Fergus Falls
Transportation Plan Update

Final Draft Report

Prepared For

City of Fergus Falls, Minnesota

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Fergus Falls Transportation Plan Update
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SECTION 1 – PROJECT OVERVIEW

INTRODUCTION

The City of Fergus Falls, Minnesota has commissioned a Transportation Plan Update for the City. This report documents the planning analysis results and recommendations of the **Fergus Falls Transportation Plan Update**. This Plan is an update to the "*Thoroughfares & Transportation Plan Report No. 3*" by Nason, Law, Wehrman & Knight, Inc. completed in February, 1964. That report has not been updated since.

The plan is prepared to document the transportation system evaluation, deficiencies analysis and alternative improvements development/analysis of the Plan Update.

PROJECT PURPOSE

The purposes of this Plan Update are: 1) to document and analyze the City of Fergus Falls surface transportation system, including the roadway network, pedestrian and bicycle facilities, transit, rail, and air travel components; 2) to review/update the existing principles and policies governing transportation elements; 3) to identify deficiencies of the existing transportation system; 4) to project future growth and expected transportation demands; 5) to identify anticipated future system deficiencies; 4) to identify alternative transportation system improvements to meet existing and future deficiencies; and 5) to develop selection of preferred solution alternatives and their fiscal needs.

The Transportation Plan Update is intended to be a general guide for the expansion and improvement of the existing system. The level of detail developed for each of the plan elements is sufficient for this intended purpose. To further implement specific recommendations, specific problems will require detailed study and additional design beyond the scope of this plan. It is the intent of the Transportation Plan Update to present a program of improvements that will successfully meet the needs of the City of Fergus Falls for the next twenty years. This plan should be updated periodically (e.g. every five years) to ensure continued applicability of plan recommendations and to respond to unanticipated changes within the community or the transportation system.

STUDY AREA

The extent of the Plan is dependent on the growth of the community. For purposes of this plan, the 2030 projected city limits were determined to constitute the extent of the study area. The current city limits encompass 15.1 square miles of area. The ultimate extent of the city limits are expected to encompass 40.1 square miles, representing growth of 24.8 square miles. The study area, with current and projected city limits, is shown in Figure 1.

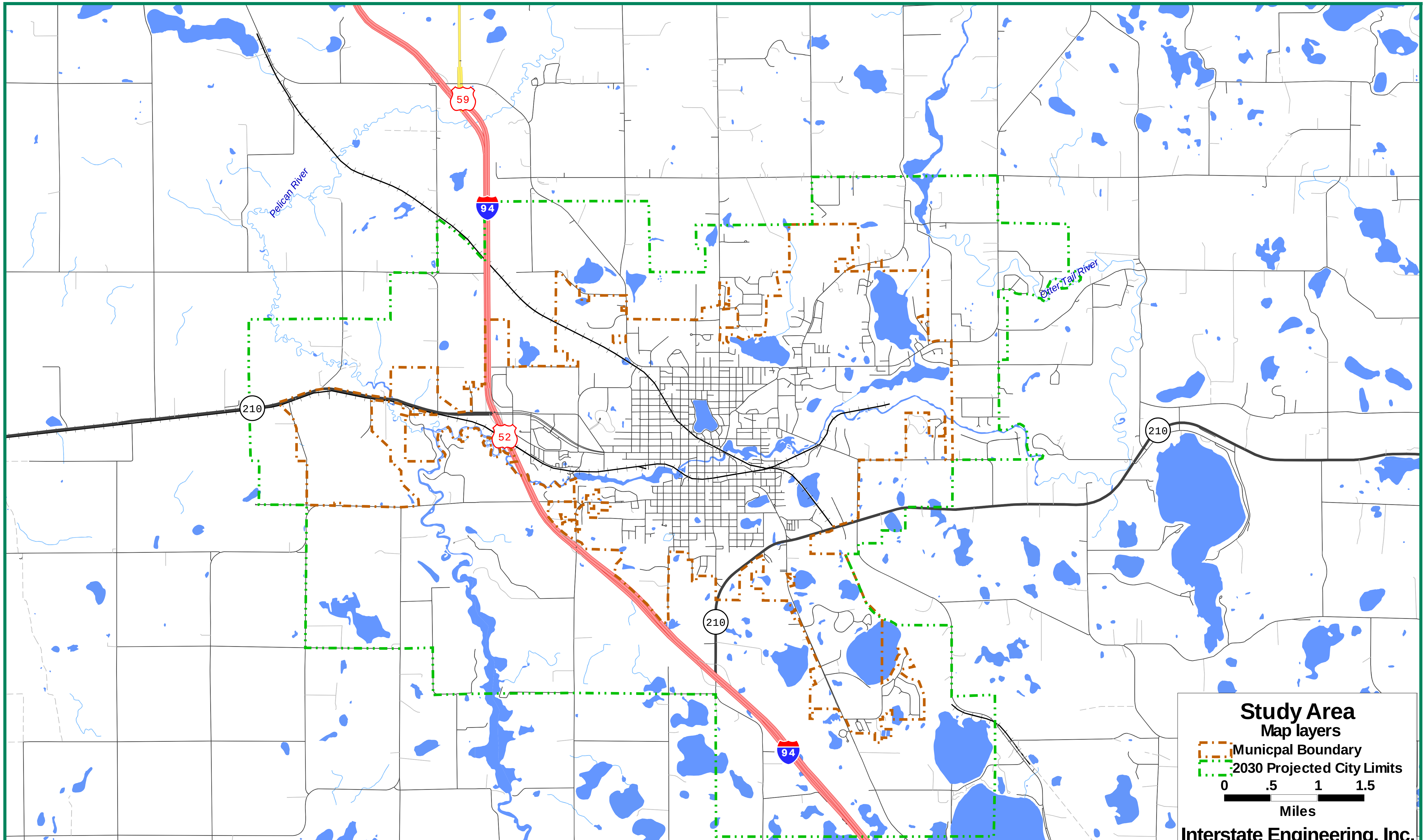
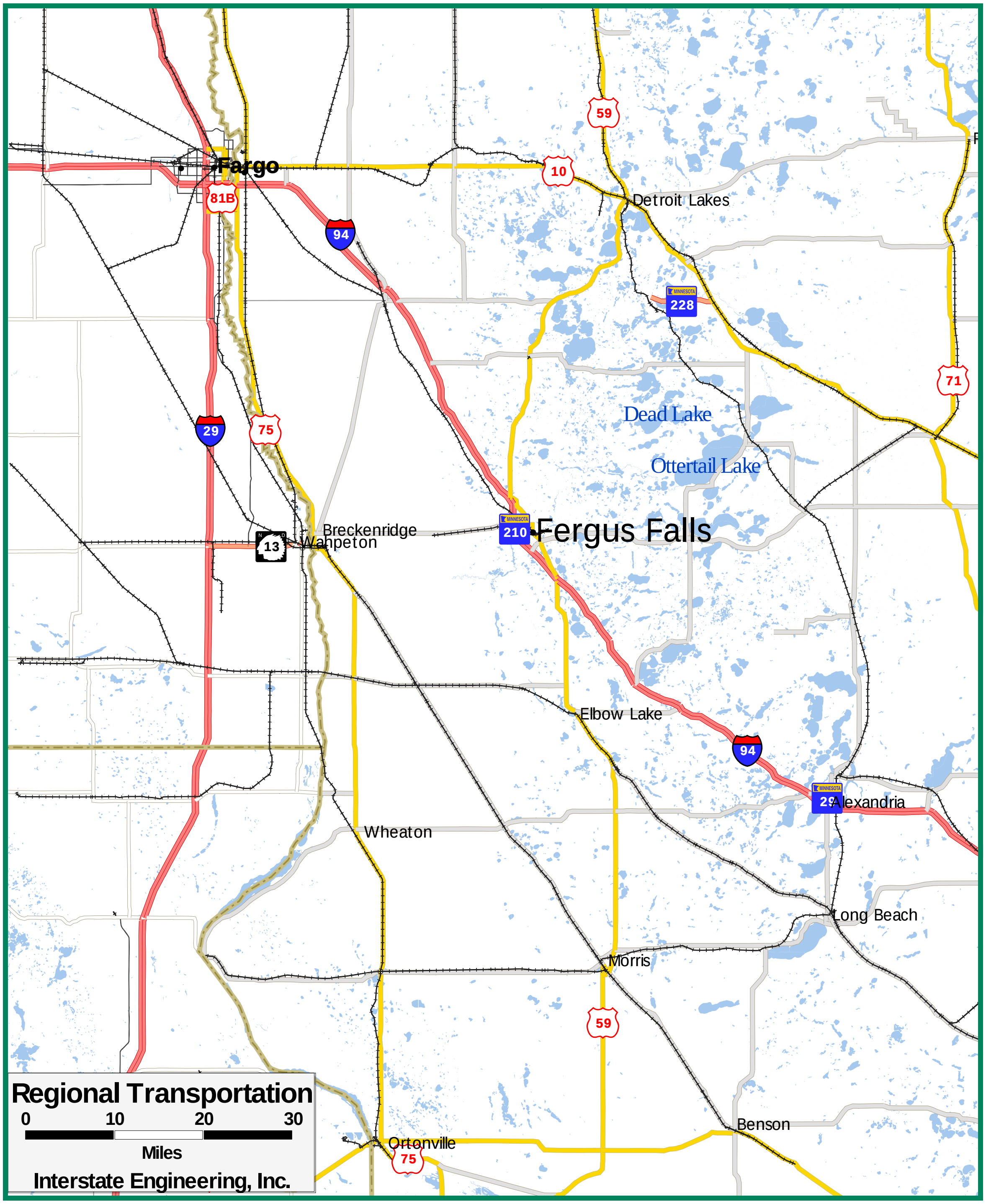


Figure 1 – Study Area

The City of Fergus Falls is located about 60 miles southeast of Fargo, ND, and about 160 miles northwest of Minneapolis, MN. Interstate Highway 94 (I-94) provides a high speed, uninterrupted flow facility connection with both major cities. Interstate Highway 29 is located about 35 miles to the west, near the town of Wahpeton, ND. I-29 provides connections north to Fargo, ND (40 miles north) and south to Sioux Falls, SD (190 miles south). A vicinity map showing regional surface transportation facilities is included as Figure 2.



SECTION 2 - GUIDING PRINCIPLES AND POLICIES

It is essential to establish sound principles and policies to be used as guides for formulation of this, and future, transportation plans. Although general in nature, planning principles and policies are essential tools for evaluating existing transportation patterns, identifying existing and projected deficiencies of the transportation system, and governing design guidelines for various types of streets and highways serving the planning area.

For this project, a review of the existing principles, policies, functional classifications and typical sections, as enumerated in the 1964 Thoroughfares & Transportation Plan, was conducted. While most of the principles and policies of the previous plan are sound, they have been updated to reflect contemporary engineering and planning practices and terminology.

The term "thoroughfare", used with the existing principles and policies document has been replaced with "arterial" to bring functional classifications in line with current design and classification standards (MnDOT and AASHTO). In addition, updated principles and policies discourage direct residential lot access to collector streets expected to carry more than 1,000 vehicles per day. Also, "bikeways" are now addressed in the cross-section components discussion.

The following planning principles and policies have been used as a general guide in development of this transportation plan:

A. **The Plan should be coordinated with all elements of the Comprehensive Plan.**
   1. It should interconnect the various land use districts with safe, convenient routes.
   2. It should be designed to route through traffic around areas of congestion and around residential neighborhoods.
   3. It should provide suitable access and capacity to areas of intense activity or areas generating large volumes of traffic.

B. **In form, streets should be carefully inter-related to create a harmonious, integrated network of local, collector and arterial streets.**
   1. Arterial streets should provide reasonably direct access to Interstate Highway 94, other through highways and County Roads.
   2. The geometric design of the various types of streets should reflect contemporary engineering practice.

C. **The Plan should be designed in relationship to the basic functions to be performed.**
   1. Principal Arterials should be designed to safely move traffic at moderate to fast speeds.
   2. Local streets should discourage fast through traffic and should be used only to carry local traffic to and from collector and arterial streets. Contemporary planning techniques should be employed for new development to provide connectivity between

neighborhoods, discourage movement of through traffic, and to incorporate traffic calming measures into street layout and design.

Three basic types of arterial routes provide for flow of traffic into, through, and around the City of Fergus Falls. The definitions of those route types are provided as follows:

B. CROSS-TOWN ROUTES

1. These routes enable vehicular traffic to move from one section of the community to another without entering congested areas of the Central Business District.
2. The present development pattern, with industrial and commercial areas scattered on all sides of the City, make this type of facility an important part of the thoroughfares system.
3. Examples of existing cross-town routes include West Alcott Avenue, East Channing Ave, and North Tower Road/West Fir Avenue.

A. RADIAL ROUTES

1. These routes carry traffic in and out of the areas of intense use, connecting them with residential districts and rural areas.
2. Areas of intense activity are the Central Business District, other service commercial areas and industrial land use areas.
3. Examples of existing radial routes include Lincoln Avenue, Vernon Avenue, North Broadway, Union Avenue, and Pebble Lake Road.

C. CIRCUMFERENTIAL ROUTES

1. This facility carries through traffic around areas of intense activity, allowing a relatively high speed and high volume of traffic to move freely, avoiding congested areas.
2. Examples of existing circumferential routes include North Tower Road/West Fir Avenue, the Trunk Highway 210 By-pass, and Interstate 94.

The City of Fergus Falls' existing transportation system contains elements of all three route types. In some cases, routes currently function in more than one category. An example is the North Tower Road/West Fir Avenue route that currently functions as both a cross-town route and as a circumferential route. This transportation plan will examine the existence of these route elements and, where appropriate, suggest modifications or new construction to complete the function provided by all route types. Existing arterial facility route types are shown in Figure 3.

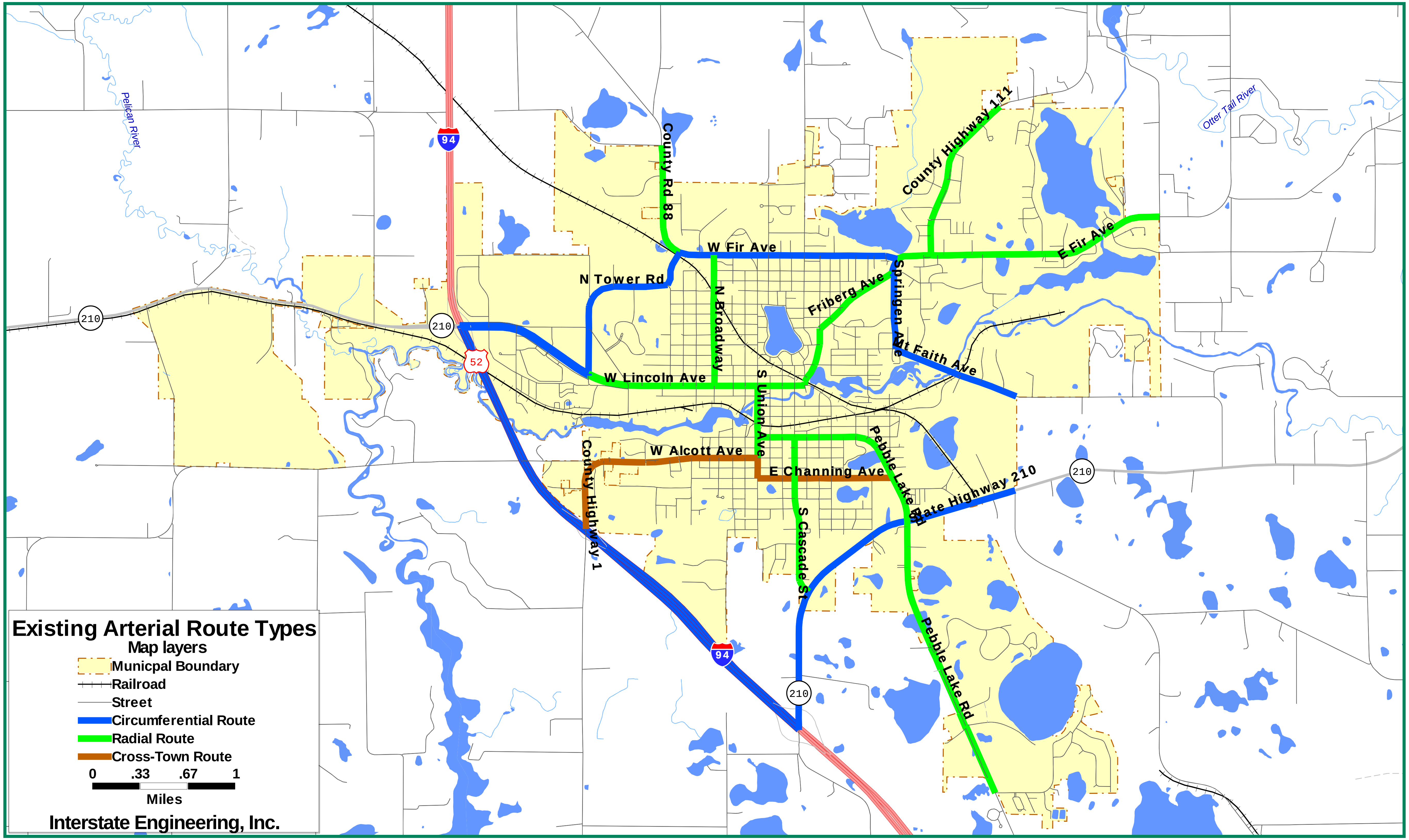


Figure 3 – Existing Arterial Route Types

SECTION 3 – FUNCTIONAL CLASSIFICATION AND CROSS SECTION ELEMENTS

The street and highway system meeting the surface transportation needs of Fergus Falls is divided into five functional classes according to intended trip length, travel speed, area type served, and land access provided. In general, higher classifications tend to serve longer trip lengths at higher speeds, with little or no emphasis on local land access. Lower classifications serve shorter, local trip lengths, slower speeds, and provide the majority of land access functions. The functional classification system of the 1964 plan has been updated for this transportation plan to bring functional classifications in line with current design and classification standards (MnDOT and AASHTO), and are described as follows:

FUNCTIONAL CLASSIFICATION SYSTEM

A. FREEWAY
   1. Carries large volumes of through traffic between urban areas.
   2. Four moving lanes of traffic with dividing median.
   3. Access is limited with grade separations and various types of interchanges controlling intersecting traffic.
   4. Designed for large volumes of traffic to move safely and conveniently at high speeds.
   5. I-94 is an example of a freeway.

B. PRINCIPAL ARTERIAL
   1. Carries large volumes of traffic between urban centers and between the centers and between major centers of activity of the community. Principal arterials serve the highest traffic volume corridors and carry a high proportion of the total urban area travel. Principal arterials carry most of the trips entering and leaving the community.
   2. Four moving lanes of traffic with a dividing median if possible.
   3. Intersections at grade are controlled by safety devices such as traffic signals or signs.
   4. Where feasible, direct access to private property should be prohibited, and service drives paralleling the major routes should serve as access roads.
   5. Right of way from 100 to 120 feet is recommended for Primary Arterials.
   6. Examples of principal arterials are Lincoln Avenue, South Union Avenue, and East Vernon Avenue.

C. MINOR ARTERIAL
   1. Minor Arterials interconnect with and augment the Principal Arterial system. Minor Arterials carry traffic at medium speeds from one district of land use to another and includes urban connections to rural collector roads.
   2. Can provide either two or four lanes for moving vehicles, depending upon the volumes of traffic.
   3. Minor Arterials in the Central Business District should have four moving lanes in addition to required parking lanes to enable large volumes of traffic to move smoothly without interference from parking and turning vehicles.

4. Traffic signs or signals are used to control intersecting traffic.
5. The minimum CBD thoroughfare corresponds to some existing pavement widths with two 8 foot parking lanes, two 12 foot moving lanes, and a 10 foot left-turn lane at intersections.
6. A minimum right of way of 80 feet is recommended, with reduced right of way allowed within the CBD only when necessary.
7. Examples of minor arterial streets include Fir Avenue, North Union Avenue, Friberg Avenue, and West Alcott Avenue.

D. COLLECTOR STREET

1. Carries local and neighborhood traffic within the land use districts to the minor and principal arterials.
2. Carry medium to low speed urban traffic on a minimum of two moving lanes and two parking lanes.
3. Where necessary, traffic signs regulate intersecting minor streets.
4. Private commercial properties may be permitted direct access to collector streets. Direct residential property access is discouraged where daily traffic volume is expected to exceed 1,000 vehicles per day.
5. Minimum right of way of 75 feet is recommended.
6. Examples of collector streets include East Mount Faith Avenue, North Broadway Street, and East Washington Avenue.

E. LOCAL STREET

1. Carries low volumes of local traffic at slow speeds within land use districts.
2. Primary function is to provide access to private property separate from the higher classifications of streets.
3. A pavement width of 36 feet accommodates two moving and two parking lanes within a 75 foot right of way.
4. Examples of local streets are West Stanton Avenue, East Janius Avenue, North 1st Avenue, and North Vine Street.

Using updated functional classifications, the functional class system for streets and highways within the study area are shown in Figure 4.

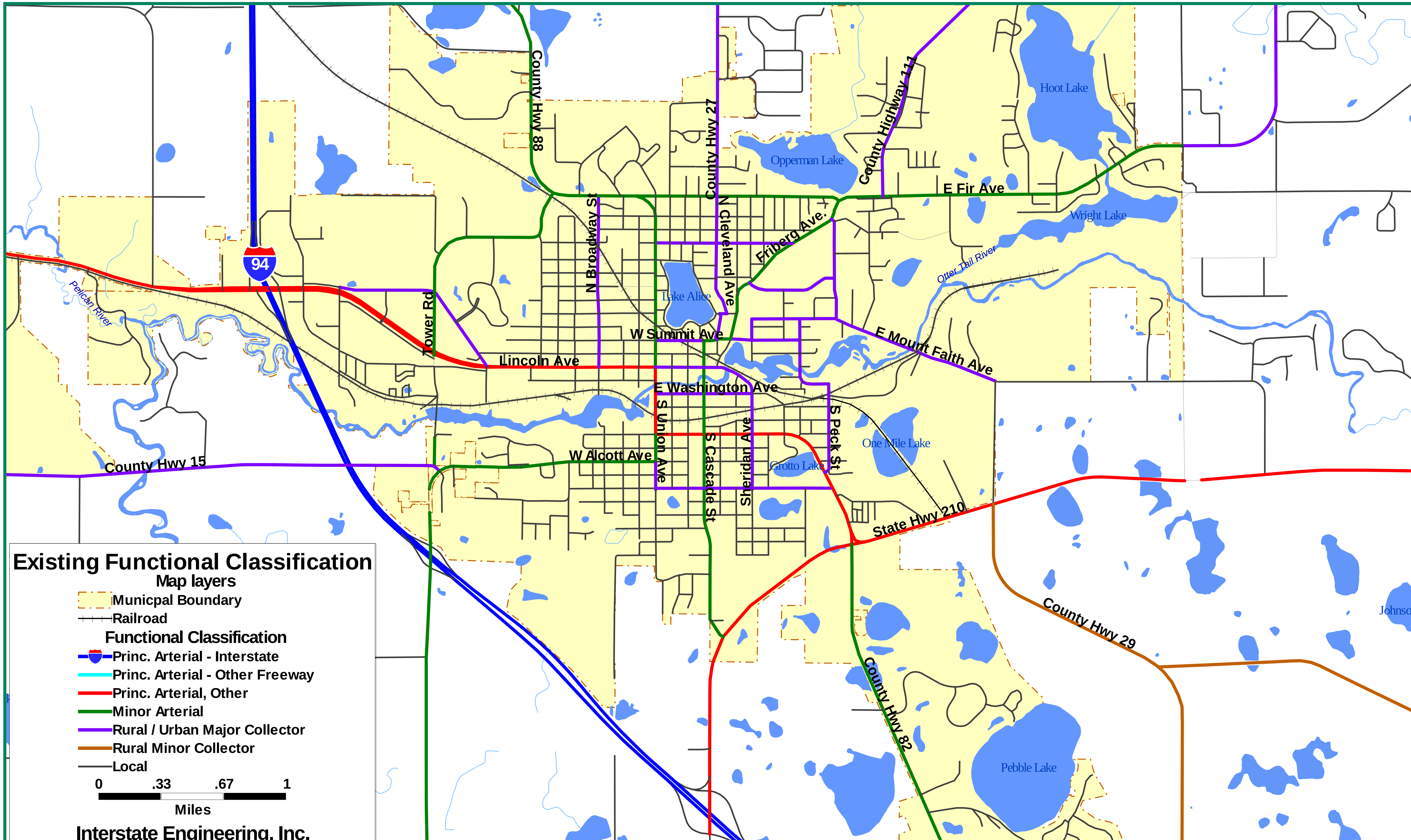


Figure 4 - Existing Functional Classification

TYPICAL SECTIONS

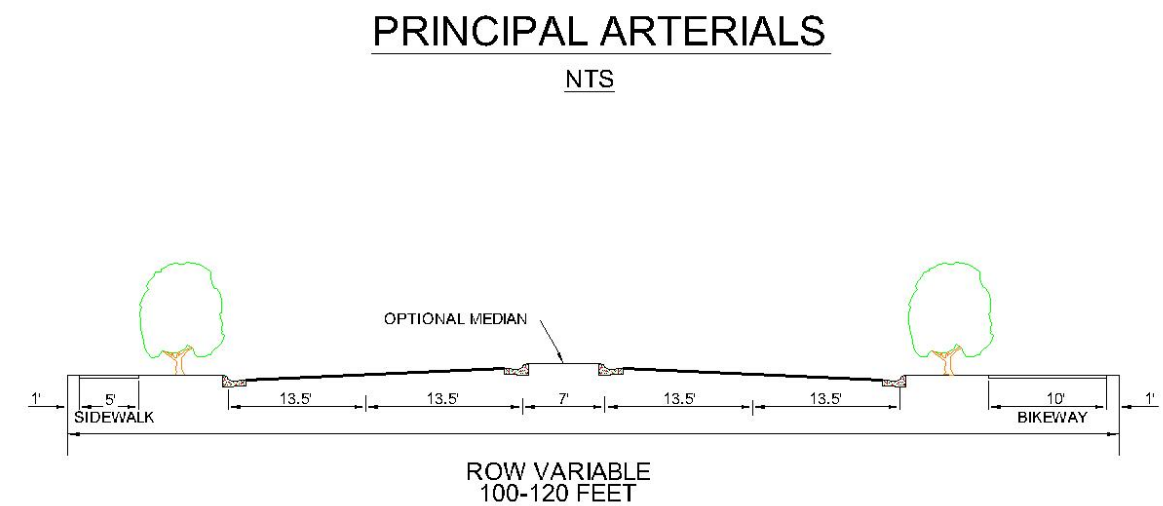
Street typical section "standards" of the 1964 plan have also been reviewed. This Transportation Plan does not set street cross section standards, but does present guidelines for typical arterial, collector and local streets. Specific construction standards for individual street construction or reconstruction projects will be determined on a case-by-case basis utilizing guidelines presented in this planning document.

In addition to re-naming to conform to contemporary engineering and planning practices, street typical sections have been updated to add the potential for placement of a bikeway on one side of Principal Arterials (sidewalk on the other side). We also suggest maximum reasonable separation of sidewalks and bikeways from the curb on Principal Arterial Streets.

12-foot lanes should be utilized for Minor Arterials (existing standard allows 11-foot lanes), and again substantial separation should be provided between the sidewalks and the curb.

12-foot travel lanes should be used for collector streets, but recommend allowing a reduction to 10-foot lane width for local streets. For local streets, a detached (boulevard) sidewalk is preferred to provide space for snow storage and for development of a tree canopy. An attached (curb walk) is allowed as an alternate where conditions warrant or space is not available for detached sidewalk facilities. Having the sidewalk adjacent to the curb is desirable in commercial areas only.

Figures 5 and 6 show street typical section guidelines.



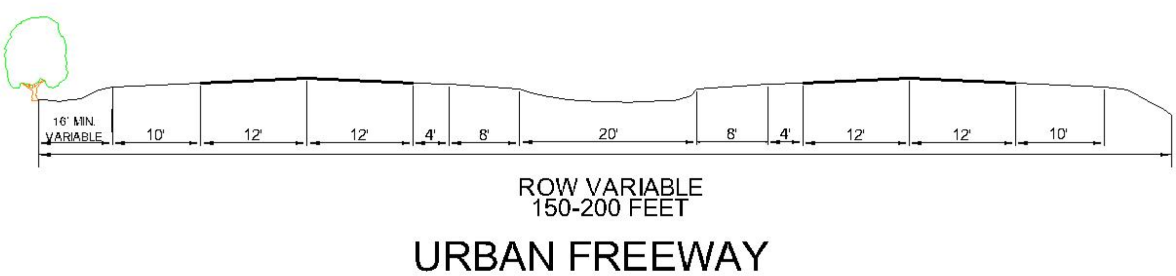


Figure 5 - Principal Arterial & Urban Freeway Typical Sections

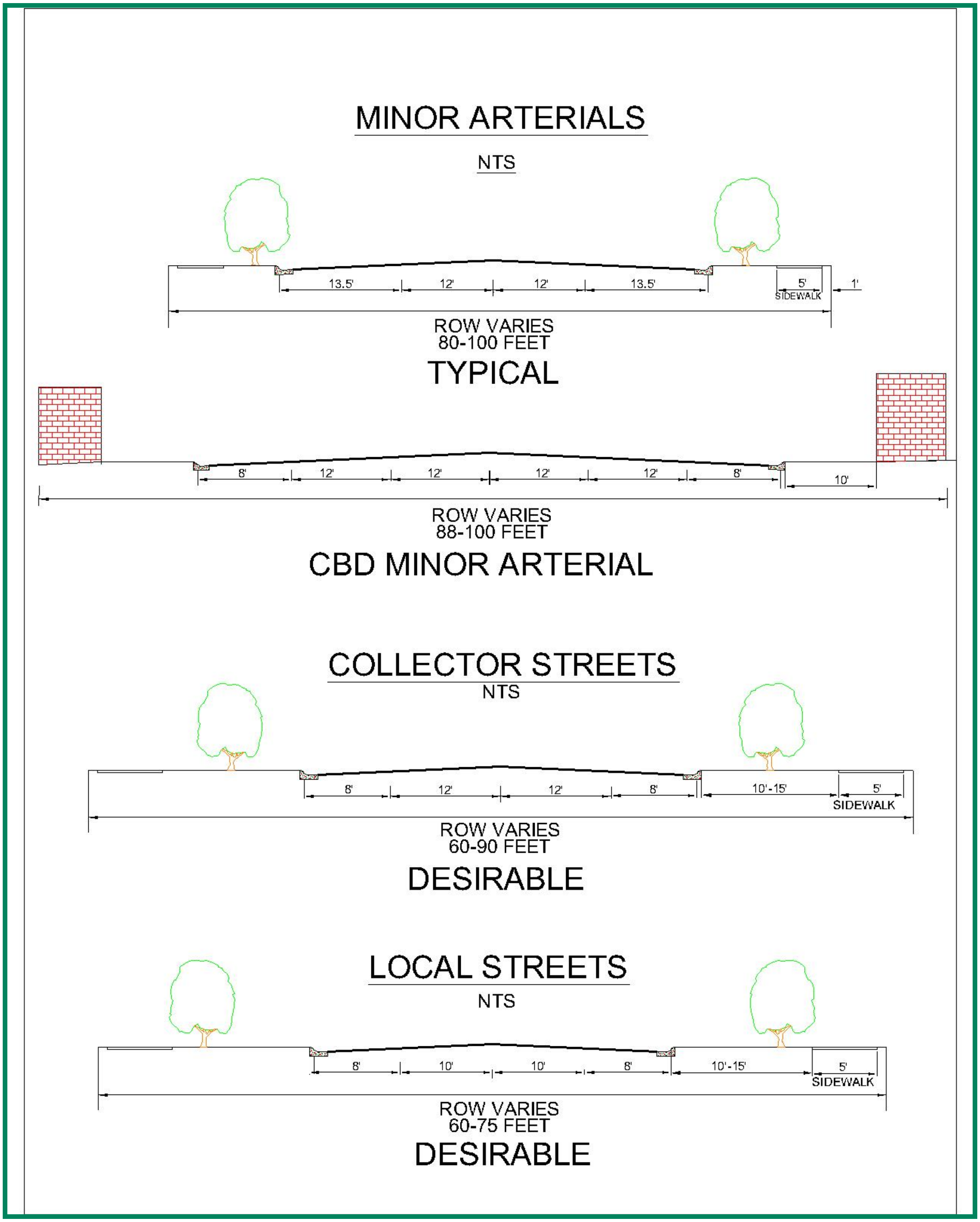


Figure 6 - Minor Arterial, Collector, and Local Street Typical Sections

Each street element consists of several cross section components in addition to vehicle travel lanes. To serve travel needs of both motorized and non-motorized transportation elements, cross section components work together to provide a complete transportation corridor. Guidelines for development of each cross section component are as follows:

CROSS-SECTION COMPONENTS

A. SIDEWALKS

1. Pedestrian ways and sidewalks are vital in areas of intense commercial, public and semi-public uses, and in residential districts.
2. Schools, churches and hospitals are examples of public and semi-public uses which generate enough pedestrian traffic to warrant sidewalks.
3. The width and distance from traffic lanes should increase as the amount of pedestrian traffic and vehicular traffic increases.
4. A minimum width of five (5) feet is recommended for sidewalks, using the maximum separation distance available between sidewalks and traffic lanes.

B. BIKEWAYS

1. Bikeways are a complimentary element to sidewalks for non-motorized transportation and should be provided for both recreation and commuter traffic.
2. Bikeways are part of the street section and can be either on-street or separated from the street.
3. When separated from the street, bikeways serve as sidewalks on one side of the street.

C. BOULEVARD PLANTING STRIPS

1. The area between the curb and sidewalk or right of way line should be sufficiently wide to provide space for tree planting, pedestrian safety and snow storage.
2. The width of this buffer strip should be widened as the speed of traffic increases, so that the undesirable impact of traffic upon adjoining property is minimized.
3. Ten (10) feet is a recommended minimum for a boulevard.

D. MEDIAN BOULEVARD

1. The strip of landscaping or the concrete curb median dividing oncoming lanes of traffic makes an important contribution to safety and flow of traffic.
2. A three foot paved, raised median (exclusive of curb section) is the minimum recommended, and wider medians of 12 feet or more will provide sufficient space for turning lanes at intersections.
3. Medians, although they may be of varying widths, are provided on all freeways and are optional for primary arterials, depending on the right of way width, as well as the amount of traffic served.
4. Where possible, a median of 16 feet or more should be provided at key intersections, allowing an extra lane for vehicles making left turns across the main stream of traffic.

E. TRAFFIC LANES

1. The width of traffic lanes should be related to the speed of traffic, with the lanes widening as traffic speed increases.
2. Traffic lanes of 12 feet are recommended for all arterial and collector routes to provide maximum safety.
3. A minimum width of 10 may be used on minor residential streets where through traffic is to be discouraged or on certain Central Business District streets where traffic is moving at a relatively slow speed and space for the roadway is limited.

F. PARKING LANES

1. Generally, on-street parking should be discouraged along all routes designated as arterials.
2. Where on-street parking is allowed, a parking lane 8 to 10 feet wide should be provided.
3. For maximum safety and turning ease, parking should be prohibited near all intersections.

SECTION 4 - EXISTING CONDITIONS

DATA GATHERING

Significant data has been gathered to complete this transportation plan update. Traffic counts, crash data, existing and future zoning, and population statistics have all been obtained from various sources.

Planning documents provided by, or acquired from the City have been reviewed for information relevant to completion of this Transportation Plan Update. Documents reviewed include the following:

- Fergus Falls Thoroughfares & Transportation Plan Report No. 3, Nason, Law, Wehrman & Knight, Inc., February 1964
- Traffic Impact Study, Minnesota Highway 210, Wal-Mart Stores, Inc., Olsson Associates, January, 2007
- Tower Road Bridge Corridor Traffic Diversion Study (various documents), SRF Consulting Group, Inc., February, 2006
- Claritas MarketPlace Report, Claritas, Inc., May, 2007
- Fergus Falls Comprehensive Housing Study, Community Partners Research, Inc., May,2 005
- 2006 Retail Trade Analysis Report, Fergus Falls & Otter Tail County, Minnesota, University of Minnesota Extension, 2008
- Draft Water Supply & Distribution Plan, Bonestroo, March, 2008
- Airport Layout Plan Update, Fergus Falls Municipal Airport, SEH Associates, Inc., June, 2009
- City of Fergus Falls Comprehensive Parks, Recreation and Forestry System Plan, Sanders, Wacker, Bergly, Inc., December 2008
- City of Fergus Falls, Minnesota Capital Improvement Program, 2009-2013
- Preliminary Layouts, Northwest Industrial Park, Interstate Engineering, October 2006

We have acquired considerable GIS-based or compatible mapping files and information databases. The City of Fergus Falls provided the following:

- Road centerline files, including separate files for weight-restricted roads.
- Zoning coverage (existing and ultimate)
- Black & white aerial photography (portion of City)
- Pedestrian walkway, multi-use path, and bikeway coverage (existing and planned)
- City Park coverage (existing and planned)
- City Limits boundary (existing and ultimate)

In addition to GIS information provided by the City of Fergus Falls, additional coverages were acquired from internet web-based sources. Comprehensive traffic volume data and coverages for state system roads were acquired from the MnDOT web site. Color aerial photography for Otter Tail County was obtained from the Minnesota Department of

Administration web site. The Department of Administration web site was also utilized to obtain additional demographic information on population and housing for Fergus Falls and Otter Tail County.

Land use information in the form of current and future zoning has been acquired from the City of Fergus Falls. Demographic statistics for population and households has been acquired for historical conditions (back to 1970 in some cases) and current conditions. In addition, population and household projections formulated within other studies or documents acquired have been tabulated.

TRAFFIC VOLUMES

Traffic count information from both the City of Fergus Falls and from the Minnesota Department of Transportation has been obtained. In addition to spot count data, information provided by the City consisted of counts documented in various traffic studies conducted for the City or submitted in conjunction with development proposals. Data gathered from the MnDOT consisted of count data available on their internet web page. The MnDOT data contained "current" counts (2007) as well as historical data going back to 1992 for all state system roadways. Traffic count data has been mapped on project base mapping in a GIS format. Figure 7 shows current (2007) average weekday daily traffic volumes and also shows the existing functional classification of streets.

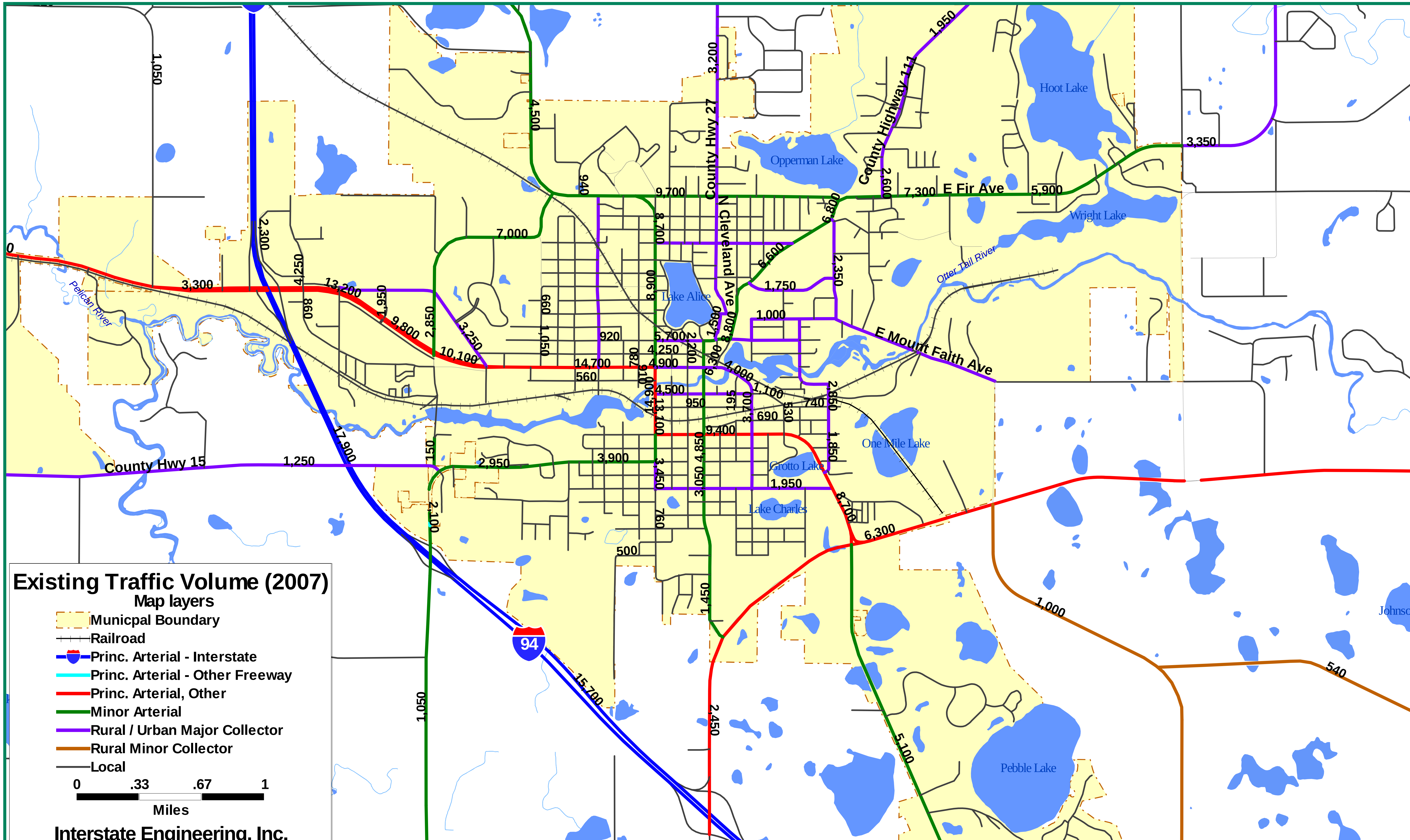


Figure 7 - Current Traffic Volume

CONGESTION AND LEVEL OF SERVICE

Planning-level capacities for various classifications of streets were developed for use with developing an initial list of capacity deficiencies. Link capacities are a function of the number of lanes, but are also influenced by other factors such as peak hour factors, type of intersection controls, percent trucks, green-to-red cycle length ratios at signalized intersections, etc. Determining actual capacities for each link in a network was not performed for this planning level analysis. Instead, generalized capacities were determined for links based on functional class, number of lanes, and area type.

To estimate street capacity using average daily traffic requires development of 24-hour capacities, since streets carry varying flows during different periods of the day and capacity is typically measured during a one hour period. Typically, peak flow rates occur during the morning and evening peak hours, or "rush hours", although traffic studies have shown that the peak hour on Lincoln Avenue between Broadway and Union actually occurs at noon. For most urban communities, peak hour traffic represents 8-10% of the all-day volume present on a facility. In addition, peak hour traffic rarely has a 50/50 directional distribution split. Typically, directional splits during peak hours are closer to 60/40.

Finally, "capacity" is a relative term that may have different meanings to different individuals, or even from one community to another. The Highway Capacity Manual defines Level of Service (LOS) to quantify roadway operating characteristics. Much like school grades, LOS A represents excellent operating characteristics of minimal delay and great freedom to maneuver while LOS F represents extremely congested conditions, long queues and delays, and little or no freedom to maneuver. While large urban areas may define LOS D, or even LOS E as the minimum acceptable condition for planning, urban areas the size of Fergus Falls (14,000 population) typically view LOS C as an acceptable minimum for design and planning. Based on procedures of the Highway Capacity Manual, values of link LOS can be generally related to volume-to-capacity ratios (v/c) as shown in Table 1.

Table 1 - Level of Service Related to V/C Ratio

Link V/C Ratio	Approximate Link Peak Hour LOS
0.0 to 0.60	A
0.61 to 0.70	B
0.71 to 0.80	C
0.81 to 0.90	D
0.91 to 1.00	E
> 1.00	F

Using typical values that relate daily to peak hour volumes, and based on directional splits common during peak hour periods, 24-hour "capacities" can be developed for use with 24-

hour volumes that will reflect v/c conditions (and congestion) that typically occurs during peak hour periods. The relationship is written as follows:

> V/C = [ADT x 0.10 x 0.60] / [(number of directional lanes) x (per lane per hour capacity for that facility type and area type)]

For purposes of this plan, roadway capacities by facility type and area type were initially set utilizing recommendations of NCHRP Report No. 365, Tables 52-58. Representative hourly capacities for various facility types and area types are listed in Table 2.

Table 2 - Representative Per Lane Capacities (vehicles per hour per lane)

Facility Type	Area Type	Hourly Per Lane Capacity
Freeways	Suburban/Rural	1,800
Divided Multi-lane Highway	Rural	1,800
Divided Multi-lane Highway	Suburban	1,600
Two Lane Road	Suburban/Rural	1,500
Single Lane Signalized Intersection Approach	Urban/Suburban	825
Two Lane Signalized Intersection Approach	Urban/Suburban	825
Collector – All Way Stop Control Intersection	Urban/Suburban	750

Utilizing representative values for hourly per-lane capacity listed in NCHRP Report No. 365, representative capacities were developed for freeways, principal arterials, and minor arterials for Fergus Falls.

In general daily per-lane capacities for different facility types were established as follows:

Facility Type	Daily Per-Lane Capacity
Freeway	18,000 vpd
Principal Arterial – Rural	14,000 vpd
Principal Arterial – Suburban	11,000 vpd
Principal Arterial – Urban	10,000 vpd
Minor Arterial	8,250 vpd
Rural / Urban Major Collector	7,500 vpd

Using the planning level capacities, streets with daily traffic volumes available were assessed for LOS. In total, daily volume data was available for 132 individual street segments representing 85 miles of roadway. Comparing planning-level capacities to existing daily traffic, we have identified an initial list of street segments that may be experiencing capacity-related deficiencies. We have identified eight street segments experiencing LOS D, two segments experiencing LOS E, and five segments experiencing LOS F. Table 3 summarizes the LOS analysis for street segments with traffic volume data available that are functionally classified as freeways, arterial, or collector streets. Figure 8 shows street segment LOS as determined for streets with count data that are major collectors, arterials or freeways on the functional classification plan.

Table 3 - Congestion Summary, Existing Conditions

Level of Service	Number of Street Segments	Total Length of Segments (mi.)
A	104	75.5
B	4	1.4
C	9	3.3
D	8	2.1
E	2	0.8
F	5	1.9
TOTAL	132	85.0

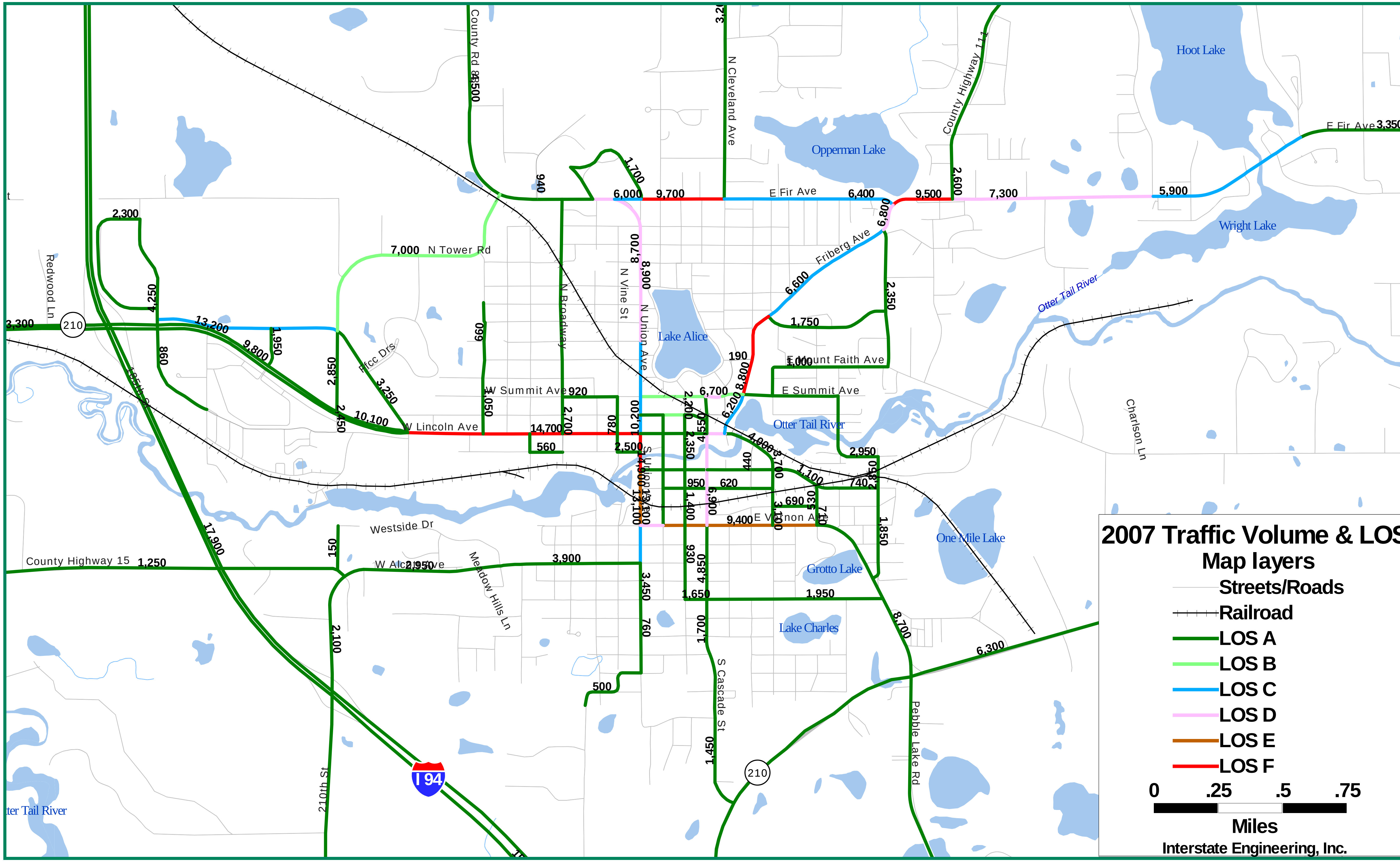


Figure 8 - Current Traffic Volume and Level of Service

SAFETY ASSESSMENT

The Minnesota Crash Mapping Analysis Tool (MnCMAT) and crash database was utilized to identify potential safety deficiencies. Using the MnCMAT, crash data for the five year period of 2003-2007 for the City of Fergus Falls was examined. The examination included extraction of generalized data as well as closer examination of high crash intersections and street segments.

For the five year period examined, there were 1,133 reported crashes in the City of Fergus Falls. Three (3) fatal crashes were reported. Table 4 provides more detail for all crashes in the City.

Table 4 - Crash Summary, Fergus Falls, 2003-2007

CRASH SUMMARY	NUMBER OF CRASHES
Fatal Crashes	3
Incapacitating Injury Crashes	9
Non-Incapacitating Injury Crashes	105
Possible Injury Crashes	191
Property Damage Crashes	825
Total	1,133
SURFACE CONDITION SUMMARY	
Dry	718
Wet	136
Snow	63
Slush	15
Ice/Packed Snow	182
Water (standing, moving)	1
Debris	2
Other/Not Reported	16
TYPE OF CRASH SUMMARY	
Rear End Crashes	282
Right Angle Crashes	417
Head On Crashes	49
Same Direction Sideswipe Crashes	97
Opposite Direction Sideswipe Crashes	19
Run Off Road Crashes	69
Left-Turn Crashes	63
Right-Turn Crashes	21
Pedestrian Crashes	8
Pedicycle Crashes	14
Other/Not Reported	94

LOCATION OF CRASH SUMMARY	
Not At Intersection or Junction	225
At Intersection/Junction or Intersection-Related	681
At Alley or Driveway Access	61
At Railroad Crossing	5
At School or Recreational Trail Crossing	3
Other/Not Reported	158

Intersections crashes were examined to determine locations with highest crash rates and crash severity rates. The MnCMAT was utilized to "stack" crashes that occurred in intersections or junctions. The stack graphic, shown in Figure 9, allowed easy identification of locations with the highest number of intersection or intersection-related crashes. Based on the graphical representation of crashes, 14 intersections and five street segments were examined in closer detail to identify crash rates and trends in crash types.

For intersections and streets selected for more detailed examination, a comparison of the crash rate to the "critical crash rate" has also been performed. A comparison using a critical crash rate is considered to be the best for identifying hazardous locations since the critical rate accounts for key variables that affect safety, including:

- The type of the facility
- The type of intersection control
- The amount of exposure
- The random nature of crashes

When comparing actual intersection crash rates to the calculated critical crash rate, intersections or roadway segments can be divided into three basic categories:

- *Locations with crash rate below the categorical average*: These locations are considered SAFE because of the low frequency of crashes and can be eliminated from further review.
- *Locations with a crash rate above the categorical average, but below the critical rate*: These locations are considered to be SAFE because there is a very high probability (90-95%) that the higher than average crash rate is due to the random nature of crashes.
- *Locations with a crash rate above the critical rate*: These locations are considered to be UNSAFE and in need of further review because there is a high probability (90-95%) that conditions at the site are contributing to the higher crash rate.

The number of total crashes at study area intersections selected for closer examination varied from a low of six crashes, to a high of 34 crashes. One fatal crash and one incapacitating injury crash incident were included in the selected locations. Table 5 shows the results of the intersection crash data assessment.

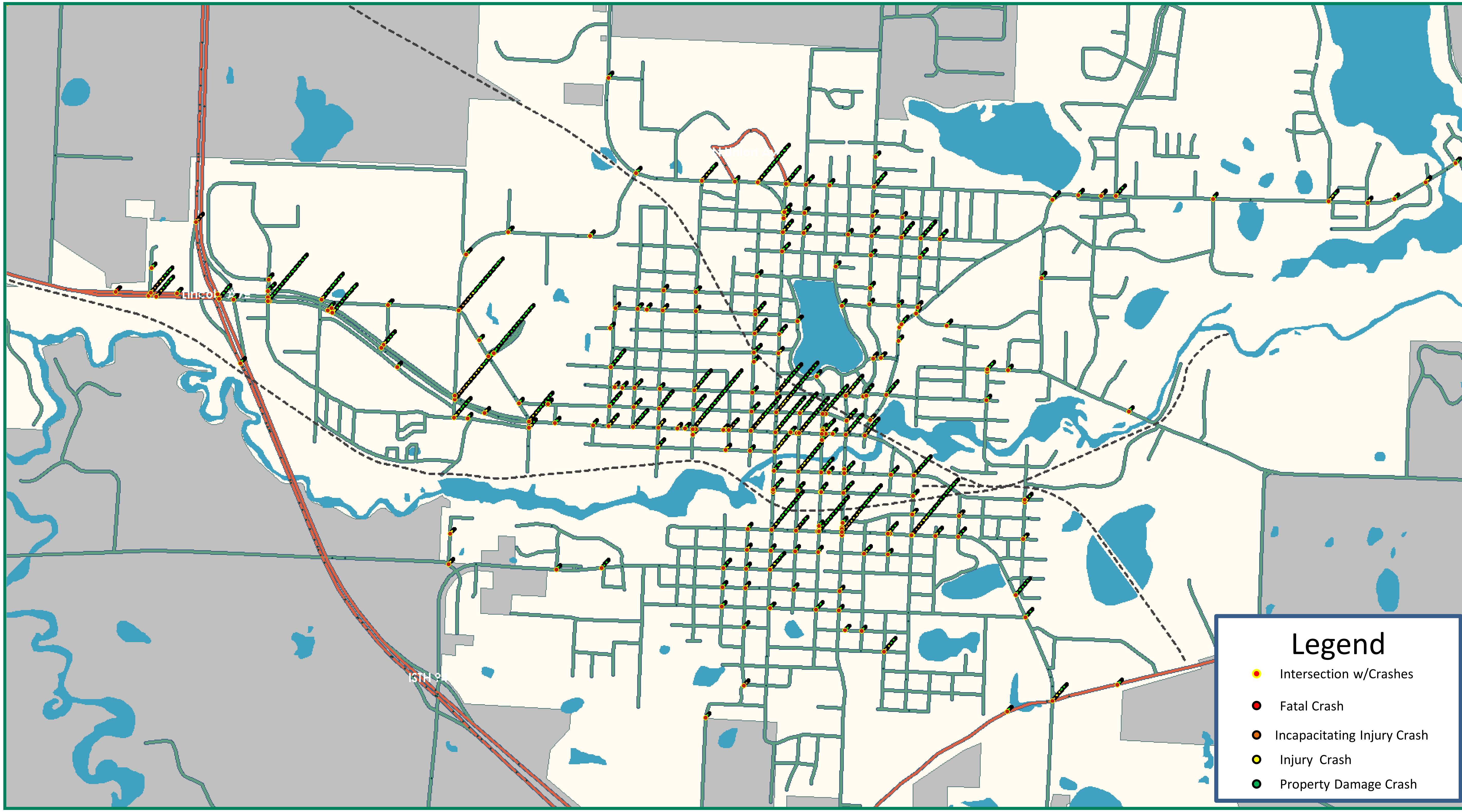


Figure 9 - Intersection and Intersection-related Crashes, 2003-2007

Table 5 - Selected Crash Statistics, Fergus Falls, 2003-2007

Fergus Falls Transportation Plan Update

Intersection Crash Data

Intersection	Total Crashes	Fatal Crashes	Incapacitating Injury Crashes	Injury Crashes	PDO Crashes	Daily Entering Volume (vpd)	Crash Rate*	Severity Index**	Severity Rate***	Average Rate	Critical Rate****
Tower Rd. / Lincoln Ave.	34	0	0	11	23	12,600	1.48	1.65	2.44	0.3	0.62
Lincoln Ave. / Redwood Ln.	9	0[1]	0	5	4	5,000	0.99	2.11	2.08	0.3	0.82
Tower Rd. / College Way	17	1[2]	0	5	11	9,400	0.99	2.00	1.98	0.3	0.67
Sheridan Ave. / Vernon Ave.	21	0	1	5	15	12,500	0.92	1.81	1.67	0.3	0.62
Union Ave. / Cavour Ave.	21	0	0	7	14	14,450	0.80	1.67	1.33	0.3	0.59
Cascade St. / Vernon Ave.	19	0	0	8	11	14,975	0.70	1.84	1.28	0.6	1.00
Union Ave. / Summit Ave.	19	0	0	6	13	13,510	0.77	1.63	1.26	0.3	0.60
W. Fir Ave. / Broadway	6	0	0	4	2	6,350	0.52	2.33	1.21	0.3	0.76
Lincoln Ave. / Broadway	23	0	0	6	17	16,575	0.76	1.52	1.16	0.7	1.11
Lincoln Ave. / Cascade St.	14	0	0	4	10	11,200	0.68	1.57	1.08	0.6	1.07
Lincoln Ave. / Vine St.	13	0	0	7	6	14,845	0.48	2.08	1.00	0.3	0.59
Lincoln Ave. / Union Ave.	19	0	0	6	13	21,900	0.48	1.63	0.78	0.7	1.05
W. Fir Ave. / Union Ave.	14	0	0	3	11	19,200	0.40	1.43	0.57	0.3	0.55
Union Ave. / Vernon Ave.	13	0	0	2	11	17,550	0.41	1.31	0.53	0.6	0.97

Street Segment Crash Data

Segment Description	Total Crashes	Fatal Crashes	Incapacitating Injury Crashes	Injury Crashes	PDO Crashes	Daily Traffic Volume	Segment Length (mi.)	Crash Rate*	Severity Index**	Severity Rate***	Average Rate	Critical Rate****
Lincoln Ave. - Union Ave. to Court St.	5	0	0	1	4	4,900	0.088	6.35	1.40	8.90	2.3	7.34
Cascade St. - Lincoln Ave. to Washington Ave.	7	0	0	3	4	6,900	0.140	3.97	1.86	7.37	2.3	5.53
Friberg Ave. - Mt. Faith Ave. to Northern Ave.	6	0	0	0	6	8,800	0.101	3.70	1.00	3.70	2.3	5.68
Lincoln Ave. - N. Broadway to Oak St.	7	0	0	2	5	14,700	0.134	1.95	1.57	3.06	2.3	4.50
Lincoln Ave. - N. Buse St. to N. Broadway	4	0	0	1	3	14,700	0.127	1.17	1.50	1.76	2.3	4.56

*Crash Rate: Number of crashes per million entering vehicles (intersection) or million vehicle miles traveled (segment).
**Severity Index: Ratio of number of fatal and incapacitating injury crashes times 8, plus the number of other injury crashes times 3, plus the number of property damage crashes to the total number of crashes.
***Severity Rate: The crash rate multiplied by the severity index.
1: Staff recalls two fatal crashes at this location that are not in the MnMCAT records for the time period querried.
2: Staff does not recall a fatal crash at this location within the time period querried.
****Critical Rate: Determined to 95% level of confidence per the MnDOT "Traffic Safety Fundamentals Handbook", August 2008, CH2M Hill, Inc.
Shaded locations exhibit crash rates higher than the calculated Critical Crash Rate.

Crash Data Source: Minnesota Crash Mapping Analysis Tool (MnCMAT), Years 2003-2007, inclusive

The following paragraphs discuss the crash history for the six intersections with crash rates that exceed the critical rate. The intersections are shown in Figure 10.

Tower Road / Lincoln Avenue

The intersection of Tower Road with Lincoln Avenue experienced the highest number of crashes in the five year period (34), and also resulted with the highest severity rate. It also has the distinction of experiencing the highest number of injury crashes (11). This location is an unsignalized intersection on a multi-lane divided roadway. While traffic volumes at this intersection are not the highest of those intersections examined, it is a busy location with 12,600 vpd entering the intersection. An examination of crash reports showed 23 of the crashes were reported as right-angle crashes, with five left-turn crashes. This intersection is planned to be signalized in 2011 or 2012, a modification would be expected to reduce the number of right-angle crashes and the injury rate, but might also be expected to increase rear-end type crashes.

Lincoln Avenue / Redwood Lane

The intersection of Lincoln Avenue with Redwood Lane did not experience a high volume of crashes (9), but over half of the crashes at this location resulted with injuries. The high percentage of injury crashes, coupled with the relatively low traffic volume resulted with this location scoring the second-highest severity rate of all intersections assessed. An examination of crash reports showed that all crashes involved westbound vehicles, with six of the nine crashes involving westbound/southbound conflicts. This intersection was signalized in 2009, a change that would be expected to reduce the number of right-angle crashes and the injury rate, but might also be expected to increase rear-end type crashes.

Tower Road / College Way

The intersection of Tower Road with College Way experienced 17 crashes over the five year period. One of only three fatal crashes to occur in the City happened at this location. While experiencing moderate daily traffic (9,400 vpd entering the intersection), the fatal crash coupled with five other injury crashes results with a high severity rate at this location. Operating as an unsignalized four-legged intersection, the easterly leg of the intersection intersects the others with a skew of almost 45-degrees. At this location, the most prevalent crash type is right-angle crashes (14 of 17) with eight of the right-angle crashes involving westbound/southbound conflicts.

Sheridan Avenue / Vernon Avenue

The intersection of Sheridan Avenue with Vernon Avenue experienced 21 total crashes over the five year period. Although this intersection is a stop-controlled four legged intersection, all but two crashes involved at least a southbound vehicle (stop controlled approach). Almost half of the crashes were right angle type involving vehicles southbound and westbound vehicles (10 crashes). An investigation of conditions at the intersection shows no clear cause for the right angle crashes (visibility, traffic control devices, etc.). An examination of the individual crash reports also does not indicate any contributing conditions for the right angle crashes. It is thought that the heavy volume of traffic on Vernon Avenue (9,400 vpd) reduces gaps in traffic causing drivers to become impatient and make poor decisions when entering the street.

Union Avenue / Cavour Avenue

The intersection of Union Avenue with Cavour Avenue also experienced 21 crashes over the five year period of study. This intersection has stop sign control for the Cavour Avenue approaches and, as with the Sheridan/Vernon intersection, right angle crashes were the most prevalent type (8 crashes). There were also a relatively high number of rear-end type crashes, with all but one involving southbound traffic. Most of the right angle crashes (5 of 8) involved northbound and eastbound vehicles. An investigation of conditions at the intersection shows visibility is not impaired for the eastbound approach, although the approach is on an up-grade. As with the Sheridan/Vernon intersection, the heavy volume of traffic on Union Avenue is likely a contributing factor as it carries 10,200 vpd.

Union Avenue / Summit Avenue

The intersection of Union Avenue with Summit Avenue is located only one block north of the previously discussed Union/Cavour intersection. This intersection experienced a total of 19 crashes during the five year period of study. As with the previous location, right angle crashes are the most prevalent type (6 crashes), with most of them involving westbound vehicles. An investigation of conditions at the intersection show a dense hedge is located adjacent to the sidewalk on the northeast corner of this location that does reduce sight distance to the north for the westbound approach. The sight restriction could be a contributing factor as the greatest number of right angle crashes involved westbound vehicles colliding with southbound traffic. As with the previous location, heavy traffic volume on Union Avenue is also thought to contribute to the crash experience at this location.

In addition to intersection crashes, street segments were also examined for high crash locations. Using the MnMCAT, five street segments showing the highest number of crashes were selected for examination. Segments carried varying levels of traffic volume, from a low of 4,900 vpd, to a high of 14,700 vpd. The interstate highway was excluded from this assessment. Table 5 also shows results of the street segment assessment.

Of the five segments selected for detailed assessment, none of the segments had crash rates that exceeded the critical crash rate, although three segments did exhibit crash rates that exceed the average crash rate for the facility type. The three street segments exhibiting crash rates that exceeded the average rate (and also had the highest crash severity rates) are discussed in the paragraphs below. The segments are also shown on Figure 10.

Lincoln Avenue – Union Ave. to Court St.
This street segment experienced five crashes in the five year period studied. One crash was reported with possible injuries with the remainder being property damage crashes. Three of the five crashes were rear-end type, all involving westbound vehicles. Rear-end crashes do not seem to be intersection-related since they were all located just west of the Lincoln Ave./Court St. intersection (on the departure leg). All rear-end crashes also occurred during dry road conditions. One crash involved a pedestrian (possible injury during rainy conditions) and the remaining crash involved a parked vehicle (dry pavement conditions). The relatively light traffic volume on this street segment (4,900 vpd) resulted with a crash severity rate of 8.90.

Cascade Street – Lincoln Ave. to Washington Ave.
This street segment experienced seven crashes in the study period, with one non-incapacitating injury and two possible injury crashes. One crash involved a pedicycle (dry, daylight conditions), and one involved a parked vehicle (wet, daylight conditions). Two crashes were rear-end type, while two were left-turn crashes. No discernible pattern of crashes was evident in the crash records. The crash severity rate for this street segment is 7.37.

Friberg Avenue – Mount Faith Ave. to Northern Ave.
This street segment experienced six total crashes during the study period, all property-damage crashes. All but one occurred during dry, daylight street conditions with the remaining crash occurring during wet, daylight conditions. All of the crashes were rear-end type crashes with no prominent directionality (two southbound, three northbound, one westbound). The crash records indicate at least one of the rear-end crashes involved a left-turning vehicle. The crash severity rate for this street segment is 3.70.

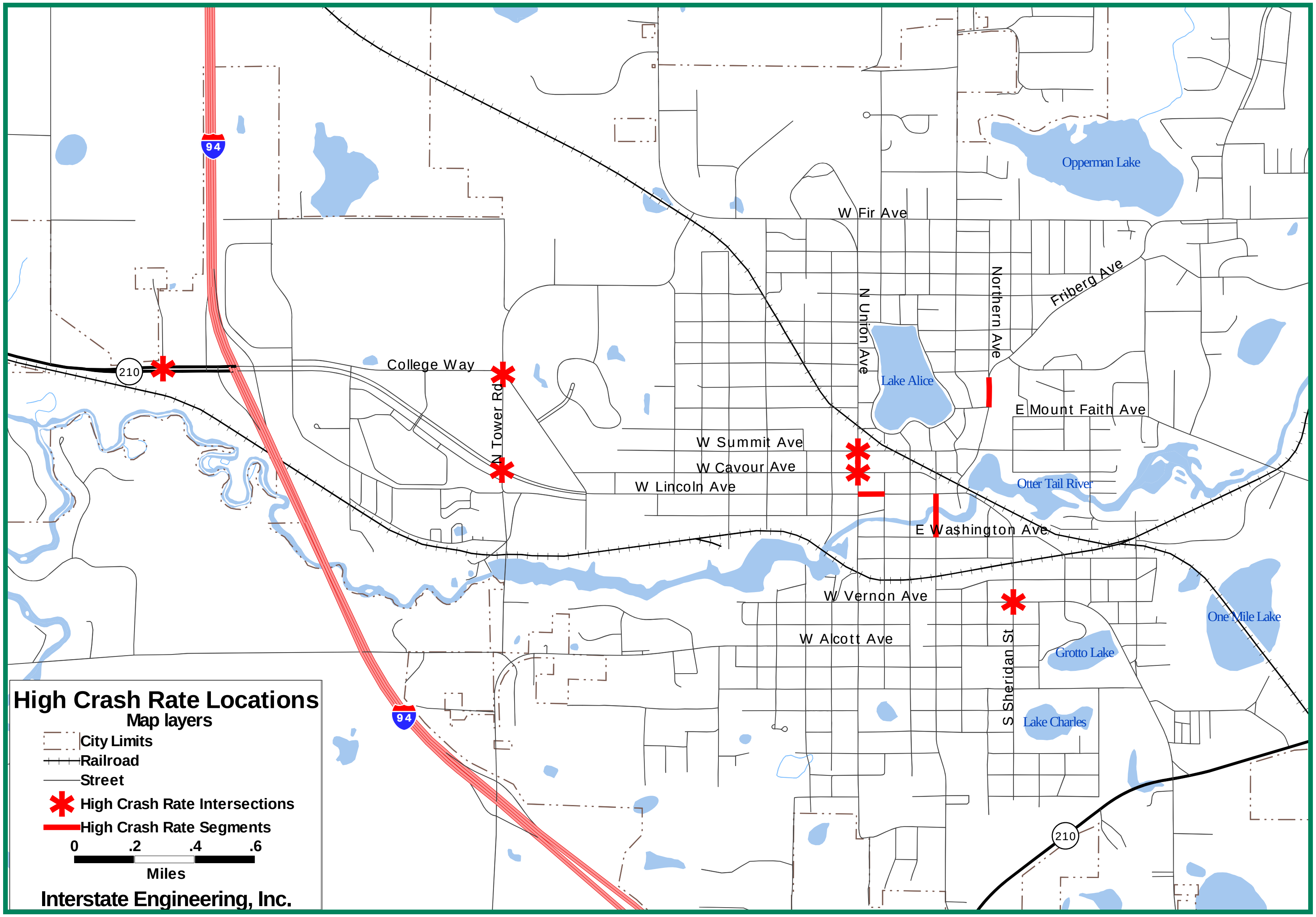


Figure 10 – High Crash Rate Locations

CIRCULATION ASSESSMENT

The Thoroughfare Plan included with the 1964 Thoroughfares & Transportation Plan for the City of Fergus Falls provided functional classification for existing facilities and planned facilities. Many of the planned improvements identified in the 1964 plan have been completed. With this plan update, the 1964 Thoroughfare Plan was reviewed and updated to include streets that have been constructed since the plan was created. The updated plan was presented previously as the Functional Classification Plan (Figure 4).

The City of Fergus Falls has grown considerably since development of the 1964 plan. At the time the 1964 plan was developed, Interstate Highway 94 was not yet complete and traffic destined to use the interstate traveled on US Highway 52 through the city. The physical size of the City has increased, with most significant expansion of the transportation system occurring in the northeast and western areas. The construction of the interstate highway and the three interchanges serving Fergus Falls has also prompted development to the south.

Circulation and connectivity issues in Fergus Falls are due mainly to physical barriers to transportation. Most significant barriers to transportation infrastructure in Fergus Falls are rivers and lakes, the interstate highway, and railroad tracks. While these elements do not present impenetrable barriers, they do make crossings more expensive, technically difficult, or environmentally undesirable. Additional physical barriers to surface transportation include park areas, the land fill, and the golf course. Development of surface transportation facilities through developments or land uses such as these is not feasible or compatible with the underlying land use. A map graphic showing barriers to transportation is included as Figure 11.

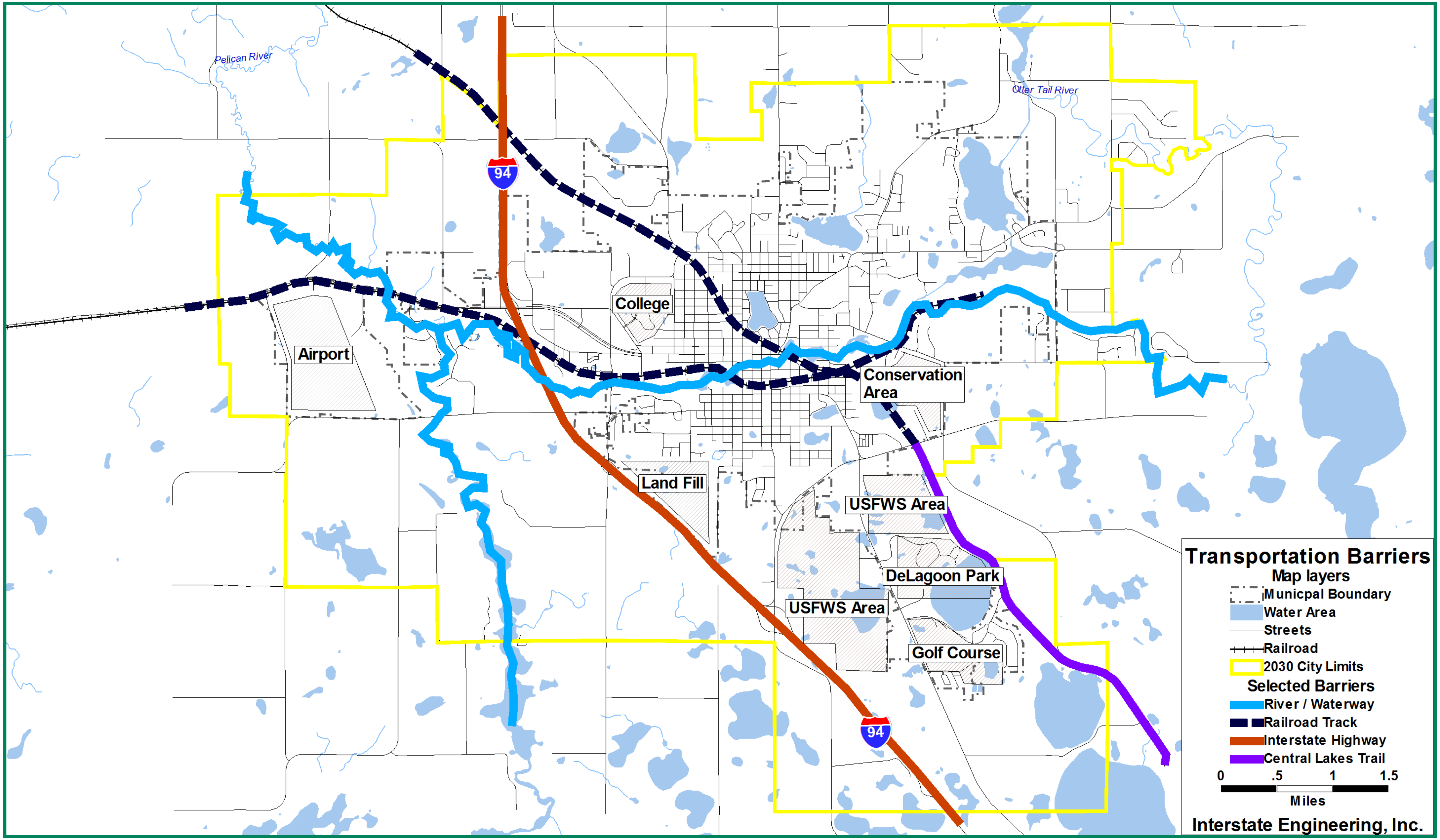


Figure 11 - Physical Barriers to Surface Transportation Facilities

West of the Union Avenue crossing of the Otter Tail River, no roadway crosses the river within the city limits. Only the interstate highway provides a crossing. The City recognized this connectivity deficiency and is constructing a new crossing at Tower Road (2011-2012). Both of these connections were identified on the Thoroughfare Plan of the 1964 plan.

East of the downtown area, only South Concord Street and Mt. Faith Avenue provide crossings of the Otter Tail River. As the City continues to grow, it will be advisable to plan another crossing to the east of the Mt. Faith Avenue/Main Street river crossing. Such a route would help establish a new circumferential route on the east side of the City.

PHYSICAL CONDITIONS ASSESSMENT

As part of an on-going process, the City maintains and regularly updates a Capital Improvements Plan (CIP) that lists planned and programmed projects for transportation as well as storm water systems, water and wastewater systems, solid waste, sidewalks & bikepaths, etc. The existing CIP lists projects for the five year period of 2012 to 2016 and includes six sidewalk/shared-use path projects and 20 streets projects. While shared-use path projects are new construction, street project include new construction, reconstruction, paving, bridge, and mill/overlay projects.

The CIP projects list is an on-going planning method where the listing is updated each year. New project needs are identified as city staff becomes aware, and completed projects are dropped from the list. As such, the CIP listing is a current assessment of physical conditions.

Figure 12 shows street projects currently identified on the CIP. Project identification codes shown in Figure 10 correspond to project descriptions listed in Table 6.

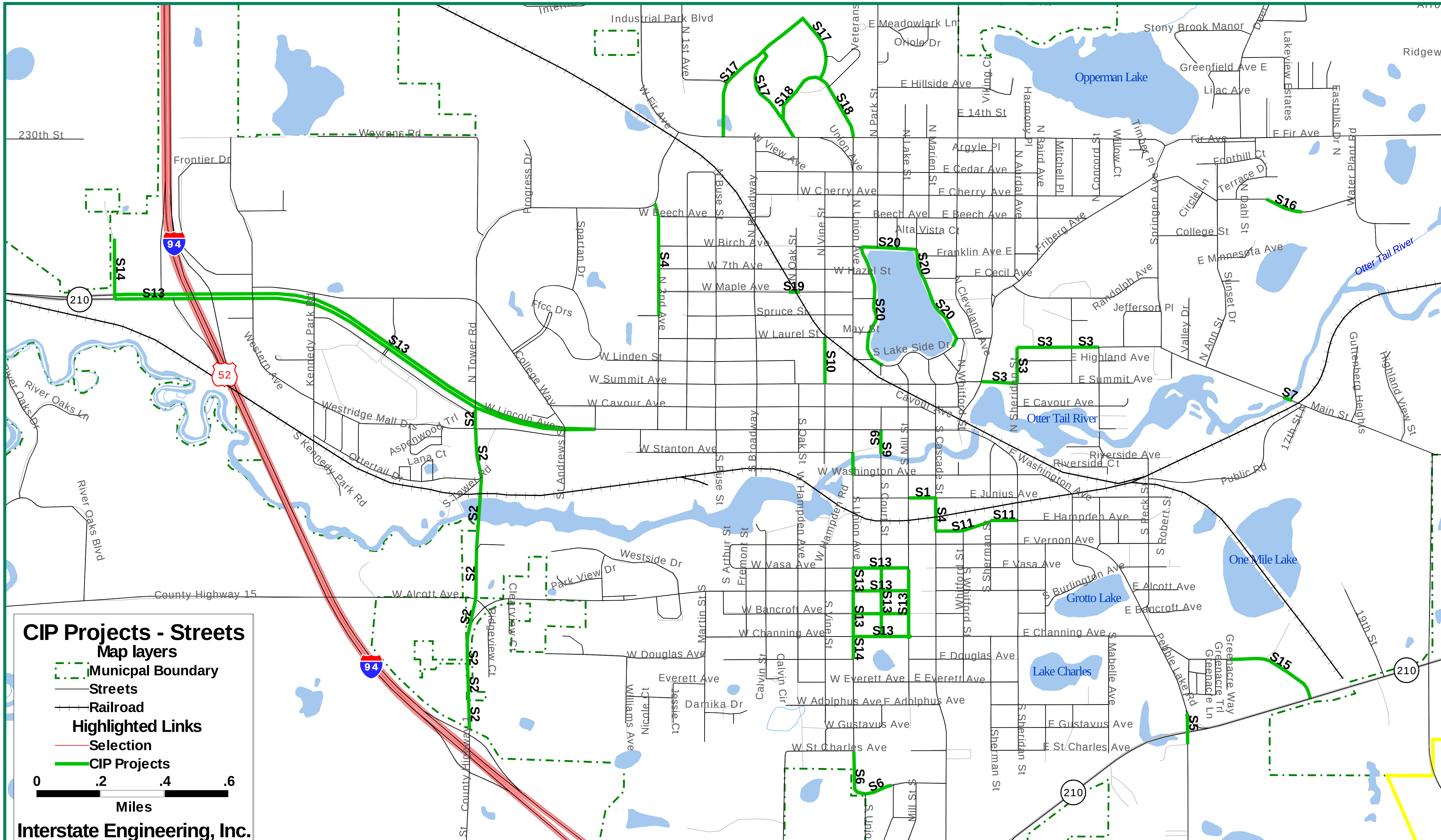


Figure 12 - CIP Streets Projects

Table 6 - CIP Street Project Information

Map Code	Project Description	Project #	Project Budget Estimate ($)					
			2012	2013	2014	2015	2016	TOTAL
S1	Junius Ave. (Mill to Cascade), Reconstruction	06-STR-001	120,000					120,000
S2	Tower Road & Bridge, Reconstruction & New Construction	06-STR-006	10,787,000					10,787,000
S3	Summit/Sheridan/Mt. Faith (Friberg to Concord)	06-STR-009	400,000					400,000
S4	Cascade RR Crossing (S. of Junius)	06-STR-013				150,000		150,000
S5	Traffic Signals (TH 210 @ Pebble Lake Rd.	06-STR-017	1,500,000					1,500,000
S6	Union @ Hilltop (Realign, Grade and Pave)	06-STR-019		100,000				100,000
S7	Main Street Bridge (Replace over Otter Tail River)	06-STR-033			900,000			900,000
S8	CBD Reconstruction, Ph. II	06-STR-034					500,000	500,000
S9	Court St. (Lincoln to Bridge), Reconstruction	06-STR-035	100,000					100,000
S10	Vine St. (Summit to Laurel)	06-STR-037					100,000	100,000
S11	Hampden (Cascade to Sheridan)	07-STR-038					250,000	250,000
S12	City-Wide Mill & Overlay	07-STR-040	625,000	625,000	625,000	625,000	250,000	2,750,000
S13	Union/Mill to Channing/Vasa Area	08-STR-041	1,500,000					1,500,000
S14	Union Ave. (Channing to Douglas)	08-STR-042					150,000	150,000
S15	Douglas (Minnie St. (Vacated) to TH210)	10-STR-043	300,000					300,000
S16	Somerset Rd. (Ann St. (Vacated) to 700' East)	10-STR-044	250,000					250,000

Map Code	Project Description	Project #	Project Budget Estimate ($)					
			2012	2013	2014	2015	2016	TOTAL
S17	RTC Campus Redevelopment	10-STR-045	1,000,000					1,000,000
S18	TH297 Turnback (Mill & Overlay)	10-STR-046	275,000					275,000
S19	Maple Avenue RR Crossing Closure	10-STR-047	50,000					50,000
S20	Lake Alice Area – Phase II	11-STR-048		250,000				250,000
TOTALS			16,907,000	975,000	1,525,000	775,000	1,250,000	21,432,000

NON-MOTORIZED TRASPORTATION ELEMENTS

Non-motorized transportation elements consist of walking and bicycle routes. Walking routes can consist of sidewalks along streets (either attached or detached to the curb) or pathways within separate corridors. Bicycle routes are made up of bicycle lanes, bicycle paths, bicycle routes, bicycle trails, or bikeways. Bicycle and pedestrian are often combined through the design and construction of shared use paths. The MnDOT Bicycle Modal Plan (January, 2005) defines each of the bicycle elements as follows:

<u>Bicycle Lane:</u> A portion of a roadway or shoulder designated for the exclusive or preferential use by persons using bicycles. Bicycle lanes are to be distinguished from the portion of the roadway or shoulder used for motor vehicle traffic by physical barrier, striping, marking, or other similar device. The width and design treatment of bicycle lanes varies from five to ten feet depending on many factors, including traffic volume, speed, number of lanes, presence of on-street parking, traffic composition (especially truck volumes), bus routes, etc. Bicycle lane design should be accomplished in accordance with the Mn/DOT Bikeway Facility Design Manual (March 2007).

<u>Shared-use Path:</u> A shared-use path facility designed for shared use by both pedestrians and persons using bicycles and constructed or developed separately from the roadway or shoulder. Widths of shared-use paths vary with the volume of expected pedestrian use, but should be at least 10 feet wide. Shared-use paths should be designed to provide adequate sight distance and maintain horizontal and vertical alignment suitable for bicycle speeds. Shared-use path design should be accomplished in accordance with the Mn/DOT Bikeway Facility Design Manual (March 2007).

<u>Bicycle Route:</u> A roadway or shoulder signed to encourage bicycle use (but not a separate or demarked facility). Typically bicycle routes utilize a shared lane where bicycles may need to share a travel lane with motor vehicles, especially appropriate on low-speed, low-volume streets or roads. Often, bicycle routes are provided with a wide outside lane designed with extra width to accommodate bicycles. Wide outside lanes should be no less than 14 feet, and no more than 16 feet wide.

<u>Bicycle Trail:</u> A bicycle route or bicycle path developed by the Commissioner of Natural Resources under section 85.016. Bicycle trails often do not follow vehicle traffic corridors and are frequently utilized to provide recreational facilities within parks and other natural areas.

<u>Bikeway:</u> A bicycle lane, bicycle path, or bicycle route, regardless of whether it is designated for the exclusive use of bicycles or is to be shared with other transportation modes.

As defined for this plan update, both bicycle and pedestrian facility may be within the street section and parallel to the street, or within an exclusive corridor dedicated to non-motorized use. While bicycle paths, as defined, are for exclusive or preferential use by bicycles, it is also assumed for purposes of this plan update that bicycle paths will function as multi-use paths that are also suitable for use by pedestrians.

The City of Fergus Falls has a considerable system of existing shared-use paths and bikeways. 8.8 miles of shared-use paths and 6.8 miles of bikeways currently exist within the City of Fergus Falls.

The CIP identifies additional planned shared-use paths and bikeway facilities for the next five year cycle. In addition, future shared-use path and bikeway projects have also been identified for long-term planning. Figure 13 shows existing and currently planned bicycle facilities identified on the CIP. Project identification codes shown in Figure 13 correspond to project descriptions listed in Table 7.

Table 7 - CIP Bicycle Facility Project Information

Map Code	Project Description	Project #	Project Budget Estimate ($)					
			2012	2013	2014	2015	2016	TOTAL
BP1	Reconstruct Bike Path, CR #1 from Godel Dr. to Diversion Dr.	06-BIKE-001	127,500					127,500
BP2	New Bike Path Construction, Union Avenue River Crossing	06-BIKE-002			75,000			75,000
BP3	New Bike Path/Bikeway Construction, CR #111 from Ridgewood Dr. to Connell Dr.	06-BIKE-004				50,000		50,000
BP4	New Construction, Riverpath Bike Path to Hannah Park	06-BIKE-005				50,000	50,000	100,000
BP5	New Bikeway Construction, N. Park St. from W. Fir Ave. to Skogmo Blvd. (Veterans Home)	06-BIKE-006		50,000				50,000
BP6	Reconstruct Pebble Lake Road Bike Path, S. Concord St. to TH210	10-BIKE-009		50,000				50,000
TOTALS			$ 127,500	$ 100,000	$ 75,000	$ 100,000	$ 50,000	$ 452,500

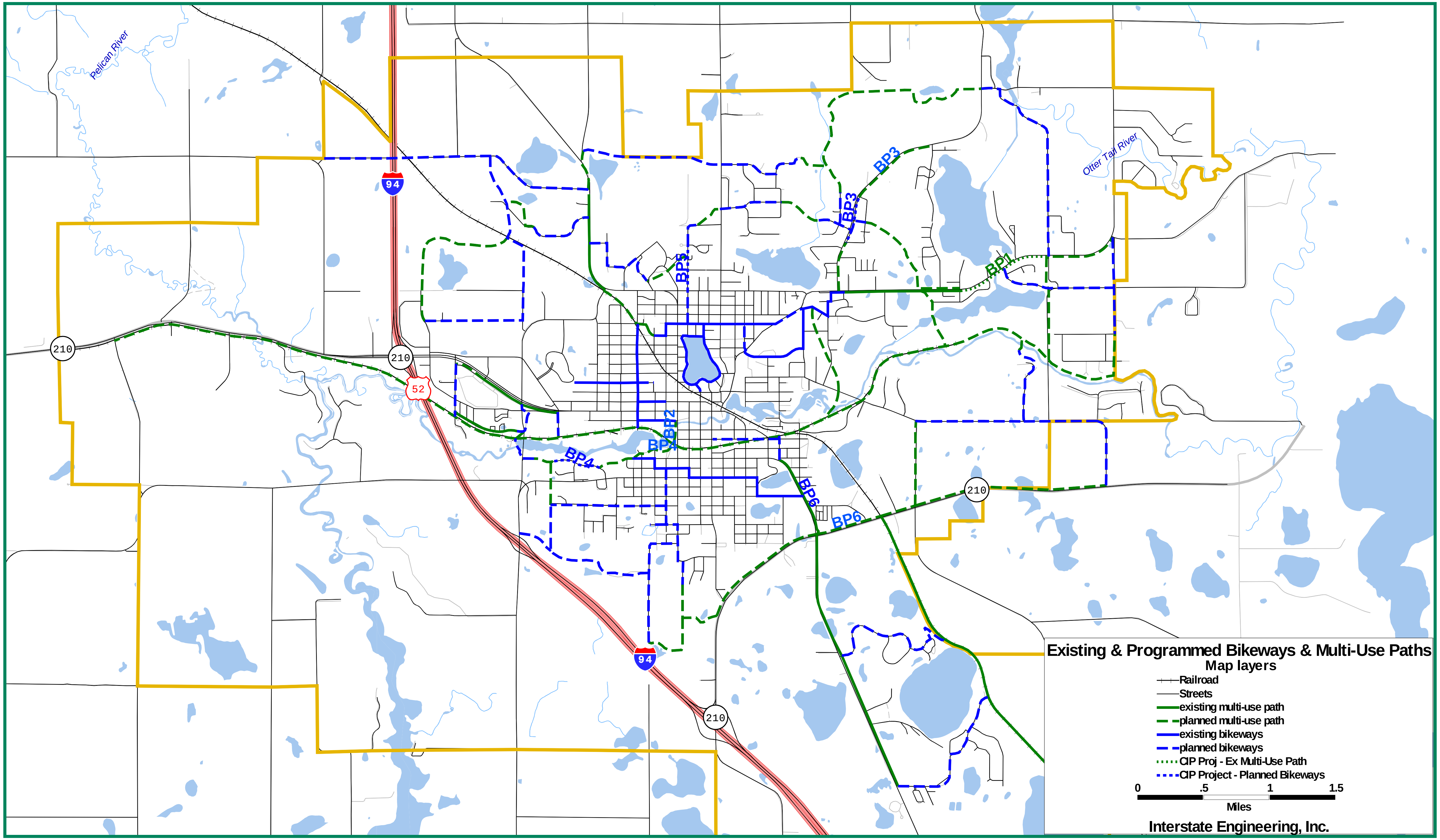


Figure 13 – Existing and Planned Bicycle Facilities

FREIGHT AND AVIATION SYSTEM ELEMENTS

Truck Freight

Fergus Falls is located along Interstate Highway 94 (I-94) which provides truck freight connections to the remainder of the state, and the nation. Most all goods shipped to/from the City of Fergus Falls arrive/depart via truck freight. The City also provides truck services for truck freight passing through Fergus Falls on the interstate highway system.

While load limits on state highways and the interstate highway are regulated by MnDOT, load limits have been established on certain city streets. In a general sense, streets classified as arterials are limited to nine or ten ton load limits. Exceptions are Cleveland Ave./County Road 27, W. Vernon Ave., W. Alcott Ave., and all local streets. Although classified as minor or principal arterials, these facilities are restricted to a seven ton load limit. Load restrictions for city streets are shown in Figure 14.

Rail Freight

Rail service is provided to Fergus Falls by the Otter Tail Valley Railroad. Passenger rail service is no longer provided to Fergus Falls and freight service is almost exclusively delivery of coal to the Hoop Lake Power Plant and grain unit trains from French, located west of Fergus Falls. Rail lines southeast and east of the city have been abandoned.

Active rail lines continue to constitute a barrier to transportation as new at-grade rail crossings are difficult to permit and grade separated rail crossings are often prohibitively expensive or disruptive to existing development. Crossings of abandoned rail lines that have been converted to bike trails also create transportation barriers.

Aviation

The Fergus Falls Municipal Airport is located about two miles west of I-94, south of State Highway 210, and is sited on about 726 acres of land. An Airport Layout Plan (ALP) update was recently completed for the airport by Short Elliott Hendrickson, Inc. (SEH). Based on information contained in the ALP update, the airport has 45 based aircraft, including twin engine and turboprop aircraft. The airport is a publicly owned and operated facility governed by the City of Fergus Falls.

One Fixed Base Operator (FBO) exists at the airport (Fergus Falls Flight Center), providing day-to-day line service and routine airport upkeep. Scheduled air carrier service was last offered at Fergus Falls in 1996. At that time, annual enplanements exceeded 5,000, but typically averaged about 4,300 passengers. Public comments received during development of the ALP update indicate local business users desire the addition of passenger service and airport improvements to support regional tourism markets. The ALP update “Summary of Airport Needs and Deficiencies” lists “preparation of an Airport Service/Business Plan to evaluate the prospects of a resumption of passenger air service, air cargo service, and general aviation charger service” an a need/deficiency.

Ground transportation connections to the airport are adequate for current and projected airport vehicle traffic. Average daily vehicle traffic to/from the airport measured 68 vehicles per day in 2006, and is projected to reach 118 vehicles per day by the year 2026.

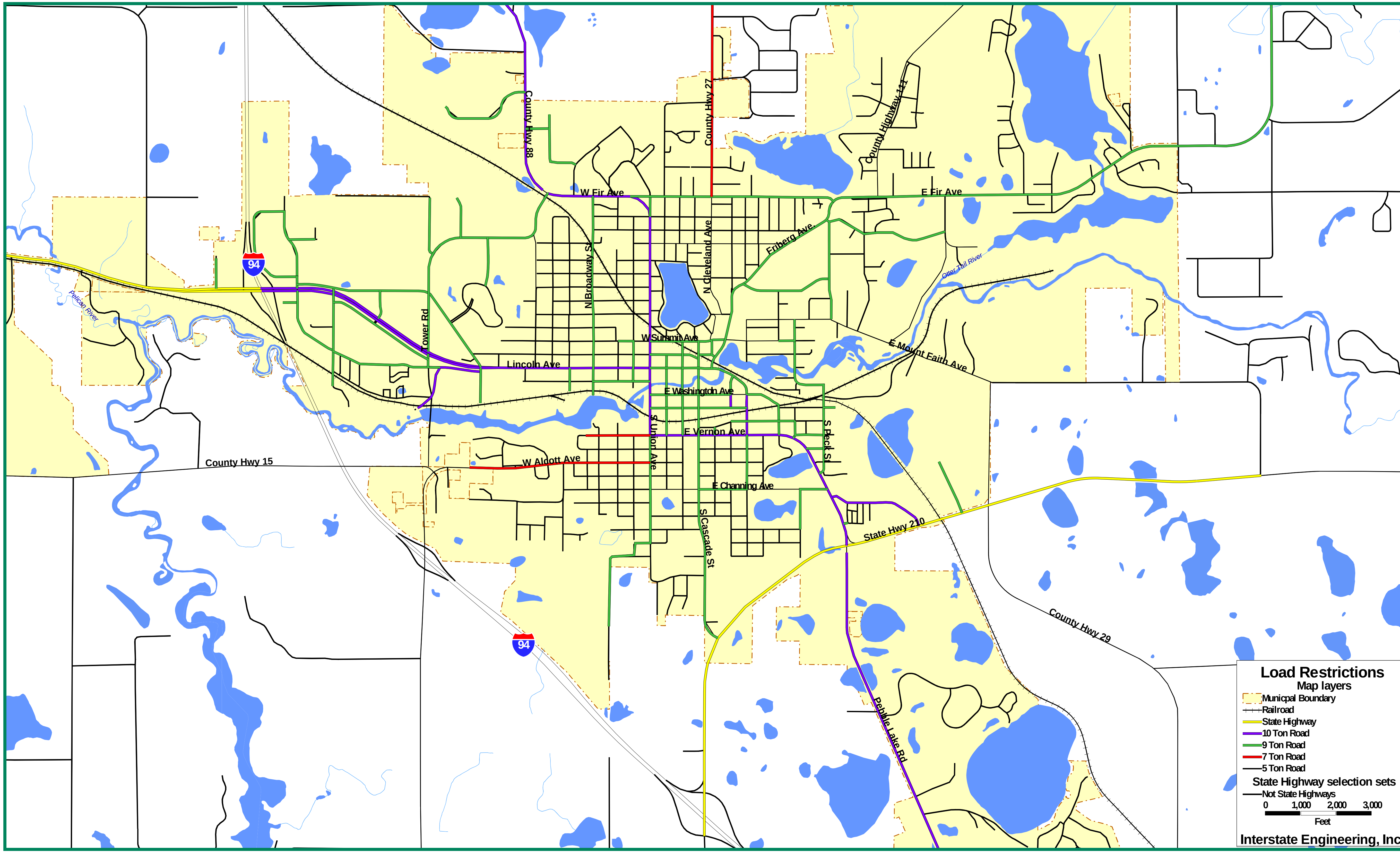


Figure 14 - Load Restrictions

TRANSIT ELEMENTS

The City of Fergus Falls is not served by scheduled transit service. The Otter Tail Express operates as a county-wide transit service available as a "dial-a-ride" demand based service. Otter Tail Express offers services such as:

- Curb to curb service.
- Assistance for passengers with special needs.
- Assistance with handling small parcels.
- Bus accommodations for three and four-wheeled mobility aids.
- Service within the City of Fergus Falls for $1.50 per ride, and service within five miles of the City for $2.50 per ride.
- Intercity service to cities of Parkers Prairie, and Perham.
- Operating hours of Monday-Friday, 7:30am to 4:30pm.

Otter Tail Express recommends two days advance notice for booking reservations, but notes that last minute trips may be accommodated depending on availability. Recent funding increases from MnDOT will allow planned expansion of service to include additional communities along State Highway 210 such as Battle Lake, Dalton, Clitherall, Henning, and Underwood. Potential service expansion includes a morning and afternoon commuter route along SH 210 to/from Fergus Falls, and daytime rides to/from Fergus Falls to support transportation for purposes such as shopping, doctor appoints, etc.

SECTION 5 - FUTURE CONDITIONS

POPULATION PROJECTIONS

The City of Fergus Falls has experienced both periods of growth and decline over the last 40 years. Records indicate the City had a population of 12,443 people in 1970 and has a current (2010) population of 13,138 people in 5,814 households. The City population only grew by 76 persons between 1970 and 1980, and actually declined by 157 persons between 1980 and 1990. Since 1990, the population has grown by over 900 people. Between 1990 and 2000, population of the City grew at an annual rate of 0.9% per year, or about 9% overall for the 10-year period. From 2000 to 2010, the population has declined by about 300 people.

The population of Otter Tail County experienced similar growth to that of the City of Fergus Falls, including the population decline between 1980 and 1990. In 1970, Otter Tail County has a population of 46,097 people and by the year 2000 had grown to a population of 57,159. Between 1990 and 2000, the population of the County grew at an annual rate of 1.2% per year, or about 12.7% overall for the 10-year period. The current (2010) population of Otter Tail County is 57,303 persons. Fergus Falls contains about 23% of the population of the entire county.

Historic trends are often a good indicator of future conditions. Utilizing a linear projection of population figures since 1970 yields a year 2030 projected population of 15,695 people for the City of Fergus Falls. Ignoring pre-1990 population decreases, the population of Fergus Falls can be expected to increase to 16,560 persons by the year 2030. A similar trend analysis shows projected population for Otter Tail County to be 65,895 people by the year 2030.

While population is a good indicator for expected travel demand, the number of occupied households is a stronger indicator and is most often used to estimate trip productions for travel demand modeling. Household data shows that there were 4,686 households in the City of Fergus Falls in 1980, and that the number had increased to 5,805 by the year 2003, and to 5,814 by 2010. Using a linear trend analysis, it is projected that the City will have 7,115 households by the year 2030 (an additional 1,301 households over 2010 conditions). Between 1990 and 2000, the number of households in the City increased at a rate of 1.04% per year, or about 10.89% overall for the 10-year period.

Otter Tail County experienced household growth at a stronger rate than the City. With 18,549 households in 1980, the county grew to contain 19,510 households in 1990. County household growth represents an annual rate of 1.51% per year, or an overall growth of 16.2% for the 10-year period. Extrapolating household growth for the county leads to a projection of 28,497 households by the year 2030.

For purposes of this Transportation Plan Update, we will assume an annual growth rate of 1% per year for traffic volume in general. This figure corresponds well to historic growth for both population and households for the City of Fergus Falls. Charts showing historic growth and growth projections for population and households in Fergus Falls and Otter Tail County are included as Figures 15 - 18.

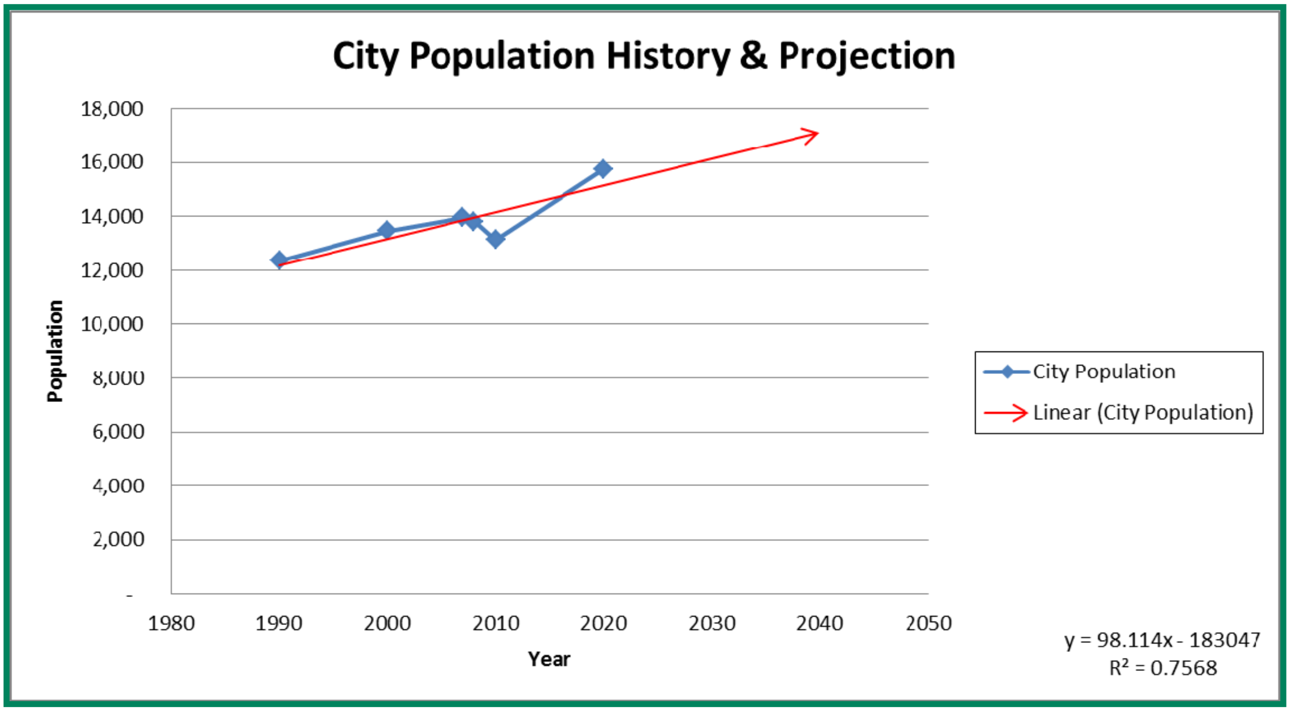


Figure 15 - Fergus Falls Population History & Projection

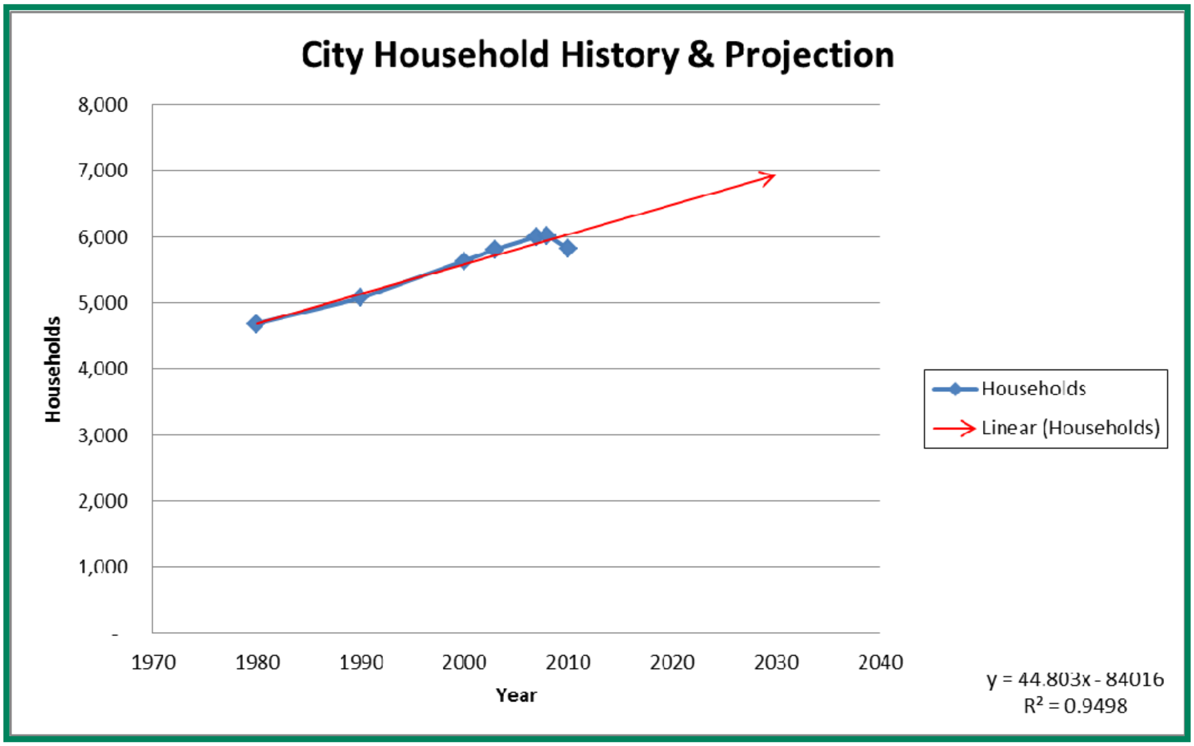


Figure 16 - Fergus Falls Household History & Projection

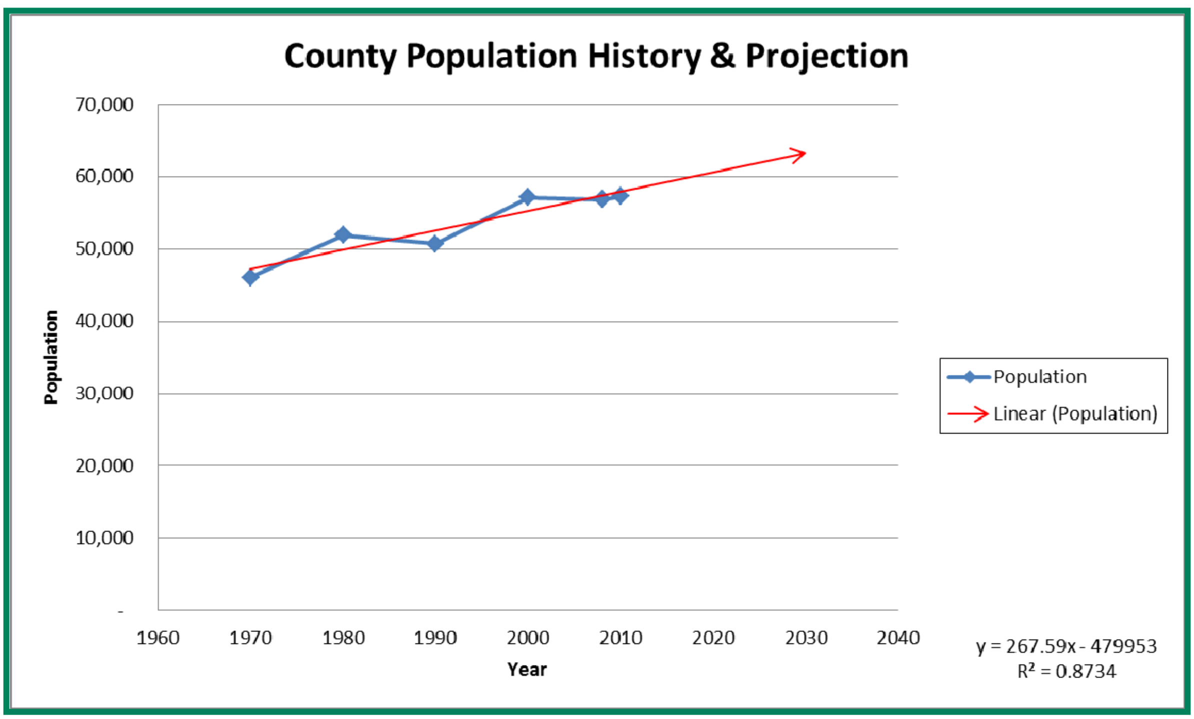


Figure 17 - Otter Tail County Population History & Projection

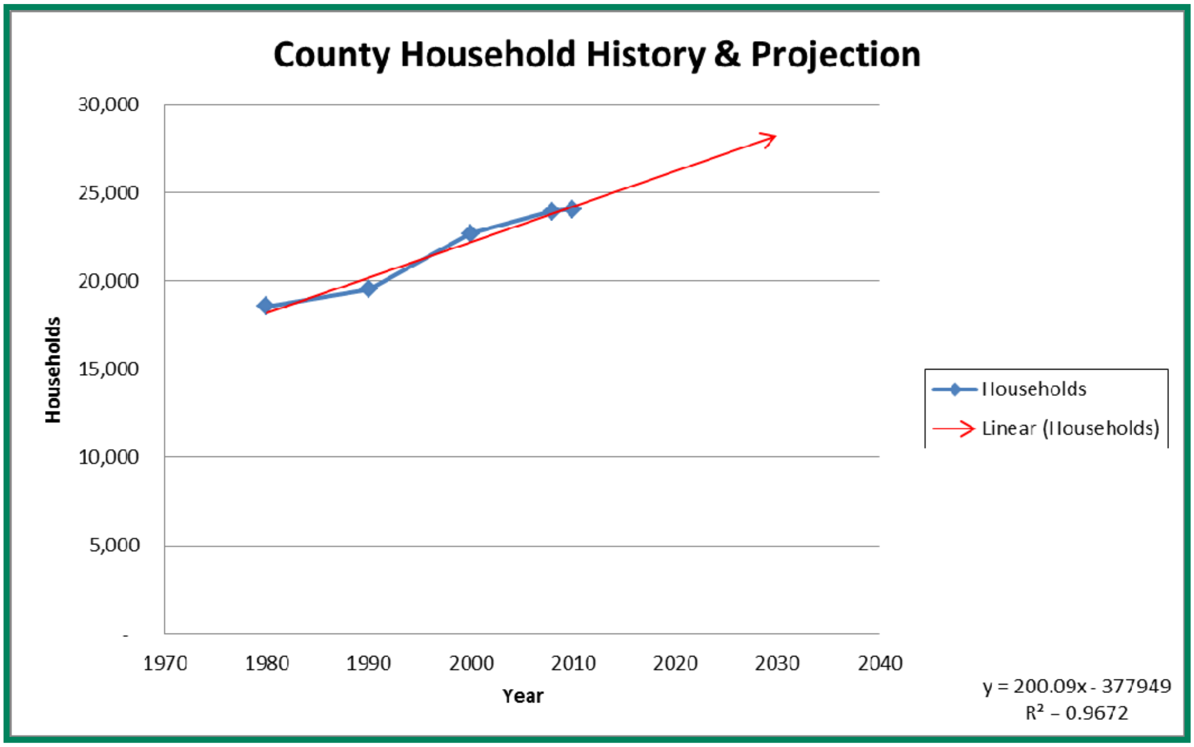


Figure 18 - Otter Tail County Household History & Projection

To determine the impact of population/household growth on the transportation system, we must estimate the *location* of the growth as well as its magnitude. Several sources of information were consulted to best guess where household (residential) growth will occur. Consulted were the City's Future Zoning Plan, the Parks, Forestry and Recreation Plan, and the Water Supply and Distribution Plan. Also consulted were aerial photographs and mapping of existing roadways.

It is intuitive that development occurs first where it is easiest (and least expensive). Extending City infrastructure (sewer, water, streets) can represent significant cost to development beyond the limits of those existing systems. By examining an aerial photograph overlaid with zoning information, current city limit boundaries, and the water plan, we can highlight areas where vacant land exists close to, or inside the city limits, with nearby water (and sewer) services that is, or will be zoned residential. Based on an analysis of the City's comprehensive plan, zoning maps, and past growth trends, the City's Parks, Forestry and Recreation Plan projected residential growth will occur primarily in the north, northeast, and southwest areas of the City.

Using the best available information, we have identified 23 different areas where residential growth is likely to occur within the 20-year planning horizon. Areas anticipated to accommodate the bulk of residential growth over the next 20 years are shown in Figure 19.

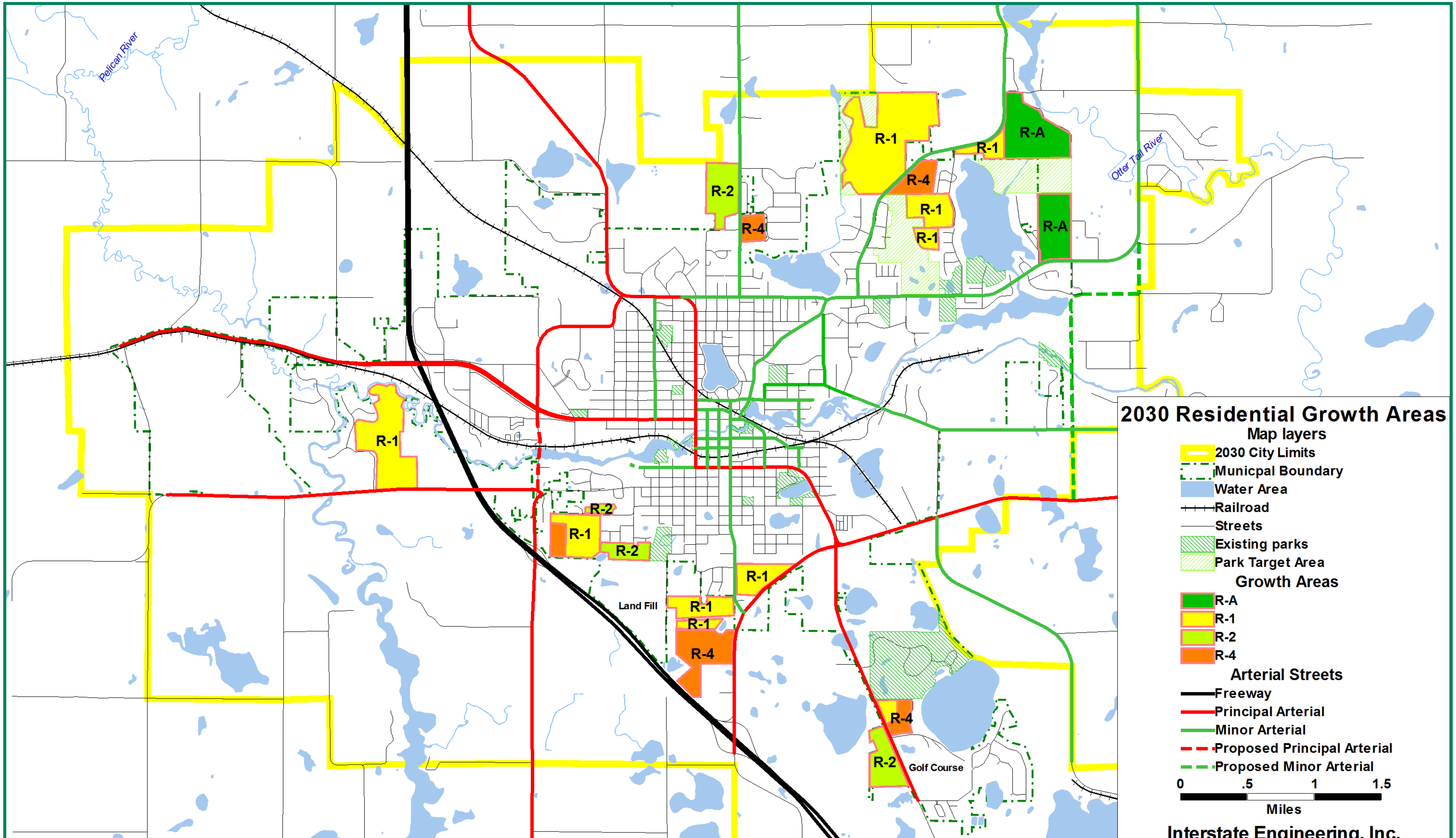


Figure 19 - Anticipated Residential Growth Areas

Included in the projected growth areas are 185 acres zoned R-A (residential agricultural), 540 acres zoned R-1 (one family residential), 153 acres zoned R-2 (one & two family residential), and 99 acres zoned R-4 (multiple family residential – townhouses). Identified residential growth areas include a total of 977 acres.

Using average vehicle trip rates from the ITE publication "Trip Generation", it is estimated that single family residents will generate about 10 vehicle trips per household and multi-family residential households will generate about 6 trips per household. Using household projections made earlier, it is estimated that forecast growth in residential development will generate about 10,000 additional vehicle trips for City streets.

EMPLOYMENT GROWTH

Very little information exists to project the growth of employment. Commercial and industrial land uses will continue to growth at about the same pace as population in their service area. While a community such as Fergus Falls is largely self-sufficient in that population growth locally doesn't depend on commercial/industrial growth in a neighboring community, commercial/industrial development in Fergus Falls does have a service area larger than the city itself. Therefore, growth of commercial/industrial development within Fergus Falls will likely keep pace with population growth of Otter Tail County more closely than that of the city proper.

For retail businesses, the Claritas MarketPlace study of retail stores (2006) shows a significant shortage (gap) for the following types of establishments within an eight (8) mile radius of Fergus Falls:

- Furniture and home furnishings
- Electronics and appliance stores
- Hardware stores
- Health and personal care stores
- Clothing and accessories stores
- Sporting goods, hobby, book, and music stores
- Foodservice and drinking places

The shortages become even larger when looking at a 16 mile radius of Fergus Falls, indicating no significant additional "supply" for those types of establishments exists between the eight (8) mile and 16 mile radius areas.

The types of establishments listed typically locate near high traffic streets and junctions of major travel corridors. A look at the future zoning map for Fergus Falls shows this to be the case, where business zone districts are located along the Interstate 94, Highway 210, and Lincoln Avenue corridors. Figure 20 shows business zone districts within the City of Fergus Falls where growth is expected to occur over the next 20 years.

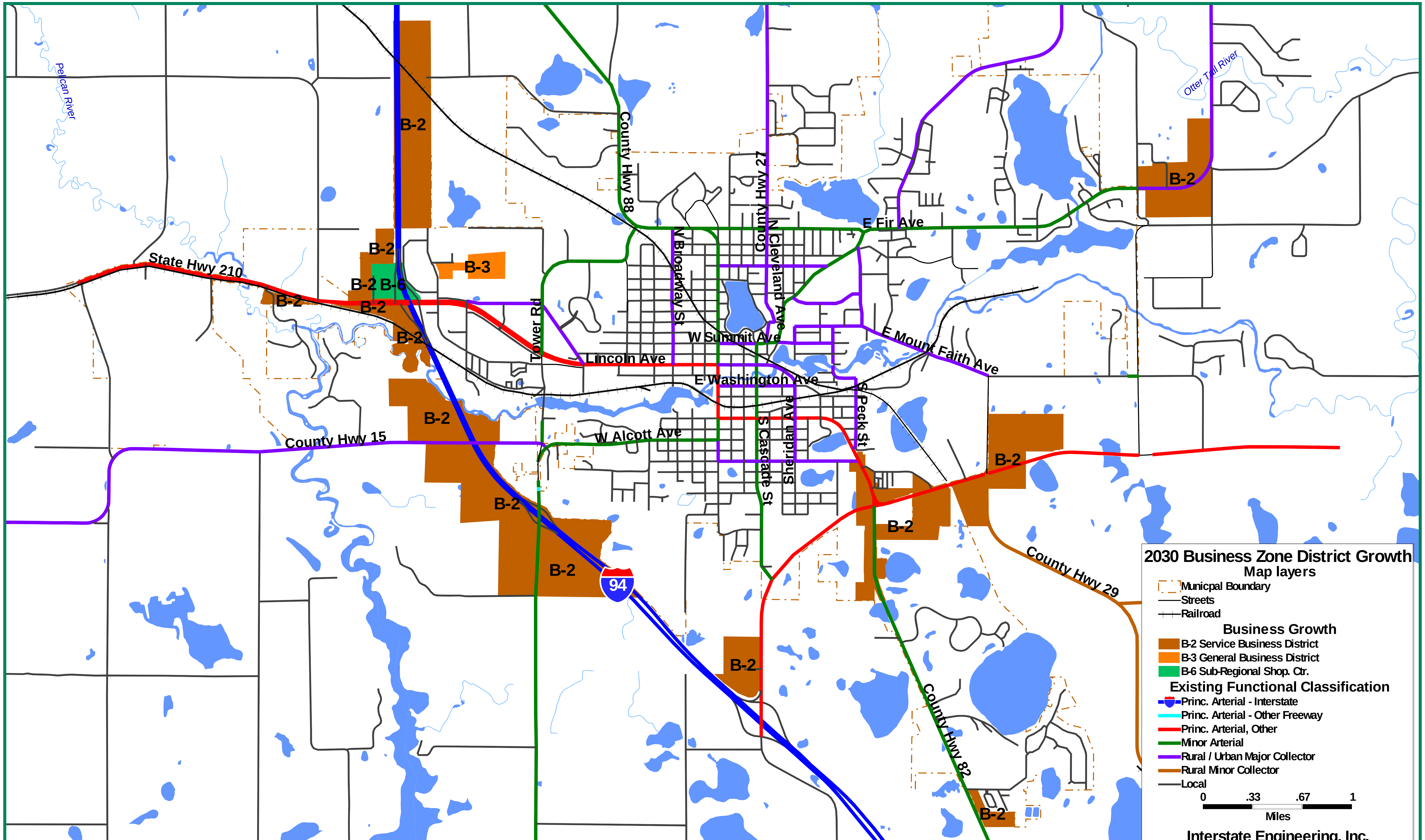


Figure 20 - Business Zone Growth Districts

While growth information for industrial type development is not readily available, the location of industrial development is determined by zoning. Based on future zoning for Fergus Falls and discussions with City Staff, industrial growth is slated for areas west of Interstate 94 along Highway 210, and in the northwest part of the city along the rail corridor between County Highway 88 and Tower Road. Other, smaller industrial zone districts are grouped in the southeast part of the city along the rail corridor, and in the south central part of the city along the Interstate 94 highway. Figure 21 shows industrial zoned districts within the City of Fergus Falls anticipated to experience growth over the next 20 years.

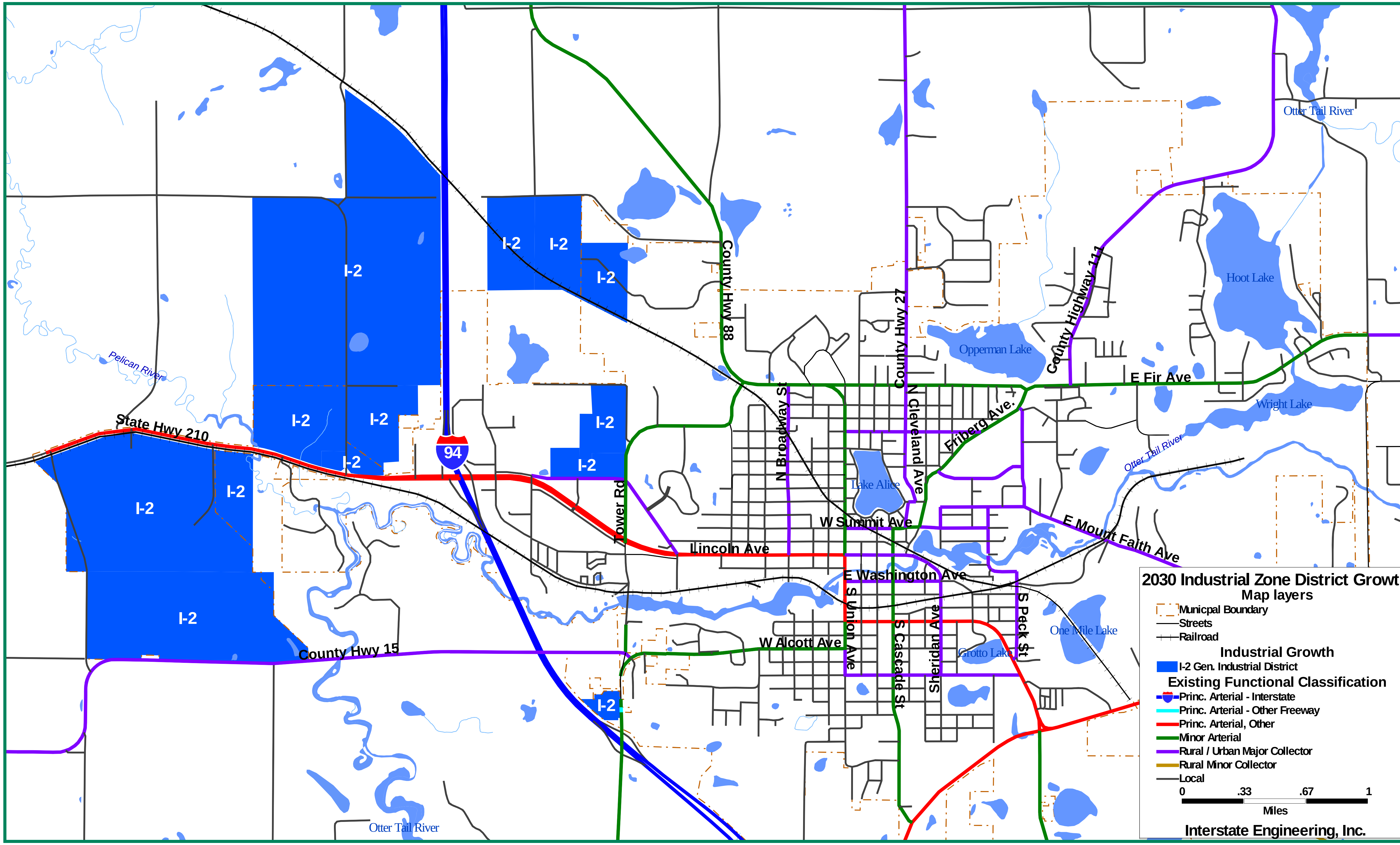


Figure 21 - Industrial Zone Growth Districts

FUTURE TRAVEL DEMAND

As discussed previously in this section, a 1% per year growth in general background traffic volume will be assumed. In addition to general growth of background traffic, traffic growth in specific corridors can also be estimated based on the location and magnitude of anticipated growth of population and employment.

While trip-making between residential and industrial/business areas is predominate during peak periods (rush hour), the bulk of trip-making associated with new development is not work related. Trips for purposes of school and shopping actually account for the bulk of trips associated with residential development. These types of trips are not concentrated between places of residence and places of employment, but rather are generally spread throughout the street network.

Using general growth of 1% per year (growth factor of 1.2571), resulting daily traffic projections have been formulated for the existing street system (no major new/expanded roadway projects). Year 2030 daily background traffic projections are shown in Figure 22. Also shown in Figure 22 are resulting levels of service based on daily traffic projections on the existing street system with no improvements.

Using the planning level capacities, streets with daily traffic volumes projected to year 2030 levels were assessed for LOS. In total, daily volume projections were formulated for the same 132 individual street segments as with 2007 conditions, representing 85 miles of roadway. Comparing planning-level capacities to existing daily traffic, we have identified an initial list of street segments that may be experiencing capacity-related deficiencies. We have identified 4 street segments experiencing LOS D, seven segments experiencing LOS E, and 16 segments experiencing LOS F. Significant is the number of street segments with LOS A dropped from 104 to 91, while the miles of streets with LOS D or worse doubled from 4.8 miles to 9 miles. Table 8 summarizes the year 2030 LOS analysis for street segments with no improvements to existing streets and no new arterial street connections.

Table 8 - Congestion Summary, 2030 Traffic - Existing Street Conditions

Level of Service	Number of Street Segments	Total Length of Segments (mi.)
A	90	68.6
B	8	5.2
C	7	2.4
D	4	2.0
E	7	2.0
F	16	5.5
TOTAL	132	85.7

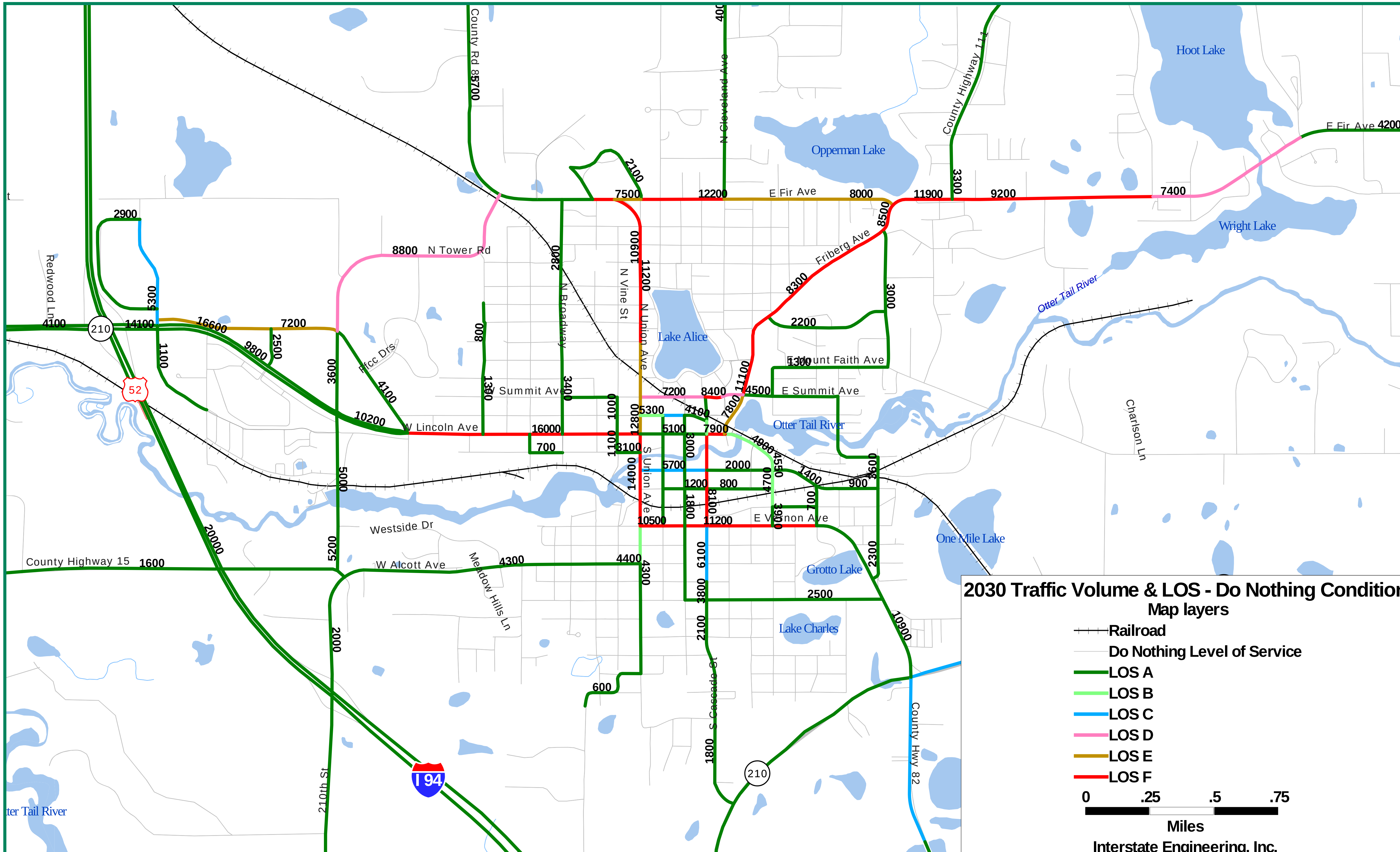


Figure 22 - 2030 Traffic Volume Projections & LOS, No Street Network Improvements

Factoring existing traffic to project future traffic volume is very generalized and does not account for the spatial distribution of new development and new travel demands that ensue. Since growth in population and employment does not occur uniformly over an urbanized area, it is important to identify anticipated growth areas to better identify transportation corridors that may experience higher than average growth.

Figures 19, 20, and 21 previously showed areas anticipated to experience the heaviest growth in residential, business, and industrial development over the next 20 years. Mapping all three growth areas provides insights into corridors that can expect to experience higher than average traffic growth due to the interactions between growth areas. Figure 23 shows the spatial relationship between growth areas and indicates where travel demand is expected to increase at higher than average rates. It is important to recognize the increased travel demand to allow planning of new facilities, or improvements to existing facilities to meet expected future demands.

While future travel *demand* does not change significantly with the introduction of new streets or with widening of existing streets, route choices will occur with new street connections, shifting traffic from one facility to another, and level of service is most certainly affected with street widening projects. Three street improvements projects identified on the Capital Improvements Plan (CIP) can have a significant impact to traffic circulation patterns, and therefore, future traffic projections. The three CIP projects all provide new street connections that are anticipated to provide more direct routes between areas of the city and relieve congestion currently experienced on some streets:

- East Bypass (CIP #S2)
- Tower Road and Bridge (under construction 2011-2012)
- Second Avenue Extension to Tower Road (CIP #S4)

A separate traffic study was conducted to project the impact of the Tower Road and Bridge project. One of the purposes of the Tower Road project is to provide an additional crossing of the Otter Tail River west of the downtown area. It was anticipated that the additional crossing location would dramatically reduce traffic on existing downtown river crossings (especially Union Avenue) and prevent a short section of I-94 from being utilized for "in-town" trips. Based largely on reductions of travel time and distance, construction of the Tower Road and Bridge project was estimated to provide a 40% reduction in Union Avenue and I-94 "local" traffic. In total, between 4,800 and 5,600 vehicles per day are projected to divert to a new Tower Road connection south of Lincoln Avenue and across the Otter Tail River.

For purposes of this plan update, the three CIP projects discussed previously will be considered "committed" improvements. That is, they are already planned and programmed, and are assumed to be completed within the next 20 years. To develop estimates of future traffic volume, the impact of committed projects and the spatial impacts of new development need to be considered. Once these factors are considered, an estimate of future travel demand on an "existing plus committed" street network can be developed.

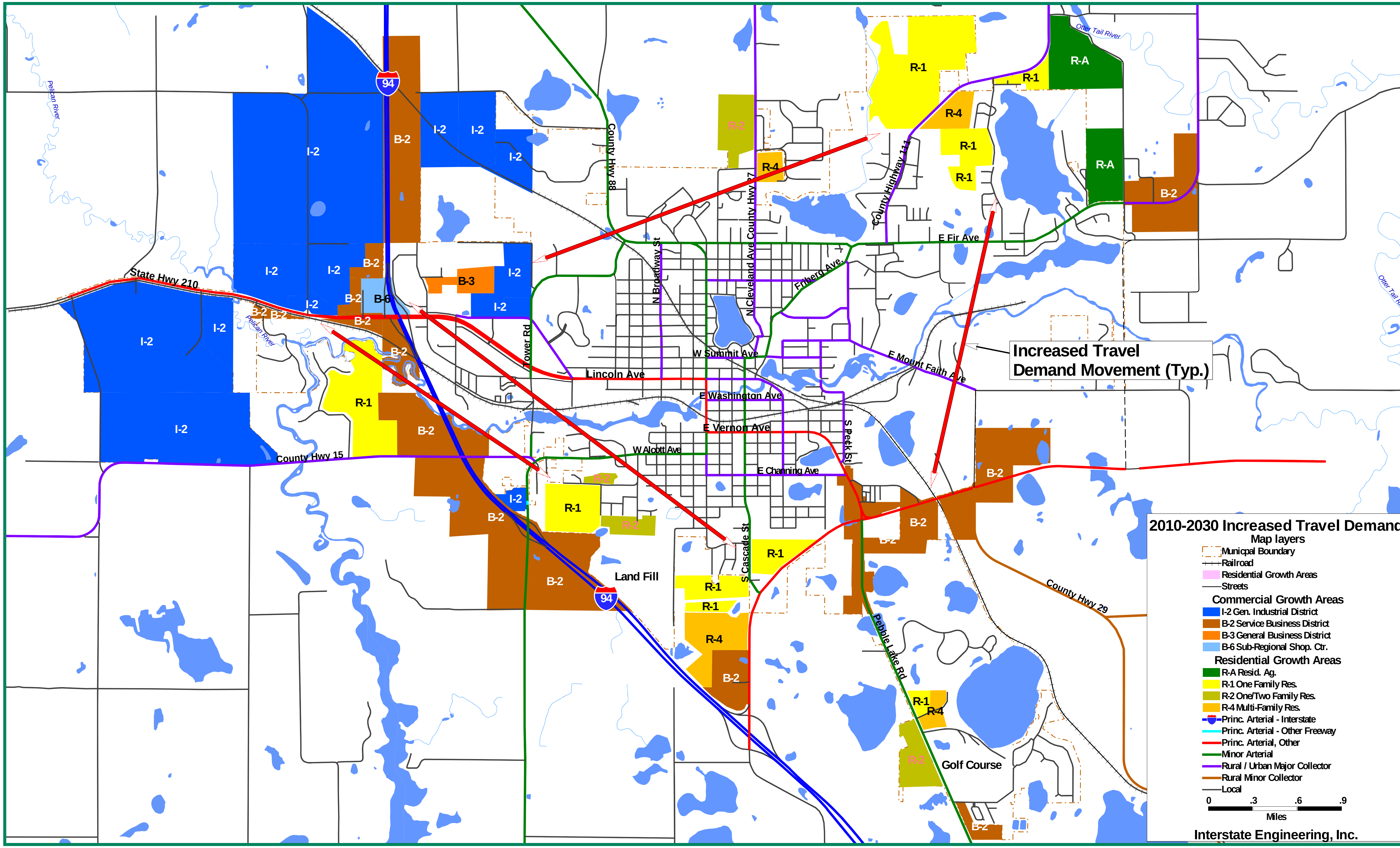


Figure 23 - Growth Areas and Increased Travel Demand

To adjust future traffic projections that result from simply factoring existing volume by the selected growth, impacts of committed projects were considered first. For purposes of this plan, three transportation projects were identified that materially impact traffic circulation and/or capacity of existing streets:

- East Bypass – A extension north from State Highway 210 on an alignment with Diversion Drive, to 230th Street, then east ½ mile to 230th Avenue, then north to connect with County Highway 1..
- Tower Road – Extension of Tower Road south from Lincoln Avenue, across the Otter Tail River, to connect to W. Alcott Avenue/County Highway 1.
- 2nd Avenue Extension – Extend 2nd Avenue north from W. Maple Avenue to N. Tower Road.

The impacts of the Tower Road project have been previously studied. Previous studies have concluded that the project will reduce traffic volumes on area roads and result with a traffic volume of between 4,800 and 5,600 vehicles per day on the Tower Road extension.

The East Bypass project is a recognized need, but has not been studied in depth. For purposes of this plan update, the East Bypass project is anticipated to reduce traffic on north-south routes in the eastern part of downtown, especially on Pebble Lake Road, South Sheridan Street, East Vernon Road, South Peck Street, North Concord Street, Springen Avenue, and Friberg Avenue.

The 2nd Avenue extension will provide a much needed north-south connection between Lincoln Avenue and North Tower Road and should reduce traffic volumes on North Broadway Street and Lincoln Avenue west of Broadway. A corresponding increase in traffic on North Tower Road will also result.

It has been previously estimated that new development in Fergus Falls over the next 20 years will generate approximately 10,000 new vehicle trips. While most new development trips are "accounted" for with generalized growth in existing traffic volumes, the spatial location of new development will tend to concentrate increased trip-making on adjacent and connecting arterial streets. To account for increased trip-making due to new development, selected arterial streets volumes have been increased an additional 10%. Arterial streets selected for the additional incremental volume increase are shown in Figure 24.

After the incremental adjustments were made, new street connections were assigned traffic volumes from parallel facilities in general accordance with the descriptions offered above. Figure 25 shows final year 2030 daily traffic volumes for the existing plus committed surface transportation network.

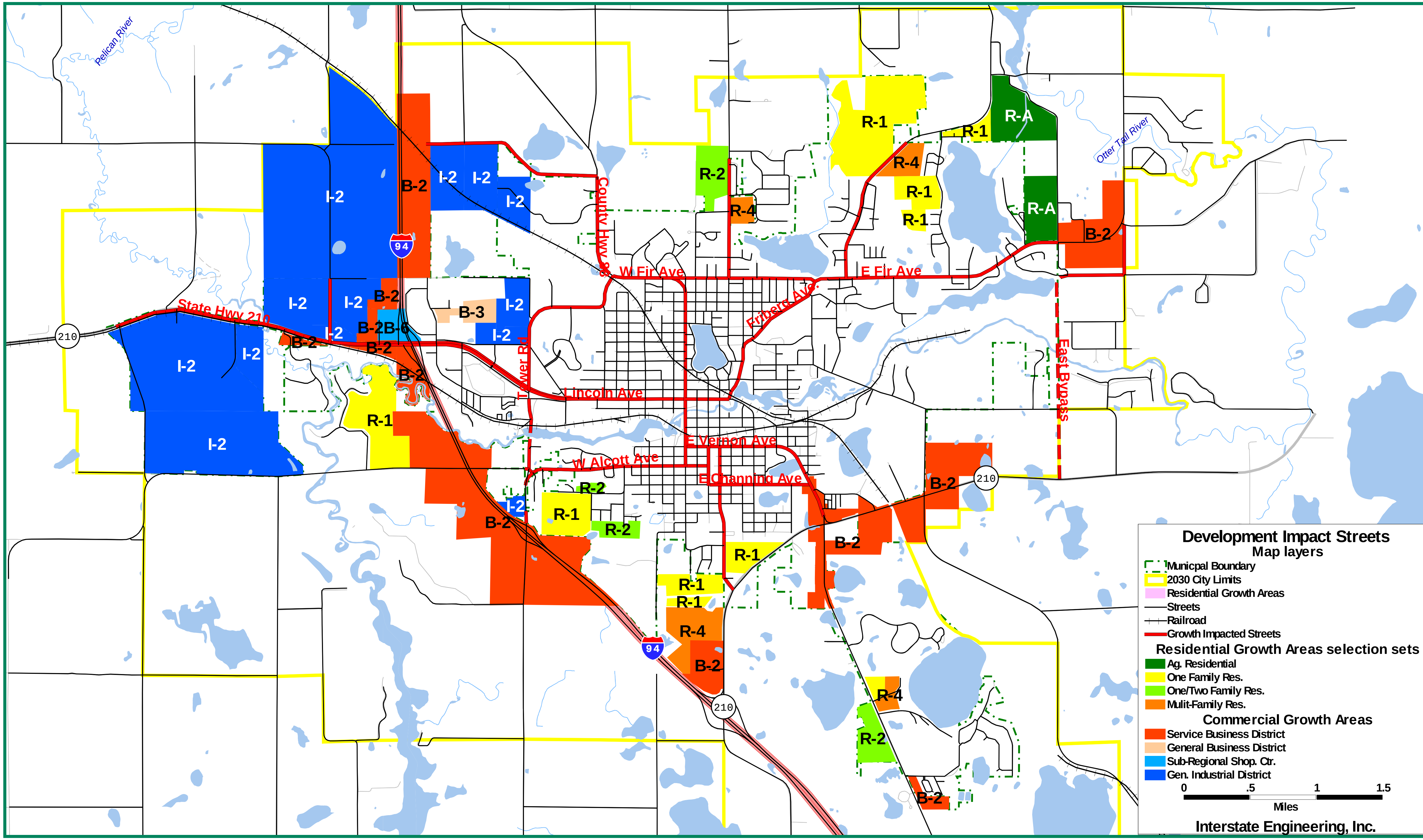


Figure 24 - Streets Selected for Incremental Volume Increase (10%)

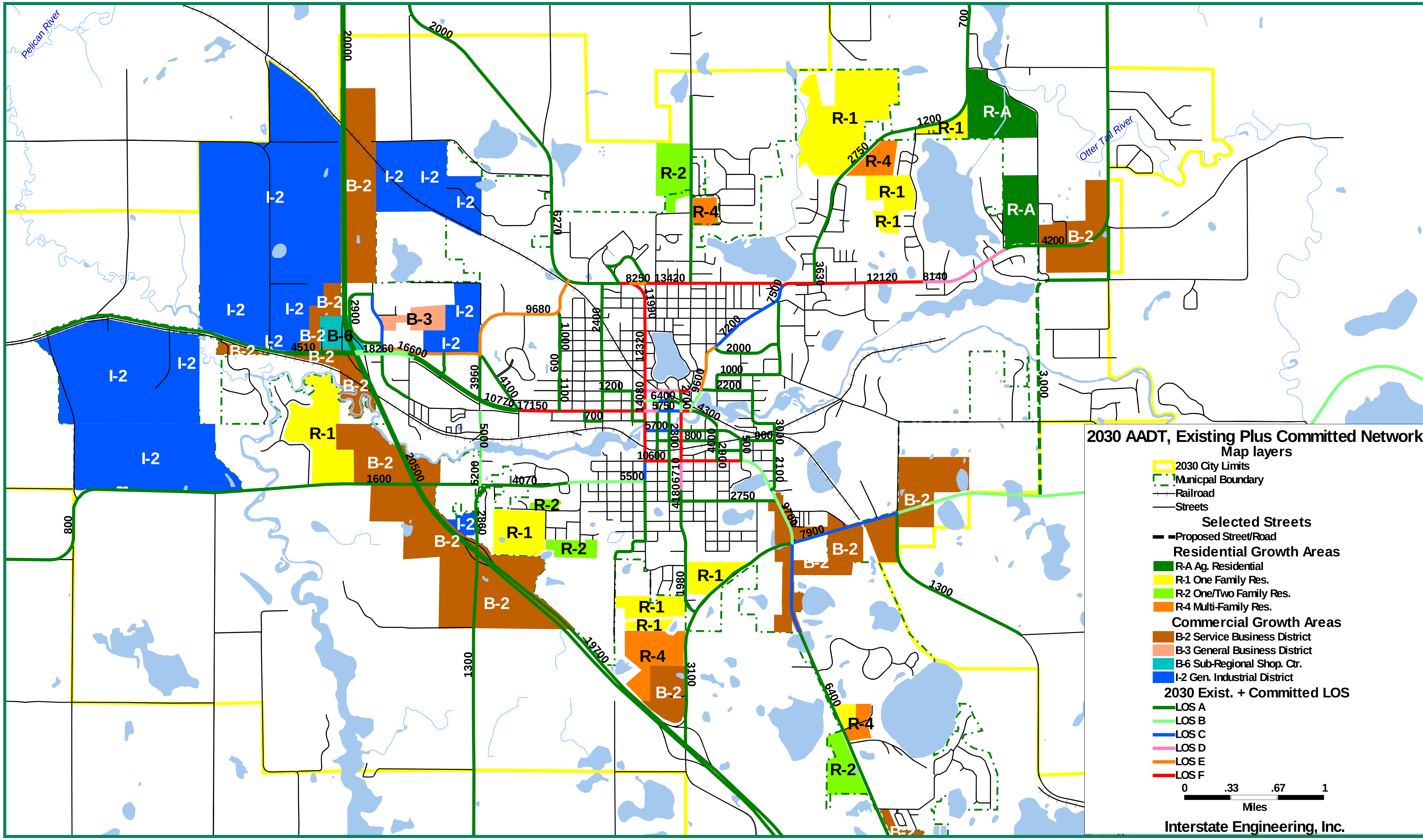


Figure 25 - Year 2030 Projected Daily Traffic Volume, Existing Plus Committed Street Network

SECTION 6 - FUTURE TRANSPORTATION DEFICIENCIES

Deficiencies of the transportation system can be generalized into five basic categories:

1. Capacity Deficiencies,
2. Connectivity Deficiencies,
3. Safety Deficiencies, and
4. Non-Motorized System Deficiencies.

In addition, deficiencies in one category often result with problems in a different category. For instance, capacity deficiencies may be caused in part by lack of adequate connecting routes. The lack of adequate connecting facilities that leads to congestion deficiencies may, in turn create safety deficiencies evident with increased crash rates.

Previous sections of the Transportation Plan Update have examined city streets to determine where congestion is occurring, or is projected to occur in the future. Crash records were examined to determine which street segments and intersections have exhibited highest crash rates. The results of these examinations have identified where deficiencies exist in the existing transportation system, and predicts where deficiencies will exist in the future if no improvements are made. Identified deficiencies are identified for each basic category below.

Capacity Deficiencies

Programmed capacity issues are primarily located on radial routes, routes that are intended to take traffic in and out of the city center. The lack of adequate circumferential routes forces these routes to carry cross-town traffic with no origin or destination within the heart of the city. Street segments projected to experience LOS E or LOS F conditions under future traffic demands, even with committed improvements projects are:

- West Lincoln Avenue from College Way to Union Avenue
- Union Avenue from West Fir Avenue to Vernon Avenue
- Fir Avenue from North Union Avenue to Brenvei Drive
- Vernon Avenue from South Union Avenue to South Burlington Avenue
- South Cascade Street from Lincoln Avenue to Vernon Avenue
- North Tower Road from College Way to West Fir Avenue
- College Way from Western Avenue to North Tower Road

Connectivity Deficiencies

Connectivity deficiencies identified consist of mostly a lack of adequate circumferential routes. With development occurring primarily at the edges of the developed city, travel between these developing areas needs to be accommodated without the need to travel through the heart of the city, where increasing street capacity is difficult and expensive. Often called by-pass routes, circumferential route deficiencies identified include the following:

- East-west connection to the north of the City, at/about 250th Street, between CSAH 88 and CSAH 1.
- North-south connection to the east of City, connecting East Fir Avenue to TH210 via East Mount Faith Avenue.

    - North-south connection west of I-94, from Lincoln Avenue to CSAH 25 southwest of the TH210/I-94 interchange.

Safety Deficiencies

Safety deficiencies show up through an examination of crash history for street segments and intersections. It is not surprising that street segments and intersections with the highest crash rates are also facilities that are also experiencing capacity issues. When congestion increases, the number of potential conflicts grows. Interruptions to traffic flow in the form of stop-and-go traffic conditions also contribute to crash potential.

To identify street segments and intersections that represent potential safety deficiencies, both crash rate and severity rates were utilized. The crash rates are a reflection of traffic volume and the number and severity of crashes. These rates were determined from an examination of five years of crash data (2003-2007) utilizing the Minnesota Crash Mapping Analysis Tool (MnCMAT). The results of the Safety Assessment (presented earlier) identified street segments and intersections (see Figure 9) with the highest crash rates and severity rates.

Street segments and intersections with the highest crash rates or crash severity rates are:

- <u>Street Segments</u>
    - Lincoln Avenue, Union Avenue to Court Street
    - Cascade Street, Lincoln Avenue to Washington Avenue
    - Friberg Avenue, Mt. Faith Avenue to Northern Avenue
    - Lincoln Avenue, North Broadway to Oak Street
- <u>Intersections</u>
    - Lincoln Avenue / Tower Road (scheduled for signalization in 2012)
    - Lincoln Avenue / Redwood Lane (new signal installed)
    - Tower Road / College Way
    - Sheridan Avenue / Vernon Avenue
    - Union Avenue / Cavour Avenue
    - Cascade Street / Vernon Avenue

Non-motorized System Deficiencies

The non-motorized system consists of sidewalks and bicycle facilities. While pedestrian facilities in the form of sidewalks are included within the street typical sections and are constructed in concert with street construction or reconstruction, bicycle facilities are often separate facilities that require separate construction. The City of Fergus Falls has a considerable system of bike ways (6.8 miles) and multi-use paths (8.8 miles), yet gaps in the system exist, mainly in the form of connectivity between elements of the system.

The City of Fergus Falls has completed a comprehensive plan to connect existing bicycle elements and to expand the system to new existing neighborhoods, primarily through the connections between parks and green spaces. The bicycle facility planning conducted by the City of Fergus Falls goes beyond the 5-year CIP to include a comprehensive plan of bikeways and multi-use paths. General deficiencies of the non-motorized transportation system are as follows:

- Connection across the Otter Tail River west of downtown
- Bikeway connections from outlying areas to downtown Fergus Falls
- Recreational multi-use paths in scenic non-motorized corridors (Otter Tail River, for example)

It should be noted that an on-going study is being performed to address the Otter Tail River crossing west of downtown. The study also includes an examination of alternatives to extend the path along the river further to the west.

SECTION 7 - IMPROVEMENT ALTERNATIVES

MOTORIZED TRANSPORTATION SYSTEM

Improvements to the motorized transportation system can be generally classified as improvements to improve capacity and/or safety of existing streets, or the construction of new facilities.

Improving capacity of existing facilities can take many forms, from adding travel lanes to reconfiguration of existing lanes. Relatively simple and inexpensive techniques such as access control and traffic signal coordination can provide measurable improvements to street capacity and reduce crash rates. Even with projects already programmed (on the 5-year CIP), additional improvements will be required to carry projected future travel demands.

Potential improvements for existing motorized facilities (beyond those listed in the CIP) are as follows:

Improve Capacity for Lincoln/Union/Vernon Route for Through Traffic:

This corridor contains both residential and commercial property frontage. As one of the original radial routes in the City, the corridor consists of curbed streets, detached sidewalks, with mature trees between the curb and sidewalk. Widening the street section to accommodate additional through lanes will be very disruptive, especially within the residential sections. The primary impediment to capacity on these streets is left turns and driveway ingress/egress maneuvers that disrupt traffic flow. Improvement alternatives for this route are as follows:

1. Lincoln Avenue, 4th Street to Union Avenue
    a. Eliminate parking near street intersections to allow re-striping for left turn bays at street intersections.
    b. Eliminate parking throughout and re-stripe as a three-lane section with center two-way left turn lane throughout.
2. Vernon Avenue, Union Avenue to Sheridan Street
    a. Eliminate parking near street intersections to allow re-striping for left turn bays at street intersections.
    b. Eliminate parking throughout and re-stripe as a three-lane section with center two-way left turn lane throughout.
    c. Replace 3-way stop control (unconventional) at Vernon/Union with traffic signal control.

    While the three-lane alternatives for segments 1 and 2 above will provide the most capacity for the streets without physically widening them, it is also most disruptive for residential property along the segments. In areas where residential property fronts these streets, the parking lane is used as a buffer area to allow residents to back from their driveways without backing into the through lane. If on-street parking is eliminated, residents will have greater difficulty backing from driveways, especially during peak traffic periods. Forcing backing maneuvers into the through lane may also have an undesirable impact to traffic safety.

3. Union Avenue, Stanton Avenue to West Vernon Avenue
   Eliminate on-street parking and re-stripe as 4-lane street (two through lanes in each direction). This improvement will also require intersection improvements (re-configurations) at the Union Avenue intersection with Vernon Avenue to accommodate the transition back to a 2-lane street further south.

Improve Capacity for Union Avenue between Lincoln Avenue and West Fir Avenue

This corridor is one of two main routes to the downtown area from the north (the other being the Friberg Avenue corridor). This corridor traverses an older residential area as a curbed street with detached sidewalks. Mature trees typically occupy the space between the curb and the sidewalk, making any significant street widening project undesirable. In this corridor of older residences, some homes do not have contemporary driveways and garages that are accessed from the lot frontage. Garages for those residents are typically accessed from alleys at the rear of the lot. The primary impediment to capacity on this street is left turns and driveway ingress/egress maneuvers. Improvement alternatives for this route are as follows:

4. Union Avenue, West Lincoln Avenue to West Fir Avenue
   a. Eliminate parking near street intersections to allow re-striping for left turn bays at street intersections.
   b. Eliminate parking throughout and re-stripe as a three-lane section with center two-way left turn lane.

   While the three-lane alternatives for segments 1 and 2 above will provide the most capacity for the streets without physically widening them, it is also most disruptive for residential property along the segments. In areas where residential property fronts these streets, the parking lane is used as a buffer area to allow residents to back from their driveways without backing into the through lane. If on-street parking is eliminated, residents will have greater difficulty backing from driveways, especially during peak traffic periods. Forcing backing maneuvers into the through lane may also have an undesirable impact to traffic safety.

Improve Capacity for Fir Avenue between Union Avenue and Brenvei Drive

This corridor is the primary east-west route on the north side of the City, connecting CR #1 on the east with I-94 (via North Tower Road and Lincoln Avenue) on the west. With the existing size of the City and extent of arterial facilities, this functions as a circumferential route. This facility exists as a three-lane arterial street east of Friberg Avenue, and as a two lane street west of Friberg Avenue to Union Avenue. The segment between Friberg Avenue and Union Avenue is primarily residential with direct driveway access and on-street parking. Unlike the corridors discussed previously, this corridor does not have sidewalks, yet there are mature trees along both sides of the corridor located some distance behind the curb. Several alternatives exist for improving capacity and level of service along this corridor.

5. Fir Avenue, Union Avenue to Friberg Avenue
    a. Eliminate parking near street intersections to allow re-striping for left turn bays at street intersections.
    b. Eliminate parking throughout and re-stripe as a three-lane section with center two-way left turn lane.
6. Fir Avenue, Friberg Avenue to Brenvei Drive
   This route exists as a three-lane facility. Rather than improve the capacity of this facility by widening to a four or five-lane arterial, it may be more reasonable to improve level of service of this facility by reducing demand on this facility through construction of a North Bypass. A north bypass will allow traffic from developing areas northeast of the City to access I-94 without using Fir Avenue.

In addition to just targeting routes expected to be congested in the future, it is prudent to examine the impact of providing new connections between existing areas of the city to relieve congestion on existing facilities. These facilities are typically circumferential routes designed to allow traffic to travel to highway connections outside the urban area without traversing the interior of the city. By separating this "through" traffic from traffic with a destination in the city core, the demand on radial routes can be reduced, eliminating the need for disruptive and expensive capacity improvements.

While TH210 essentially forms a south circumferential route at the edge of the City, similar routes do not exist to the north, east and west. Connecting perimeter areas of the City with circumferential routes has been identified as a deficiency in the previous section.

Bypass Routes

Bypass routes form circumferential routes that that help keep traffic out of core downtown urban areas when no downtown origin or destination is part of a trip. Bypasses are typically constructed to allow relatively high speeds and provide high capacity for traffic volume. As noted earlier in this Plan Update, the existing surface transportation system of Fergus Falls causes some routes to function both as cross town routes and de-facto bypass routes. The Fir Avenue-Tower Road route is an example of a cross town route that also carries "bypass" traffic, and is a route that is predicted to experience congestion.

Three bypass routes are proposed as improvement alternatives as part of this Plan Update; the East Bypass, North Bypass, and West Bypass. When implemented, the bypass routes will function to keep through town traffic out of already congested urban thoroughfares. In some cases, construction of a bypass route may delay or even eliminate the need for capacity improvements on urban streets. It should be noted that bypass routes are not always favored by some residents, especially by business owners that prefer higher volumes of traffic on streets where their businesses are located. In addition, bypass routes often take advantage of existing roads to reduce costs of construction and right-of-way acquisition. Rural residents often resist construction of bypasses near/through their properties.

These bypass facilities are long range improvements intended to be implemented as the City grows. While long range planning and corridor preservation activities are important to ultimate implementation of bypass facilities, construction of bypass routes are often development-driven, and often developer funded. The East Bypass will provide the most immediate relief for existing congestion, while the North and West Bypasses could be prioritized later. The three bypass routes proposed for the Fergus Falls Transportation Plan Update are discussed in the sections which follow, and are shown on Figure 26.

7. East Bypass

Originally, a connection from East Mount Faith Avenue, south to TH210 at its intersection with CSAH 29 had been identified in the CIP as the East Bypass. This route took advantage of the existing Otter River Bridge on East Mount Faith Avenue, then proposed a new route for construction along the east side of the river to connect to East Fir Avenue. This route was expected to reduce traffic through the heart of the City by providing an uncongested route from developing residential areas to the northeast with developing business areas to the southeast, and to I-94.

Based on the analysis conducted with this Transportation Plan Update, the East Bypass route identified on the current CIP may not be as desirable as a route further to the east. The Fir Avenue to East Mount Faith Avenue route could quickly become "within" the city with continued residential growth to the east. It is more desirable to look further east for a route to serve traffic from out of town travelers and outlying areas of the City. To intercept the highest volume of traffic originating from outside the City, it makes sense to connect the East Bypass to County Highway 1. County Highway 1 carries over 3,300 vehicles per day (2007), whereas County Highway 111 carries less than 1,000. An eastern bypass connecting County Highway 1 with Trunk Highway 210 will intercept the greatest volume of traffic passing through Fergus Falls (without a destination within the City) and will be located beyond identified growth areas for the next 20+ years. For purposed of this Transportation Plan Update, the recommended East Bypass route has been moved further east to connect with County Highway 1 at 230th Avenue, then go south and west to intersect Trunk Highway 210 at the edge of the ultimate city limits, about 1 mile east of the County Highway 29/Trunk Highway 210 intersection.

8. North Bypass

This route is tentatively set on the alignment of 250th Street and extends from CSAH 1 on the east, to CSAH 88 on the west. As with the East Bypass, this facility is expected to reduce traffic traveling on City streets, particularly traffic on Fir Avenue. The route provides an alternative for traffic from the developing residential areas north of the City with developing industrial and business zones developing along and west of the I-94 corridor. As an alternate, the route could run south on 190th Avenue to connect to CSAH 88 further south.

9. West Bypass

The West Bypass is less of a "bypass" and more of an arterial street designed to provide access to expected industrial and business zone districts west of I-94. The route extends from Lincoln Avenue (TH210) on the north, to CSAH 15 (TH210) on the south. The route takes advantage of the existing CSAH 15 bridge over the Otter Tail River to allow phased construction without an expensive, new river crossing. While not targeting existing congestion, this route will allow development of planned business districts west of I-94, providing a good connection with the Tower Road project currently under construction.

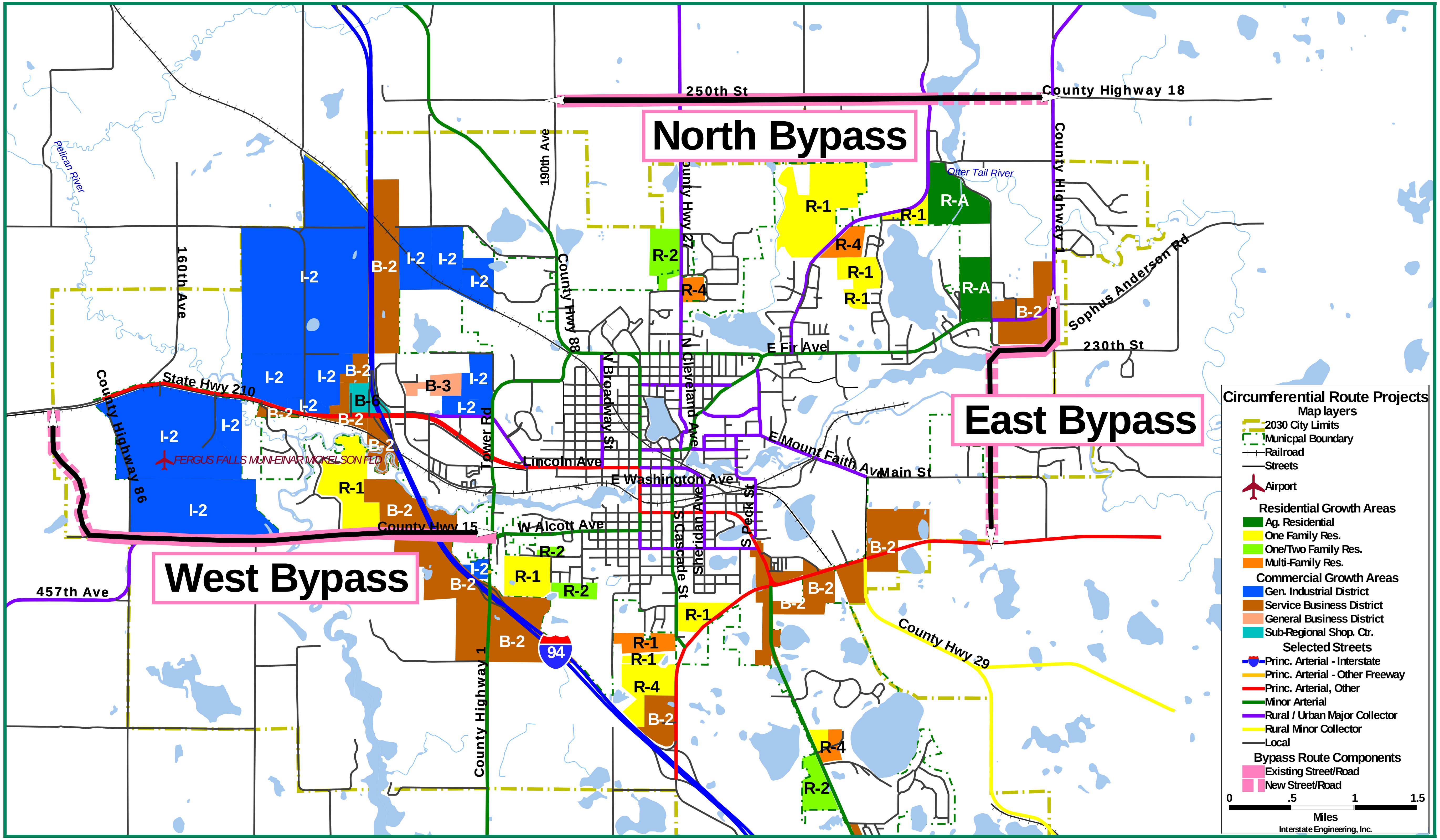


Figure 26 – Bypass Route Alternatives

New Arterial Routes

In addition to the bypass projects, other new routes are often recommended to provide capacity within a heavily traveled corridor (parallel route) or to complete discontinuities that exist with other radial or cross town routes. The existing layout of arterial routes in the City (see Figure 3) shows a lack of north-south connections across the Otter Tail River west of the downtown crossing on Union Avenue. This discontinuity forces much north-south travel through the downtown area and contributes to congestion on Union Avenue and it's connecting routes.

10. Tower Road Extension

The Tower Road extension with a new bridge over the Otter Tail River (CIP street project #S2) is the other significant new roadway project need identified at this time. The Tower Road extension is expected to provide significant relief for the Lincoln/Union/Vernon route through the heart of the city by providing an additional crossing of the Otter Tail River between the downtown area and the I-94 corridor. This project is currently under construction with completion scheduled for 2012.

10A. 2nd Avenue Extension

2nd Avenue is discontinuous between West Maple Avenue and North Tower Road. Completing this connection will provide a much needed north-south connection and should reduce traffic volumes on North Broadway Street and Lincoln Avenue west of Broadway.

Safety Improvements

Safety projects are projects targeted specifically at improving safety of the motorized transportation system. Locations that could most benefit from improvements targeted at improving safety are identified through an examination of crash history. For the Fergus Falls Transportation Plan Update, an examination of crash history identified six intersections where the crash rates exceeded the critical crash rates, and three street segments where the crash rates exceeded the average crash rate (although not the critical crash rate).

All of the intersections identified as safety concerns have either recently (during the time of this plan development) been improved or are within street segments targeted for capacity improvement of some sort. Intersection safety improvement alternatives are discussed in the following paragraphs.

11. Tower Road / Lincoln Avenue Intersection

This intersection experienced the highest number of crashes in the City over the five year period examined (34 crashes). The high number of injury crashes at this location resulted with this location also having the highest severity crash rate of all intersections within the City. The crash rate at this location is more than double the critical crash rate for an intersection of this type. The poor safety record at this location has not gone unnoticed, however, and the City of Fergus Falls has a plan to install a traffic signal at this location in 2012. The City also has identified a lighting project for this section of Lincoln Avenue, which should also improve safety at this location. Given the high speeds on Lincoln Avenue (45 mph speed limit), high traffic volumes, and the crash history, this location meets traffic signal warrants. Traffic on Tower Road at this location is also anticipated to increase significantly once the Tower Road extension across the Otter Tail River is completed, further heightening the need for traffic signal control.

Lincoln Avenue / Redwood Lane Intersection
This location has been the site of two recent fatal crashes (per City Staff recollection). During the time this Plan was developed, the intersection was temporarily controlled as an all-way stop, and is now under traffic signal control. The installation of traffic signal control should address safety issues at this location. No further improvements are identified for this location.

12. Tower Road / College Way Intersection
   a. The MnCMAT crash data showed this location experienced a fatal crash involving a right-angle collision between southbound and westbound vehicles. The east leg of this intersection intersects Tower Road at a skew of about 45-degrees. This skew increases the crossing distance for east and westbound traffic and reduces the turning speed for westbound left turn traffic and northbound right turns. While it is doubtful this location would meet volume warrants for installation of a traffic signal, the intersection would benefit from reconstruction to realign the westbound approach to closer to 90-degrees.
   b. As an alternative to reconstructing the east leg, a modern roundabout would also provide safety benefits by reducing vehicle conflict points and vehicle speeds in/through the intersection.

13. Sheridan Avenue / Vernon Avenue Intersection
Safety at this location will improve with capacity improvement alternatives outlined for the Vernon Avenue corridor. Either re-striping to provide left turn lanes at intersections or re-striping to create a three lane section on Vernon Avenue will eliminate parking near intersections. Eliminating on-street parking near this intersection will improve visibility and allow drivers on the side street stop-controlled approaches better visibility of approaching traffic.

15. Union Avenue / Cavour Avenue Intersection
Safety at this intersection will also improve with capacity improvement alternatives outlined for the Union Avenue corridor. As with the Sheridan Avenue / Vernon Avenue intersection, capacity improvement alternatives on Union Avenue will eliminate on-street parking near this intersection and improve visibility for entering traffic.

16. Union Avenue / Summit Avenue Intersection
Safety at this intersection will also improve with capacity improvement alternatives outlined for the Union Avenue corridor. As with the Sheridan Avenue / Vernon Avenue intersection, capacity improvement alternatives on Union Avenue will eliminate on-street parking near this intersection and improve visibility for entering traffic. The dense hedge

on the intersections northeast corner should also be removed or trimmed so that it is no taller than 42 inches to further improve visibility on the westbound approach.

Of the three street segments identified as having crash rates higher than the average rate for similar facilities, one falls within a corridor identified for capacity improvements. Street segment safety improvement alternatives are discussed in the following paragraphs.

17. Lincoln Avenue, Union Avenue to Court Street
The most prevalent crash on this street segment is the westbound rear-end type. 60% of crashes on this segment were westbound rear-end crashes. It is likely that the crashes were related to traffic stopped or stopping for the traffic signal at the Lincoln Avenue / Union Avenue intersection. While rear end crashes are an unavoidable consequence of signalized intersections, they can be reduced by reducing the number of vehicles stopping through instituting coordinated signal timing and maintaining the timing plan as traffic conditions change.

18. Cascade Street, Lincoln Avenue to Washington Avenue
Cascade Street between Lincoln Avenue and Washington Avenue exists as a two lane (one lane each direction) minor arterial street. On-street parking is allowed on both sides of the street and a bridge spans the Otter Tail River midway between Lincoln and Washington Avenues. While the Washington Avenue intersection operates as an all-way stop controlled intersection, the intersection at Lincoln Avenue is traffic signal controlled. A mid-block pedestrian cross-walk exists just north of Washington Avenue at the main entrance to the Otter Tail Power building. The crosswalk is equipped with an overhead flashing amber beacon.

While seven crashes occurred on this segment over the five year period analyzed, only four involved moving vehicles. The others included a collision with a pedicycle, a collision with a parked vehicle, and a single vehicle run-off-road type crash. Since no discernable pattern exists with the crash history, and since a field examination of street conditions revealed no obvious street defects, no improvements are suggested for this street segment.

19. Friberg Avenue, Mt. Faith Avenue to Northern Avenue
This street segment is currently configured as a three lane facility with on-street parking allowed only on one side (west side). All crashes reported in this segment (six total) were rear-end type crashes. As this street segment passes by a high school, it is interesting to note that all crashes occurred at around 8 am or 3:30 pm….school start and dismissal times. It is also interesting to note that all crashes involved at least one driver between 16 & 19 years of age. Rather than a defect with the street, it is likely that crashes on this street segment are a result of congestion related to school traffic and driver inexperience. No improvement alternatives are recommended for this segment of Friberg Avenue.

Motorized system projects identified in this section are located on Figure 27. Project numbers used in Figure 27 correspond with paragraph numbers used in this section to describe improvement alternatives. Project numbers are also used in the next section for tabulations of projects and estimated implementation costs.

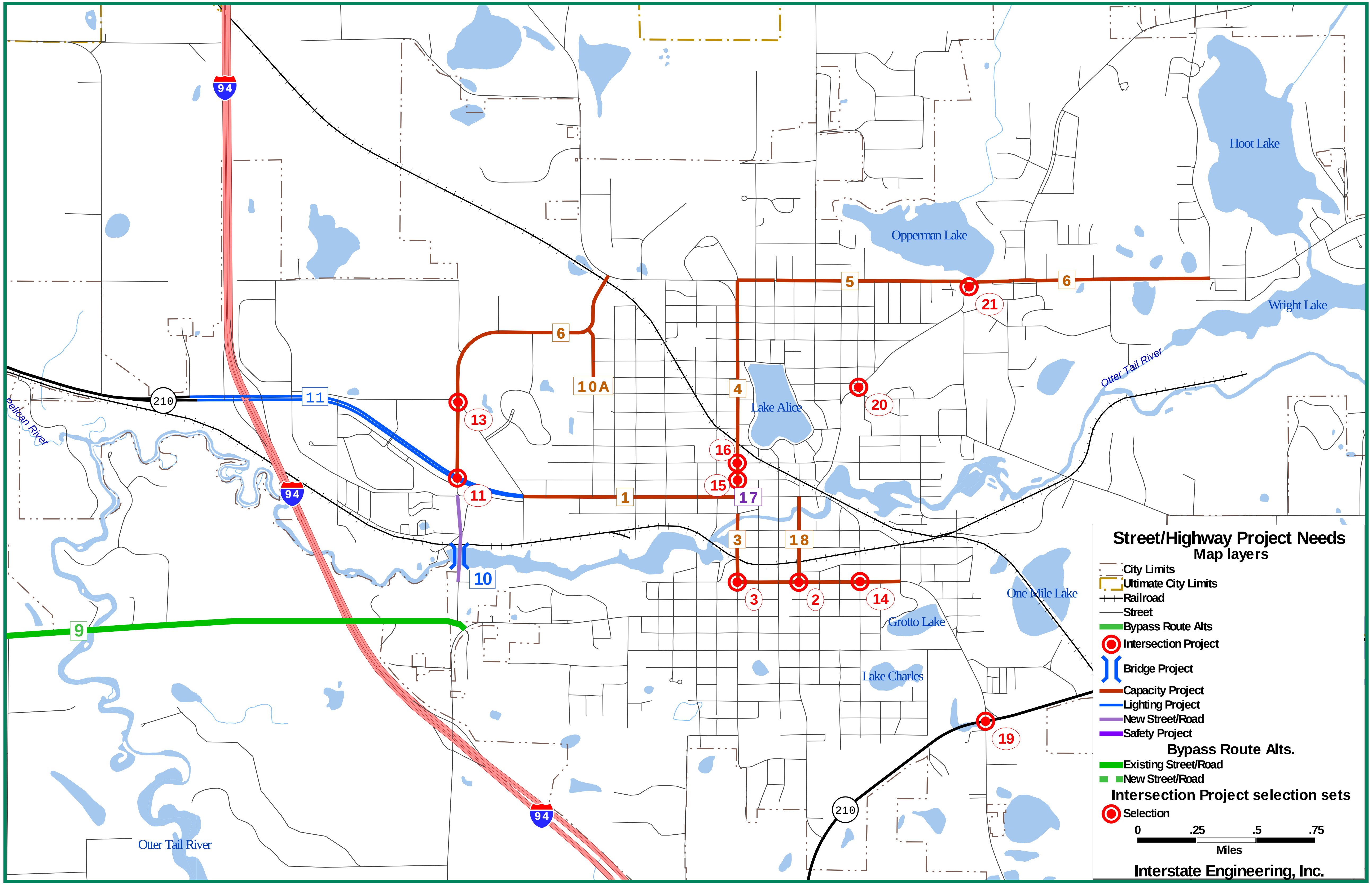


Figure 27 – Motorized Transportation Projects

NON-MOTORIZED TRANSPORTATION SYSTEM

The City of Fergus Falls has a considerable system of existing multi-use paths and bikeways. The "City of Fergus Falls Comprehensive Parks, Recreation and Forestry System Plan" (Sanders, Wacker, Bergly, Inc.), completed in December 2008 outlines the need for a system of non-motorized trails and pathways to link parks, schools, neighborhoods and employment centers located in Fergus Falls. The plan recognizes the recreational and alternative transportation mode benefits of trails and paths.

While this Fergus Falls Transportation Plan Update will not "second guess" or repeat the efforts of the recently completed parks plan, projects identified in that plan are included within this plan. Those projects provide connections between existing segments of the non-motorized system, and provide new connections to existing parks, schools, neighborhoods and employment centers. The projects identified in the parks plan include both facilities within roadway rights-of-way and those separate from roadways.

The existing 5-year CIP identifies seven bicycle facility projects (reconstruction and new construction) totaling over $500,000 while the recently completed parks plan identifies many more projects for the 20-year planning horizon. The parks plan and the projects identified within it are included within this plan by reference. Figure 13 (included previously) shows the existing, programmed, and planned bikeways and multi-use paths.

SECTION 8 – PRIORITIES AND COST ESTIMATES

TRANSPORTATION SYSTEM PROJECT PRIORITIES

It is difficult to establish priorities of one system improvement project over another. Future local and arterial street connections are typically constructed to meet the needs of development and to compliment the bypass routes and other major improvements. Minor improvements are typically made on an as-needed basis to address deterioration in level of service.

While this plan identified many improvements deemed necessary or desirable, implementation is typically made by selecting and prioritizing projects each year through the update of the Capital Improvements Plan. To assist with budgeting and selection of projects for inclusion in the 5-year CIP, this plan will only identify suggested improvements as needed in the near-term (0-5 years) or long term (5-20 years).

PROJECT COST ESTIMATES

For planning purposes it is useful to develop concept-level preliminary estimates of probable construction cost for improvements identified in this plan. While the cost estimates are not refined, they are useful to determining order-of-magnitude project costs. As projects are nominated for inclusion in each 5-year CIP, project cost estimates should be reviewed and updated to provide greater detail for project elements and to use up-to-date pricing for major project elements.

Table 8 lists transportation projects identified in this plan and shows the estimated project costs. Costs are tabulated in one of two columns, indicating whether the project should be considered for near-term implementation or long-term implementation. Details of cost elements for each project alternative are included in Appendix A.

Table 9 – Improvement Project Alternatives

Proj. No.	Project Name/Location	Project Description/Alternative	Project Type	Project Cost (2010 $)		CIP Project No.	Comments
				Near-Term Cost	Long-Term Cost		
1a	**Lincoln Avenue - 4th Street to Union Avenue**	Eliminate parking near intersections to provide LT Lanes	Capacity	$ 115,000		N/A	
1b	**Lincoln Avenue - 4th Street to Union Avenue**	Eliminate parking throughout, convert to 3-lane street	Capacity	$ 200,000		N/A	
2a	**West Vernon Avenue, Union Avenue to Sheridan Street**	Eliminate parking near intersections to provide LT Lanes	Capacity	$ 800,000		N/A	Includes new traffic signal at Vernon/Union, and reconstruct existing traffic signal at Vernon/Cascade.
2b	**West Vernon Avenue, Union Avenue to Sheridan Street**	Eliminate parking throughout, convert to 3-lane street	Capacity	$ 830,000		N/A	Includes new traffic signal at Vernon/Union, and reconstruct existing traffic signal at Vernon/Cascade.
3	**Union Avenue, Stanton Avenue to West Vernon Avenue**	Eliminate on-street parking, re-stripe as 4-lane street	Capacity	$ 425,000		N/A	Includes intersection reconstruction and new traffic signal at Vernon/Union (see also improvement #2)
4a	**Union Avenue, West Lincoln to West Fir Avenue**	Eliminate parking near intersections to provide LT Lanes	Capacity		$ 180,000	N/A	
4b	**Union Avenue, West Lincoln to West Fir Avenue**	Eliminate parking throughout, convert to 3-lane street	Capacity		$ 200,000	N/A	
5a	**Fir Avenue, Union Avenue to Friberg Avenue**	Eliminate parking near intersections to provide LT Lanes	Capacity		$ 110,000	N/A	
5b	**Fir Avenue, Union Avenue to Friberg Avenue**	Eliminate parking throughout, convert to 3-lane street	Capacity		$ 215,000	N/A	
6	**Fir Avenue, Friberg Avenue to Brenvei Drive**	Construct North Bypass	Capacity	N/A	N/A	N/A	No changes proposed to Fir Avenue to alleviate congestion if North Bypass is planned.
7	**East Bypass**	County Highway 1 Alignment Alt.	Circulation/Capacity		$ 8,200,000	N/A	
8	**North Bypass**	250th Street Alignment	Circulation/Capacity		$ 15,300,000	N/A	
9	**West Bypass**	County Highway 15 Alignment	Circulation/Capacity		$ 12,900,000	N/A	
10	**Tower Road - Western Ave. to Alcot Ave.**	Street construction/reconstruction & new bridge	Circulation/Capacity	$ 12,500,000		06-STR-006	
11	**Tower Road / Lincoln Avenue Intersection**	Install Traffic Signal	Safety	$ 250,000		N/A	Planned for 2011 or 2012 construction.
12	**Lincoln Avenue / Redwood Lane Intersection**	Install Traffic Signal	Safety	N/A		N/A	Project completed in 2010.
13a	**Tower Road / College Way Intersection**	Reconstruct Intersection	Safety		$ 580,000	N/A	
13b	**Tower Road / College Way Intersection**	Reconstruct Intersection as a modern roundabout	Safety		$ 360,000	N/A	

Table 9 – Improvement Project Alternatives (cont.)

Proj. No.	Project Name/Location	Project Description/Alternative	Project Type	Project Cost (2010 $)		CIP Project No.	Comments
				Near-Term Cost	Long-Term Cost		
14	**Sheridan Avenue / Vernon Avenue Intersection**	Eliminate parking and re-stripe to provide left-turn lanes	Safety	$ 35,000		N/A	Intersection improvements will be completed if Vernon Avenue corridor improvements (Proj. 2a) are implemented.
15	**Union Avenue / Cavour Avenue Intersection**	Eliminate parking and re-stripe to provide left-turn lanes	Safety	$ 35,000		N/A	Intersection improvements will be completed if Union Avenue corridor improvements (Proj. 4a) are implemented.
16	**Union Avenue / Summit Avenue Intersection**	Eliminate parking and re-stripe to provide left-turn lanes, trim hedge	Safety	$ 35,000		N/A	Intersection improvements will be completed if Union Avenue corridor improvements (Proj. 4a) are implemented.
17	**Lincoln Avenue, Union Avenue to Court Street**	Traffic Signal Coordination	Safety	$ 10,000		N/A	Costs to re-affirm existing coordination plan and field implementation/checking
18	**Lincoln Avenue - St. Andrews to Redwood Ln.**	Street Lighting	Safety	$ 200,000		06-STR-024	
19	**Pebble Lake Road / TH 210 Intersection**	New Traffic Signal	Safety/Capacity	$ 250,000		06-STR-017	Currently Under Construction
20	**Friberg/Randolph/Cecil Intersection**	Intersection Realignment & Traffic Signal	Safety/Capacity	$ 375,000		06-STR-032	
21	**Friberg Avenue / Fir Avenue Intersection**	New Traffic Signal	Safety/Capacity		$ 250,000	N/A	
BP1	**Bike Path on CSAH 1 from Godel Dr. to Diversion Dr.**	Bike Path Reconstruction	Non-Motorized	$ 25,000		06-BIKE-001	
BP2	**Bike Path, Union Avenue River Crossing**	New Bike Path Construction	Non-Motorized	$ 25,000		06-BIKE-002	
BP3	**Bike Path/Bikeway, CSAH 111 from Ridgewood Dr. to Connell Dr.**	New Bike Path Construction	Non-Motorized	$ 50,000		06-BIKE-003	
BP4	**Riverpath Bike Path to Hanna Park**	New Bike Path Construction	Non-Motorized	$ 60,000		06-BIKE-004	
BP5	**Bikeway, N. Park St., W. Fir Avenue to Skogmo Blvd. (Veterans Home)**	New Bikeway Construction	Non-Motorized	$ 50,000		06-BIKE-005	
BP6	**Bike Path, Central Lakes Trail Connection to TH210**	New Bike Path Construction	Non-Motorized	$ 260,000		06-BIKE-006	
BP7	**Bike Path, Pebble Lake Road, S. Concord St. to TH210**	Bike Path Reconstruction	Non-Motorized	$ 30,000		06-BIKE-007	
			TOTAL COST*	**$ 15,645,000**	**$ 37,645,000**		

* Where more than one alternative exists at a location, only the more expensive alternative is included in the total.

APPENDIX A

COST ESTIMATE DETAILS

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Lincoln Avenue, N. 4th Avenue to Union Avenue				Restrict parking & re-stripe at intersections only.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.53	$75,000.00 /mile	$39,750	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.53	$75,000.00 /mile	$39,750	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$79,500	
Engineering/Design/Const. Serv. (20%)			$15,900	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$95,400	
Contingency (20%)			$19,080	
GRAND TOTAL			**$114,480**	

PROJECT PARAMETERS

Project length (mi)	0.90
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:

1. Seven intersections, revise 200 ft. either side of each intersection.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Lincoln Avenue, N. 4th Avenue to Union Avenue				Restrict parking & re-stripe as 3-lane throughout.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.90	$75,000.00 /mile	$67,500	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.90	$75,000.00 /mile	$67,500	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$135,000	
Engineering/Design/Const. Serv. (20%)			$27,000	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$162,000	
Contingency (20%)			$32,400	
GRAND TOTAL			**$194,400**	

PROJECT PARAMETERS

Project length (mi)	0.90
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Vernon Avenue, Union Avenue to Sheridan Street				Restrict parking & re-stripe at intersections only.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.38	$75,000.00 /mile	$28,500	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.38	$75,000.00 /mile	$28,500	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals	2	$250,000.00 /each	$500,000	
		/each	$0	
		/each	$0	
SUB-TOTAL			$557,000	
Engineering/Design/Const. Serv. (20%)			$111,400	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$668,400	
Contingency (20%)			$133,680	
GRAND TOTAL			**$802,080**	

PROJECT PARAMETERS

Project length (mi)	0.51
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:
1. Seven intersections, revise 200 ft. either side of each intersection.
2. New traffic signal at Vernon/Union
3. Replace traffic signal at Vernon/Cascade

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Vernon Avenue, Union Avenue to Sheridan Street				Restrict parking & re-stripe as 3-lane throughout.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.51	$75,000.00 /mile	$38,250	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.51	$75,000.00 /mile	$38,250	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals	2	$250,000.00 /each	$500,000	
		/each	$0	
		/each	$0	
SUB-TOTAL			$576,500	
Engineering/Design/Const. Serv. (20%)			$115,300	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$691,800	
Contingency (20%)			$138,360	
GRAND TOTAL			**$830,160**	

PROJECT PARAMETERS

Project length (mi) 0.51
Street/Road Width (ft)
ROW Width (ft)

NOTES:

1. New traffic signal at Vernon/Union
2. Replace traffic signal at Vernon/Cascade

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Union Avenue, Stanton Avenue to Vernon Avenue				Restrict parking & re-stripe as 4-lane throughout.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.29	$75,000.00 /mile	$21,750	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.29	$75,000.00 /mile	$21,750	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals	1	$250,000.00 /each	$250,000	
		/each	$0	
		/each	$0	
SUB-TOTAL			$293,500	
Engineering/Design/Const. Serv. (20%)			$58,700	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$352,200	
Contingency (20%)			$70,440	
GRAND TOTAL			**$422,640**	

PROJECT PARAMETERS

Project length (mi)	0.29
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:

1. New traffic signal at Vernon/Union

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Union Avenue, West Lincoln Avenue to West Fir Avenue				Restrict parking & re-stripe at intersections only.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.83	$75,000.00 /mile	$62,250	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.83	$75,000.00 /mile	$62,250	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$124,500	
Engineering/Design/Const. Serv. (20%)			$24,900	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$149,400	
Contingency (20%)			$29,880	
GRAND TOTAL			**$179,280**	

PROJECT PARAMETERS

Project length (mi)	0.91
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:

1. 11 intersections, revise 200 ft. either side of each intersection.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Union Avenue, West Lincoln Avenue to West Fir Avenue				Restrict parking & re-stripe as 3-lane throughout.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.91	$75,000.00 /mile	$68,250	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.91	$75,000.00 /mile	$68,250	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$136,500	
Engineering/Design/Const. Serv. (20%)			$27,300	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$163,800	
Contingency (20%)			$32,760	
GRAND TOTAL			**$196,560**	

PROJECT PARAMETERS

Project length (mi)	0.91
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Fir Avenue, Union Avenue to Friberg Avenue				Restrict parking & re-stripe at intersections only.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.50	$75,000.00 /mile	$37,500	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.50	$75,000.00 /mile	$37,500	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$75,000	
Engineering/Design/Const. Serv. (20%)			$15,000	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$90,000	
Contingency (20%)			$18,000	
GRAND TOTAL			**$108,000**	

PROJECT PARAMETERS
Project length (mi) 0.98
Street/Road Width (ft)
ROW Width (ft)

NOTES:
1. Four full intersections, seven half-intersections, revise 200 ft. each approach.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Fir Avenue, Union Avenue to Friberg Avenue				Restrict parking & re-stripe as 3-lane throughout.
ITEM	ESTIMATED QUANTITY	ESTIMATED UNIT COST	EXTENDED COST	NOTES
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.98	$75,000.00 /mile	$73,500	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.98	$75,000.00 /mile	$73,500	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$147,000	
Engineering/Design/Const. Serv. (20%)			$29,400	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$176,400	
Contingency (20%)			$35,280	
GRAND TOTAL			**$211,680**	

PROJECT PARAMETERS

Project length (mi) 0.98
Street/Road Width (ft)
ROW Width (ft)

NOTES:

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Tower Road / College Way Intersection				Reconstruct to realign east leg to 90-degree approach.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")	3,000	$18.00 /sq.yd.	$54,000	
Road Base (12")	3,000	$8.00 /sq.yd.	$24,000	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow	10,000	$12.00 /cu.yd.	$120,000	Area for realignment requires considerable embankment.
Curb/Gutter		$12.00 /lin.ft.	$0	Assme rural section w/o curb
Sidewalk		$25.00 /sq.yd.	$0	Assume rural section w/o sidewalk
Utilities	0.10	$50,000.00 /mile	$5,000	
Drainage (Storm Inlets/Pipes)	0.10	$250,000.00 /mile	$25,000	
Signing/Striping	0.10	$75,000.00 /mile	$7,500	
Lighting	0.10	$350,000.00 /mile	$35,000	
Const. Traffic Control	0.10	$75,000.00 /mile	$7,500	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
Revise 2 driveway connections	2	$20,000.00 /each	$40,000	
		/each	$0	
SUB-TOTAL			$318,000	
Engineering/Design/Const. Serv. (20%)			$63,600	
R.O.W. (purchase)	50,000	$2.00 /sq.ft.	$100,000	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$481,600	
Contingency (20%)			$96,320	
GRAND TOTAL			**$577,920**	

PROJECT PARAMETERS

Project length (mi)	0.10
Street/Road Width (ft)	44
ROW Width (ft)	80

NOTES:

1. Construct new east leg, approximately 600 feet long.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Tower Road / College Way Intersection				Reconstruct intersection as modern roundabout.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")	1,000	$18.00 /sq.yd.	$18,000	Asphalt for new roundabout only
Road Base (12")	1,000	$8.00 /sq.yd.	$8,000	Base for new roundabout only
Grading (Uncl.Ex.)	2,000	$8.00 /cu.yd.	$16,000	Excavation for leveling roundabout area.
Borrow	2,000	$12.00 /cu.yd.	$24,000	Borrow for leveling roundabout area
Curb/Gutter		$12.00 /lin.ft.	$0	Assme rural section w/o curb
Sidewalk		$25.00 /sq.yd.	$0	Assume rural section w/o sidewalk
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)	0.10	$250,000.00 /mile	$25,000	
Signing/Striping	0.20	$75,000.00 /mile	$15,000	Includes re-striping and new signing on all approaches
Lighting	0.20	$350,000.00 /mile	$70,000	
Const. Traffic Control	0.10	$75,000.00 /mile	$7,500	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
Landscaping & Irrigation	1	$50,000.00 /each	$50,000	Center of roundabout area.
		/each	$0	
SUB-TOTAL			$233,500	
Engineering/Design/Const. Serv. (20%)			$46,700	
R.O.W. (purchase)	10,000	$2.00 /sq.ft.	$20,000	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$300,200	
Contingency (20%)			$60,040	
GRAND TOTAL			**$360,240**	

PROJECT PARAMETERS

Project length (mi)	0.10
Street/Road Width (ft)	44
ROW Width (ft)	80

NOTES:

1. Construct new east leg, approximately 600 feet long.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

East Bypass				Construct East Bypass as Major Rural Collector Street
ITEM	ESTIMATED QUANTITY	ESTIMATED UNIT COST	EXTENDED COST	NOTES
Asphalt (6")	62,000	$18.00 /sq.yd.	$1,116,000	
Road Base (12")	62,000	$8.00 /sq.yd.	$496,000	
Grading (Uncl.Ex.)	85,000	$8.00 /cu.yd.	$680,000	Assume 2 ft. depth over ROW for length of project.
Borrow	45,000	$12.00 /cu.yd.	$540,000	
Curb/Gutter		$12.00 /lin.ft.	$0	Assume rural section w/o curb
Asphalt Bike Path	15,000	$25.00 /sq.yd.	$375,000	Assume 10 ft. wide asphalt Bike Path within road ROW
Utilities	0.90	$50,000.00 /mile	$45,000	Assume utility conflicts only where road exists
Drainage (Storm Inlets/Pipes)	1.50	$100,000.00 /mile	$150,000	Reduced cost for rural construction
Signing/Striping	2.40	$75,000.00 /mile	$180,000	
Lighting	0.20	$350,000.00 /mile	$70,000	Lighting only major intersections
Const. Traffic Control	0.90	$75,000.00 /mile	$67,500	Only required were route follows existing roads
Misc. Major Elements				
Drainage Structures	4	$60,000.00 /each	$240,000	Misc. small drainageway crossings.
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
Otter Tail River Bridge	10,000	$125.00 /sq.ft.	$1,250,000	Assume 250 ft. span
Environmental Mitigation	1	$100,000.00 /each	$100,000	
SUB-TOTAL			$5,309,500	
Engineering/Design/Const. Serv. (20%)			$1,061,900	
R.O.W. (purchase)	16.5	$25,000.00 /Ac.	$412,500	90 ft. ROW where new road is being constructed.
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$6,783,900	
Contingency (20%)			$1,356,780	
GRAND TOTAL			**$8,140,680**	

PROJECT PARAMETERS

Project length (mi)	2.40
Street/Road Width (ft)	44
ROW Width (ft)	90

NOTES:

1. 0.9 miles of total follows existing roads.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

North Bypass				Construct North Bypass as Major Rural Collector Street
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")	130,000	$18.00 /sq.yd.	$2,340,000	Assumes complete reconstruction of 250th St. along route.
Road Base (12")	130,000	$8.00 /sq.yd.	$1,040,000	Assumes complete reconstruction of 250th St. along route.
Grading (Uncl.Ex.)	176,000	$8.00 /cu.yd.	$1,408,000	Assume 2 ft. depth over ROW for length of project.
Borrow	50,000	$12.00 /cu.yd.	$600,000	
Curb/Gutter		$12.00 /lin.ft.	$0	Assume rural section w/o curb
Asphalt Bike Path	30,000	$25.00 /sq.yd.	$750,000	Assume 10 ft. wide asphalt Bike Path within road ROW
Utilities	4.00	$50,000.00 /mile	$200,000	Assume utility conflicts only where road exists
Drainage (Storm Inlets/Pipes)	5.00	$100,000.00 /mile	$500,000	Reduced cost for rural construction
Signing/Striping	5.00	$75,000.00 /mile	$375,000	
Lighting	0.30	$350,000.00 /mile	$105,000	Lighting only major intersections
Const. Traffic Control	4.00	$75,000.00 /mile	$300,000	Only required were route follows existing roads
Misc. Major Elements				
Drainage Structures	5	$60,000.00 /each	$300,000	Misc. small drainageway crossings.
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
Otter Tail River Bridge	10,000	$125.00 /sq.ft.	$1,250,000	Assume 250 ft. span
Environmental Mitigation	1	$200,000.00 /each	$200,000	
SUB-TOTAL			$9,368,000	
Engineering/Design/Const. Serv. (20%)			$1,873,600	
R.O.W. (purchase)	40.0	$25,000.00 /Ac.	$1,000,000	90 ft. ROW for new road, 60 ft. for existing route.
Relocate Res.	2	$250,000.00 /each	$500,000	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$12,741,600	
Contingency (20%)			$2,548,320	
GRAND TOTAL			**$15,289,920**	

PROJECT PARAMETERS

Project length (mi)	5.00
Street/Road Width (ft)	44
ROW Width (ft)	90

NOTES:

1. 4.0 miles of total follows existing roads.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

West Bypass				Construct West Bypass as Major Rural Collector Street
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")	112,000	$18.00 /sq.yd.	$2,016,000	Assumes complete reconstruction of 250th St. along route.
Road Base (12")	112,000	$8.00 /sq.yd.	$896,000	Assumes complete reconstruction of 250th St. along route.
Grading (Uncl.Ex.)	152,000	$8.00 /cu.yd.	$1,216,000	Assume 2 ft. depth over ROW for length of project.
Borrow	50,000	$12.00 /cu.yd.	$600,000	
Curb/Gutter		$12.00 /lin.ft.	$0	Assume rural section w/o curb
Asphalt Bike Path	26,000	$25.00 /sq.yd.	$650,000	Assume 10 ft. wide asphalt Bike Path within road ROW
Utilities	3.20	$50,000.00 /mile	$160,000	Assume utility conflicts only where road exists
Drainage (Storm Inlets/Pipes)	4.33	$100,000.00 /mile	$433,000	Reduced cost for rural construction
Signing/Striping	4.33	$75,000.00 /mile	$324,750	
Lighting	0.30	$350,000.00 /mile	$105,000	Lighting only major intersections
Const. Traffic Control	3.20	$75,000.00 /mile	$240,000	Only required were route follows existing roads
Misc. Major Elements				
Drainage Structures	4	$60,000.00 /each	$240,000	Misc. small drainageway crossings.
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
Otter Tail River Bridge	10,000	$125.00 /sq.ft.	$1,250,000	Assume 250 ft. span new bridge.
Environmental Mitigation	1	$100,000.00 /each	$100,000	
SUB-TOTAL			$8,230,750	
Engineering/Design/Const. Serv. (20%)			$1,646,150	
R.O.W. (purchase)	35.0	$25,000.00 /Ac.	$875,000	90 ft. ROW for new road, 60 ft. for existing route.
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$10,751,900	
Contingency (20%)			$2,150,380	
GRAND TOTAL			**$12,902,280**	

PROJECT PARAMETERS

Project length (mi)	4.33
Street/Road Width (ft)	44
ROW Width (ft)	90

NOTES:

1. 3.2 miles of total follows existing roads.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

North 2nd Avenue Extension - Maple to Tower				New Street Construction as Local Street
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")	5,300	$18.00 /sq.yd.	$95,400	
Road Base (12")	5,600	$8.00 /sq.yd.	$44,800	
Grading (Uncl.Ex.)	2,000	$8.00 /cu.yd.	$16,000	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter	2,900	$12.00 /lin.ft.	$34,800	
Sidewalk	1,600	$25.00 /sq.yd.	$40,000	
Utilities	0.27	$50,000.00 /mile	$13,500	
Drainage (Storm Inlets/Pipes)	0.27	$250,000.00 /mile	$67,500	
Signing/Striping	0.27	$75,000.00 /mile	$20,250	
Lighting	0.27	$350,000.00 /mile	$94,500	
Const. Traffic Control	0.27	$75,000.00 /mile	$20,250	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$447,000	
Engineering/Design/Const. Serv. (20%)			$89,400	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$536,400	
Contingency (20%)			$107,280	
GRAND TOTAL			**$643,680**	

PROJECT PARAMETERS

Project length (mi)	0.27
Street/Road Width (ft)	37
ROW Width (ft)	

NOTES:

1. Assume no ROW purchase required.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Sheridan Street / Vernon Avenue Intersection				Re-stripe to provide left turn lanes at approaches.
ITEM	ESTIMATED QUANTITY	ESTIMATED UNIT COST	EXTENDED COST	NOTES
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.15	$75,000.00 /mile	$11,250	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.15	$75,000.00 /mile	$11,250	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$22,500	
Engineering/Design/Const. Serv. (20%)			$4,500	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$27,000	
Contingency (20%)			$5,400	
GRAND TOTAL			**$32,400**	

PROJECT PARAMETERS

Project length (mi)	0.15
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:

1. Revise 200 ft. on each approach.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Union Avenue / Cavour Avenue Intersection				Re-stripe to provide left turn lanes at approaches.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.15	$75,000.00 /mile	$11,250	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.15	$75,000.00 /mile	$11,250	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$22,500	
Engineering/Design/Const. Serv. (20%)			$4,500	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$27,000	
Contingency (20%)			$5,400	
GRAND TOTAL			**$32,400**	

PROJECT PARAMETERS

Project length (mi)	0.15
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:

1. Revise 200 ft. on each approach.

CONCEPTUAL ESTIMATE OF PROJECT COSTS
Fergus Falls Transportation Plan Update

Union Avenue / Summit Avenue Intersection				Re-stripe to provide left turn lanes at approaches.
ITEM	**ESTIMATED QUANTITY**	**ESTIMATED UNIT COST**	**EXTENDED COST**	**NOTES**
Asphalt (6")		$18.00 /sq.yd.	$0	
Road Base (12")		$8.00 /sq.yd.	$0	
Grading (Uncl.Ex.)		$8.00 /cu.yd.	$0	
Borrow		$12.00 /cu.yd.	$0	
Curb/Gutter		$12.00 /lin.ft.	$0	
Sidewalk		$25.00 /sq.yd.	$0	
Utilities		$50,000.00 /mile	$0	
Drainage (Storm Inlets/Pipes)		$250,000.00 /mile	$0	
Signing/Striping	0.15	$75,000.00 /mile	$11,250	
Lighting		$350,000.00 /mile	$0	
Const. Traffic Control	0.15	$75,000.00 /mile	$11,250	
Misc. Major Elements				
Drainage Structures		$60,000.00 /each	$0	
Canal Structures		$100,000.00 /each	$0	
Traffic Signals		$250,000.00 /each	$0	
		/each	$0	
		/each	$0	
SUB-TOTAL			$22,500	
Engineering/Design/Const. Serv. (20%)			$4,500	
R.O.W. (purchase)		$2.00 /sq.ft.	$0	
Relocate Res.		$250,000.00 /each	$0	
Relocate Bus. or Comm. Estab.		$350,000.00 /each	$0	
SUB-TOTAL			$27,000	
Contingency (20%)			$5,400	
GRAND TOTAL			**$32,400**	

PROJECT PARAMETERS

Project length (mi)	0.15
Street/Road Width (ft)	
ROW Width (ft)	

NOTES:

1. Revise 200 ft. on each approach.