ST. CLOUD METROPOLITAN TRANSIT COMMISSION

Transit Priority Operation Analysis

St. Cloud MTC
Transit Priority Deployment
St. Cloud, Minnesota

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Prepared for:

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Technical Appendix (bound separately)

I. Introduction

The St. Cloud Metropolitan Transit Commission (MTC) is exploring an area-wide deployment of transit priority. This report summarizes the results of an engineering study conducted for the proposed deployment.

A. Transit Priority Service

A transit priority system consists of special bus detection devices, traffic signal control equipment and traffic operations strategies. These components are used to vary the typical operation of traffic signals to provide advantages to buses. Transit priority has the potential to significantly decrease delay for the small number of buses while only causing small increases in average delay for the many autos at signalized intersections. Furthermore, the operator of the signal system has the ability to adjust the transit priority settings to control the impacts on traffic operations.

As transit priority service reduces the delay and queuing time of buses at traffic signals it helps buses maintain schedules and keep a more consistent travel time through the system. The more consistent travel time improves bus schedule adherence and makes transit a more attractive mode of transportation. In addition, as general traffic volumes and congestion grow and delay increases in the St. Cloud region, the application of transit priority will help maintain the current transit level of service.

B. St. Cloud Transit Priority Pilot Test Project

In 2000, the MTC, Mn/DOT, City of St. Cloud and Stearns County cooperatively conducted a successful Pilot Test of transit priority service. This pilot test was installed over a limited portion of the Southwest/Crosstown bus route and an extensive data collection and evaluation effort was completed to determine the impacts of transit priority on the operational efficiency of both transit and automobile traffic flows.

One of the conclusions of the pilot test was that transit priority was effective in reducing the delay and queue times for buses at traffic signals. The overall average percent reduction in traffic signal delay was 43% in traffic signal delay. The average reduction in time per signal was 11.8 seconds. The reduction in signal delay time resulted in increases in driving time and service time for buses. The increase in driving time allowed bus drivers to maintain schedules without trying to “catch up.” The need to “catch up” would cause drivers to increase speed and reduce passenger loading time. As a result, passenger comfort was greater when the priority system was implemented.

The pilot test results documented fairly negligible overall increases in auto delay caused by transit priority. All increases in overall average automobile delay at an intersection were less than one second. The pilot test determined that in the worst-case scenario, delay for a particular vehicle could increase from a value of 50 seconds to a value of 200 seconds.

The deployment engineering study summarized in this report uses what was learned during the pilot test to plan for deployment of transit priority at signalized intersections served by St. Cloud MTC.

II. Bus Route Analysis

To determine the feasibility and practicality of deploying transit priority in St. Cloud, it is important to determine the expected benefits and changes to bus travel that would be caused by transit priority deployment. The decision makers need data about expected changes in bus and auto traffic flow efficiency to make informed decisions. The scope of this project was to perform a reasonable and appropriate level of analysis that would provide this important data. A more detailed analysis that would involve extensive data collection and possible traffic simulation was outside the scope of this project. The planning level analysis of this project was subject to many well-judged assumptions that were calibrated against the data gathered and the analysis conducted on the St. Cloud Transit Priority Pilot Test project. In all cases, a reasonableness test was applied to the results. Project participants were given the opportunity to review and comment on results during the analysis process.

An analysis of bus routes was undertaken to determine the existing operating conditions of transit in St. Cloud. The analysis was performed to determine the number and movement directions of buses passing through study area intersections on a daily and peak period basis. Estimates of the traffic signal delay for buses at intersections were developed. The MTC bus schedule was provided as data for the project. The numbers of buses that travel on each route were identified by peak period and for the entire day. A traffic intersection network was created with the Synchro computer program containing all intersections with bus traffic. The Synchro program can import vehicle volumes from spreadsheet files. Synchro was used to print maps showing bus volumes and to calculate delay values used during the analysis.

Bus routes were coded as a series of intersection identification numbers that followed the path of the bus route. A spreadsheet model was developed to determine bus turning movement counts for the peak and daily periods at the signalized intersections in the study area. The bus routes were divided into segments and analysis was performed to calculate segment lengths and typical travel times. The bus travel times were calculated by dividing the segment length by an assumed bus speed. The assumed bus travel speed was set equal to the speed limit divided by a factor of 1.3. The 1.3 factor was determined after an analysis of the results of the St. Cloud Transit Priority Pilot Test data.

Bus delay calculations along routes and at intersections were incorporated in the spreadsheet model. Where traffic count data was available, the Synchro signal timing analysis program was used to calculate auto movement delay for each intersection movement and peak period. The Synchro delay calculations were compared against the results of the St. Cloud Priority Pilot Test data. A calibration factor of 1.2 was developed and applied to the automobile delay to estimate transit delay. Therefore, it was assumed that a bus experiences 20% more delay passing through a traffic signal than an automobile. There was no traffic count data available for the analysis at many of the minor study area intersections. These intersections are generally less congested and not contained in the ***icons*** traffic signal system. For these intersections, a typical delay value was assumed to be two-thirds of the average of delays at intersections where data is available. This assumption was validated against the data collected in the St. Cloud Priority Pilot Test.

The St. Cloud Transit Priority Pilot Test measured an average bus delay reduction of 43% for intersections where transit priority was deployed. This average reduction factor was applied to

the total delay calculations to determine the approximate potential reductions in bus delay resulting from deployment of transit priority.

Table 1 contains a summary of key St. Cloud MTC bus travel statistics. The 15.5 hour reductions in traffic signal delay is greater than 7% of the weekday scheduled time for buses, The 7% time reduction will help MTC improve service. Table 2 contains the estimated average time savings determined for a bus along each route.

Table 1
St. Cloud MTC Bus Travel Statistics Summary

Total Miles of Bus Travel	3,301 miles per day
Total Hours of Schedule Time	209 hours per day
Total Hours of Bus Delay at Traffic Signals	36 hours per day
Potential Reduction of Bus Delay Resulting from Transit Priority Deployment	15.5 hours per day

Table 2
St. Cloud MTC Forecasted Time Savings for Each Scheduled Run

Route	Time Savings in Minutes
Westside	5.8
Waite Park	4.9
Pantown	4.0
Southwest Crosstown	3.4
Industrial Park	3.4
Northside	3.1
East Side 15 & 45	2.9
Southside	2.9
Southeast	2.4
Sauk Rapids 15 & 45	2.4
Clipper West	2.1
Clipper Northeast	1.3
University	1.3
Clipper Southeast	0.6

III. Cost Analysis

The cost analysis was created to develop planning level estimates of costs to deploy transit priority at all signalized intersections in the St. Cloud MTC service area. The cost estimates are necessary to determine funding requirements for the phased deployment of transit priority in St. Cloud.

The components of the transit priority system proposed for St. Cloud are:

- Econolite ASC/2S Traffic Signal Controllers
- 3M Opticom Emergency Vehicle Detectors
- 3M Opticom Phase Selectors
- 3M Opticom Low Priority Emitters
- Hybrid transit priority software which was jointly developed by Econolite and the Illinois DOT for a project on Cermak Roads in the Chicago vicinity

These components were successfully tested and demonstrated during the St. Cloud Transit Priority Pilot Test project. Substitutes for these components would be considered, but the substitutes must be tested to verify that they provide equivalent and compatible capabilities.

An inventory of traffic signal and emergency vehicle preemption equipment was developed for the study area intersections. The inventory data was categorized by operating agency and provided to the project participants for review and comment. Based on agency comment, changes in the inventory were made to make the inventory consistent with on-going and planned equipment upgrades. The results of the inventory were compared against the required components to determine where upgrades would be necessary to install transit priority. These changes and the steps necessary to install the changes were tabulated.

Intersection costs for transit priority deployment were calculated for all intersections. The costs varied from less than $1,000 for intersections that needed only the Cermak Roads software and setup to over $30,000 for intersections that needed a new traffic signal cabinet, controller, and 3M Opticom equipment. The cost estimate included $30,000 for emitters installed on the MTC buses. Table 3 below summarizes the needs and costs by agency and for the project as a whole.

It is envisioned that half of the deployment funding will be provided by MTC Federal Transit capital sources and the remaining half from Mn/DOT ITS funds. The local agencies will be expected to contribute in-kind services, but not to contribute hard dollars to project funding. The in-kind service contribution involves equipment and software installation along with minor rewiring by the agencies that may be used to help match funds from outside sources.

Table 3
Deployment Costs Summary by System

Agency	Transit Priority Inters.	Cabinets	Controllers	Opticom Installations	Emitters	Project Funding Req.	In-Kind Agency Cont.	Total Project Cost
Mn/DOT	27	0	2	3	0	$ 63,565	$ 6,750	$ 70,315
Sauk Rapids	4	0	3	3	0	$ 49,525	$ 2,150	$ 51,675
St. Cloud	34	4	22	10	0	$ 282,700	$ 9,200	$ 291,900
Stearns Co.	24	2	5	12	0	$ 207,610	$ 10,500	$ 218,110
St. Cloud MTC	0	0	0	0	20	$ 30,000	$ -	$ 30,000
Subtotal	89	6	32	28	20	$ 633,400	$ 28,600	$ 662,000
Final Design / Const. Mgmt. / Contingency								$ 38,000
Grand Total								$ 700,000

IV. Utility Analysis

The purpose of the utility analysis is to determine the value of deploying transit priority at intersections. The utility values and costs were used to rank intersections for deployment. The rankings of intersections were then grouped to form phases for deployment.

A utility analysis was performed that determined a value for installing transit priority at each signalized intersection and on each transit route. The utility analysis considered the following factors in determining the results:

- Volume of buses that pass through an intersection each day
- Estimated delay of buses at an intersection
- Ease of deployment for transit priority
- Value of installing transit priority at an intersection based on MTC input
- Value of the traffic signal and vehicle preemption upgrade resulting from deploying transit priority to the agencies that operate traffic signals

The volumes and delays of buses were developed during the analysis of bus routes. The input factors were set as a ratio relating to the maximum value for all intersections. For example, the 327 buses a day served at the intersection of 6th Ave. S. & 1st St. S. is the highest in the study. This intersection was coded with a volume factor of 10. If another intersection served half the number of buses, its volume factor was set to half of 10, or 5. The delay values were set in a similar manner to the volume values.

The ease of installation was related to the work necessary to deploy transit priority. The ease-of-installation factor differentiates intersections having similar rankings for other factors in order to rank higher the intersections that require less effort.

The St. Cloud MTC provided value factors for each intersection. On-time performance, transit ridership and other items relating to transit schedules were considered in developing the factors. The ratings were used to differentiate the value of transit priority for each route.

The value factor for agencies was set according to the new equipment provided to the agencies. The highest values were set for intersections that would receive a new cabinet, controller and emergency vehicle preemption equipment. Intersections that need only setup and programming but no new equipment to deploy transit priority were assigned a value of “0.” The utility values were calculated for each intersection. The utility divided by cost ratios were then calculated and arranged to rank intersections. Westwood and the St. Cloud MTC reviewed the results and formulated a deployment strategy that included four phases, summarized in Table 4.

Phase 1 deploys transit priority at 53 of the 87 project intersections. Thirty-nine of the 53 Phase 1 intersections require only the Cermak Roads transit priority software and setup services. The remaining 14 intersections require equipment upgrades. Phase 1 also requires funds to purchase and install emitters on 20 buses. The Phase 1 funding requirement is estimated at $164,200, or 28% of the total project funding. The deployment of Phase 1 will result in 73% of the estimated project benefits.

Phases 2 and 3 involve few intersections, require more equipment and generate less benefit. Phases 2 and 3 include 18 intersections, generate 26% of the project benefit and require 50% of the project funds.

Phase 4 contains intersections that serve few or no buses. This phase includes 16 intersections, requires 22% of the project funding and generates only 0.5% of the project benefit.

Table 4
Deployment Phase Strategy

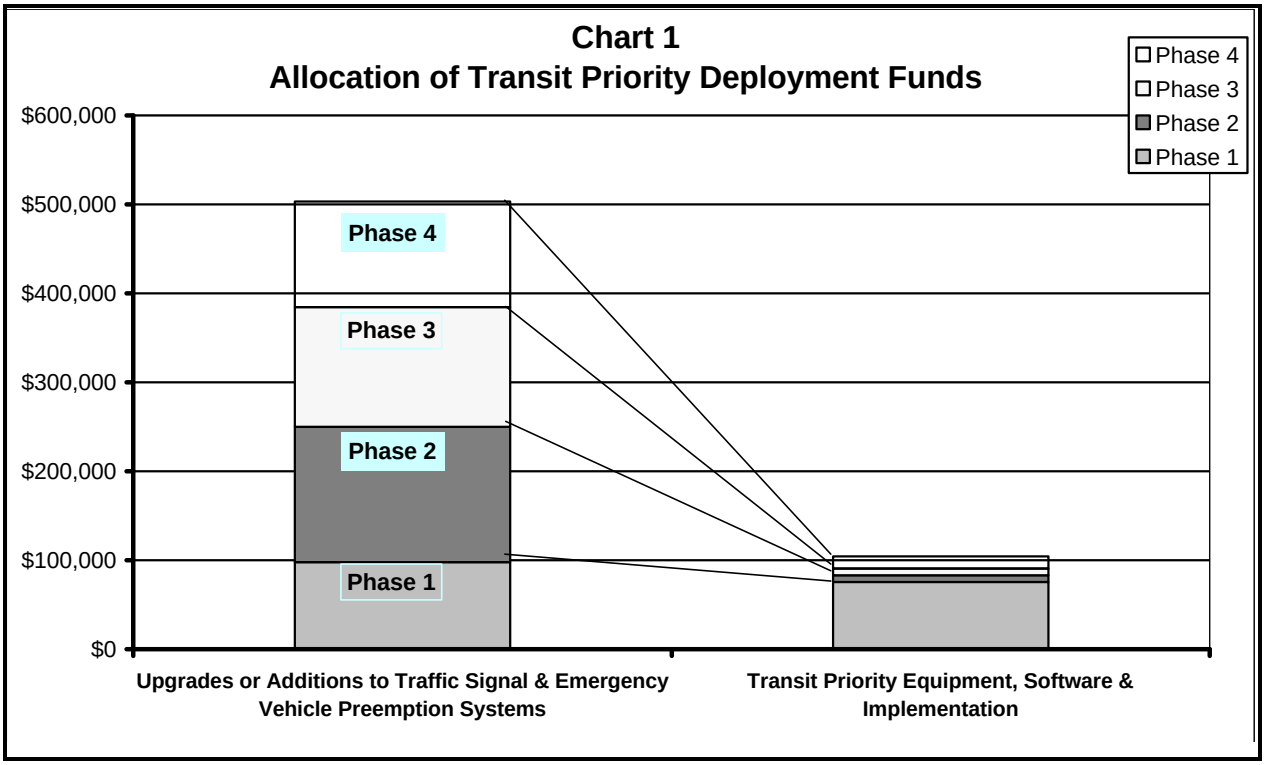
Project Phase	Agency	Number of Transit Priority Intersections	Number of Cabinets	Number of Controllers	Number of Opticom Installations	Number of Emitters	Project Funding Requirement	In-Kind Agency Contribution	Total Project Cost	% of Bus Volume	Delay Reduction - Minutes Per Day
Phase 1	Mn/DOT	17	0	0	0	0	$ 12,915	$ 3,350	$ 16,265	14.1%	148.0
	Sauk Rapids	1	0	0	0	0	$ 755	$ 150	$ 905	0.5%	4.6
	St. Cloud	24	1	13	2	0	$ 102,150	$ 4,400	$ 106,550	45.4%	394.6
	Stearns Co.	9	0	1	0	0	$ 10,275	$ 1,750	$ 12,025	8.9%	75.2
	St. Cloud MTC	0	0	0	0	20	$ 30,000	$ -	$ 30,000	0.0%	0.0
Phase 1 Total		51	1	14	2	20	$ 156,095	$ 9,650	$ 165,745	68.9%	622.5
Phase 2	Mn/DOT	2	0	2	2	0	$ 32,510	$ 1,300	$ 33,810	1.8%	17.0
	St. Cloud	4	3	4	2	0	$ 86,480	$ 1,100	$ 87,580	12.4%	125.3
	Stearns Co.	3	0	0	3	0	$ 38,460	$ 2,100	$ 40,560	6.1%	57.8
Phase 2 Total		9	3	6	7	0	$ 157,450	$ 4,500	$ 161,950	20.3%	200.0
Phase 3	Mn/DOT	1	0	0	1	0	$ 12,820	$ 700	$ 13,520	1.3%	11.8
	Sauk Rapids	1	0	1	1	0	$ 16,250	$ 600	$ 16,850	1.0%	8.7
	St. Cloud	4	0	3	4	0	$ 61,570	$ 2,500	$ 64,070	3.1%	28.5
	Stearns Co.	3	0	1	3	0	$ 41,900	$ 2,100	$ 44,000	3.1%	28.8
Phase 3 Total		9	0	5	9	0	$ 132,540	$ 5,900	$ 138,440	8.5%	77.8
Phase 4	Mn/DOT	7	0	0	0	0	$ 5,320	$ 1,400	$ 6,720	0.0%	0.0
	Sauk Rapids	2	0	2	2	0	$ 32,520	$ 1,400	$ 33,920	0.0%	0.1
	St. Cloud	2	0	2	2	0	$ 32,500	$ 1,200	$ 33,700	0.3%	3.9
	Stearns Co.	9	2	3	6	0	$ 116,975	$ 4,550	$ 121,525	2.0%	19.8
Phase 4 Total		20	2	7	10	0	$ 187,315	$ 8,550	$ 195,865	2.3%	23.8
Subtotal		89	6	32	28	20	$ 633,400	$ 28,600	$ 662,000	100.0%	924.2
Final Design / Const. Mgmt. / Contingency									$ 38,000		
Grand Total		89	6	32	28	20	$ 633,400	$ 28,600	$ 700,000	100.0%	924.2

Cost estimate does not include a transit priority upgrade to intersection # 20 in Stearns County. This intersection may be added to the deployment depending on status of the planned reconstruction on Riverside Ave. & CSAH 78 (2nd St. S.).

Most of the transit priority deployment funds are spent to upgrade the traffic signal system and the emergency vehicle system. These upgrades provide the agencies that operate traffic signals more capable, reliable and user-friendly equipment. The new controllers can be connected to the ***icons*** system when communication connections are added. The new emergency preemption equipment will improve safety and reduce response times when emergency vehicles respond to incidents.

The project funds that are directly allocated to transit priority are necessary to acquire and install emitters for the buses, program transit priority and perform minor rewiring to implement transit priority.

As shown on Chart 1 below, more than 80% of the total project budget will be spent on improving the traffic signal system. After Phase 1, each subsequent phase spends a higher portion of funds for traffic signal and emergency vehicle system upgrades than for transit priority.



V. Recommended Deployment Strategies

- Obtain formal agency approval for the area-wide deployment of transit priority.

- Develop an agreement or letter of understanding between MTC and the agencies operating the traffic signals regarding the deployment and operation of the transit priority system. This document will describe the responsibilities of the traffic signal operators and MTC to fund, install and operate the transit priority system. It will outline the

expectations of the agencies regarding the operation of emitters on buses. It will outline MTC's expectations of the agencies to provide in-kind services to make the system operational. It will discuss funding and project execution.

- Develop a proposed work plan, critical path and time-line for project deployment. The time-line should include items for securing funding, finalizing agreements, final design and deployment installation.

- Review the forecasted reductions in traffic signal delay and plan for the impacts on bus schedules and on-time performance.

- Consider adding a project to evaluate the effectiveness of the area-wide transit priority deployment. The project will include data collection, analysis and documenting results.

- Create a signal operations committee including agency and MTC representatives. This committee will address transit priority operational issues.

- Develop contracts for the final design and construction management of the transit priority deployment. These contracts must be coordinated with the Mn/DOT ITS office.

APPENDIX

A Signal System Inventory by Agency

TECHNICAL APPENDIX (BOUND SEPARATELY)

B Summary of Transit Priority Deployment Phases

C Cost by Intersection

D Cost by Agency

E Cost by Phase

Signal System Inventory
Sorted by Agency and Intersection

Sync #	Agency	Street1	Street2	Controller	Priority	Ped Buttons	Coord.
2	Mn/DOT	T.H. 15	CSAH 29 (35th Ave. N.E.)	Econolite ASC/2 - 2100	3M 452	Yes	Free
3	Mn/DOT	T.H. 15	CSAH 1	Econolite ASC/2	3M ?	Yes	Free
4	Mn/DOT	T.H. 15	Co. Rd. 134	Econolite ASC/2S	3M ?	Yes	Free
9	Mn/DOT	T.H. 10	E. St. Germain	Econolite ASC-8000	None	Yes	
10	Mn/DOT	T.H. 23 (Division)	14th Ave. S.E.	Econolite KMC-8000	None	Yes	
11	Mn/DOT	T.H. 10	15th Ave. S.E.	Econolite ASC/2 - 2100	None	SB,NB,EB	
101	Mn/DOT	T.H. 23 (Division)	12th Ave.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
102	Mn/DOT	T.H. 23 (Division)	8th Ave.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
103	Mn/DOT	T.H. 23 (Division)	6th Ave.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
104	Mn/DOT	T.H. 23 (Division)	4th Ave.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
105	Mn/DOT	T.H. 23 (Division)	Wilson Ave.	Econolite ASC/2 - 2100	3M 562	Yes	Yes
106	Mn/DOT	T.H. 23 (Division)	Lincoln Ave.	Econolite ASC/2	3M 562	Yes	Yes
201	Mn/DOT	T.H. 23 (Division)	33rd Ave.	Econolite ASC/2 - 2100	3M 562	Yes	Yes
202	Mn/DOT	T.H. 23 (Division)	29th Ave.	Econolite ASC/2	3M 562	Yes	Yes
203	Mn/DOT	T.H. 23 (Division)	25th Ave.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
204	Mn/DOT	T.H. 23 (Division)	22nd Ave.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
205	Mn/DOT	T.H. 23 (Division)	19-1/2 Ave.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
206	Mn/DOT	T.H. 23 (Division)	Washington Mem. Dr.	Econolite ASC/2	3M 262	Yes	Yes
401	Mn/DOT	T.H. 23 (2nd St. S.)	10th Ave. S. (Waite Park)	Econolite ASC/2	3M - (yr 2001)	Yes	Yes
402	Mn/DOT	T.H. 23 (2nd St. S.)	6th Ave. S. (Waite Park)	Econolite ASC/2	3M - (yr 2001)	Yes	Yes
403	Mn/DOT	T.H. 23 (2nd St. S.)	2nd Ave. S. (Waite Park)	Econolite ASC/2	3M - (yr 2001)	Yes	Yes
404	Mn/DOT	T.H. 23 (2nd St. S.)	Waite Ave. S. (Waite Park)	Econolite ASC/2 - 2100	3M - (yr 2001)	Yes	Yes
405	Mn/DOT	T.H. 23 (2nd St. S.)	T.H. 15	Econolite ASC/2 - 2100	3M 262	Yes	Yes
601	Mn/DOT	T.H. 15	12th St. N.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
602	Mn/DOT	T.H. 15	8th St. N.	Econolite ASC/2	3M 262	Yes	Yes
603	Mn/DOT	T.H. 15	3rd St. N.	Econolite ASC/2	3M 262	Yes	Yes
604	Mn/DOT	T.H. 23 (Division)	T.H. 15	Econolite ASC/2	3M 562	Yes	Yes
5	Sauk Rapids	Benton Dr.	2nd St. N.	MN Microtronics 800/8	? (Opticom SEB only)	Yes	Free
6	Sauk Rapids	Benton Dr.	1st St. S.	Econolite KMC-8000	Traconex 244	Yes	
7	Sauk Rapids	Benton Dr.	2nd Ave. S. / 5th St.	Eagle EPAC 300	None	Yes	
8	Sauk Rapids	Benton Dr. / Lincoln	Summit Ave. S.	Econolite ASC/2S - 2100	3M 454	Yes	
12	St. Cloud	E. St. Germain	Lincoln Ave.	Econolite ASC-8000	3M 262, A & B channels	Yes	Free
13	St. Cloud	E. St. Germain	Wilson Ave.	Econolite ASC-8000	3M 262	Yes	
14	St. Cloud	E. St. Germain	2nd Ave./Riverside Dr.	Econolite ASC-8000	3M 262	Yes	Free
15	St. Cloud	9th Ave. N.	8th St. N.	Econolite ASC-8000	3M 262	Yes	Free

Signal System Inventory
Sorted by Agency and Intersection

Sync #	Agency	Street1	Street2	Controller	Priority	Ped Buttons	Coord.
16	St. Cloud	9th Ave. N.	11th St. N.	Econolite ASC-8000	TOMAR (OPIC-4)	Yes	
17	St. Cloud	9th Ave. N.	13th St. N.	Econolite ASC-8000	TOMAR (OPIC-4)	Yes	
18	St. Cloud	9th Ave. N.	15th St. N.	Econolite ASC-8000	TOMAR (OPIC-4)	Yes	
19	St. Cloud	9th Ave. N.	Northway Dr.	Econolite ASC/2 - 2100	None	NB,EB only	
26	St. Cloud	33rd Ave. N.	3rd St. N.	Econolite ASC/2 - 2100	3M 262	Yes	
27	St. Cloud	25th Ave. N.	3rd St. N.	MN Microtronics 800/8	3M 262	Yes	Free
28	St. Cloud	W. St. Germain	33rd Ave. S.	Econolite ASC-8000	None	Yes	Free
30	St. Cloud	10th St. S.	Washington Mem. Dr.	Econolite ASC/2 - 2100	3M 452	Yes	
32	St. Cloud	9th Ave.	10th St. S.	Econolite ASC-8000	3M 754	Yes	
33	St. Cloud	9th Ave.	7th St. S.	Econolite ASC/2 - 2100	3M 452	Yes	
34	St. Cloud	Clearwater Rd.	16th St. S.	Econolite ASC-8000	TOMAR (OPIC-4)	Yes	Free
35	St. Cloud	Clearwater Rd.	22nd St. S.	Econolite ASC-8000	TOMAR (OPIC-4)	Yes	
41	St. Cloud	10th Ave. N.	2nd St. N.	Econolite ASC-8000	3M 262 (2)	Yes	Yes
42	St. Cloud	7th Ave. N.	2nd St. N.	Econolite ASC-8000	3M 562	Yes	
43	St. Cloud	6th Ave. N.	1st St. N.	Econolite ASC-8000	3M 562	Yes	Yes
44	St. Cloud	4th Ave. N.	1st St. N.	Econolite ASC/2 - 2100	3M 352	Yes	Yes
45	St. Cloud	4th Ave. S.	1st St. S.	Eagle EF 140	3M 262	None	
46	St. Cloud	6th Ave. S.	1st St. S.	Eagle EF 140	3M 262	None	
47	St. Cloud	W. St. Germain	8th Ave.	Econolite ASC-8000	None	Yes	
48	St. Cloud	W. St. Germain	10th Ave.	Econolite ASC-8000	3M 352 (2)	Yes	
49	St. Cloud	W. St. Germain	12th Ave.	Econolite ASC-8000	3M 262	Yes	
50	St. Cloud	8th Ave. S.	1st St. S.	Eagle EF 140	3M 262	None	
51	St. Cloud	7th Ave. S.	1st St. S.	Eagle EF 140	Did not find 3M Opticom? (was listed as 3M 262)	None	
701	St. Cloud	33rd Ave.	12th St. N.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
702	St. Cloud	29th Ave.	12th St. N.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
703	St. Cloud	25th Ave.	12th St. N.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
704	St. Cloud	Northway Dr.	13th St. N.	Econolite ASC/2 - 2100	3M 262	Yes	Yes
705	St. Cloud	Northway Dr.	15th St. N.	Econolite ASC/2 - 2100	None	Yes	Yes
3001	St. Cloud	5th Ave.	10th St. S.	Econolite ASC/2S - 2100	3M 752	Yes	Free
3101	St. Cloud	Michigan Ave.	Killian Blvd.	Econolite ASC/2S - 2100	3M 562	Yes	Free

Signal System Inventory
Sorted by Agency and Intersection

Sync #	Agency	Street1	Street2	Controller	Priority	Ped Buttons	Coord.
1	Stearns Co.	Riverside Ave.	CSAH 78 (2nd St. S.)	Econolite ASC/2 - 2000	None	Yes	
20	Stearns Co.	CSAH 1	9th Ave. No.	Econolite D4212	None	SB,EB only	
21	Stearns Co.	CR 134	Fingerhut	Econolite ASC/2S - 2100	None	Yes	
22	Stearns Co.	CSAH 81 (3rd St. N.)	CR 138 (10th Ave. N.)	Econolite ASC/2 - 2000	None	Yes	Free
23	Stearns Co.	CSAH 81 (3rd St. N.)	2nd Ave. NE (Waite Park)	MN Microtronics 800/8	None	NB,WB only	Free
24	Stearns Co.	CSAH 4 (8th St. N.)	33rd Ave. N.	Econolite ASC/2 - 2100	3M 262	Yes	
25	Stearns Co.	CSAH 4 (8th St. N.)	25th Ave. N.	MN Microtronics 800/8	3M 262	Yes	Free
29	Stearns Co.	CSAH 75 (Roosevelt)	Cooper Ave. S.	Econolite ASC/2S - 2100	3M 452	Yes	
38	Stearns Co.	CSAH 75 (Roosevelt)	22nd St. S.	MN Microtronics 800/8	None	Yes	Free
39	Stearns Co.	CSAH 75 (Roosevelt)	Traverse Rd.	MN Microtronics 800/8	None	Yes	Free
40	Stearns Co.	CSAH 75 (Roosevelt)	Washington Mem. Dr.	MN Microtronics 800/8 NC	None	Yes	Free
301	Stearns Co.	CSAH 75 (2nd St. S.)	33rd Ave. S.	Econolite ASC/2 - 2100	3M ?	Yes	Yes
302	Stearns Co.	CSAH 75 (2nd St. S.)	29th Ave. S.	Econolite ASC/2 - 2100	3M ?	Yes	Yes
303	Stearns Co.	CSAH 75 (2nd St. S.)	25th Ave. S.	Econolite ASC/2 - 2100	3M ?	Yes	Yes
501	Stearns Co.	CSAH 75 (Division	CSAH 81 (15th Av. No.)	Econolite ASC/2	3M compatible - Tomar	Yes	Yes
502	Stearns Co.	CSAH 75 (Division	10th Ave. (Waite Park)	Econolite ASC/2	3M compatible - Tomar	Yes	Yes
503	Stearns Co.	CSAH 75 (Division	6th Ave. (Waite Park)	Econolite ASC/2	3M compatible - Tomar	Yes	Yes
504	Stearns Co.	CSAH 75 (Division	2nd Ave. (Waite Park)	Econolite ASC/2	3M compatible - Tomar	Yes	Yes
505	Stearns Co.	CSAH 75 (Division	Waite Ave.	Econolite ASC/2 - 2100	None	Yes	Yes
506	Stearns Co.	CSAH 75 (Division	Cross Roads	Econolite ASC/2 - 2100 NC	None	Yes	Yes
801	Stearns Co.	CSAH 4 (8th St. N.)	44th Ave. N.	Econolite ASC/2 - 2100	3M ?	Yes	Yes
901	Stearns Co.	CSAH 4 (8th St. N.)	McLeland Rd.	Econolite ASC/2 - 2100	None	Yes	Yes
1001	Stearns Co.	CSAH 4 (8th St. N.)	CR 138 (54th Ave. N.)	Econolite ASC/2 - 2100	None	Yes	Yes
1101	Stearns Co.	CSAH 4 (8th St. N.)	CR 134 (Ridgewood Road)	Econolite ASC/2 - 2100	None	Yes	Yes