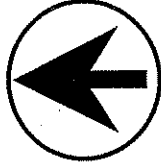


Date : 7/18/01

Count Number : TMC0121

Location : CSAH 14  
@ CSAH 21/ CR 54



North

CSAH 21 / CR 54

154

#2

80

74		
	D	11
	E	17
	F	46

CSAH 14

48	G
2367	H
1003	J

3418

6612

#3

3194

5525

#1

2922		
	A	376
	B	2222
	C	5
2603		

CSAH 14

CSAH 21 / CR 54

1396

#4

2893

926	K
27	L
544	M
1497	

LANES OF APPROACH

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

Anoka County Highway Department

Traffic Volume and Turning

Movement Study

# Anoka County Highway Department Traffic Engineering

Weather: Hot, Humid  
Counter: TDC-8  
Counted by: Jessica/Melissa

Traffic Volume and Turning Movement Stud

File Name : TMC0121  
Site Code : 01210101  
Start Date : 07/18/2001  
Page No : 1

Groups Printed- 1 - Group 1

Start Time	CSAH 21/ CR 54 Southbound					CSAH 14 Westbound					CSAH 21/CR 54 Northbound					CSAH 14 Eastbound					Exclu Total	Inclu. Total	Int. Total
	Left	Thru	Rig ht	Hea vy	App. Total	Left	Thru	Rig ht	Hea vy	App. Total	Left	Thru	Rig ht	Hea vy	App. Total	Left	Thru	Rig ht	Hea vy	App. Total			
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	0	0	0	0	0	10	10	0	2	20	1	0	7	0	8	0	38	0	3	38	5	66	71
06:15	1	0	0	0	1	12	25	0	3	37	3	0	3	0	6	0	54	9	1	63	4	107	111
06:30	1	0	0	0	1	16	26	0	7	42	0	0	10	0	10	0	38	14	4	52	11	105	116
06:45	0	0	0	0	0	30	34	2	3	66	6	1	4	0	11	1	58	17	6	76	9	153	162
Total	2	0	0	0	2	68	95	2	15	165	10	1	24	0	35	1	188	40	14	229	29	431	460
07:00	0	0	0	0	0	30	36	1	3	67	1	0	6	2	7	0	53	13	9	66	14	140	154
07:15	4	0	0	1	4	24	30	0	8	54	5	0	11	1	16	0	102	16	8	118	18	192	210
07:30	2	0	0	1	2	24	43	1	8	68	7	0	12	1	19	0	69	16	11	85	21	174	195
07:45	1	1	0	0	2	26	31	1	9	58	6	0	8	2	14	0	62	12	8	74	19	148	167
Total	7	1	0	2	8	104	140	3	28	247	19	0	37	6	56	0	286	57	36	343	72	654	726
08:00	0	1	0	0	1	25	45	0	8	70	4	0	9	2	13	0	58	6	9	64	19	148	167
08:15	1	1	0	0	2	13	29	0	8	42	0	2	8	0	10	0	48	7	9	55	17	109	126
08:30	0	0	0	0	0	18	30	0	13	48	9	0	9	5	18	0	46	6	14	52	32	118	150
08:45	0	0	0	0	0	11	31	0	8	42	5	1	12	0	18	0	42	3	7	45	15	105	120
Total	1	2	0	0	3	67	135	0	37	202	18	3	38	7	59	0	194	22	39	216	83	480	563
09:00	0	0	0	0	0	10	28	2	4	40	7	1	12	0	20	0	44	7	5	51	9	111	120
09:15	0	0	0	0	0	7	31	0	3	38	3	1	14	3	18	0	37	5	6	42	12	98	110
09:30	0	0	0	0	0	11	15	0	6	26	8	0	12	3	20	0	32	3	6	35	15	81	96
09:45	0	0	0	0	0	17	41	1	3	59	4	1	12	0	17	0	29	4	8	33	11	109	120
Total	0	0	0	0	0	45	115	3	16	163	22	3	50	6	75	0	142	19	25	161	47	399	446
10:00	3	0	0	2	3	11	29	0	11	40	7	1	15	3	23	0	33	2	7	35	23	101	124
10:15	0	0	0	0	0	12	21	1	3	34	5	0	9	1	14	0	38	6	12	44	16	92	108
10:30	1	0	0	0	1	4	33	1	5	38	3	0	16	2	19	0	34	1	6	35	13	93	106
10:45	0	0	1	0	1	15	36	0	4	51	9	1	13	1	23	0	33	6	6	39	11	114	125
Total	4	0	1	2	5	42	119	2	23	163	24	2	53	7	79	0	138	15	31	153	63	400	463
11:00	0	0	0	0	0	10	29	0	3	39	1	0	1	0	2	0	13	5	3	18	6	59	65
11:15	1	0	0	0	1	18	29	1	7	48	5	0	8	2	13	0	28	2	5	30	14	92	106
11:30	1	1	0	0	2	16	39	0	9	55	7	0	12	3	19	0	20	6	5	26	17	102	119
11:45	0	0	0	0	0	15	19	0	3	34	4	0	8	3	12	0	17	1	2	18	8	64	72
Total	2	1	0	0	3	59	116	1	22	176	17	0	29	8	46	0	78	14	15	92	45	317	362
12:00	0	0	0	0	0	13	36	1	10	50	5	0	24	4	29	0	31	1	8	32	22	111	133
12:15	0	1	1	0	2	29	32	1	11	62	5	0	13	1	18	0	35	2	6	37	18	119	137
12:30	1	0	0	0	1	7	37	0	14	44	9	1	3	2	13	0	25	4	5	29	21	87	108
12:45	0	1	0	0	1	18	30	1	4	49	10	0	11	0	21	0	28	9	10	37	14	108	122
Total	1	2	1	0	4	67	135	3	39	205	29	1	51	7	81	0	119	16	29	135	75	425	500
13:00	1	0	0	0	1	18	35	1	6	54	8	2	4	0	14	0	14	8	5	22	11	91	102
13:15	1	0	1	0	2	18	27	2	3	47	4	0	5	1	9	0	24	4	4	28	8	86	94
13:30	1	0	0	0	1	11	32	2	6	45	4	0	11	1	15	0	32	6	3	38	10	99	109
13:45	0	0	0	0	0	14	29	0	7	43	9	0	6	0	15	0	23	3	7	26	14	84	98
Total	3	0	1	0	4	61	123	5	22	189	25	2	26	2	53	0	93	21	19	114	43	360	403
14:00	1	0	0	0	1	9	42	1	5	52	8	0	13	0	21	0	20	2	2	22	7	96	103
14:15	0	0	1	0	1	9	29	1	2	39	9	1	14	1	24	0	23	0	2	23	5	87	92
14:30	1	1	0	0	2	10	30	1	1	41	8	1	18	0	27	0	32	3	2	35	3	105	108
14:45	1	1	0	0	2	15	46	0	2	61	4	0	14	0	18	0	39	4	5	43	7	124	131
Total	3	2	1	0	6	43	147	3	10	193	29	2	59	1	90	0	114	9	11	123	22	412	434
15:00	0	1	1	0	2	15	52	1	3	68	11	0	22	2	33	0	28	4	0	32	5	135	140
15:15	1	1	1	0	3	13	46	1	8	60	15	2	18	2	35	0	28	11	4	39	14	137	151
15:30	1	2	1	1	4	17	49	1	2	67	18	0	17	4	35	0	43	7	4	50	11	156	167
15:45	0	0	0	0	0	20	72	0	5	92	21	1	29	3	51	0	37	10	3	47	11	190	201
Total	2	4	3	1	9	65	219	3	18	287	65	3	86	11	154	0	136	32	11	168	41	618	659
16:00	0	0	0	0	0	13	48	1	3	62	15	1	19	0	35	0	30	5	0	35	3	132	135
16:15	0	0	0	0	0	11	67	0	4	78	5	0	20	2	25	0	16	3	2	19	8	122	130
16:30	1	0	0	0	1	8	69	1	3	78	24	0	21	0	45	0	41	5	3	46	6	170	176
16:45	1	0	0	0	1	16	79	3	3	98	23	0	25	1	48	0	49	8	3	57	7	204	211
Total	2	0	0	0	2	48	263	5	13	316	67	1	85	3	153	0	136	21	8	157	24	628	652
17:00	2	0	0	0	2	20	62	0	6	72	11	0	15	2	26	0	35	5	6	40	14	140	154
17:15	1	0	0	0	1	25	65	1	3	91	13	0	23	0	36	1	49	5	2	55	5	183	188
17:30	0	0	1	0	1	22	70	0	2	92	18	2	54	2	74	0	40	5	2	45	6	212	218
17:45	0	1	0	1	1	18	59	2	4	79	19	1	36	2	56	1	53	7	2	61	9	197	206
Total	3	1	1	1	5	85	246	3	15	334	61	3	128	6	192	2	177	22	12	201	34	732	766



For Street Approaches:

Eastbound:

CSAH 14

Data File: C:\Program Files\JAMAR\PETRA\Data Files\TMC0121.war  
 Count Type: IMC. Channel: 0. Count Date: 7/18/ 1  
 Number of Lanes: 1  
 Approach Speed: 35  
 Total Approach Traffic: 2603

Westbound:

CSAH 14

Data File: C:\Program Files\JAMAR\PETRA\Data Files\TMC0121.war  
 Count Type: IMC. Channel: 0. Count Date: 7/18/ 1  
 Number of Lanes: 1  
 Approach Speed: 35  
 Total Approach Traffic: 3418

Minor Street Approaches:

Northbound:

CSAH 21/CR 54

Data File: C:\Program Files\JAMAR\PETRA\Data Files\TMC0121.war  
 Count Type: IMC. Channel: 0. Count Date: 7/18/ 1  
 Number of Lanes: 1  
 Approach Speed: 30  
 Total Approach Traffic: 1497

Southbound:

CSAH 21/ CR 54

Data File: C:\Program Files\JAMAR\PETRA\Data Files\TMC0121.war  
 Count Type: IMC. Channel: 0. Count Date: 7/18/ 1  
 Number of Lanes: 1  
 Approach Speed: 30  
 Total Approach Traffic: 74

Analysis of 8-Hour Volume Warrants (Criteria refers to high volume side street for that hour):

Hour	Main	Side	Warrant 1	Warrant 2	Warrant 8
Begin	(Total)	Vol. Dir. Rank	Meets? Criteria	Meets? Criteria	Meets? Criteria
0	0	0 S 17	150	75	120
1	0	0 S 18	150	75	120
2	0	0 S 19	150	75	120
3	0	0 S 20	150	75	120
4	0	0 S 21	150	75	120
5	0	0 S 22	150	75	120
6	394	35 N 16	150	75	120
7	590	56 N 13	MAIN 150	75	120
8	418	59 N 12	150	75	120
9	324	75 N 11	150	SIDE 75	120
10	316	79 N 10	150	SIDE 75	120
11	268	46 N 15	150	75	120
12	340	81 N 9	150	SIDE 75	120
13	303	53 N 14	150	75	120
14	316	90 N 6	150	SIDE 75	120
15	455	154 N 2	SIDE 150	SIDE 75	SIDE 120
16	473	153 N 3	SIDE 150	SIDE 75	SIDE 120
17	535	192 N 1	--BOTH-- 150	SIDE 75	SIDE 120
18	409	139 N 4	150	SIDE 75	SIDE 120
19	311	116 N 5	150	SIDE 75	120
20	323	84 N 8	150	SIDE 75	120
21	246	85 N 7	150	SIDE 75	120
22	0	0 S 23	150	75	120
23	0	0 S 24	150	75	120

## Warrant Summary:

Urban values apply.

## Warrant 1 - Minimum Vehicular Volumes

NOT SATISFIED. Required values reached for 1 hours. Criteria--Main St.: 500; Side St.: See Volume Summary.

## Warrant 2 - Interruption of Continuous Traffic

NOT SATISFIED. Required values reached for 0 hours. Criteria--Main St.: 750; Side St.: See Volume Summary.

## Warrant 3 - Minimum Pedestrian Volumes

NOT SATISFIED. Ped volumes too low. Criteria--190 Peds in peak hour, 100 peds in 4th high hour.

## Warrant 4 - School Crossing

NOT APPLICABLE. Gap data has not been defined.

## Warrant 5 - Progressive Movement

NOT SATISFIED. Adjacent signals closer than 1000 feet and/or not part of coordinated system.

## Warrant 6 - Accident Experience

NOT SATISFIED. 0 correctable accidents is fewer than required 5.

Correctable Accidents: 0; Right Angle Accidents: 0; Left Turn Accidents: 0; Other Accidents: 0.

## Warrant 7 - Systems Warrant

NOT SATISFIED. Peak hour total entering volume 732 does not meet criteria of 1000

NSEW- Approaches which are part of the principal through traffic roadway network.

- Approaches which include rural or suburban highways outside, entering or traversing a city.
- Approaches which appear as a major route in an official transportation plan.

## Warrant 8 - Combination of Warrants

NOT SATISFIED. Required values reached for 0 hours. Criteria--Main: 600; Side: See Volume Summary.

## Warrant 9 - Four Hour Volumes

NOT SATISFIED. Required values reached for 0 hours.

## Warrant 10 - Peak Hour Delay

NOT SATISFIED. Peak hour (1700 hours) volume not adequate.

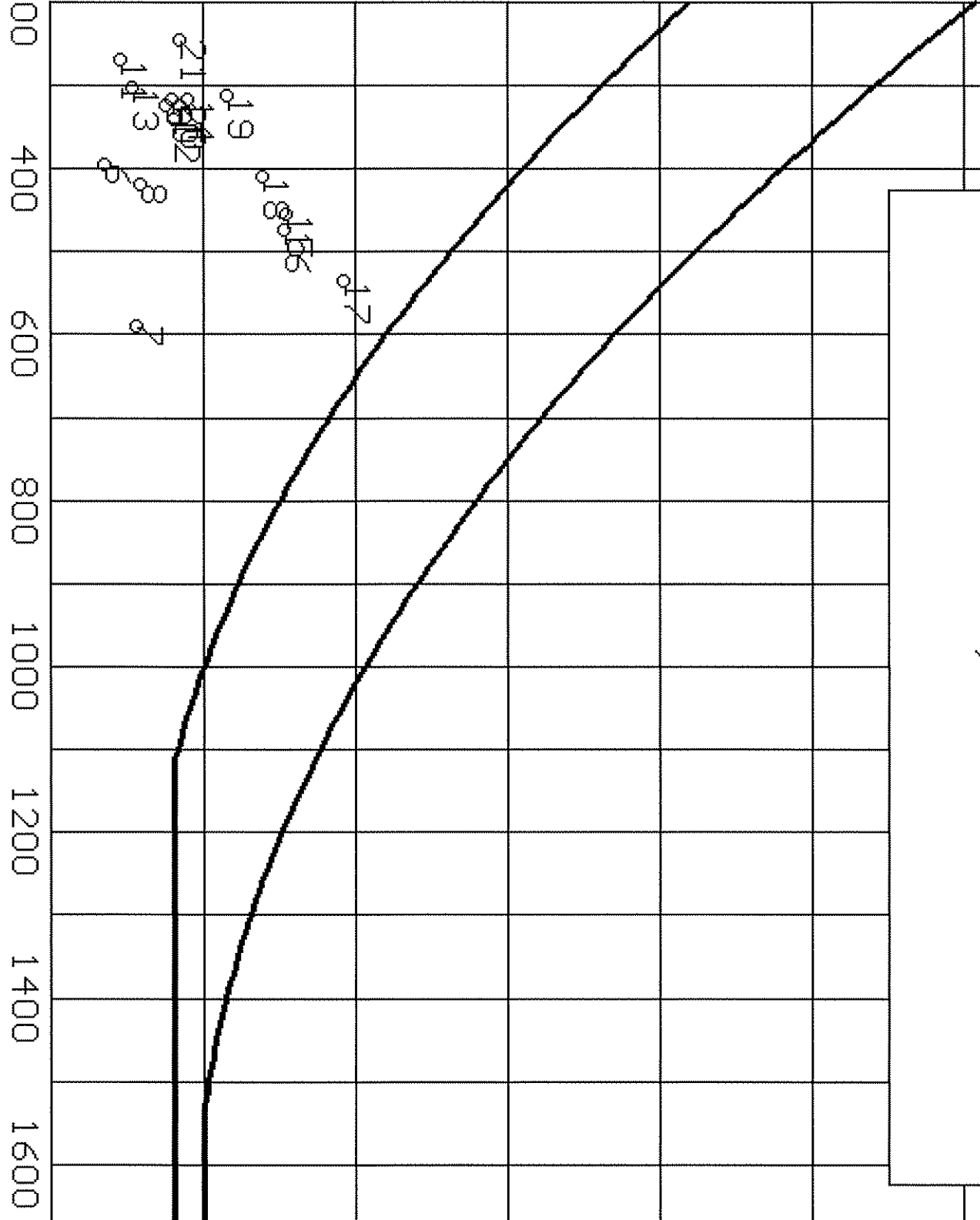
Criteria--Main St.: 800 (4 approaches), 650 (3 approaches); Side St.: 100.

## Warrant 11 - Peak Hour Volume

NOT SATISFIED.

Minor St. High Vol. Approach (UPH)

0 100 200 300 400 500 600



Warrant 9, Four-Hour Volumes  
Warrant 11, Peak-Hour Volumes

Major St. Total of Both Approaches (UPH)

**Multiway Stop Warrant Analysis**  
**TMC 0121 CSAH 14 @ CSAH 21/CR 54**  
**Speed Limit of Major Roadway..... 35**

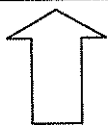
**Minimum Traffic Volumes Multiway Stop Warrant Criteria:**

- a) The total vehicular volume entering the intersection from all approaches must average at least 500 vehicles per hour (vph) for any 8 hours of an average day, AND:
- b) The combined vehicular and pedestrian volume from the minor street or highway must average at least 200 vph for the same 8 hours, with an average delay to minor street vehicular traffic of at least 30 seconds per vehicle during the maximum hour, BUT:
- c) When the 85-percentile approach speed of the major street traffic exceeds 40 miles per hour, the minimum volume warrant is 70% of the above requirements.

Hour	Total Vehicular Traffic Entering the Intersection	Vehicular Traffic Entering on First Minor Roadway	Vehicular Traffic Entering on Second Minor Roadway	Sum of Minor Approaches	Hours Stop Warrant Met
6 AM - 7 AM	431	2	35	37	0
7 AM - 8 AM	654	8	56	64	0
8 AM - 9 AM	480	3	59	62	0
9 AM - 10 AM	399	0	75	75	0
10 AM - 11 AM	400	5	79	84	0
11 AM - 12 PM	317	3	46	49	0
12 PM - 13 PM	425	4	81	85	0
1 PM - 2 PM	360	4	53	57	0
2 PM - 3 PM	412	6	90	96	0
3 PM - 4 PM	618	9	154	163	0
4 PM - 5 PM	628	2	153	155	0
5 PM - 6 PM	732	5	192	197	0
6 PM - 7 PM	552	4	139	143	0
7 PM - 8 PM	432	5	116	121	0
8 PM - 9 PM	414	7	84	91	0
9 PM - 10 PM	338	7	85	92	0

**TOTAL HOURS MET: 0**

**MULTIWAY STOP WARRANT IS NOT MET**



**NORTH**

**COUNT LOCATION:**

CSAH 14 @

**DATE:**

7/18/01

CSAH 21/ CR 54

APP. #1 = CSAH 14
APP. #2 = CSAH 21/CR 54
APP. #3 = CSAH 14
APP. #4 = CSAH 21/ CR 54

APP. #1

APP. #2

APP. #3

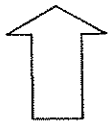
APP. #4

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						8		
2:15-2:30						4		
2:30-2:45	1			1	2	3		
2:45-3:00						5		
<b>HOURLY TOTAL</b>					<b>2</b>	<b>HOURLY TOTAL</b>		<b>20</b>
3:00-3:15						5		
3:15-3:30						12	2	
3:30-3:45						11		
3:45-4:00			2		2	8		
<b>HOURLY TOTAL</b>					<b>2</b>	<b>HOURLY TOTAL</b>		<b>38</b>
4:00-4:15			2		2	4		
4:15-4:30						6		
4:30-4:45						5		
4:45-5:00						7		
<b>HOURLY TOTAL</b>					<b>2</b>	<b>HOURLY TOTAL</b>		<b>22</b>
5:00-5:15						7	1	4
5:15-5:30				3	3	6		
5:30-5:45						3		
5:45-6:00						7		2
<b>HOURLY TOTAL</b>					<b>3</b>	<b>HOURLY TOTAL</b>		<b>30</b>
6:00-6:15		1			1	5		
6:15-6:30						5		
6:30-6:45						3		
6:45-7:00						1		
<b>HOURLY TOTAL</b>					<b>1</b>	<b>HOURLY TOTAL</b>		<b>14</b>
7:00-7:15	1	1			2	1		
7:15-7:30						1		
7:30-7:45			2		2	3		
7:45-8:00						4		
<b>HOURLY TOTAL</b>					<b>4</b>	<b>HOURLY TOTAL</b>		<b>9</b>
8:00-8:15						3		
8:15-8:30	1			1	2	1		
8:30-8:45						1		
8:45-9:00						1		
<b>HOURLY TOTAL</b>					<b>2</b>	<b>HOURLY TOTAL</b>		<b>6</b>
9:00-9:15						1		
9:15-9:30						1		
9:30-9:45	3				3			
9:45-10:00								
<b>HOURLY TOTAL</b>					<b>3</b>	<b>HOURLY TOTAL</b>		<b>2</b>





NORTH

COUNT LOCATION:

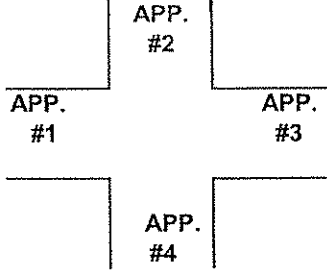
CSAH 14 @

DATE:

7/18/01

CSAH 21/ CR 54

APP. #1 = CSAH 14
APP. #2 = CSAH 21/CR 54
APP. #3 = CSAH 14
APP. #4 = CSAH 21/ CR 54



- 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						5		
6:15-6:30			1		1	4		
6:30-6:45						9		1
6:45-7:00						7		
<b>HOURLY TOTAL</b>					<b>1</b>	<b>HOURLY TOTAL</b>		<b>26</b>
7:00-7:15						11		1
7:15-7:30			2		2	18		
7:30-7:45						19		2
7:45-8:00						16		2
<b>HOURLY TOTAL</b>					<b>2</b>	<b>HOURLY TOTAL</b>		<b>69</b>
8:00-8:15						18		
8:15-8:30	1	2			3	18		
8:30-8:45						31		
8:45-9:00			1		1	16		
<b>HOURLY TOTAL</b>					<b>4</b>	<b>HOURLY TOTAL</b>		<b>83</b>
9:00-9:15	1				1	10		
9:15-9:30				1	1	12		
9:30-9:45						15		
9:45-10:00			1		1	11		
<b>HOURLY TOTAL</b>					<b>3</b>	<b>HOURLY TOTAL</b>		<b>48</b>
10:00-10:15			1		1	19	1	2
10:15-10:30				1	1	17		
10:30-10:45						11		
10:45-11:00	2				2	11		
<b>HOURLY TOTAL</b>					<b>4</b>	<b>HOURLY TOTAL</b>		<b>61</b>
11:00-11:15		1	1		2	5		
11:15-11:30				1	1	14		
11:30-11:45						16		1
11:45-12:00			1		1	7		1
<b>HOURLY TOTAL</b>					<b>4</b>	<b>HOURLY TOTAL</b>		<b>44</b>
12:00-12:15						22		
12:15-12:30						18		
12:30-12:45						21		
12:45-1:00						11		1
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>73</b>
1:00-1:15						11		
1:15-1:30						9		
1:30-1:45						9		
1:45-2:00						14		
<b>HOURLY TOTAL</b>						<b>HOURLY TOTAL</b>		<b>43</b>