

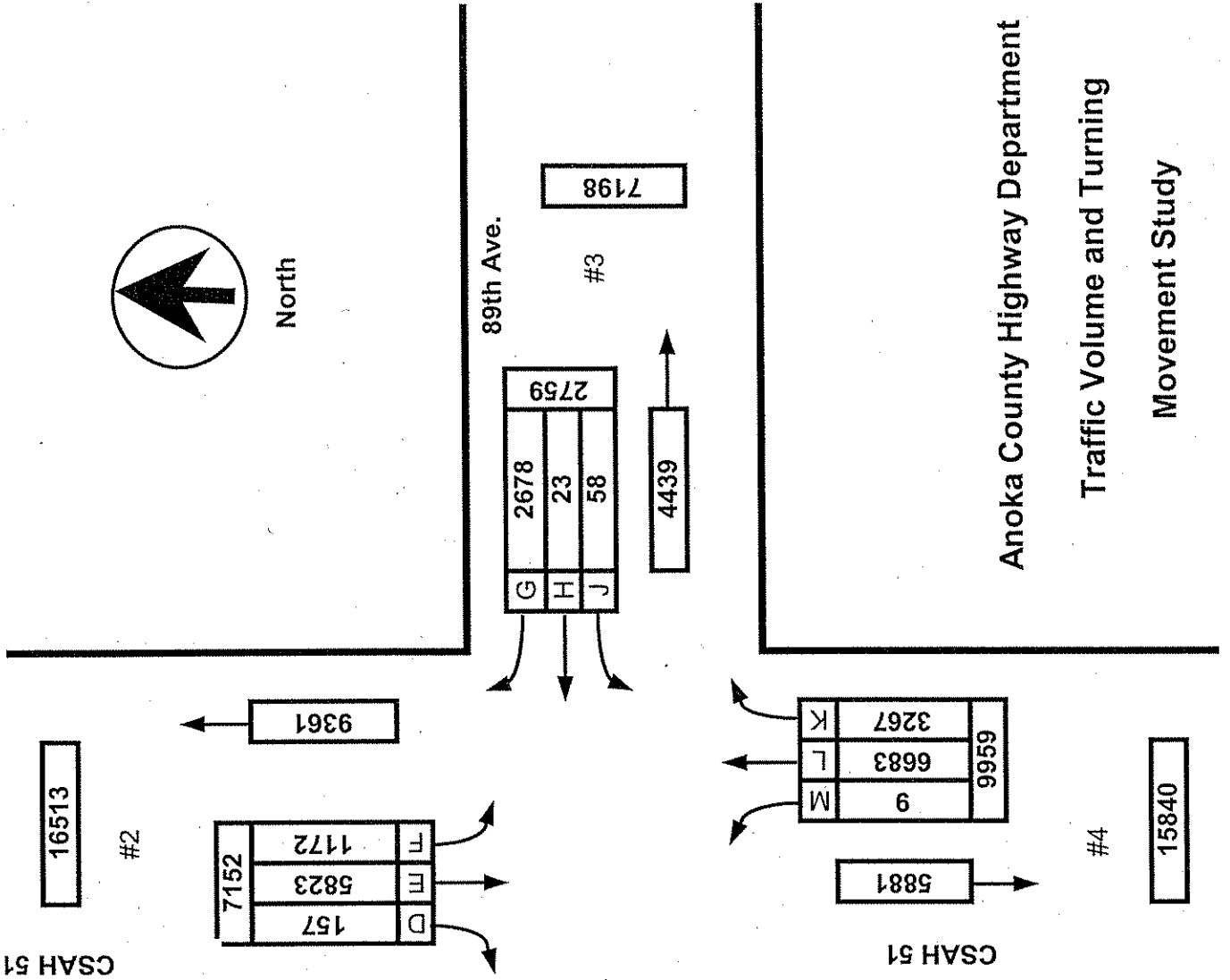
Date : 6/03/04

Count Number : TMC0416

Location : CSAH 51 (University Ave.)

@ 89th Ave.

	LANES OF APPROACH			TOTAL
	RIGHT TURN LANE	LEFT TURN LANE	THRU LANES	
#1	0	0	0	0
#2	0	1	2	3
#3	1	0	0	1
#4	1	0	2	3



CSAH 51

CSAH 51

Anoka County Highway Department  
 Traffic Engineering  
 Traffic Volume and Turning Movement Study

File Name : TMC0416  
 Site Code : 04160101  
 Start Date : 06/02/2004  
 Page No : 1

Weather: Cloudy and Mild  
 Counter: TDC-8  
 Counted by: Katelyn/Kyle

Groups Printed- Unshifted

Start Time	CSAH 51 Southbound					89th Ave. Westbound					CSAH 51 Northbound					none Eastbound					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total	Left	Thru	Right	Heavy	App. Total			
	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0				
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0				
06:00	7	79	1	1	87	1	1	6	1	8	0	18	9	4	27	0	0	0	0	0	6	122	128
06:15	8	139	0	2	147	0	1	4	0	5	0	8	5	1	13	0	0	0	0	0	3	165	168
06:30	2	198	1	4	201	0	2	13	1	15	0	27	10	1	37	0	0	0	0	0	6	253	259
06:45	9	206	2	5	217	1	0	21	1	22	0	21	20	4	41	0	0	0	0	0	10	280	290
Total	26	622	4	12	652	2	4	44	3	50	0	74	44	10	118	0	0	0	0	0	25	820	845
07:00	16	189	0	6	205	0	0	10	0	10	1	36	22	2	59	0	0	0	0	0	8	274	282
07:15	15	223	1	3	239	0	0	13	1	13	0	34	29	2	63	0	0	0	0	0	6	315	321
07:30	21	203	0	5	224	0	1	15	0	16	0	22	28	3	50	0	0	0	0	0	8	290	298
07:45	15	221	1	4	237	0	0	29	0	29	1	31	37	4	69	0	0	0	0	0	8	335	343
Total	67	836	2	18	905	0	1	67	1	68	2	123	116	11	241	0	0	0	0	0	30	1214	1244
08:00	23	133	1	1	157	0	2	19	0	21	0	31	35	8	66	0	0	0	0	0	9	244	253
08:15	13	79	2	2	94	0	0	17	1	17	0	41	26	5	67	0	0	0	0	0	8	178	186
08:30	14	80	3	2	97	0	0	11	0	11	0	43	32	2	75	0	0	0	0	0	4	183	187
08:45	19	81	3	8	103	0	0	20	2	20	0	43	35	3	78	0	0	0	0	0	13	201	214
Total	69	373	9	13	451	0	2	67	3	69	0	158	128	18	286	0	0	0	0	0	34	806	840
09:00	22	89	5	2	116	2	0	38	2	40	0	48	42	4	90	0	0	0	0	0	8	246	254
09:15	33	62	4	3	99	2	0	25	0	27	0	40	36	3	76	0	0	0	0	0	6	202	208
09:30	26	96	2	4	124	2	0	46	0	48	0	50	34	4	84	0	0	0	0	0	8	256	264
09:45	20	81	4	3	105	0	0	34	2	34	0	67	47	1	114	0	0	0	0	0	6	253	259
Total	101	328	15	12	444	6	0	143	4	149	0	205	159	12	364	0	0	0	0	0	28	957	985
10:00	22	87	2	2	111	1	0	39	0	40	0	62	43	5	105	0	0	0	0	0	7	256	263
10:15	29	81	5	2	115	1	1	32	0	34	0	61	60	3	121	0	0	0	0	0	5	270	275
10:30	28	57	2	5	87	0	0	45	2	45	0	82	53	6	135	0	0	0	0	0	13	267	280
10:45	0	0	0	0	0	2	0	48	2	50	0	79	65	3	144	0	0	0	0	0	5	194	199
Total	79	225	9	9	313	4	1	164	4	169	0	284	221	17	505	0	0	0	0	0	30	987	1017
11:00	26	86	4	2	116	1	0	47	2	48	0	81	54	6	135	0	0	0	0	0	10	299	309
11:15	23	94	4	4	121	2	0	40	0	42	0	73	44	2	117	0	0	0	0	0	6	280	286
11:30	23	79	4	3	106	0	0	34	0	34	0	74	72	5	146	0	0	0	0	0	8	286	294
11:45	20	60	3	2	83	0	0	38	0	38	0	84	69	2	153	0	0	0	0	0	4	274	278
Total	92	319	15	11	426	3	0	159	2	162	0	312	239	15	551	0	0	0	0	0	28	1139	1167
12:00	17	38	0	1	55	1	1	46	0	48	0	92	70	3	162	0	0	0	0	0	4	265	269
12:15	16	57	2	2	75	1	1	48	2	50	0	84	70	5	154	0	0	0	0	0	9	279	288
12:30	27	67	2	2	96	1	0	59	1	60	0	101	83	8	184	0	0	0	0	0	11	340	351
12:45	22	100	7	4	129	0	1	48	0	49	0	112	74	7	186	0	0	0	0	0	11	364	375
Total	82	262	11	9	355	3	3	201	3	207	0	389	297	23	686	0	0	0	0	0	35	1248	1283
13:00	21	86	1	1	108	0	0	50	0	50	0	122	70	6	192	0	0	0	0	0	7	350	357
13:15	28	90	5	2	123	2	0	59	1	61	0	106	65	0	171	0	0	0	0	0	3	355	358
13:30	26	99	4	2	129	1	0	48	0	49	0	104	72	4	176	0	0	0	0	0	6	354	360
13:45	0	0	0	0	0	2	0	50	0	52	0	102	69	3	171	0	0	0	0	0	3	223	226
Total	75	275	10	5	360	5	0	207	1	212	0	434	276	13	710	0	0	0	0	0	19	1282	1301
14:00	17	82	7	4	106	2	0	40	2	42	0	125	62	2	187	0	0	0	0	0	8	335	343
14:15	34	96	1	4	131	2	0	42	0	44	0	109	77	3	186	0	0	0	0	0	7	361	368
14:30	24	81	4	2	109	0	1	65	0	66	0	136	76	7	212	0	0	0	0	0	9	387	396
14:45	24	105	5	5	134	2	1	64	2	67	0	116	63	2	179	0	0	0	0	0	9	380	389
Total	99	364	17	15	480	6	2	211	4	219	0	486	278	14	764	0	0	0	0	0	33	1463	1496
15:00	15	66	4	2	85	1	2	77	1	80	0	152	72	5	224	0	0	0	0	0	8	389	397
15:15	18	97	1	3	116	1	0	38	0	39	1	152	45	3	198	0	0	0	0	0	6	353	359
15:30	21	106	2	2	129	0	0	59	0	59	1	154	56	4	211	0	0	0	0	0	6	399	405
15:45	28	115	6	4	149	2	0	51	1	53	0	175	70	1	245	0	0	0	0	0	6	447	453
Total	82	384	13	11	479	4	2	225	2	231	2	633	243	13	878	0	0	0	0	0	26	1588	1614
16:00	31	95	2	2	128	0	0	75	0	75	1	192	69	5	262	0	0	0	0	0	7	465	472
16:15	21	93	0	0	114	2	0	62	0	64	1	218	81	3	300	0	0	0	0	0	3	478	481
16:30	28	88	0	0	116	0	0	71	0	71	0	249	91	0	340	0	0	0	0	0	0	527	527
16:45	27	96	1	1	124	1	0	69	0	70	0	255	89	3	344	0	0	0	0	0	4	538	542
Total	107	372	3	3	482	3	0	277	0	280	2	914	330	11	1246	0	0	0	0	0	14	2008	2022
17:00	16	75	4	2	95	0	0	69	1	69	0	247	77	4	324	0	0	0	0	0	7	488	495
17:15	34	111	0	1	145	0	0	57	0	57	0	268	90	2	358	0	0	0	0	0	3	560	563
17:30	24	97	4	1	125	1	1	78	1	80	1	219	63	2	283	0	0	0	0	0	4	488	492
17:45	25	112	2	2	139	0	0	58	1	58	1	186	53	1	242	0	0	0	0	0	4	439	443
Total	99	395	10</																				



**ANOKA COUNTY HIGHWAY  
PC-WARRANTS  
TRAFFIC SIGNAL WARRANT ANALYSIS**

Study Name : TMC0416  
Study Date : 06/03/04  
Page No. : 1

**Signal Warrants - Summary**

**Major Street Approaches**

**Northbound: CSAH 51**  
Number of Lanes: 2  
Approach Speed: 35  
Total Approach Volume: 9,959

**Southbound: CSAH 51**  
Number of Lanes: 2  
Approach Speed: 35  
Total Approach Volume: 7,152

**Minor Street Approaches**

**Eastbound: none**  
Number of Lanes: 1  
  
Total Approach Volume: 9

**Westbound: 89th Ave.**  
Number of Lanes: 1  
  
Total Approach Volume: 2,759

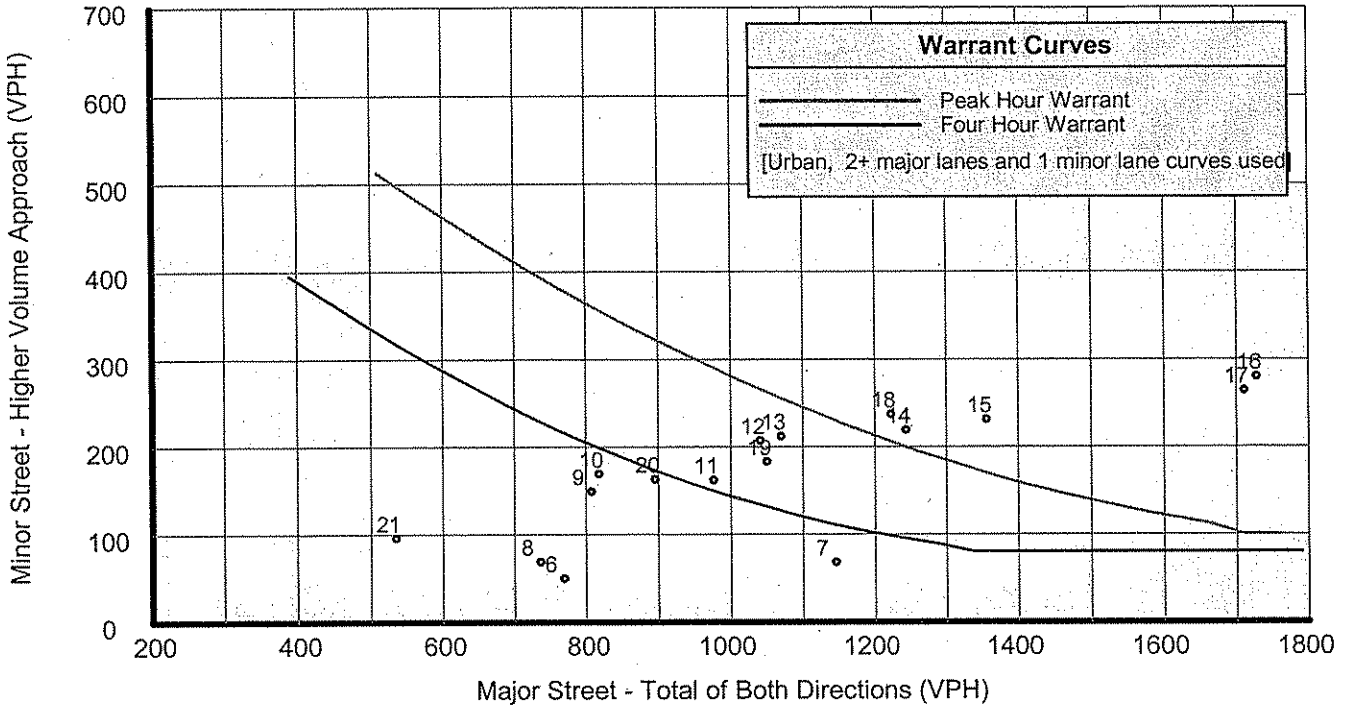
**Warrant Summary (Urban values apply.)**

<b>Warrant 1 - Eight Hour Vehicular Volumes</b> .....	<b>Satisfied</b>
<b>Warrant 1A - Minimum Vehicular Volume</b> .....	Satisfied
Required volumes reached for 11 hours, 8 are needed	
<b>Warrant 1B - Interruption of Continuous Traffic</b> .....	Satisfied
Required volumes reached for 9 hours, 8 are needed	
<b>Warrant 1 A&amp;B - Combination of Warrants</b> .....	Satisfied
Required volumes reached for 12 hours, 8 are needed	
 <b>Warrant 2 - Four Hour Volumes</b> .....	 <b>Satisfied</b>
Number of hours (9) volumes exceed minimum >= minimum required (4).	
 <b>Warrant 3 - Peak Hour</b> .....	 <b>Satisfied</b>
<b>Warrant 3A - Peak Hour Volumes</b> .....	Satisfied
Volumes exceed minimums for at least one hour.	
<b>Warrant 3B - Peak Hour Delay</b> .....	Satisfied
Number of hours (49) volumes exceed minimum >= required (1). Delay data not evaluated.	
 <b>Warrant 4 - Pedestrian Volumes</b> .....	 <b>Not Evaluated</b>
 <b>Warrant 5 - School Crossing</b> .....	 <b>Not Evaluated</b>
 <b>Warrant 6 - Coordinated Signal System</b> .....	 <b>Not Evaluated</b>
 <b>Warrant 7 - Crash Experience</b> .....	 <b>Not Evaluated</b>
 <b>Warrant 8 - Roadway Network</b> .....	 <b>Not Evaluated</b>

# ANOKA COUNTY HIGHWAY PC-WARRANTS TRAFFIC SIGNAL WARRANT ANALYSIS

Study Name : TMC0416  
Study Date : 06/03/04  
Page No. : 2

## Signal Warrants - Summary



### Analysis of 8-Hour Volume Warrants:

Hour Begin	Major Total	Higher Minor		War-1A			War-1B			War-1A&B		
		Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	EB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
01:00	0	0	EB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
02:00	0	0	EB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
03:00	0	0	EB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
04:00	0	0	EB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
05:00	0	0	EB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
06:00	770	50	WB	600-Yes	150-No	Major	900-No	75-No	---	720-Yes	120-No	Major
07:00	1,146	68	WB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
08:00	737	69	WB	600-Yes	150-No	Major	900-No	75-No	---	720-Yes	120-No	Major
09:00	808	149	WB	600-Yes	150-No	Major	900-No	75-Yes	Minor	720-Yes	120-Yes	Both
10:00	818	169	WB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-Yes	120-Yes	Both
11:00	977	162	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
12:00	1,041	207	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
13:00	1,070	212	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
14:00	1,244	219	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
15:00	1,357	231	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
16:00	1,728	280	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
17:00	1,711	264	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
18:00	1,223	237	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
19:00	1,050	183	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
20:00	896	163	WB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-Yes	120-Yes	Both
21:00	535	96	WB	600-No	150-No	---	900-No	75-Yes	Minor	720-No	120-No	---
22:00	0	0	EB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
23:00	0	0	EB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---

**ANOKA COUNTY HIGHWAY  
PC-WARRANTS  
TRAFFIC SIGNAL WARRANT ANALYSIS**

Study Name : TMC0416  
Study Date : 06/03/04

**Multi-Way Stop Warrant Report**

**Major Street Approaches**

**Northbound: CSAH 51**  
Total Approach Volume: 9,959  
Approach Speed: 35

**Southbound: CSAH 51**  
Total Approach Volume: 7,152  
Approach Speed: 35

**Minor Street Approaches**

**Eastbound: none**  
Total Approach Volume: 9

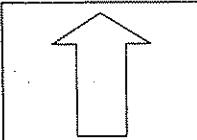
**Westbound: 89th Ave.**  
Total Approach Volume: 2,759

**Warrant Summary**

- Criteria A - Interim Measure** ..... Not Evaluated  
If traffic signals are justified, stop signs can be installed as an interim measure.
- Criteria B - Crash Experience** ..... Not Evaluated  
Number of crashes (0) is less than the minimum required (5).
- Criteria C - Minimum Volumes and Delays** ..... Not Satisfied  
Delay data not evaluated  
Required volumes reached for 7 hours, 8 are needed
- Criteria D - 80% of Volumes, Delays, and Crashes** ..... Not Evaluated  
Delay data not evaluated  
Required volumes reached for 0 hours, 8 are needed

**Analysis of 8-Hour Volume Warrants:**

Time	Major Crit Total	Minor Total	Crit C			Crit D		
			Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00 - 01:00	0	0	300-No	200-No	No	240-No	160-No	No
01:00 - 02:00	0	0	300-No	200-No	No	240-No	160-No	No
02:00 - 03:00	0	0	300-No	200-No	No	240-No	160-No	No
03:00 - 04:00	0	0	300-No	200-No	No	240-No	160-No	No
04:00 - 05:00	0	0	300-No	200-No	No	240-No	160-No	No
05:00 - 06:00	0	0	300-No	200-No	No	240-No	160-No	No
06:00 - 07:00	770	50	300-Yes	200-No	Major	240-Yes	160-No	Major
07:00 - 08:00	1,146	68	300-Yes	200-No	Major	240-Yes	160-No	Major
08:00 - 09:00	737	69	300-Yes	200-No	Major	240-Yes	160-No	Major
09:00 - 10:00	808	149	300-Yes	200-No	Major	240-Yes	160-No	Major
10:00 - 11:00	818	169	300-Yes	200-No	Major	240-Yes	160-Yes	Both
11:00 - 12:00	977	162	300-Yes	200-No	Major	240-Yes	160-Yes	Both
12:00 - 13:00	1,041	207	300-Yes	200-Yes	Both	240-Yes	160-Yes	Both
13:00 - 14:00	1,070	212	300-Yes	200-Yes	Both	240-Yes	160-Yes	Both
14:00 - 15:00	1,244	219	300-Yes	200-Yes	Both	240-Yes	160-Yes	Both
15:00 - 16:00	1,357	231	300-Yes	200-Yes	Both	240-Yes	160-Yes	Both
16:00 - 17:00	1,728	280	300-Yes	200-Yes	Both	240-Yes	160-Yes	Both
17:00 - 18:00	1,711	264	300-Yes	200-Yes	Both	240-Yes	160-Yes	Both
18:00 - 19:00	1,223	237	300-Yes	200-Yes	Both	240-Yes	160-Yes	Both
19:00 - 20:00	1,050	183	300-Yes	200-No	Major	240-Yes	160-Yes	Both
20:00 - 21:00	896	172	300-Yes	200-No	Major	240-Yes	160-Yes	Both
21:00 - 22:00	535	96	300-Yes	200-No	Major	240-Yes	160-No	Major
22:00 - 23:00	0	0	300-No	200-No	No	240-No	160-No	No
23:00 - 00:00	0	0	300-No	200-No	No	240-No	160-No	No



**NORTH**

**COUNT LOCATION:**

CSAH 51 (University Ave.) @

**DATE:**

06/03/2004

89th Ave.

APP. #1 =
APP. #2 = CSAH 51
APP. #3 = 89th Ave.
APP. #4 = CSAH 51

APP. #2

APP. #3

APP. #4

HEAVY VEHICLE- ANY VEHICLE HAVING MORE THAN FOUR TIRES TOUCHING THE PAVEMENT

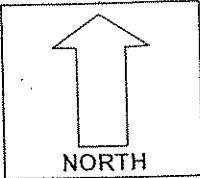
A. TRUCKS- A HEAVY VEHICLE INVOLVED PRIMARILY IN THE TRANSPORT OF GOODS OR IN THE DELIVERY OF A SERVICE.

B. RV- A HEAVY VEHICLE OPERATED BY A PRIVATE MOTORIST AND INVOLVED IN THE TRANSPORT OF RECREATIONAL EQUIPMENT OR FACILITIES.

C. BUSES- A HEAVY VEHICLE INVOLVED IN THE TRANSPORTATION OF GROUPS OF PEOPLE.

TIME	PEDESTRIANS					HEAVY VEHICLES		
	APP. #1	APP. #2	APP. #3	APP. #4	15 MIN TOT	TRUCKS	RV	BUS
6:00-6:15AM						3		3
6:15-6:30						2		2
6:30-6:45						4		1
6:45-7:00						7		3
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>25</b>
7:00-7:15						5		3
7:15-7:30						5	1	
7:30-7:45						7		1
7:45-8:00						6		2
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>30</b>
8:00-8:15						8		3
8:15-8:30						8		
8:30-8:45						3		
8:45-9:00						11		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>34</b>
9:00-9:15						7		1
9:15-9:30						6		
9:30-9:45						6		2
9:45-10:00						4		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>27</b>
10:00-10:15						6		1
10:15-10:30						5		
10:30-10:45						10		4
10:45-11:00						2		2
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>30</b>
11:00-11:15						9		1
11:15-11:30						5		1
11:30-11:45						8		
11:45-12:00						4		2
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>30</b>
12:00-12:15						2		2
12:15-12:30						9		1
12:30-12:45						10		1
12:45-1:00						8		3
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>36</b>
1:00-1:15						6		1
1:15-1:30						3		
1:30-1:45						6		
1:45-2:00						4		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>21</b>
					<b>TOTAL</b>		<b>TOTAL</b>	<b>233</b>

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COUNT LOCATION:

CSAH 51 (University Ave.) @

DATE:

06/02/2004

89th Ave.

APP. #1 =
APP. #2 = CSAH 51
APP. #3 = 89th Ave.
APP. #4 = CSAH 51

APP. #2

APP. #3

APP. #4

- HEAVY VEHICLE- ANY VEHICLE HAVING MORE THAN FOUR TIRES TOUCHING THE PAVEMENT
- A. TRUCKS- A HEAVY VEHICLE INVOLVED PRIMARILY IN THE TRANSPORT OF GOODS OR IN THE DELIVERY OF A SERVICE.
  - B. RV- A HEAVY VEHICLE OPERATED BY A PRIVATE MOTORIST AND INVOLVED IN THE TRANSPORT OF RECREATIONAL EQUIPMENT OR FACILITIES.
  - C. BUSES- A HEAVY VEHICLE INVOLVED IN THE TRANSPORTATION OF GROUPS OF PEOPLE.

TIME	PEDESTRIANS					HEAVY VEHICLES		
	APP. #1	APP. #2	APP. #3	APP. #4	15 MIN TOT	TRUCKS	RV	BUS
2:00-2:15PM						7		1
2:15-2:30						6		1
2:30-2:45						7		2
2:45-3:00						8		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>33</b>
3:00-3:15						4		3
3:15-3:30						4		2
3:30-3:45						5		
3:45-4:00						4	1	1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>24</b>
4:00-4:15						5		2
4:15-4:30						2		1
4:30-4:45								
4:45-5:00						2		2
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>14</b>
5:00-5:15						4		2
5:15-5:30						2		1
5:30-5:45						3		1
5:45-6:00						2		2
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>17</b>
6:00-6:15						2		1
6:15-6:30						1		
6:30-6:45						2		1
6:45-7:00						2		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>10</b>
7:00-7:15						1		
7:15-7:30						1		
7:30-7:45								
7:45-8:00								
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>2</b>
8:00-8:15								
8:15-8:30								
8:30-8:45						1		
8:45-9:00						1		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>2</b>
9:00-9:15								
9:15-9:30								
9:30-9:45						1		
9:45-10:00								
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>1</b>
					<b>TOTAL</b>		<b>TOTAL</b>	<b>336</b>

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