

Appendix F

Technical Memo – 2030 AM Peak Hour Analysis



MEMORANDUM

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Subject: Appendix F: 2030 AM Peak Hour Traffic Analysis

INTRODUCTION

The purpose of this technical memorandum is to provide an analysis of the a.m. peak traffic operation projected 2030 conditions. In general, there is considerably less traffic during the a.m. peak hour than the p.m. peak hour. However, with the a.m. peak, the predominant direction of travel is often opposite of the p.m. peak period, therefore it is appropriate to determine whether mitigation measures beyond those identified in the p.m. peak are necessary.

The analysis contained in this memorandum supplements the analysis within the body of the AUAR Report in which p.m. peak traffic was analyzed for the three development scenarios. In general, the p.m. peak traffic analysis showed that each of the three scenarios would require similar improvements.

Of the three development scenarios, Scenario 3 – Residential Emphasis, was determined to be too aggressive to reasonably mitigate for the p.m. peak period. Therefore, in discussions with Mn/DOT, Metropolitan Council, Anoka County, and the City of Lino Lakes, it was decided to conduct the a.m. analysis for the scenario generating the next highest amount of trips (Scenario 2 – Commercial and Industrial).

ANALYSIS PROCESS

The intent of this analysis is to determine whether the mitigation measures identified in the p.m. peak analysis are effective at addressing any operational deficiencies that may occur during the a.m. peak. Existing and future year conditions and analyzed. The following summarizes the study process and results.

Analysis Tool

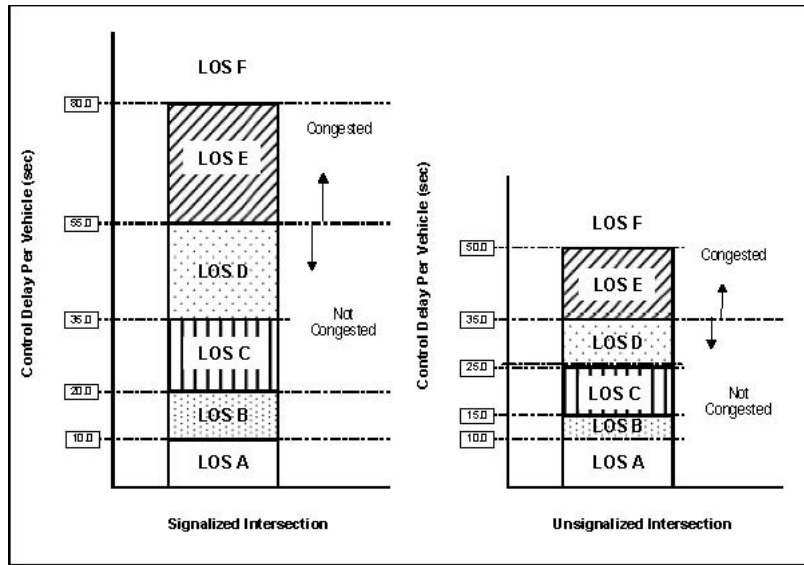
Synchro5 is a traffic operations analysis software package that implements the methodologies of the Highway Capacity Manual (HCM). Data from Synchro5 can be transferred to SimTraffic5, a detailed microscopic model that considers vehicle driver behavior, detailed interaction of vehicles with each other and the roadway between adjacent intersections, random behavior of drivers, and the delay for each individual vehicle throughout the entire peak hour. Synchro5 uses the HCM methodology to analyze intersection operations through one cycle of a traffic signal while SimTraffic5 simulates the operation of the network of traffic signals through multiple cycles over a specified period of time (e.g., 60 minutes).

Intersection Level of Service

The ability of an intersection to process traffic is affected by the number and type of vehicles, desired turning movements, intersection geometrics, and traffic control devices. Intersection level of service (LOS) differs from segment level of service in that the quality of traffic operations is defined as the delay to vehicles caused by the intersection's traffic control rather than the ratio of vehicle volumes to roadway capacity. Intersection LOS typically focuses on operations during the periods of the day with the highest traffic volumes whereas segment LOS is based on traffic volumes over an average 24-hour period. Thus, the intersection LOS analysis gives a "worst-case" result for each intersection and more clearly identifies operational problems at the intersections.

The intersection operational analysis process includes determining the LOS for the key intersections under the existing peak hour traffic conditions. LOS D/E is generally considered an acceptable operating condition during peak hours in urban areas. Figure 1 presents the intersection LOS thresholds, in terms of seconds of vehicle delay, as defined in the HCM.

Figure 1. Intersection Level of Service Thresholds



SOURCE: Highway Capacity Manual, 2000.

Appendix F: 2030 AM Peak Hour Traffic Analysis - 2

2030 Scenario 2 AM Peak Hour Traffic Assignment and Operation

The trips generated from 2030 Scenario 2 Land Use were assigned to the transportation system based on the distribution derived from the Anoka County Version of the Met Council Travel Demand Model. The transportation scenario assumes the same base network as that used in the p.m. peak hour analysis. Major projects, which are not programmed or funded, but are included within the base 2030 network include:

- . Northerly Connector and new Interchanges at I-35W and I-35E
- . Reconstruction of CSAH 14/I-35E interchange
- . Expansion of CSAH 21
- . Extension of Otter Lake Road, and
- . Expansion of I-35E to 6 lanes as far north as CSAH 14.
- . Network of Frontage/Local Roadway Network

Figure 2 displays the a.m. peak traffic assignments to the area roadway network. Figure 3 displays the resulting Level of Service (LOS) for a.m. peak hour *without* mitigation measures. Figure 4 displays the resulting LOS for the a.m. peak hour *with* the mitigation measures identified for the p.m. peak hour of operation.

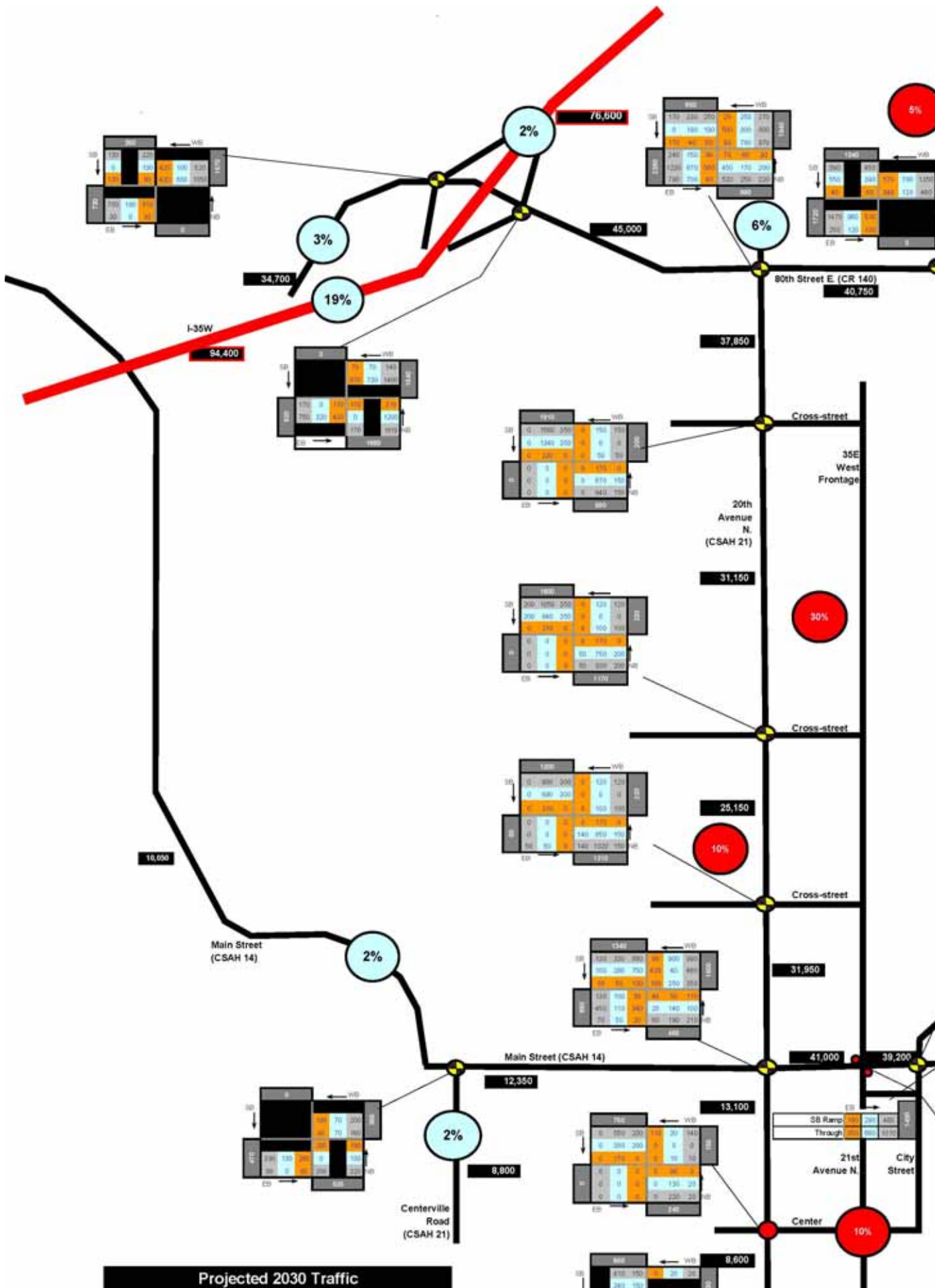
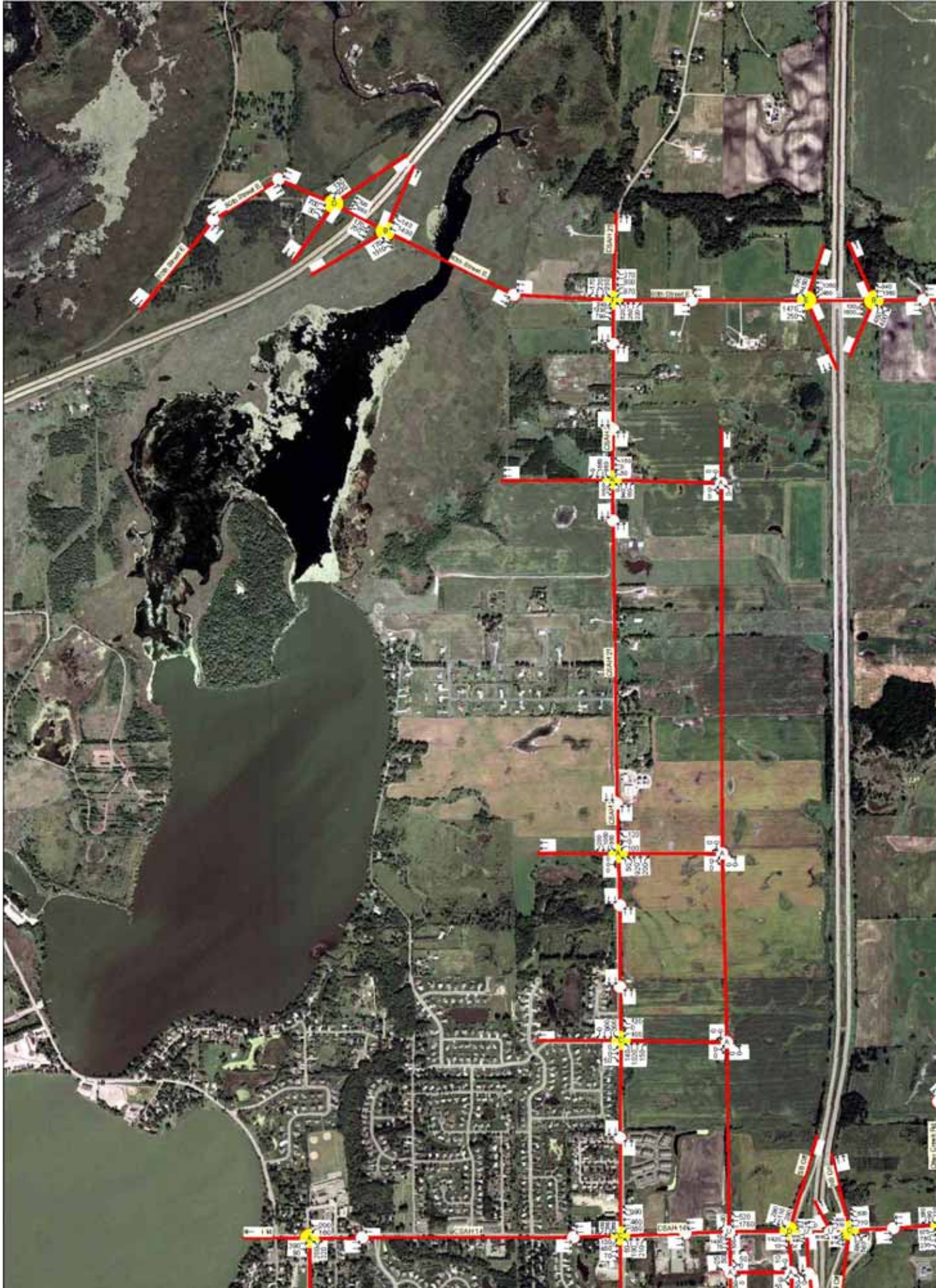
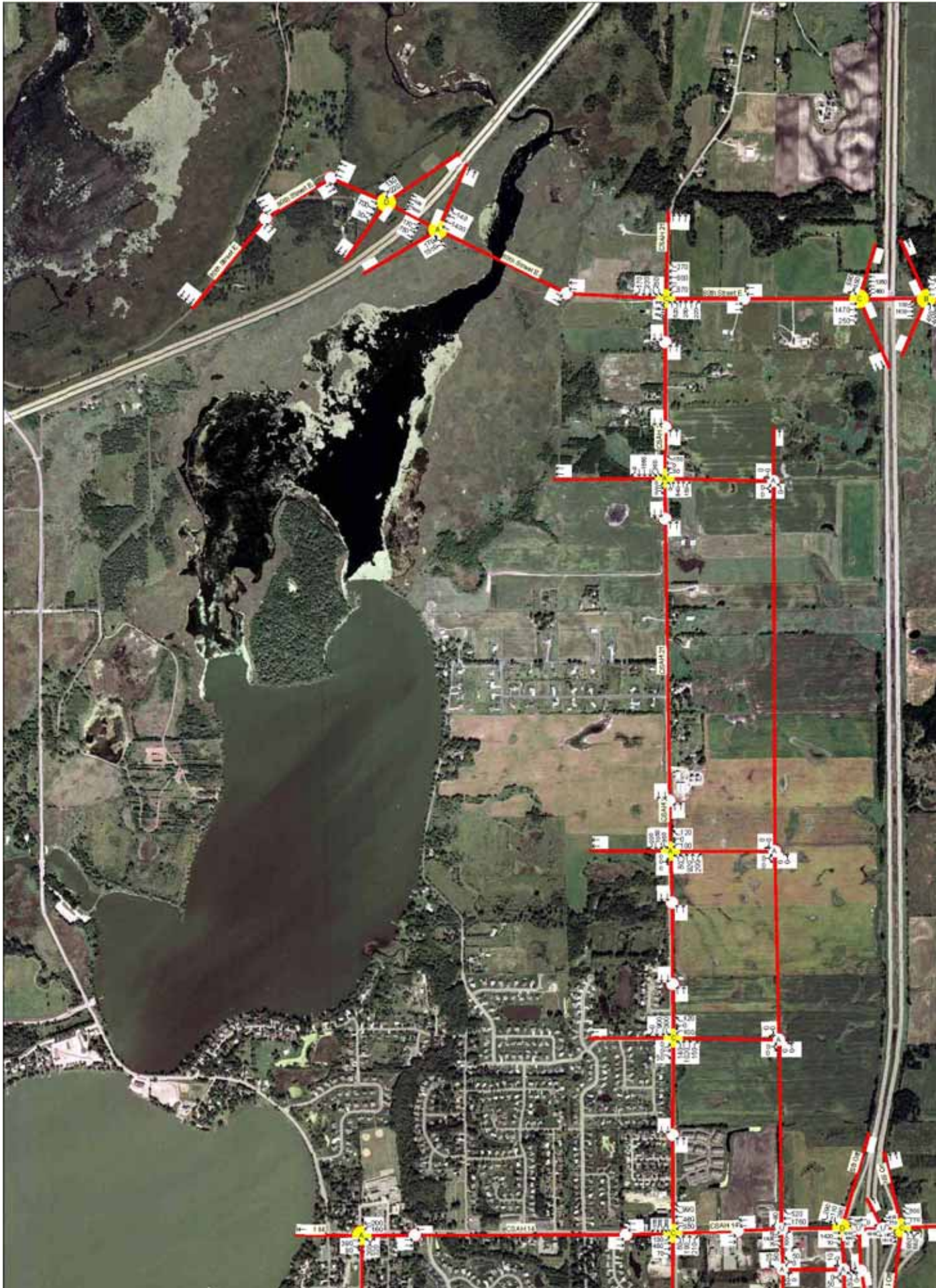




Figure 2. 2030 Scenario 2 - AM Peak Hour Traffic Assignment

SOURCE: URS Corporation





Traffic Operations Summary

Using the base 2030 transportation network, several intersections are projected to perform at LOS E or worse during the a.m. peak. The a.m. peak results are very similar to the p.m. analysis. However, with the mitigation measures identified for the p.m. analysis, all intersections are projected to operate at acceptable levels during the a.m. peak. Table 3 summarizes the level of service for the analyzed intersections for the base 2030 network year and for 2030 network with the mitigation measures identified for the p.m. analysis.

Table 3. 2030 AM Peak Hour Level of Service for the Base Network and the Mitigated Network.

Intersection	Base Network	
CR 140 (80th Street East)		
80th Street at I-35W (west ramps)	D	D
80th Street at I-35W (east ramps)	B	A
80th Street at CSAH 21	F	C
80th Street at I-35E (west ramps)	E	C
80th Street at I-35E (east ramps)	B	B
80th Street at Elmcrest Avenue	E	C
CSAH 14 (Main Street)		
CSAH 14 at CSAH 21 (Centerville Rd.)	A	A
CSAH 14 at CSAH 21	C	C
CSAH 14 at 21st Ave. N.	B	B
CSAH 14 at I-35E (west ramps)	D	D
CSAH 14 at I-35E (east ramps)	C	C
CSAH 14 at Otter Lake Road	D	D
CSAH 21 (20th Avenue North)		
CSAH 21 at North Crossroad	A	A
CSAH 21 at Middle Crossroad	A	A
CSAH 21 at South Crossroad	C	C
CR 54 South of CSAH 14		
CR 54 at Center Street	B	B
CR 54 at Ceder Street	B	B
CR 54 at South Crossroad	A	A
CR 54 at Birch Street	A	A

Conclusion

The purpose of this technical memorandum is to provide information on the projected a.m. peak traffic operations for 2030 conditions. This analysis, similar to the p.m. peak analysis, showed that without additional improvements, there would be deficiencies in the transportation system. With the inclusion of the same mitigation measures identified for the p.m. peak analysis, the transportation system was shown to perform at acceptable levels. In summary, the analysis shows that the mitigation measures identified in the p.m. peak hour analysis are effective at addressing the projected operational deficiencies during both the a.m. and p.m. peak.