area. Not applicable to Whitefish.

- *Montana Air & Congestion Initiative (MACI)–Guaranteed Program (flexible)**

  This is state program funded with flexible CMAQ funds that the Commission allocates annually to Billings and Great Falls to address carbon monoxide issues in these designated, but "not classified", CO non-attainment areas. The air quality in these cities is roughly equivalent to Missoula, however, since these cities are "not classified" so they do not get direct funding through the Federal formula.

- *Montana Air & Congestion Initiative (MACI)–Discretionary Program (flexible)**

  The MACI – Discretionary Program provides funding for projects in areas designated non-attainment or recognized as being "high-risk" for becoming non-attainment. Since 1998, MDT has used MACI-Discretionary funds to get ahead of the curve for CO and PM10 problems in non-attainment and high-risk communities across Montana. District Administrators and local governments nominate projects cooperatively. Projects are prioritized and selected based on air quality benefits and other factors. The most beneficial projects to address these pollutants have been sweepers and flushers, intersection improvements and signal synchronization projects.

- *Urban High Growth Adjustment (flexible)**

  Urban High Growth Adjustment funds are distributed to urban areas in Montana where population increased by more than 15% between the 1990 and 2000 censuses. Kalispell, Bozeman, and Missoula are the areas currently eligible for funding through this source. The intent of this funding is to address backlogged needs in these very rapidly growing cities.

Nominations for the use of these funds are established at the local level similar to STPU funds. These funds may be spent on the Urban Highway System for projects eligible for either STPU or CMAQ funds.

**State funding programs developed to distribute Federal funding within Montana*

URBAN PAVEMENT PRESERVATION (UPP) (EQUITY BONUS)*

The Urban Pavement Preservation Program is a state program that addresses urban highway system preservation needs. The program is funded from federal Equity Bonus funds that are appropriated to each State to ensure that each State receives a specific share of the aggregate funding for major highway programs. The program funds cost-effective treatments for the preservation of the existing Urban Highway System to prevent deterioration while maintaining or improving the functional condition of the system without increasing structural capacity.

Allocations and Matching Requirements – The Transportation Commission determines the annual funding level for this program for preservation projects in the fifteen urban areas. Projects are funded with 86.58% Federal and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process.

Eligibility and Planning Considerations – Activities eligible for this funding include pavement preservation treatments on the Urban Highway System based on needs identified through a locally developed and maintained pavement management system. Priorities are developed by MDT Districts based on the local pavement management system outputs and consideration of local government nominations with final approval by the Transportation Commission. Projects are let through a competitive bidding process.

**State funding programs developed to distribute Federal funding within Montana*

SAFE-ROUTES-TO-SCHOOL (SRTS)

Allocations and Matching Requirements – Safe-Routes-To-School funds are Federally apportioned to Montana for programs to develop and promote a safe environment that will encourage children to walk and bicycle to school. Montana is a minimum apportionment state, and will receive $860,000 per year, subject to the obligation limitation. The Federal share of this program is 100%.

Eligibility and Planning Considerations – Eligible activities for the use of SRTS funds fall under two major categories with 70% directed to infrastructure improvements, and the remaining 30% for behavioral (education) programs. Funding may be used within a two mile radius of K-8 schools for improvements or programs that make it safer for kids to walk or bike to school. SRTS is a reimbursable grant program and project selection is done through an annual application process. Eligible applicants for infrastructure improvements include local governments and school districts. Eligible applicants for behavioral programs include state, local and regional agencies, school districts, private schools, non-profit organizations. Recipients of the funds will front the cost of the project and will be reimbursed during the course of the project. For grant cycle information visit: http://www.mdt.mt.gov/pubinvolve/saferoutes/

Federal Lands Highway Program (FLHP)

FLHP is a coordinated Federal program that includes several funding categories.

- *Public Lands Highways (PLH)*

  Discretionary – The PLH Discretionary Program provides funding for projects on highways that are within, adjacent to, or provide access to Federal public lands. As a discretionary program, the project selection authority rests with the Secretary of Transportation. However, this program has been earmarked by Congress under SAFETEA-LU. There are no matching fund requirements.

  Forest Highway – The Forest Highway Program provides funding to projects on routes that have been officially designated as Forest Highways. Projects are selected through a cooperative process involving FHWA, the US Forest Service and MDT. Projects are developed by FHWA's Western Federal Lands Office. There are no matching fund requirements.

- *Parkways and Park Roads*

Parkways and Park Roads funding is for National Park transportation planning activities and projects involving highways under the jurisdiction of the National Park Service. Projects are prioritized by the National Park Service and approved and developed by FHWA's Western Federal Lands Office. There are no matching fund requirements.

- *Indian Reservation Roads (IRR)*

IRR funding is eligible for multiple activities including transportation planning and projects on roads or highways designated as Indian Reservation Roads. Funds are distributed to Bureau of Indian Affairs (BIA) area offices in accordance with a Federal formula and are then distributed to projects on individual reservations. Projects are usually constructed by BIA forces. There are no matching fund requirements. Any public road within or leading to a reservation is eligible for the Indian Reservation Road funding. In practice, IRR funds are only rarely expended on state designated roads. MDT staff is aware of only two secondary routes that have received IRR funding support. These are S-418, Pryor Road, in the Crow Reservation; and S-234, Taylor Hill Road, that leads to the Rocky Boy's Reservation.

- *Refuge Roads*

Refuge Roads funding is eligible for maintenance and improvements of refuge roads, rest areas, and bicycle and pedestrian facilities. Allocations are based on a long-range transportation improvement program developed by the US Fish and Wildlife Service. There are no matching fund requirements.

Congressionally Directed Funds

- *High Priority Projects (HPP)*

  High Priority Projects are specific projects named to receive Federal funding in SAFETEA-LU Section 1702. HPP funding authority is available until expended and projects named in this section are included in Montana's percent share of the Federal highway funding program. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process. In Montana, the Federal share payable for these projects is 86.58% Federal and 13.42% non-Federal. Montana receives 20% of the total project funding named in each year 2006 thru 2009. These funds are subject to the obligation limitation.

- *Transportation Improvements Projects*

  Transportation Improvement Projects are specific projects named to receive Federal funding in SAFETEA-LU Section 1934. Transportation Improvement Project funding authority is available until expended and projects named in this section are not included in Montana's percent share of the Federal highway funding program. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process. In Montana, the Federal share payable on these projects is 86.58% Federal and 13.42% non-Federal. Montana receives a directed percent of the total project funding named in each year as follows: 2005 – 10%, 2006-20%, 2007-25%, 2008-25%, 2009-20%. These funds are subject to the obligation limitation.

Transit Capital & Operating Assistance Funding

The MDT Transit Section provides federal and state funding to eligible recipients through federal and state programs. Federal funding is provided through the Section 5310 and Section 5311 transit programs and state funding is provided through the TransADE program. The new highway bill SAFETEA-LU brought new programs for transit "New Freedoms and Job Access Reverse Commute (JARC). All projects funded must be derived from a locally developed, coordinated public transit-human services transportation plan (a "coordinated plan").

The coordinated plan must be developed through a process that includes representatives of public, private, and nonprofit transportation and human service providers and participation from the public.

- *Discretionary Grants (Section 5309)*

  Provides capital assistance for fixed guide-way modernization, construction and extension of new fixed guide-way systems, bus and bus-related equipment and construction projects. Eligible applicants for these funds are state and local public bodies.

- *Capital Assistance for the Elderly and Persons with Disabilities (Section 5310)*

  The Section 5310 Program provides capital assistance to providers that serve elderly persons and persons with disabilities. Eligible recipients must have a locally developed coordination plan. Federal funds provide 86% of the capital costs for purchase of buses, vans, wheelchair lifts, communication, and computer equipment. The remaining 14% is provided by the local recipient. Application for funding is made on an annual basis.

- *Financial Assistance for Rural General Public Providers (Section 5311)*

The purpose of the Section 5311 Program is to assist in the maintenance, development, improvement, and use of public transportation systems in rural areas (areas under 50,000 population). Eligible recipients are local public bodies, incorporated cities, towns, counties, private non-profit organizations, Indian Tribes, and operators of public transportation services. A locally developed coordinate plan is needed to receive funding assistance. Funding is available for operating and capital assistance. Federal funds pay for 86% of capital costs, 54% for operating costs, 80% for administrative costs, and 80% for maintenance costs. The remainder, or required match, (14% for capital, 46% for operating, 20% for administrative, and maintenance) is provided by the local recipient. Application for funding is made on an annual basis.

- *New Freedoms Program (5317)*

The purpose of the New Freedom Program is to provide improved public transportation services, and alternatives to public transportation, for people with disabilities, beyond those required by the Americans with Disabilities Act of 1990 (ADA). The program will provide additional tools to overcome barriers facing Americans with disabilities who want to participate fully in society. Funds may be used for capital expenses with Federal funds provided for up to 80 percent of the cost of the project, or operating expenses with Federal funds provided for up to 50 percent of the cost of the project. All projects funded must be derived from a locally developed, coordinated public transit-human services transportation plan (a “coordinated plan”).

- *Job Access Reverse Commute (JARC) (5316)*

The purpose of this grant program is to develop transportation services designed to transport welfare recipients and low income individuals to and from jobs and to develop transportation services for residents of urban centers and rural and suburban areas to suburban employment opportunities. Funds may be used for capital and operating expenses with Federal funds provided for up to 50 percent of the cost of the project.

9.4 STATE FUNDING SOURCES

STATE FUNDED CONSTRUCTION (SFC)

Allocations and Matching Requirements – The State Funded Construction Program, which is funded entirely with state funds from the Highway State Special Revenue Account, provides funding for projects that are not eligible for Federal funds. This program is totally State funded, requiring no match.

Eligibility and Planning Considerations – This program funds projects to preserve the condition and extend the service life of highways. Eligibility requirements are that the highways be maintained by the State. MDT staff nominates the projects based on pavement preservation needs. The District's establish priorities and the Transportation Commission approves the program.

TRANSADE

The TransADE grant program offers operating assistance to eligible organizations providing transportation to the elderly and persons with disabilities.

Allocations and Matching Requirements – This is a state funding program within Montana statute. State funds pay 50 percent of the operating costs and the remaining 50 percent must come from the local recipient.

Eligibility and Planning Considerations – Eligible recipients of this funding are counties, incorporated cities and towns, transportation districts, or non-profit organizations. Applications are due to the MDT Transit Section by the first working day of February each year. To receive this funding the applicant is required by state law (MCA 7-14-112) to develop a strong, coordinated system in their community and/or service area.

9.5 LOCAL FUNDING SOURCES

STATE FUEL TAX – CITY AND COUNTY

Under 15-70-101, MCA, Montana assesses a tax of $.27 per gallon on gasoline and diesel fuel used for transportation purposes. Each incorporated city and town receives a portion of the total tax funds allocated to cities and towns based on:

1) The ratio of the population within each city and town to the total population in all cities and towns in the State;
2) The ratio of the street mileage within each city and town to the total street mileage in all incorporated cities and towns in the State. The street mileage is exclusive of the Federal-Aid Interstate and Primary System.

Each county receives a percentage of the total tax funds allocated to counties based on:

1) The ratio of the rural population of each county to the total rural population in the State, excluding the population of all incorporated cities or towns within the county and State;
2) The ratio of the rural road mileage in each county to the total rural road mileage in the State, less the certified mileage of all cities or towns within the county and State; and
3) The ratio of the land area in each county to the total land area of the state.

All fuel tax funds allocated to the city and county governments must be used for the construction, reconstruction, maintenance, and repair of rural roads or city streets and alleys. The funds may also be used for the share that the city or county might otherwise expend for proportionate matching of Federal funds allocated for the construction of roads or streets on the Primary, Secondary, or Urban Systems. Priorities for these funds are established by the cities and counties receiving them.

For State Fiscal Year 2010, Flathead County's allocation (not including incorporated cities) was approximately $437,446 in state fuel tax funds. Kalispell's allocation was approximately $361,348, Whitefish's allocation was approximately $155,981, and Columbia Falls' allocation was approximately $94,452. The amount varies annually, but the current level provides a reasonable base for projection throughout the planning period.

FLATHEAD COUNTY

- *Road Fund*

The County Road Fund provides for the construction, maintenance, and repair of all county roads outside the corporate limits of cities and towns in Flathead County. Revenue for this fund comes from intergovernmental transfers (i.e., State gas tax apportionment and motor vehicle taxes), and a mill levy assessed against county residents living outside cities and towns. Flathead County's State fiscal year gas tax apportionment added approximately $474,317 to the Road Fund.

County Road Fund monies are primarily used for maintenance with little allocated for new road construction. It should be noted that only a small percentage of the total miles on the county road system are located in the study area. Projects eligible for financing through this fund will be competing for available revenues on a county-wide basis.

- *Bridge Fund*

The Bridge Fund provides financing for engineering services, capital outlays, and necessary maintenance for bridges on all off-system and Secondary routes within the county. These monies are generated through intergovernmental fund transfers (i.e., vehicle licenses and fees), and a county-wide mill levy. There is a taxable limit of four mills for this fund.

- *Special Revenue Funds*

Special revenue funds may be used by the county to budget and distribute revenues legally restricted to a specific purpose. Several such funds that benefit the transportation system are discussed briefly in the following paragraphs.

- *Capital Improvements Fund*

This fund is used to finance major capital improvements to county infrastructure. Revenues are generated by loans from other county funds, and must be repaid within ten years. Major road construction projects are eligible for this type of financing.

- *Rural Improvement District (RID) Revolving Fund*

This fund is used to administer and distribute monies for specified RID projects. Revenue for this fund is generated primarily through a mill levy and through motor vehicle taxes and fees. A mill levy is assessed only when delinquent bond payments dictate such an action.

- *Special Bond Funds*

A fund of this type may be established by the county on an as-needed basis for a particularly expensive project. The voters must approve authorization for a special bond fund. The county is not currently using this mechanism.

Private Funding Sources and Alternatives

Private financing of highway improvements, in the form of right-of-way donations and cash contributions, has been successful for many years. In recent years, the private sector has recognized that better access and improved facilities can be profitable due to increases in land values and commercial development possibilities. Several forms of private financing for transportation improvements used in other parts of the United States are described in this section.

- *Development Financing*

The developer provides the land for a transportation project and in return, local government provides the capital, construction, and necessary traffic control. Such a financing measure can be made voluntary or mandatory for developers.

- *Cost Sharing*

The private sector pays some of the operating and capital costs for constructing transportation facilities required by development actions.

- *Transportation Corporations*

These private entities are non-profit, tax exempt organizations under the control of state or local government. They are created to stimulate private financing of highway improvements.

- *Road Districts*

These are areas created by a petition of affected landowners, which allow for the issuance of bonds for financing local transportation projects.

- *Private Donations*

The private donation of money, property, or services to mitigate identified development impacts is the most common type of private transportation funding. Private donations are very effective in areas where financial conditions do not permit a local government to implement a transportation improvement itself.

- *Private Ownership*

This method of financing is an arrangement where a private enterprise constructs and maintains a transportation facility, and the government agrees to pay for public use of the facility. Payment for public use of the facility is often accomplished through leasing agreements (wherein the facility is rented from the owner), or through access fees whereby the owner is paid a specified sum depending upon the level of public use.

- *Privatization*

Privatization is either the temporary or long-term transfer of a public property or publicly owned rights belonging to a transportation agency to a private business. This transfer is made in return for a payment that can be applied toward construction or maintenance of transportation facilities.

- *General Obligation (G.O.) Bonds*

The sale of general obligation bonds could be used to finance a specific set of major highway improvements. A G.O. bond sale, subject to voter approval, would provide the financing initially required for major improvements to the transportation system. The advantage of this funding method is that when the bond is retired, the obligation of the taxpaying public is also retired. State statutes limiting the level of bonded indebtedness for cities and counties restrict the use of G.O. bonds. The present property tax situation in Montana, and recent adverse citizen responses to proposed tax increases by local government, would suggest that the public may not be receptive to the use of this funding alternative.

- *Tax Increment Financing (TIF)*

Increment financing has been used in many municipalities to generate revenue for public improvements projects. As improvements are made within the district, and as property values increase, the incremental increases in property tax revenue are earmarked for this fund. The fund is then used for improvements within the district. Expenditures of revenue generated by this method are subject to certain spending restrictions and must be spent within the district. Tax increment districts could be established to accomplish transportation improvements in other areas of the community where property values may be expected to increase.

- *Multi-Jurisdictional Service District*

This funding option was authorized in 1985 by the State Legislature. This procedure requires the establishment of a special district, somewhat like an SID or RSID, which has the flexibility to extend across city and county boundaries. Through this mechanism, an urban transportation district could be established to fund a specific highway improvement that crosses municipal boundaries (e.g., corporate limits, urban limits, or county line). This type of fund is structured similar to an SID with bonds backed by local government issued to cover the cost of a proposed improvement. Revenue to pay for the bonds would be raised through assessments against property owners in the service district.

- *Local Improvement District*

This funding option is only applicable to counties wishing to establish a local improvement district for road improvements. While similar to an RSID, this funding option has the benefit of allowing counties to initiate a local improvement district through a more streamlined process than that associated with the development of an RSID.

- *Development Exactions/Impact Fees*

Impact Fees are increasingly being considered as a potential method for financing infrastructure needs. Impact fees are financial contributions imposed by local jurisdiction on developers or builders to pay for the construction or expansion of off-site capital improvements which are necessitated by and benefit the new development. Impact fees are implemented to help assist or pay for a portion of the costs associated with the new development's impact to the local infrastructure. These fees are usually implemented to help reduce the economic burden on local jurisdictions that are trying to deal with population growth within the area. The transportation plan provides the basis for implementing the Impact Fee Program.

Implementing impact fees is dependent upon a number of factors. First, there must be a need for fiscal innovation resulting from rapid population and employment growth and an increasing demand for public facilities. Second, there must be administrative capacity to implement the impact fees. This means that the governmental body is able to review, deliberate and implement an impact-fee scheme. Finally, there must be land-use and facility planning and coordination capacity, because impact fees depend on a comprehensive land-use and capital-improvements program.

Impact fees may lead to certain types of inequities. Fees will be equitable if the new developments are the same size and kind, but the fees may be considered inequitable if lower-value developments pay impact fees that are a greater proportion of house value than is the case for higher-value developments of comparable community impact. Also, an impact-fee scheme may create problems for low-income households, because it raises housing prices, and, in a competitive market and in the short term, the developer will attempt to pass these costs on to the buyers. Development impact fees acknowledge that new development frequently creates infrastructure costs greater than the revenue generated for the municipality providing the service. These fees may raise the cost of development and could affect location decisions by residents or businesses. Impact fees can add some economic rationality to the development pattern by internalizing more of the cost of new development. If these location decisions tend to drive development away to places without fees, the community may prefer higher user fees or other ways to pay for local services.

Policy experience with impact fees is highly diverse and inconsistent from state to state. Some states have statewide enabling statutes dealing specifically with local impact fees. In other states, authority is given to certain municipalities. In most locations, impact fee policy has evolved through court-tested specific efforts by municipalities or other jurisdictions to generate funds they need to provide needed and demanded services. Valid fees must be related to the demanded cost of required new services and must be used for those services only.

Establishment of an equitable fee structure would be required to assess developers based upon the level of impact to the transportation system expected from each project. Such a fee structure could be based upon the number of additional vehicle trips generated, or upon a fundamental measure such as square footage of floor space. Once the mechanism is in place, all new development would be reviewed by the local government and fees assessed accordingly. Although at times controversial, this exaction on private development can help to soften development's impact on the surrounding transportation system.

This Transportation Plan provides general information which may be used to help develop a separate Impact Fee Study if the community so desires. This Plan itself does not serve as an Impact Fee Study. The process of implementing impact fees will need to be addressed in a separate Impact Fee Study.

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