TECHNICAL MEMORANDUM 2 – TRAFFIC
APRIL 27, 2010

INTRODUCTION

The Trunk Highway 10 (US 10) corridor is an important east-west principal arterial route in central Minnesota. Traffic volumes and characteristics play a significant role in how well the corridor functions from a safety and mobility perspective. To assess the current operation of US 10 within the study area, a variety of traffic information was assembled and analyzed, including existing and 2030 daily and peak hour traffic volumes. The remainder of this technical memorandum presents the data and analysis and begins to identify the effect of potential changes to the US 10 corridor that would support safe and efficient travel into the future.

HISTORIC AND EXISTING CONDITIONS

The design team used historic and existing traffic data to identify traffic patterns in the US 10 corridor. These patterns will be used to inform the analysis of existing traffic volumes and in the development and analysis of future traffic volumes. Collected data includes historic Average Annual Daily Traffic (AADT) volumes, existing 24-hour traffic volumes, and historic data from MnDOT automatic traffic recorders (ATRs). The remainder of this section presents and discusses the information in the following order:

- Daily Traffic Volumes
- Major Traffic Movements
- Weekday Traffic Profile
- Recreational Traffic Profile
- Operational Issue - Delays caused by Freight Trains

Daily Traffic

The study team analyzed daily traffic information from two sources: (1) MnDOT flow maps that identify average annual daily traffic (AADT) volumes for major roadways, and (2) unadjusted weekday daily traffic volume counts collected by SRF. Results from each are presented below.

<u>Historic Annual Average Daily Traffic (AADT)</u>

Traffic volumes in the study area have grown steadily over the years. Between 1998 and 2006, AADTs on Highway 10 in Elk River have increased by an average of more than 7,000 vehicles and an average of 3 percent per year. Table 1 shows the average annual daily traffic volumes from 1998 through 2006 for US 10 in several locations in Elk River.

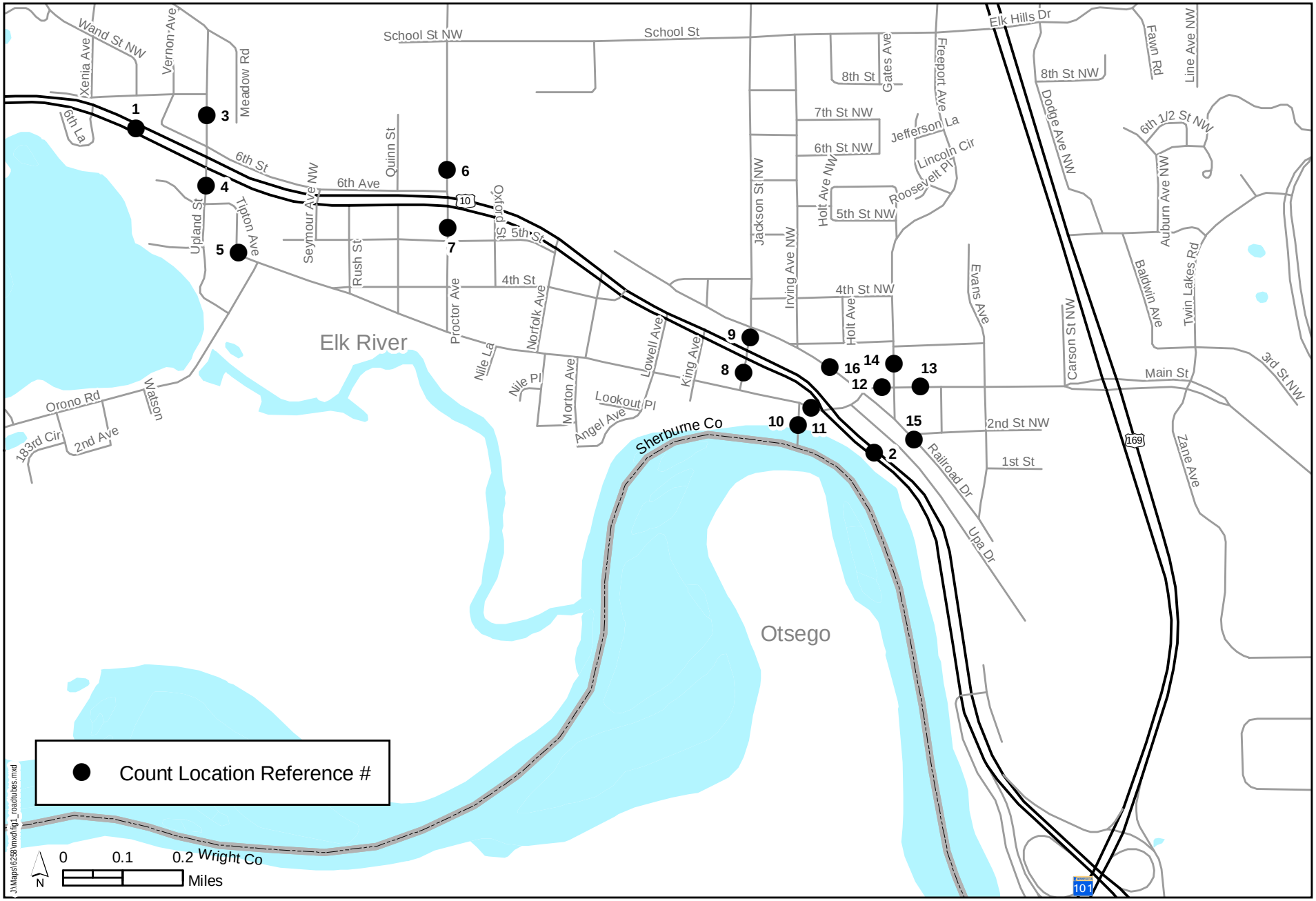
Table 1
Summary of US 10 Traffic Volumes and Changes by Location

Location	1998 AADT(1)	2000 AADT(1)	2002 AADT(1)	2004 AADT(1)	2006 AADT(1)	Growth Rate (% per year) (2)
US 10 (west of US 10/101/169 interchange)	24,100	27,400	32,900	29,000	29,000	2
US 10 (between Main St. and Jackson Ave.)	21,800	28,800	28,700	29,000	29,000	3
US 10 (west of Jackson Ave.)	24,700	25,800	30,100	34,000	34,000	4

Notes:
(1) AADT from Mn/DOT traffic flow maps.
(2) Compound growth rate calculated using 1998 and 2006 data.

Unadjusted Weekday Daily Traffic Volumes

The study team collected 24-hour traffic counts over several days at 15 locations in the study area. Figure 1 illustrates where the counts were collected. Table 2 presents the volumes, not adjusted to account for seasonal variations. The design team compared these volumes against AADTs to confirm that traffic patterns were normal when collected. The design team identified no unusual patterns.



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TRAFFIC COUNT LOCATIONS

TH 10 PRELIMINARY DESIGN AND ENVIRONMENTAL DOCUMENTATION - TECHNICAL MEMORANDUM 1

Mn/DOT District 3

Figure 1

Table 2
Unadjusted Weekday Traffic Volumes

Map Reference	Location	Unadjusted Daily Volume (1)
2	US 10 (East of Elk River)	28,664
1	US 10 (West of Elk River)	29,621
9	Jackson (N of US 10)	5,827
8	Jackson (S of US 10)	3,185
13	Main Street (E of Gates Avenue)	10,306
12	Main Street (E of US 10)	10,376
11	Main Street (W of CR 42)	9,119
10	CR 42 (S of Main)	8,377
15	Railroad Drive (E of 2nd Street)	230
16	Railroad Drive (W of Main Street)	1,942
6	Proctor Avenue (N of US 10)	13,330
7	Proctor Avenue (S of US 10)	3,947
5	Tipton Avenue (W of Main Street)	804
3	Upland (N of US 10)	4,298
4	Upland (S of US 10)	629

Notes:
(1) Volumes collected October 30-31, 2007 or November 7-8, 2007.

Major Traffic Movements

US 10 is an east-west principal arterial route that connects the Twin Cities metropolitan area with central Minnesota. A comprehensive origin-destination study was not performed for this corridor; however, major traffic patterns were identified based on discussions with the communities, reviews of traffic flow maps, and review of hourly traffic counts.

Connection to Main Street/CSAH 12
US 10 intersects Main Street at a signalized intersection 0.9 miles (4,750 feet) west of the existing TH 169 interchange ramps. Main Street/CSAH 12 is part of an east-west local street system that extends beyond US 10 east of Big Lake and also into Anoka County. According to the Elk River 2004 Transportation Plan Update and the Sherburne County 2007 Transportation Plan, Main Street carries three functional classifications in the City of Elk River:

- Minor arterial east of TH 169
- Major collector from US 10 to TH 169
- Local street from US 10 to Lowell Avenue
- Major collector west of Lowell Avenue

In Elk River, Main Street is primarily used for accessing residential areas and retail locations, though it does provide an alternate route to US 10. Main Street has the second highest volumes after Proctor Avenue.

Connection to Jackson Avenue NW

Jackson Avenue and US 10 intersect at a signalized intersection 0.2 miles (845 feet) west of the Main Street intersection. According to the Elk River 2004 Transportation Plan Update, Jackson Avenue is a north-south minor arterial. It provides access to commercial, institutional (school) and residential land uses within southern Elk River. Jackson Avenue has the third highest volumes after Main Street and Proctor Avenue.

Connection to Proctor Avenue NW (Sherburne CSAH 1)

Proctor Avenue and US 10 intersect at a signalized intersection 0.6 miles (2,960 feet) west of the Jackson Avenue intersection. According to the Sherburne County 2007 Transportation Plan, Proctor Avenue is a north-south minor arterial. Proctor Avenue/CSAH 1 extends through much of eastern Sherburne County providing access to commercial, institutional (school) and residential land uses. Proctor Avenue, north of US 10, has the highest cross street traffic volumes of the streets intersecting US 10 in this area of Elk River.

Connection to Upland Avenue NW (Sherburne CR 44)

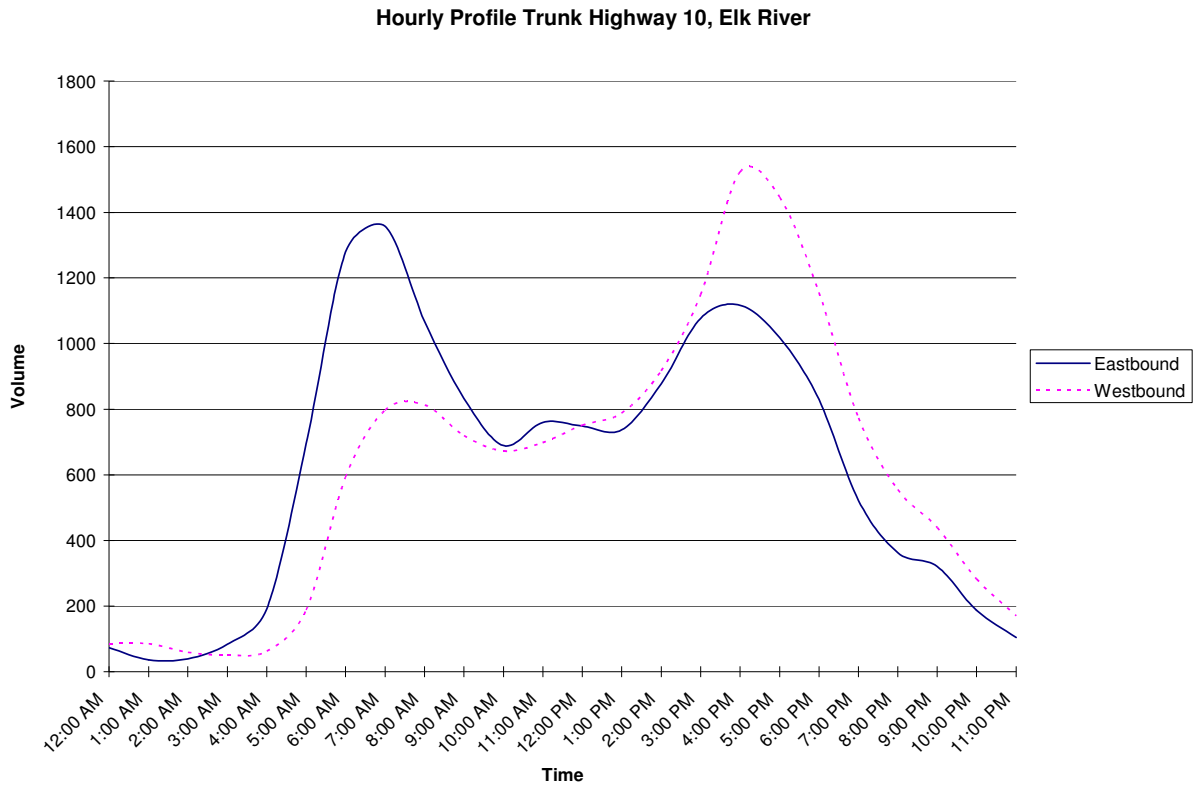
Upland Avenue and US 10 intersect at a signalized intersection 0.4 miles (2,165 feet) west of the Proctor Avenue intersection. According to the Sherburne County 2007 Transportation Plan, Upland Avenue is a north-south collector. Upland Avenue provides access to primarily residential land uses and has lower volumes than Jackson Avenue, Main Street, or Proctor Avenue.

Weekday Traffic Profile

Daily traffic volumes are one indication of highway capacity, but information about peak traffic periods provide a better indicator of what is happening as congestion can occur during peak hours that may not be reflected by daily numbers. The study team collected hourly traffic volumes on the US 10 mainline west of the TH 169/US 10 interchange (Location 2 on Figure 1) using Smart Sensor automated traffic data collectors. Figure 2 illustrates the daily traffic volume profile for northbound and southbound US 10 traffic on a weekday (Tuesday, October 30, 2007) in the Elk River area. From this data we conclude the following:

- Weekday peak hours were from approximately 7 to 8 a.m. and 4 to 5 p.m. During the morning peak hour two-way traffic volumes were about 2,100 vehicles per hour (vph), with about 1,400 vph traveling in the peak direction (eastbound for a.m.). During the evening peak hour two-way traffic volumes were about 2,600 vph, with about 1,500 vph traveling in the peak direction (westbound for p.m.).
- During the morning peak hour there was a 60/40 directional split eastbound/westbound. During the evening peak hour the split was 40/60 eastbound/westbound.
- Seven 7 percent of trips took place during the morning peak hour and nine percent took place during the evening peak hour.

Figure 2
Weekday Traffic Volumes - Trunk Highway 10



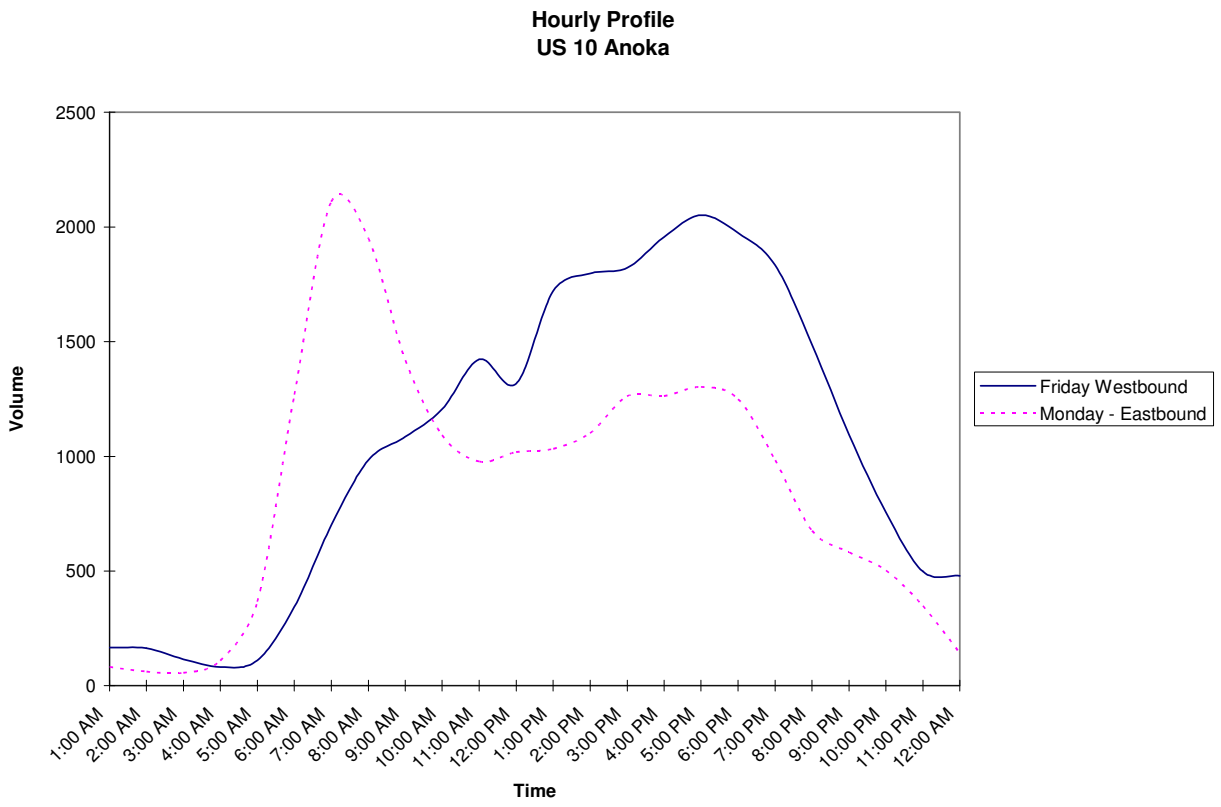
Recreational Traffic Profile

Although MnDOT policy bases highway design on weekday peak hour traffic volumes, the study team recognizes that US 10 also serves as one of the recreational links to the central lakes region. For that reason, it is important to be aware of fluctuations in traffic volumes due to recreational demand and be aware of how proposed designs will behave under these conditions. Recreational traffic data was not collected in the Elk River area. However, data from the ATR in Anoka (located about 4 miles east of TH 101/169) can illuminate characteristics of recreational traffic along US 10 in Elk River. Figure 3 presents ATR data for recreational peak directions (westbound on Friday and eastbound on Monday) for Memorial Day weekend. The data illustrates the following:

- Recreational peaks last longer than typical weekday peak periods - Westbound afternoon peak period volumes exceed 1,500 vph for eight hours (1 to 9 p.m.) on Friday. In comparison, westbound weekday traffic volumes collected by the design team exceeded 1,500 vph for only two hours. Eastbound morning peak volumes exceed 1,400 vph for three hours (7 to 10 a.m.) on Monday. In comparison, eastbound weekday traffic volumes collected by the design team exceeded 1,400 vph for one hour.

- Recreational peak volumes are higher than typical weekday volumes - Westbound afternoon peak period volumes ranged from 15 to 40 percent higher than the weekday traffic volumes collected by the design team. Eastbound morning peak period volumes ranged from 40 to 50 percent higher and the weekday traffic volumes collected by the design team.

Figure 3
US 10 Recreational Traffic Volumes (Anoka, MN)



Operational Issue - Delays caused by Freight Trains

The BNSF rail line located parallel to US 10 through Elk River directly intersects Main Street, Jackson Avenue, and Proctor Avenue. According to Mn/DOT railroad maps, this rail line is one of the busiest lines in Minnesota today and additional traffic is anticipated with the start up of Northstar Commuter Rail service. Every time a train passes through Elk River, it interrupts traffic flow on US 10, Main Street, Jackson Avenue, and Proctor Avenue adding delay to trips and creating congestion. The railroad crossings themselves are potential safety hazards and their close spacing with US 10 compound the problem.

TRAFFIC OPERATIONS ANALYSIS

The design team performed a traffic operations analysis as a way to begin identifying changes in the corridor that would support safe and efficient travel into the future. The limits of the traffic operations analysis include US 10 from Main Street in Elk River to Upland Avenue NW; the study intersections are shown in Figure 4. The purpose of the analysis is to identify the impact of increased travel demand in the year 2030 on intersections along the US 10 corridor and to begin identifying changes to the corridor that would mitigate the impact of the additional future traffic. This traffic analysis includes a travel demand modeling process that developed future traffic volumes for the US 10 corridor for the year 2030. Several concepts were developed along US 10 through Elk River and the traffic forecasts were used to determine the alternatives that best address future transportation needs of the corridor.

Existing Conditions

Existing traffic volumes were collected and analyzed at the following key intersections:

- US 10 and Main Street
- Main Street and Evans Avenue NW
- Main Street and CR 42
- Main Street and Jackson Avenue
- US 10 and Jackson Avenue
- School Street NW and Jackson Avenue
- Main Street and Proctor Avenue
- US 10 and Proctor Avenue
- School Street and Proctor Avenue
- US 10 and Upland Avenue
- Main Street and Tipton Avenue

Figure 5 reflects the existing a.m. and p.m. traffic volumes, geometrics, and traffic control at each intersection.

An operations analysis was conducted for the a.m. and p.m. peak hours at each of the respective peak hour key intersections to determine how traffic currently operates along the project segment. All signalized intersections were analyzed using the Synchro/SimTraffic software and unsignalized intersections were analyzed using the Highway Capacity Software. Capacity analysis results identify a Level of Service (LOS), which indicates how well an intersection is operating. The LOS results are based on average delay per vehicle. Intersections are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. LOS A through D is generally considered acceptable by drivers (see Table 3).

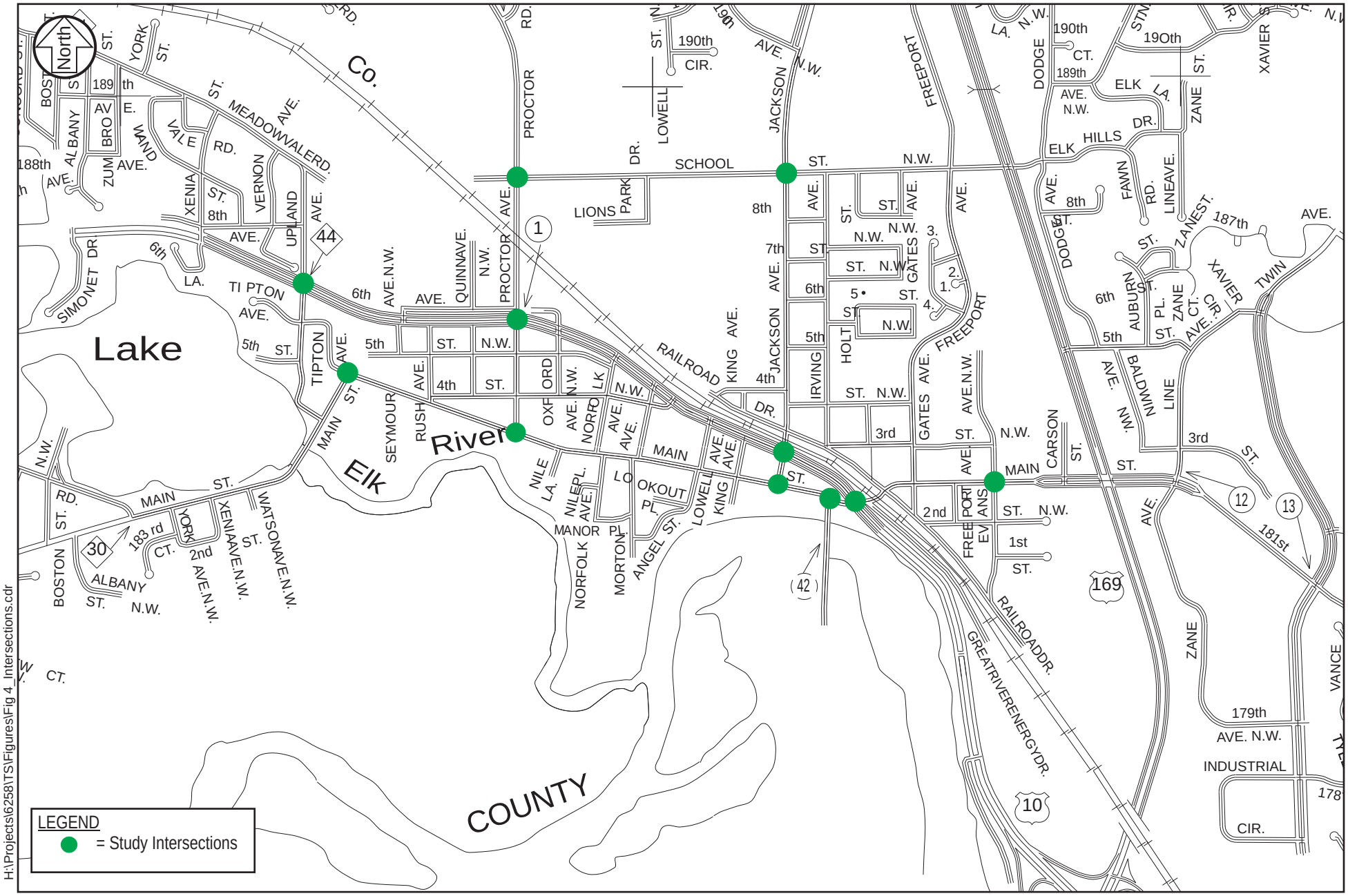
For the analysis of side-street stop controlled intersections, the operations can be described in two ways. First, the overall intersection level of service is documented, which provides the average delay per vehicle for all approaches. However, at an intersection with side-street stop control, the mainline does not stop. Therefore, the majority of delay is experienced by vehicles

on the side street. In addition to providing an average delay for all approaches, it is important to indicate the level of service on the side-street approach. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during the peak periods.

Table 3
Level of Service Criteria for Signalized and Unsignalized Intersections

Level of Service	Average Delay per Vehicle [seconds]	
	Signalized Intersections	Unsignalized Intersections
A	< 10	< 10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	> 80	> 50

(1) Stop-controlled intersection LOS criteria are the same for side-street and all-way stop controlled intersections



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Study Intersections

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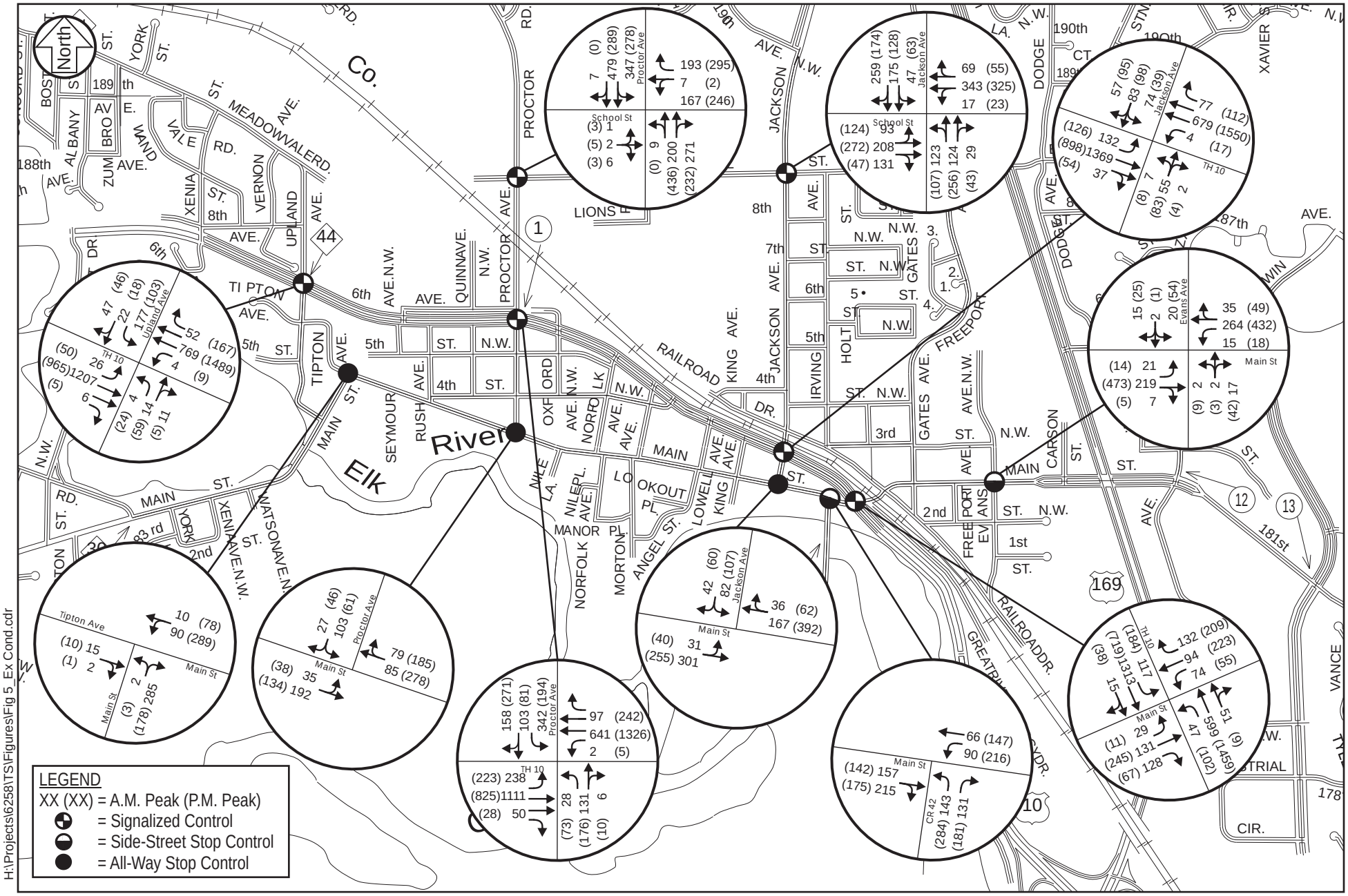
City of Elk River

Figure 4



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Existing Conditions

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City of Elk River

Figure 5

Results of the existing analysis are shown in Table 4. The existing a.m. peak hour analysis shows that all key intersections operate at an acceptable overall LOS D or better. The existing p.m. peak hour analysis shows that three key intersections operate at an unacceptable LOS E or F. These include Main Street/Evans Avenue NW, Main Street/CR 42, and US 10/Proctor Avenue. The intersections of Main Street/Evans Avenue NW and Main Street/CR 42 operate poorly due to queuing effects on Main Street at adjacent intersections. The intersection of US 10/Proctor Avenue operates poorly due to high queuing at the southbound approach. All other results from the p.m. peak hour analysis can be seen in Table 4.

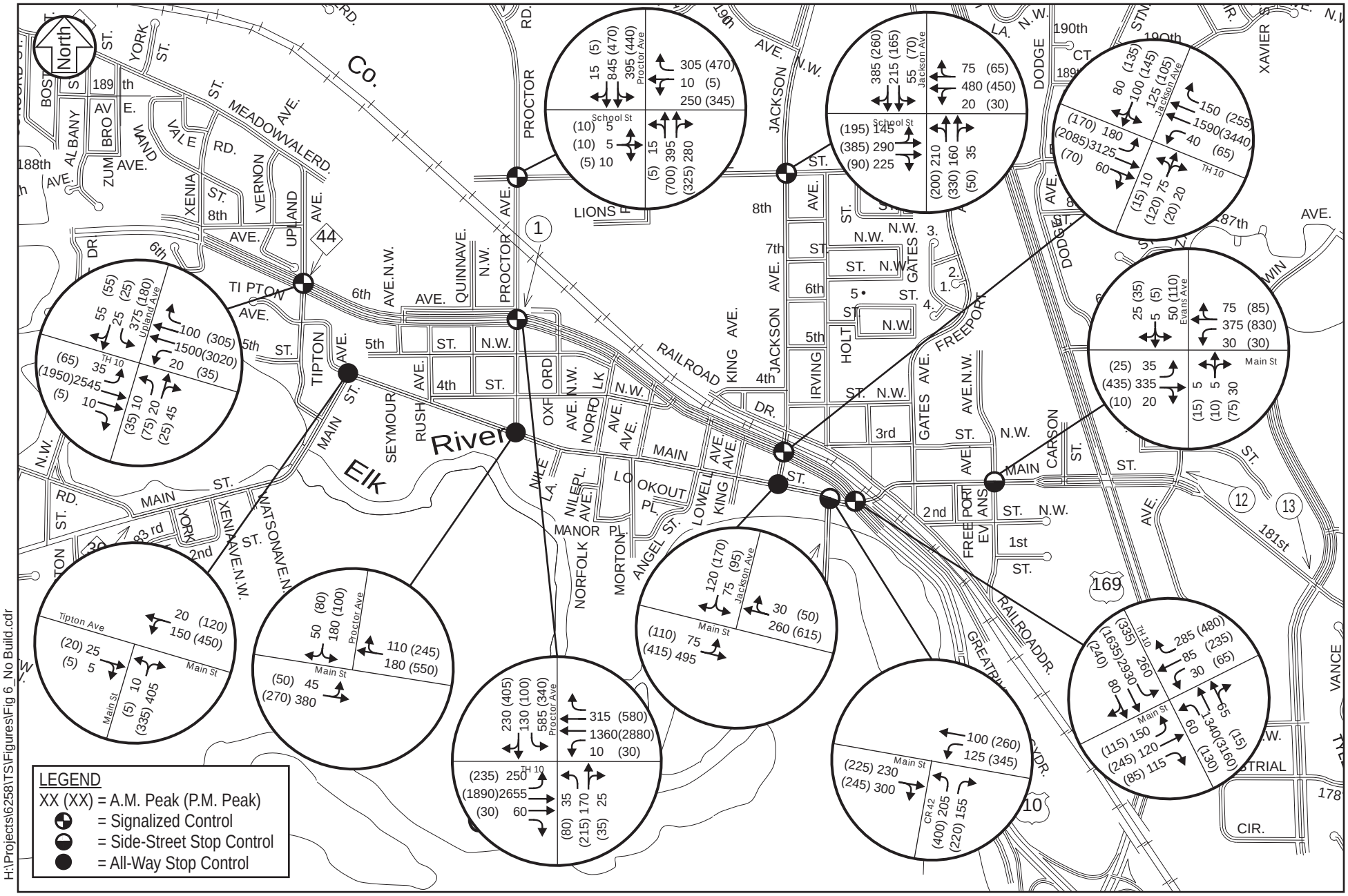
Table 4
Existing Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		A.M. Peak Hour	P.M. Peak Hour
US 10/Main Street	Signalized	C	D
Main Street/Gates Avenue	All Way Stop	B	**E**
Main Street/Evans Avenue NW	Side Street Stop	A/B	B/**F**
Main Street/Wright County 42	Side Street Stop	A/B	**F**/**F**
Main Street/Jackson Avenue	All Way Stop	B	C
US 10/Jackson Avenue	Signalized	B	C
School Street NW/Jackson Avenue	Signalized	B	B
Main Street/Proctor Avenue	All Way Stop	A	C
US 10/Proctor Avenue	Signalized	D	**E**
School Street/Proctor Avenue	Signalized	B	B
US 10/Upland Avenue	Signalized	B	B
Main Street/Tipton Avenue	All Way Stop	A	A

YEAR 2030 NO-BUILD ANALYSIS

A 2030 No-Build operations analysis was performed in order to determine what the impact that 2030 travel demand will have upon the existing US 10 corridor. In order to develop 2030 Average Daily Traffic volumes, a travel demand modeling process was developed using assumptions derived from the 2006 Sherburne County Transportation Plan forecasting process. Appendix A provides a detailed summary of the Travel Demand Modeling process.

Once 2030 No-Build Average Daily Traffic Volumes were developed from the Travel Demand Model, turning movements at each intersection could be produced using existing peak hour percentages and existing turning movement splits as an initial guide. Volumes between adjacent intersections were then balanced. 2030 No-Build turning movement volumes can be seen in Figure 6.



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Preliminary Year 2030 No Build Conditions

TH 10 Elk River - Preliminary Design and Environmental Documentation

City of Elk River

Figure 6

The results of the No-Build operations analysis are shown in Table 5. The results reveal that most intersections along the US 10 corridor report high delays at unacceptable levels in both the a.m. and p.m. peak hour periods. This is primarily due to the expected growth in traffic volumes along the US 10 corridor without additional lane capacity.

Table 5
Year 2030 No-Build Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		A.M. Peak Hour	P.M. Peak Hour
US 10/Main Street	Signalized	D	**F**
Main Street/Gates Avenue	All Way Stop	C	**F**
Main Street/Evans Avenue NW	Side Street Stop	A/C	**F/F**
Main Street/Wright County 42	Side Street Stop	**F/F**	**F/F**
Main Street/Jackson Avenue	All Way Stop	C	**F**
US 10/Jackson Avenue	Signalized	D	**F**
School Street NW/Jackson Avenue	Signalized	**F**	**F**
Main Street/Proctor Avenue	All Way Stop	C	**F**
US 10/Proctor Avenue	Signalized	**F**	**F**
School Street/Proctor Avenue	Signalized	**F**	**F**
US 10/Upland Avenue	Signalized	**F**	**F**
Main Street/Tipton Avenue	All Way Stop	B	**F**

YEAR 2030 INTERIM EXPRESSWAY ANALYSIS

An operations analysis was performed on a 6-lane Interim Expressway concept in order to determine what the impact that a 2030 travel demand will have upon the US 10 corridor. The Interim Expressway concept was produced as a means to mitigate future travel demand. Figure 7 shows the layout of the Interim Expressway concept. In order to develop 2030 Average Daily Traffic volumes, a travel demand modeling process was developed using assumptions derived from the 2006 Sherburne County Transportation Plan forecasting process. Appendix A provides a detailed summary of the Travel Demand Modeling process.

Once 2030 Interim Expressway Average Daily Traffic Volumes were developed from the Travel Demand Model, turning movements at each intersection could be produced using existing peak hour percentages and existing turning movement splits as an initial guide. Volumes between adjacent intersections were then balanced. 2030 Interim Expressway turning movement volumes can be seen in Figure 8.

The results of the 2030 Interim Expressway operations analysis are shown in Table 5. The results reveal that the intersection of TH 10/Proctor Avenue operates as a LOS E in the A.M. peak period and several intersections operate at a LOS E or worse in the P.M. peak period.

Table 5
Year 2030 Expressway A.M. and P.M. Peak Hour Capacity Analysis
Preliminary Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		A.M.	P.M.
TH 10/Main Street	Signalized	C	**F**
Main Street/Gates Avenue	Signalized	B	**F**
Main Street/Evans Avenue NW	Signalized	A	**F**
Main Street/Wright County 42	Roundabout*	Under Capacity	Under Capacity
Main Street/Jackson Avenue	All Way Stop	A	**E**
TH 10/Lowell Avenue NW	Signalized	C	B
School Street NW/Jackson Avenue	Signalized	B	D
Main Street/Proctor Avenue	All Way Stop	A	B
TH 10/Proctor Avenue	Signalized	**E**	**F**
School Street/Proctor Avenue	Signalized	B	**E**
TH 10/Upland Avenue	Signalized	C	**E**
Main Street/Tipton Avenue	All Way Stop	A	A

*Currently, there is no approved level of service criteria for roundabouts, therefore, roundabout operations are reported as either under, near, or over capacity. Under capacity indicates an intersection below the 85th percentile of the roundabout volume over capacity ratio. Near capacity is between the 85th percentile and capacity threshold. And over capacity indicates a roundabout where intersection volume exceeds capacity.

Small improvements were made to the Interim Expressway concept in attempt to improve intersection operations to a LOS D or better in both the A.M. and P.M. peak period. These improvements included longer turn bays and new turn bays; however, high delays still occurred on the TH 10 corridor. In order to improve the Interim Expressway concept so that all intersections operate at a LOS D or better, an additional expressway through lane or a conversion to a freeway section is needed.

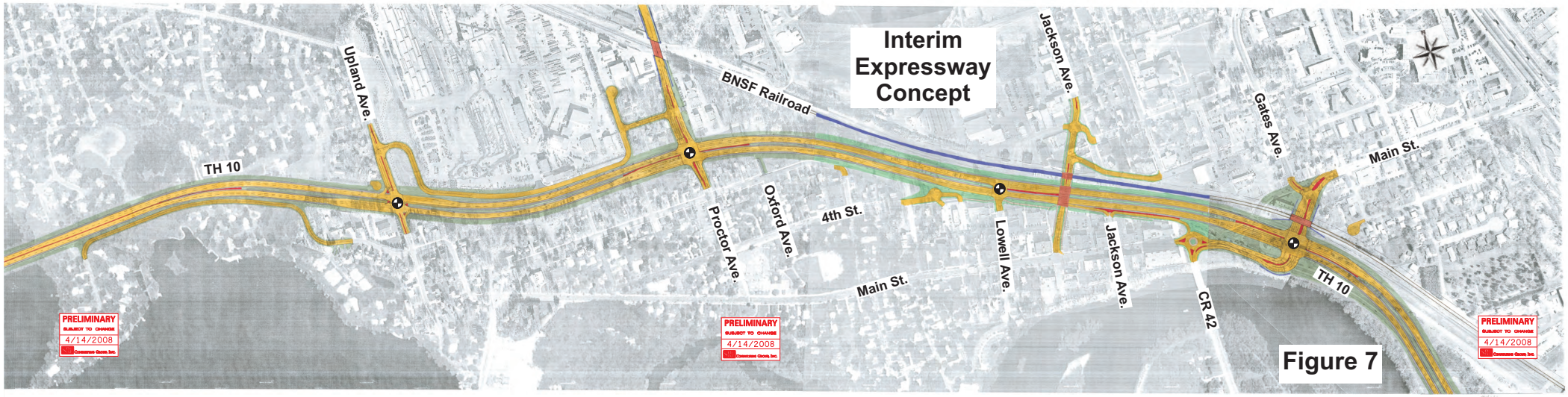
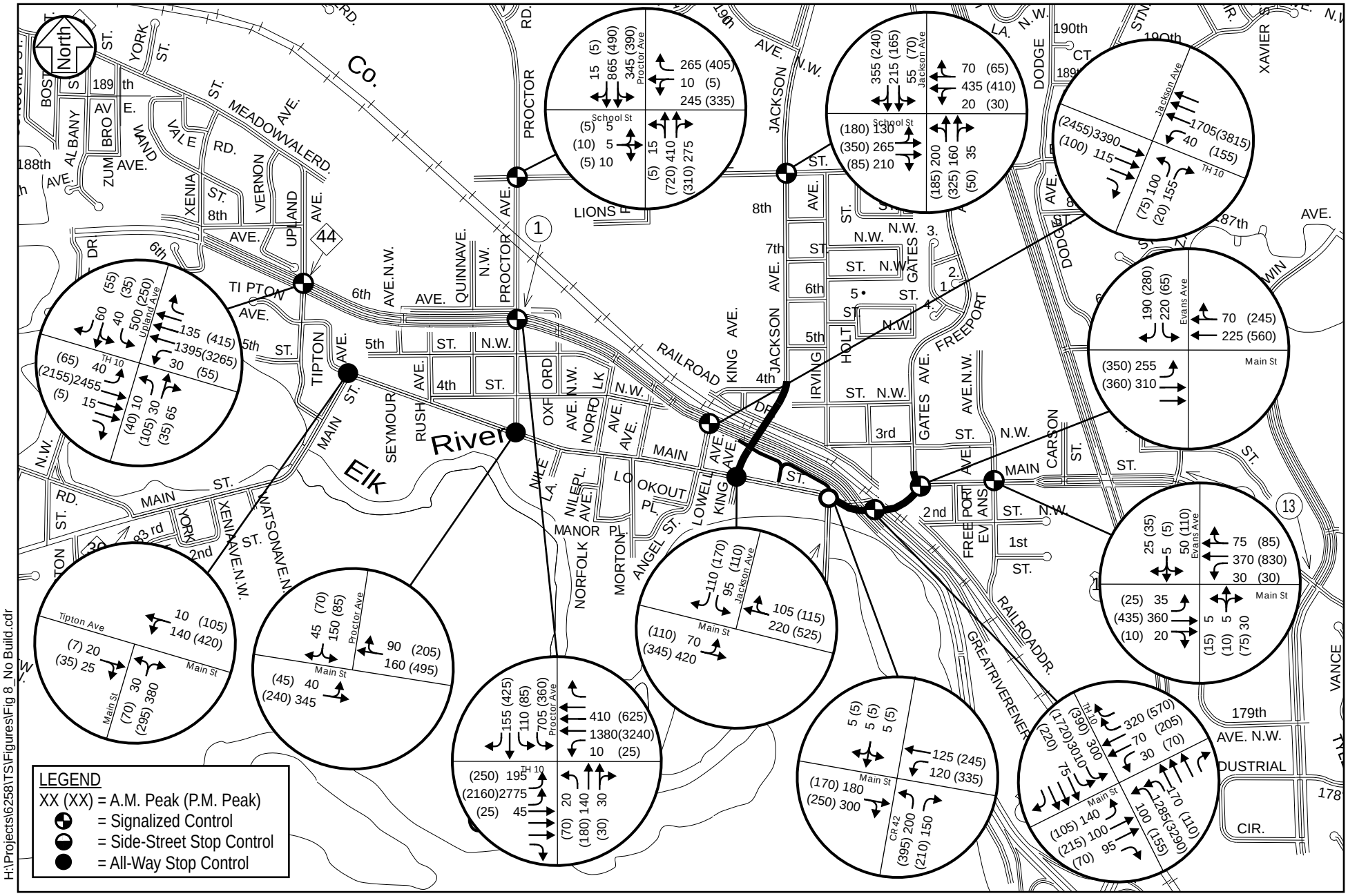

Interim Expressway Concept
Upland Ave.
TH 10
BNSF Railroad
Proctor Ave.
Oxford Ave.
4th St.
Main St.
Lowell Ave.
Jackson Ave.
Jackson Ave.
CR 42
Gates Ave.
Main St.
TH 10
PRELIMINARY
SUBJECT TO CHANGE
4/14/2008
PRELIMINARY
SUBJECT TO CHANGE
4/14/2008
PRELIMINARY
SUBJECT TO CHANGE
4/14/2008

Figure 7



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Year 2030 Build Conditions: Interim Expressway Alternative

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Figure 8

YEAR 2030 LONG-TERM FREEWAY ANALYSIS

An operations analysis was performed on a 4-lane Long-Term Freeway concept in order to determine what the impact that a 2030 travel demand will have upon the US 10 corridor. The Long-Term Freeway concept was produced as a means to mitigate future travel demand. Figure 9 shows the layout of the Long-Term Freeway concept. In order to develop 2030 Average Daily Traffic volumes, a travel demand modeling process was developed using assumptions derived from the 2006 Sherburne County Transportation Plan forecasting process. Appendix A provides a detailed summary of the Travel Demand Modeling process.

Once 2030 Long-Term Freeway Average Daily Traffic Volumes were developed from the Travel Demand Model, turning movements at each intersection could be produced using existing peak hour percentages and existing turning movement splits as an initial guide. Volumes between adjacent intersections were then balanced. 2030 Interim Expressway turning movement volumes can be seen in Figure 10.

The results of the 2030 Freeway operations analysis are shown in Table 6. The results reveal that all intersections in the A.M. and P.M. peak period operate at a LOS D or better.

Table 6
Year 2030 Freeway Build A.M. and P.M. Peak Hour Capacity Analysis
Preliminary Level of Service Results

Intersection	Intersection Control	Level of Service Results	
		A.M.	P.M.
Main Street/TH 10 Frontage Road	Signalized	C	D
Proctor Avenue/North Frontage Road	Signalized	C	C
Proctor Avenue/South Frontage Road	Signalized	D	C
Upland Avenue/North Frontage Road	Signalized	C	B
Upland Avenue/South Frontage Road	Signalized	C	C
Main Street/County Road 42	Roundabout	Under Capacity	Under Capacity
Main Street/Jackson Avenue	All Way Stop	B	B
Main Street/Proctor Avenue	All Way Stop	A	B
Main Street/Tipton Avenue	All Way Stop	A	B
Main Street/Gates Avenue	Signalized	B	C
Main Street/Evans Avenue	Signalized	A	B
School Street/Jackson Avenue	Signalized	B	B
School Street/Proctor Avenue	Signalized	B	C

*Currently, there is no approved level of service criteria for roundabouts, therefore, roundabout operations are reported as either under, near, or over capacity. Under capacity indicates an intersection below the 85th percentile of the roundabout volume over capacity ratio. Near capacity is between the 85th percentile and capacity threshold. And over capacity indicates a roundabout where intersection volume exceeds capacity.

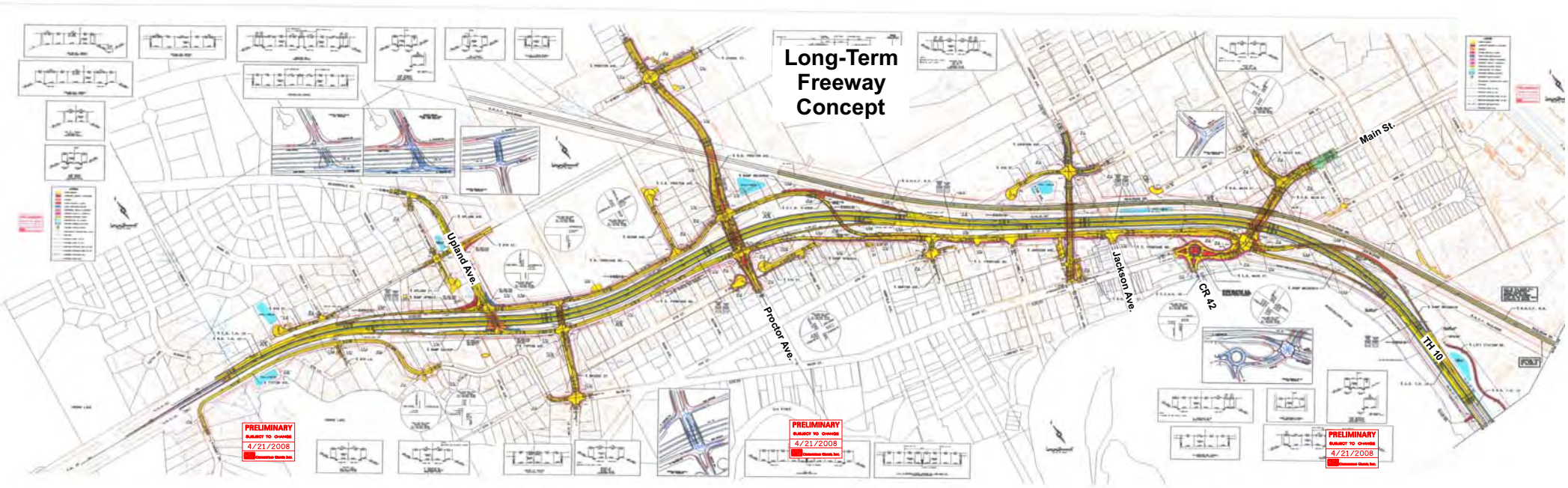
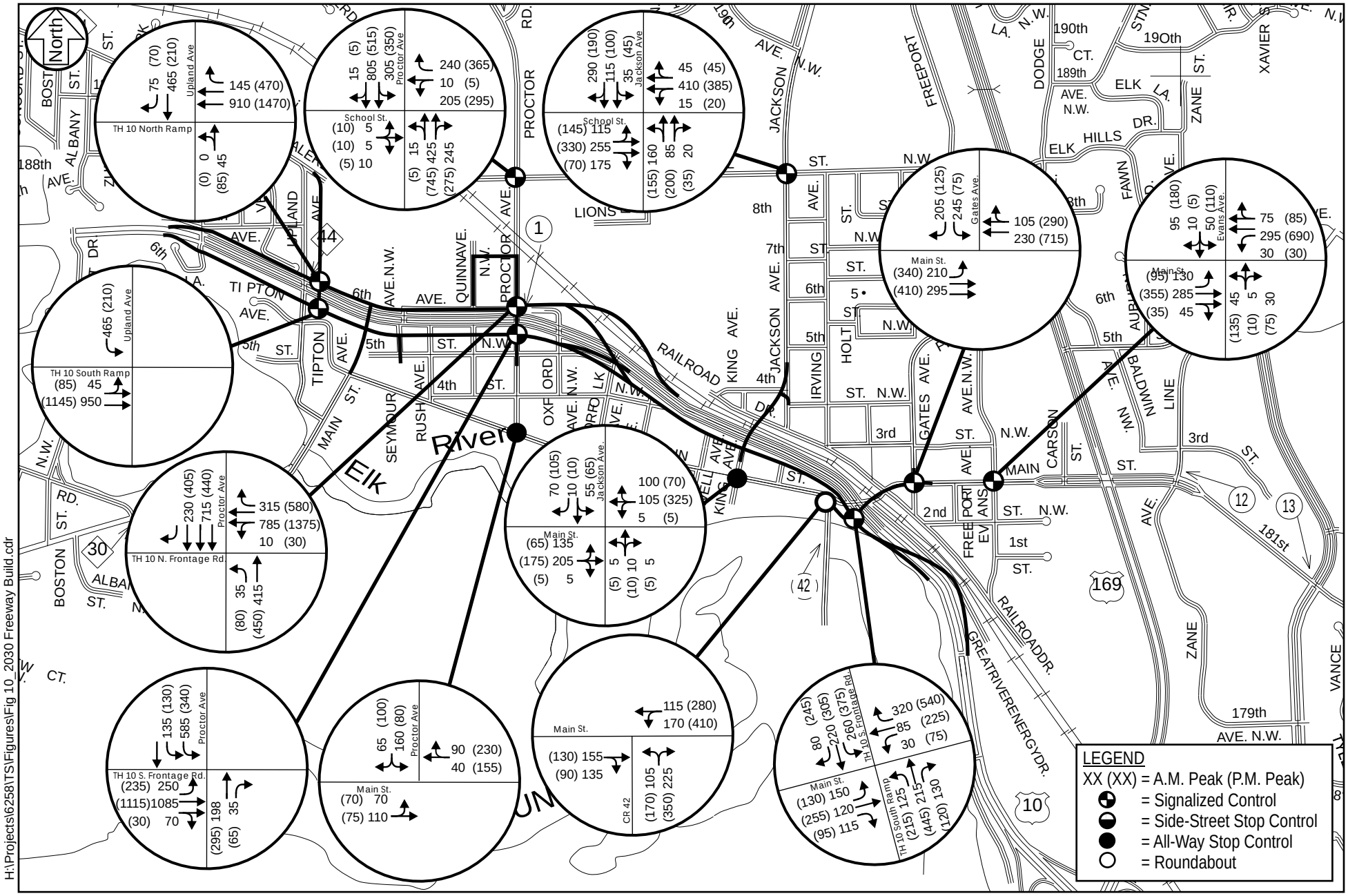

Long-Term
Freeway
Concept
Upland Ave.
Proctor Ave.
Jackson Ave.
CR 42
Main St.
TH 10
PRELIMINARY
SUBJECT TO CHANGE
4/21/2008

Figure 9



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Year 2030 Build Conditions: Long-Term Freeway Alternative

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City of Elk River

Figure 10

CONCLUSIONS AND RECOMMENDATIONS

The land use along the TH 10 corridor around Elk River plans to have significant socio-economic growth through year 2030. Because of this growth, the travel demand along TH 10 will also significantly increase. Traffic operations analysis shows that the existing TH 10 corridor will not be able to accommodate the anticipated year 2030 traffic volumes. The conversion of TH 10 to a four-lane freeway section from TH 10 in Elk River, along with the proposed interchanges at Main Street and Upland/Proctor Avenues will enable the TH 10 corridor to accommodate the year 2030 traffic volumes.

APPENDIX A:

TH 169 TRAVEL DEMAND MODELING DOCUMENTATION

SRF CONSULTING GROUP, INC.
ENGINEERS | PLANNERS | DESIGNERS

MINNEAPOLIS
FARGO
MADISON

SRF No. 0076258

MEMORANDUM

TO: John Hagen, PE, Senior Associate

FROM: Paul Morris, Engineer

DATE: November 25, 2008

SUBJECT: ELK RIVER HIGHWAY 10
PRELIMINARY DESIGN AND ENVIRONMENTAL DOCUMENTATION
FORECAST TECHNICAL MEMORANDUM

The purpose of this memorandum is to document the travel demand forecasts for the TH 10 Preliminary Design and Environmental Documentation in the City of Elk River (TH 10 Project). This memorandum includes documentation of the forecast modeling process and methodology, transportation network improvements, socio-economic data assumptions, and year 2030 forecast results.

The study area for this forecasting effort is primarily in the City of Elk River. TH 10 passes through the southern portion of Elk River, just north of the Mississippi River. Traffic volumes were forecasted for TH 10 through Elk River, as well as for the major roadways intersecting TH 10.

MODEL MODIFICATIONS

The assumptions used in this study are derived from the 2006 *Sherburne County Transportation Plan* forecasting process. Travel forecasts for TH 10 in Elk River were prepared using a modified version of the Collar County travel demand model developed by the Minnesota Department of Transportation and the Metropolitan Council. This model is a computerized procedure for predicting travel demand changes in response to development and transportation facility changes. It was completed in 2006 using data from an extensive regional Travel Behavior Inventory (TBI) conducted by the Metropolitan Council and Mn/DOT in 2001.

TAZ Structure

The Collar County model divides the 19-county Twin Cities Collar County region into 1,664 geographic transportation analysis zones (TAZ). The main exogenous data in these TAZs are population, households, retail employment, and non-retail employment. The zones serve as the beginning and end locations of travel in the region. For the *Sherburne County Transportation Plan*, the Collar County model was modified to include a greater level of detail in the County. This TAZ refinement process converted 37 zones in Sherburne County to 156 zones. This study used the same TAZ structure as the *Sherburne County Transportation Plan*.

Highway Network

All of the freeways, expressways, and major arterial roadways in the Twin Cities area are compiled into a computer representation of the region's highway system. In addition, most minor arterials and other collector roads and local streets are included. The attributes of the roadways are described in terms of area type, facility type, distance, free-flow speed, number of lanes, and capacity. The roadway network was modified to include more detail in the study area. This detailed modification was necessary to accommodate the refinement of subdivided TAZs and include lower volume roadways in the model to better estimate travel patterns.

The transportation network assumptions used in the TH 10 travel demand forecasts are shown in Table 1. The 2030 base assumptions are consistent with the regional and local network improvements identified in currently adopted plans. Specifically, the *Mn/DOT Metro District Transportation Systems Plan 2008-2030* (2005) and the Mn/DOT District 3 *Long-Range Transportation Plan 2008-2030* (2005) were referenced. This study also assumes the reconstruction of TH 169 to a freeway facility from Elk River to Princeton.

Table 1
Future Roadway Network Improvement Assumptions

Roadway Facility	*Existing*	*Year 2030 Base*
TH 10		
Big Lake Bypass	N/A	New 4-Lane Freeway
I-94 / TH 10 Regional River Crossing	N/A	4-Lane Freeway
Clear Lake to Saint Cloud	4-Lane Expressway	4-Lane Freeway
TH 101		
I-94 to TH 10	4-Lane Expressway	4-Lane Freeway
TH 169		
TH 10 to Princeton	4-Lane Expressway	4-Lane Freeway
Local Improvements		
Connection of Sherburne CSAH 33 and Anoka CSAH 22		
Connection of CSAH 12 with TH 101		
Fillmore St NW extension south to TH 10 (East of Elk River)		
Realignment of CSAH 33 / CSAH 77 intersection		

Two TH 10 build scenarios were developed for this forecasting effort, a six-lane expressway through Elk River, and a four-lane freeway through Elk River. Under the six-lane expressway scenario, TH 10 would be expanded from four-lanes to six-lanes between Upland Avenue and Main Street. No other changes to the existing alignment or access locations of TH 10 are assumed.

Under the four-lane freeway scenario, TH 10 would be converted to a freeway through Elk River. Half interchanges would be provided to the east at Main Street and Proctor Avenue, and to the west at Upland Avenue. Connections to these interchanges would be provided by frontage roads along TH 10 between Main Street and Upland Avenue.

Socio-Economic Data Inputs

Socio-economic inputs for the Twin Cities travel demand models are currently developed outside the travel demand forecasting process. The population and employment assumptions used in these forecasts are consistent with those used in the *Sherburne County Transportation Plan*. City staff at every incorporated community in Sherburne County was contacted and their best assessments of growth patterns within their communities were requested and used wherever available. The City of Elk River provided their most recent transportation plan. County staff was consulted regarding growth patterns in townships.

The population and employment totals for the study area communities are given in Table 2. Socio-economic data used in the Collar County model for all communities in the 7-county metro area is consistent with the Metropolitan Council *Regional Development Framework* as revised March 5, 2005.

Table 2
Population and Employment Totals by Community

Community	2000		2030	
	Population	Employment	Population	Employment
City of Elk River	16,144	6,175	43,069	17,881
Big Lake (city + twp)	12,306	2,310	29,682	6,302
Becker (city + twp)	5,406	1,023	21,507	7,496
Clear Lake (city + twp)	1,359	232	5,111	1,293

Source: *Sherburne County Transportation Plan* (June 2007)

YEAR 2030 NO BUILD FORECASTS

As shown in Figure A-1, year 2030 daily forecast volumes for the no build scenario indicate high levels of traffic volume increases. The daily traffic volume forecasted on TH 10 varies from 54,000 vpd to 71,000 vpd though the City of Elk River. This represents an approximately 100 percent increase over the 2005 volumes, which range from 23,200 vpd to 34,000 vpd. Since no improvements are assumed under the no build scenario by year 2030, significant levels of congestions are expected, and peak period congestion would take place during a greater number of hours each day.

Arterial roadways in the study area are also expected to experience high levels of traffic growth. Proctor Avenue just north of TH 10, is expected to increase to 19,000 vpd by 2030. Traffic volumes on other roadways intersecting TH 10 are also expected to increase with 12,500 vpd on Main Street east of TH 10 and 12,300 west of TH 10, and 8,600 vpd on Jackson Avenue north of TH 10 by year 2030. Main Street/Mississippi Road west of TH 10 will experience high traffic volume increases, with forecasts ranging from 7,800 vpd to 14,300 vpd through the study area, due to traffic that is diverted from the congested conditions on TH 10.

YEAR 2030 SIX-LANE EXPRESSWAY FORECASTS

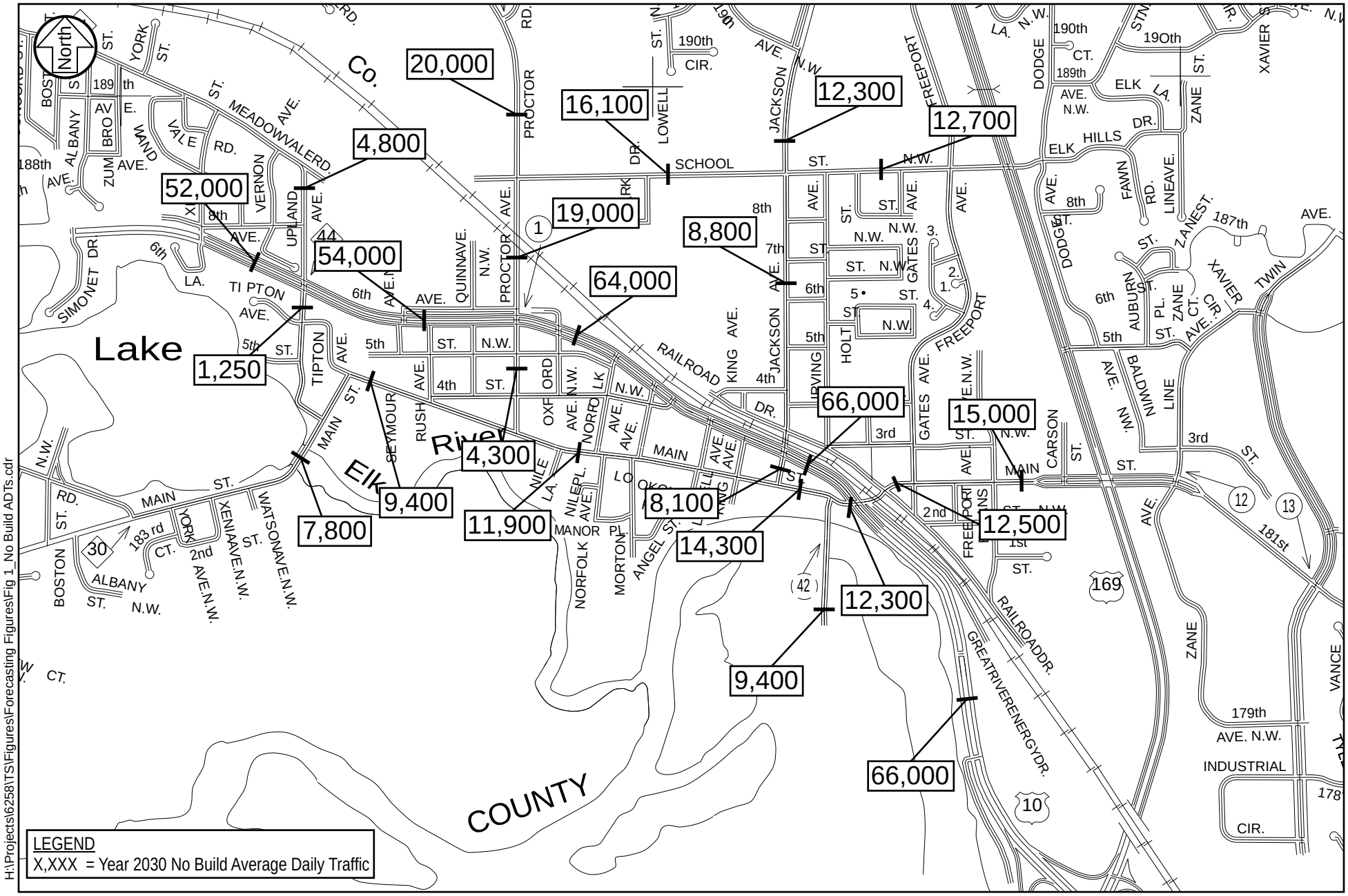
Capacity improvements on TH 10 as a six-lane expressway through the City of Elk River results in modest increases in daily forecast traffic volumes. TH 10 is anticipated to carry 2,000 to 5,000 vpd more than the no build scenario through the city of Elk River. As shown in Figure A-2, the six-lane expressway scenario is not expected to result in significant changes to year 2030 forecast volumes compared to the no build scenario. Daily traffic forecasts for this scenario are shown in Figure A-2.

YEAR 2030 FOUR-LANE FREEWAY FORECASTS

The year 2030 four-lane freeway scenario is expected to result in significantly different daily traffic volumes compared to the no build or six-lane expressway scenarios. In some locations, the forecast volume on TH 10 is expected to decrease as some of the traffic is carried by the frontage roads. Traffic on TH 10 west of Upland Ave is expected to be 60,000 vpd, and east of Main Street is expected to be 78,000. These forecasts represent increases of 8,000 to 12,000 vpd compared to the no-build scenario. Forecast volumes on arterial roadways intersection TH 10 are not expected to be significantly different compared to the no build or six-lane expressway scenarios. Main Street/Mississippi Road west of TH 10 is expected to have much lower volumes compared to the no build or six-lane expressway scenarios due to the reduction of congestion on TH 10. Daily traffic forecasts for this scenario are shown in Figure A-3.

CONCLUSION

Traffic forecasts for year 2030 in the city of Elk River indicate a high level of growth on TH 10 for the no build and both build scenarios. This high level of growth is reasonable based upon the population and employment totals that were assumed in Sherburne County. The total population of municipalities along the TH 10 corridor, see Table 1, are expected to increase from approximately 35,000 to 99,000, more than double from 2005 to 2030. Some of the new trips resulting from this population increase will be local trips, and many of those beginning west of Clear Lake will use the new I-94/TH 10 Regional River crossing to access I-94 when traveling to the Twin Cities. The remaining trips are expected to use TH 10 through Elk River when traveling towards the metro area. Therefore, traffic increases of two times the year 2005 volumes on TH 10 represent reasonable growth expectations.



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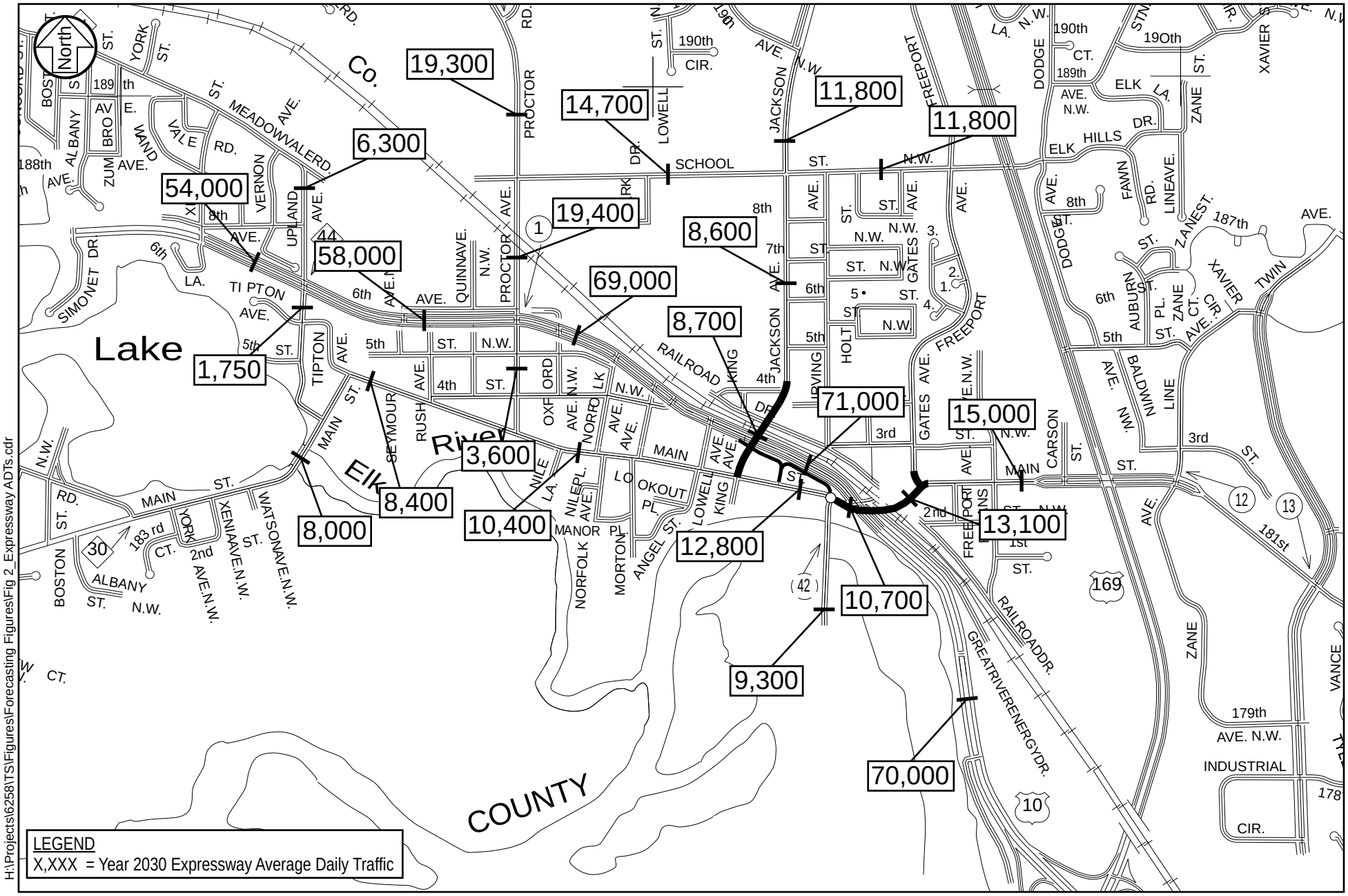
December 2008

Year 2030 Average Daily Traffic - No Build

TH 10 Elk River - Preliminary Design and Environmental Documentation

City of Elk River

Figure A-1



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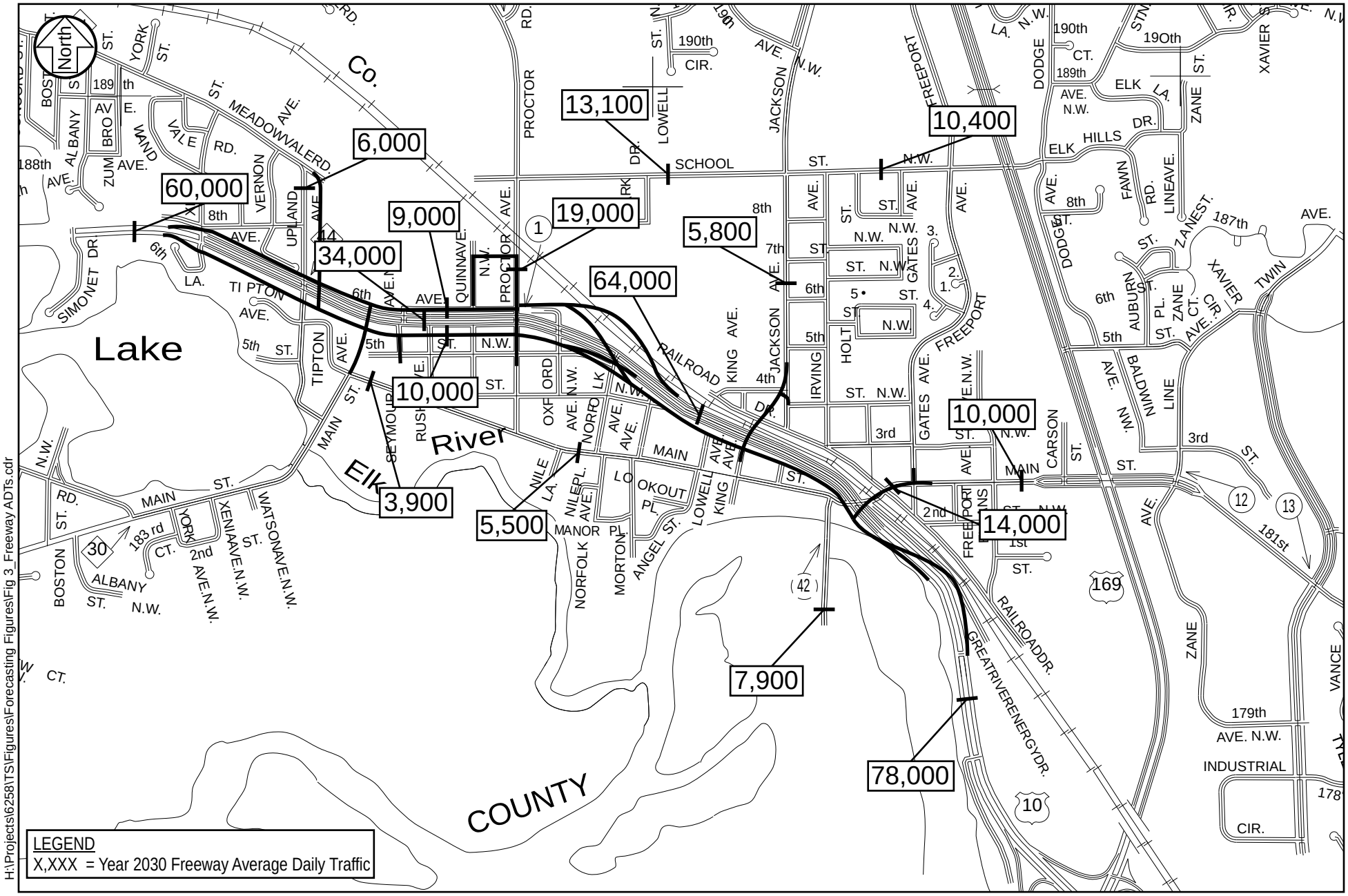
Year 2030 Average Daily Traffic - Expressway

TH 10 Elk River - Preliminary Design and Environmental Documentation

City of Elk River

Figure A-2



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Year 2030 Average Daily Traffic - Freeway

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City of Elk River

Figure A-3