



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

SIGNAL WARRANTS ANALYSIS

LOCATION: TH-51/SNELLING AVE & GARDEN AVE.

COUNTY: RAMSEY

REF. POINT: 006.604

DATE: 9/30/1997

OPERATOR: RE

Speed	Approach Description	Lanes
45	Major App1: TH-51/SNELLING AVE. NB, S OF GARDEN AVE.	4
45	Major App3: TH-51/SNELLING AVE. SB, N OF GARDEN AVE.	4
30	Minor App2: GARDEN AVE. EB, W OF TH-51/SNELLING AVE.	1
30	Minor App4: GARDEN AVE. WB, E OF TH-51/SNELLING AVE.	1

0.70 FACTOR USED? YES
 POPULATION < 10,000? NO
 EXISTING SIGNAL ? NO

HOUR	420/630				105/52		105/52		MET SAME HOURS
	MAJOR APP. 1	MAJOR APP. 3	TOTAL 1+3	WARRANT MET	MINOR APP. 2	MINOR APP. 4	WARRANT MET APP.2	WARRANT MET APP. 4	
0:00 - 1:00	119	110	229	/	1	0	/	/	/
1:00 - 2:00	64	70	134	/	0	2	/	/	/
2:00 - 3:00	65	33	98	/	0	0	/	/	/
3:00 - 4:00	42	41	83	/	0	0	/	/	/
4:00 - 5:00	53	71	124	/	1	0	/	/	/
5:00 - 6:00	139	328	467	X/	0	0	/	/	/
6:00 - 7:00	403	769	1172	X/X	6	20	/	/	/
7:00 - 8:00	891	1546	2437	X/X	10	51	/	/	/
8:00 - 9:00	795	1209	2004	X/X	17	32	/	/	/
9:00 - 10:00	789	795	1584	X/X	11	34	/	/	/
10:00 - 11:00	871	776	1647	X/X	16	21	/	/	/
11:00 - 12:00	1205	921	2126	X/X	11	13	/	/	/
12:00 - 13:00	1383	1152	2535	X/X	21	24	/	/	/
13:00 - 14:00	1203	1176	2379	X/X	21	16	/	/	/
14:00 - 15:00	1263	1074	2337	X/X	21	19	/	/	/
15:00 - 16:00	1557	1042	2599	X/X	12	19	/	/	/
16:00 - 17:00	1896	1155	3051	X/X	29	25	/	/	/
17:00 - 18:00	1870	1304	3174	X/X	46	17	/	/	/
18:00 - 19:00	1500	1103	2603	X/X	35	43	/	/	/
19:00 - 20:00	1167	996	2163	X/X	20	31	/	/	/
20:00 - 21:00	850	881	1731	X/X	11	15	/	/	/
21:00 - 22:00	739	797	1536	X/X	7	10	/	/	/
22:00 - 23:00	363	430	793	X/X	2	6	/	/	/
23:00 - 24:00	266	215	481	X/	1	1	/	/	/

	Met (Hr)	Required (Hr)	
Warrant 1	0	8	Not satisfied
Warrant 2	0	8	Not satisfied
Warrant 6	3	8	Not satisfied
Warrant 8	0	8	Not satisfied
Warrant 9	0	4	Not satisfied
Warrant 11	0	1	Not satisfied

LOCATION: TH-51/SNELLING AVE & GARDEN AVE.

COUNTY: RAMSEY

REF. POINT: 006.604

DATE: 9/30/1997

OPERATOR: RE

0.70 FACTOR USED? YES
 POPULATION < 10,000? NO
 EXISTING SIGNAL ? NO

Speed	Approach Description	Lanes
45	Major App1: TH-51/SNELLING AVE. NB, S OF GARDEN AVE.	4
45	Major App3: TH-51/SNELLING AVE. SB, N OF GARDEN AVE.	4
30	Minor App2: GARDEN AVE. EB, W OF TH-51/SNELLING AVE.	1
30	Minor App4: GARDEN AVE. WB, E OF TH-51/SNELLING AVE.	1

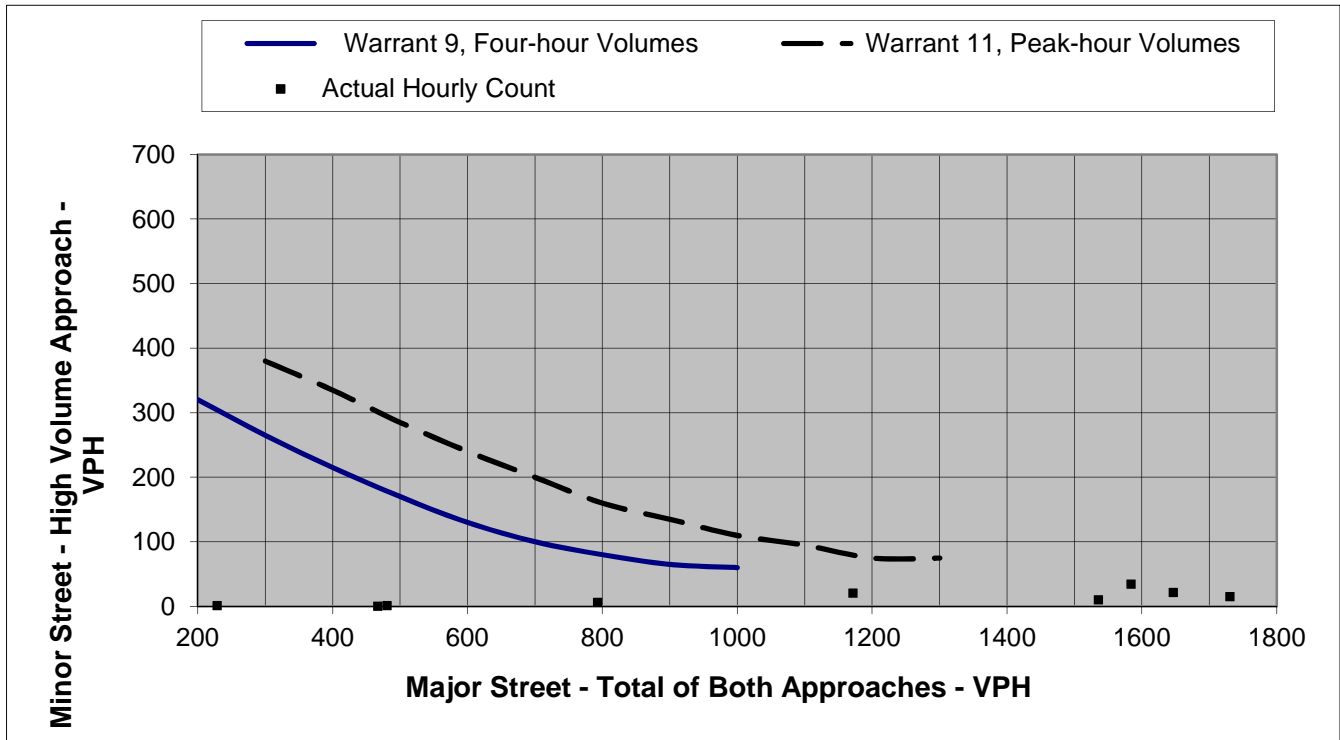


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Major	Warrant Criteria		Actual Hourly Count	
	Warrant 9, F	Warrant 11, P	Major	Actual Hourly Count
200	320		229	1
300	265	380	134	2
400	215	335	98	0
500	170	285	83	0
600	130	240	124	1
700	100	200	467	0
800	80	160	1172	20
900	65	135	2437	51
1000	60	110	2004	32
1100		95	1584	34
1200		75	1647	21
1300		75	2126	13
1400			2535	24
1500			2379	21
1600			2337	21
1700			2599	19
1800			3051	29
			3174	46
			2603	43
			2163	31
			1731	15
			1536	10
			793	6
			481	1

Four Hour Warrant

Major App	Minor App		
	1 & 1	2 & 1	2 & 2
300	360	440	590
400	310	390	530
500	260	340	460
600	215	290	390
700	180	245	330
800	150	205	280
900	125	170	235
1000	100	145	195
1100	85	120	165
1200	80	100	135
1300	80	83	110
1400	80	80	110

Peak Hour

Major App	1 & 1
400	475
500	425
600	370
700	330
800	280
900	240
1000	204
1100	175
1200	150
1300	130
1400	115
1500	100
1600	100
1700	100
1800	100

Four Hour Warrant Factored

Major App	Minor App		
	1 & 1	2 & 1	2 & 2
200	250	320	420
300	210	265	350
400	170	215	285
500	130	170	230
600	93	130	175
700	70	100	135
800	60	80	103
900	60	65	80
1000	60	60	80

Peak Hour

Major App	1 & 1
300	320
400	270
500	225
600	180
700	145
800	115
900	90
1000	75
1100	75
1200	75
1300	75

Warrant

Minor App

2 & 1	2 & 2
570	725
520	665
465	600
420	540
370	480
330	425
285	375
250	330
220	285
190	250
160	220
140	187
115	165
100	150
100	150

Warrant Factored

Minor App

2 & 1	2 & 2
380	500
335	435
285	370
240	315
200	260
160	215
135	175
110	140
95	115
75	100
75	100



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

ALL WAY STOP WARRANT

LOCATION: TH-51/SNELLING AVE & GARDEN AVE.

COUNTY: RAMSEY

REF. POINT: 006.604

DATE:

OPERATOR: RE

Speed	Approach Description	Lanes
45	Major App1: TH-51/SNELLING AVE. NB, S OF GARDEN AVE.	4
45	Major App3: TH-51/SNELLING AVE. SB, N OF GARDEN AVE.	4
30	Minor App2: GARDEN AVE. EB, W OF TH-51/SNELLING AVE	1
30	Minor App4: GARDEN AVE. WB, E OF TH-51/SNELLING AVE	1

0.70 FACTOR USED? Yes

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	350	140	WARRANT MET
					TOTAL Σ (APP.1 to APP. 4)	MINOR TOTAL APP. 2 + APP. 4	
0:00 - 1:00	119	110	1	0	230	1	/
1:00 - 2:00	64	70	0	2	136	2	/
2:00 - 3:00	65	33	0	0	98	0	/
3:00 - 4:00	42	41	0	0	83	0	/
4:00 - 5:00	53	71	1	0	125	1	/
5:00 - 6:00	139	328	0	0	467	0	X/
6:00 - 7:00	403	769	6	20	1198	26	X/
7:00 - 8:00	891	1546	10	51	2498	61	X/
8:00 - 9:00	795	1209	17	32	2053	49	X/
9:00 - 10:00	789	795	11	34	1629	45	X/
10:00 - 11:00	871	776	16	21	1684	37	X/
11:00 - 12:00	1205	921	11	13	2150	24	X/
12:00 - 13:00	1383	1152	21	24	2580	45	X/
13:00 - 14:00	1203	1176	21	16	2416	37	X/
14:00 - 15:00	1263	1074	21	19	2377	40	X/
15:00 - 16:00	1557	1042	12	19	2630	31	X/
16:00 - 17:00	1896	1155	29	25	3105	54	X/
17:00 - 18:00	1870	1304	46	17	3237	63	X/
18:00 - 19:00	1500	1103	35	43	2681	78	X/
19:00 - 20:00	1167	996	20	31	2214	51	X/
20:00 - 21:00	850	881	11	15	1757	26	X/
21:00 - 22:00	739	797	7	10	1553	17	X/
22:00 - 23:00	363	430	2	6	801	8	X/
23:00 - 24:00	266	215	1	1	483	2	X/

Allway Stop Warrant: Met (Hr) 0 Required (Hr) 8 Not satisfied

REMARKS: _____



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

TRAFFIC COUNT DATA

ROUTE #: TH-51/SNELLING AVE. NB, S OF GARDEN AVE.

COUNTY: RAMSEY

REF. PT.: 006.604

SITE CODE: APPROACH

OPERATOR: RE

FOR COUNTS BEGINNING: **September 30, 1997**

DATE HOUR \ DAY	29 MON.	30 TUE.	1 WED.	2 THU.	3 FRI.	4 SAT.	5 SUN.	AVE. WK.DAY	AVE. WKEND
0:00 - 1:00			113	126				119	
1:00 - 2:00			62	67				64	
2:00 - 3:00			58	72				65	
3:00 - 4:00			39	45				42	
4:00 - 5:00			48	59				53	
5:00 - 6:00			129	149				139	
6:00 - 7:00			416	390				403	
7:00 - 8:00			862	921				891	
8:00 - 9:00			819	772				795	
9:00 - 10:00			783	796				789	
10:00 - 11:00			865	878				871	
11:00 - 12:00			1147	1263				1205	
12:00 - 13:00		1379	1383	1387				1383	
13:00 - 14:00		1174	1233					1203	
14:00 - 15:00		1248	1279					1263	
15:00 - 16:00		1531	1584					1557	
16:00 - 17:00		1896	1896					1896	
17:00 - 18:00		1842	1899					1870	
18:00 - 19:00		1543	1457					1500	
19:00 - 20:00		1198	1137					1167	
20:00 - 21:00		840	861					850	
21:00 - 22:00		698	780					739	
22:00 - 23:00		358	368					363	
23:00 - 24:00		288	244					266	
TOTAL		13995	19462	6925				19493	

24 HOURS FACTOR:

FACTORED ADT:

REMARKS:

CORRECTED AADT:

DATA FILE --> A:\51GARDEN.da1



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

TRAFFIC COUNT DATA

ROUTE #: GARDEN AVE. EB, W OF TH-51/SNELLING AVE.

COUNTY: RAMSEY

REF. PT.: 006.604

SITE CODE: APPROACH

OPERATOR: RE

FOR COUNTS BEGINNING: **September 30, 1997**

DATE HOUR \ DAY	29 MON.	30 TUE.	1 WED.	2 THU.	3 FRI.	4 SAT.	5 SUN.	AVE. WK.DAY	AVE. WKEND
0:00 - 1:00			0	2				1	
1:00 - 2:00			0	0				0	
2:00 - 3:00			0	0				0	
3:00 - 4:00			0	0				0	
4:00 - 5:00			1	1				1	
5:00 - 6:00			0	0				0	
6:00 - 7:00			5	7				6	
7:00 - 8:00			15	5				10	
8:00 - 9:00			15	19				17	
9:00 - 10:00			9	13				11	
10:00 - 11:00			14	18				16	
11:00 - 12:00			12	10				11	
12:00 - 13:00		15	33	15				21	
13:00 - 14:00		25	18					21	
14:00 - 15:00		26	17					21	
15:00 - 16:00		11	13					12	
16:00 - 17:00		21	37					29	
17:00 - 18:00		49	43					46	
18:00 - 19:00		24	46					35	
19:00 - 20:00		14	27					20	
20:00 - 21:00		17	5					11	
21:00 - 22:00		8	7					7	
22:00 - 23:00		2	2					2	
23:00 - 24:00		2	0					1	
TOTAL		214	319	90				299	

24 HOURS FACTOR:

FACTORED ADT:

REMARKS:

CORRECTED AADT:

DATA FILE --> A:\51GARDEN.da2



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

TRAFFIC COUNT DATA

ROUTE #: TH-51/SNELLING AVE. SB, N OF GARDEN AVE.

COUNTY: RAMSEY

REF. PT.: 006.604

SITE CODE: APPROACH

OPERATOR: RE

FOR COUNTS BEGINNING: **September 30, 1997**

DATE HOUR \ DAY	29 MON.	30 TUE.	1 WED.	2 THU.	3 FRI.	4 SAT.	5 SUN.	AVE. WK.DAY	AVE. WKEND
0:00 - 1:00			109	112				110	
1:00 - 2:00			71	69				70	
2:00 - 3:00			28	39				33	
3:00 - 4:00			46	36				41	
4:00 - 5:00			65	77				71	
5:00 - 6:00			323	333				328	
6:00 - 7:00			774	765				769	
7:00 - 8:00			1525	1567				1546	
8:00 - 9:00			1262	1157				1209	
9:00 - 10:00			744	847				795	
10:00 - 11:00			749	804				776	
11:00 - 12:00		928	878	958				921	
12:00 - 13:00		1168	1111	1178				1152	
13:00 - 14:00		1167	1185					1176	
14:00 - 15:00		1048	1101					1074	
15:00 - 16:00		1057	1027					1042	
16:00 - 17:00		1178	1133					1155	
17:00 - 18:00		1284	1324					1304	
18:00 - 19:00		1088	1118					1103	
19:00 - 20:00		1002	991					996	
20:00 - 21:00		852	911					881	
21:00 - 22:00		808	786					797	
22:00 - 23:00		429	431					430	
23:00 - 24:00		211	219					215	
TOTAL		12220	17911	7942				17994	

24 HOURS FACTOR:

FACTORED ADT:

REMARKS:

CORRECTED AADT:

DATA FILE --> A:\51GARDEN.da3



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

TRAFFIC COUNT DATA

ROUTE #: GARDEN AVE. WB, E OF TH-51/SNELLING AVE.

COUNTY: RAMSEY

REF. PT.: 006.604

SITE CODE: APPROACH

OPERATOR: RE

FOR COUNTS BEGINNING: **September 30, 1997**

DATE HOUR \ DAY	29 MON.	30 TUE.	1 WED.	2 THU.	3 FRI.	4 SAT.	5 SUN.	AVE. WK.DAY	AVE. WKEND
0:00 - 1:00			0	1				0	
1:00 - 2:00			1	4				2	
2:00 - 3:00			0	1				0	
3:00 - 4:00			0	0				0	
4:00 - 5:00			0	0				0	
5:00 - 6:00			0	0				0	
6:00 - 7:00			19	21				20	
7:00 - 8:00			49	54				51	
8:00 - 9:00			27	37				32	
9:00 - 10:00			34	34				34	
10:00 - 11:00			22	20				21	
11:00 - 12:00			7	20				13	
12:00 - 13:00		30	21	22				24	
13:00 - 14:00		15	18					16	
14:00 - 15:00		17	21					19	
15:00 - 16:00		21	18					19	
16:00 - 17:00		24	26					25	
17:00 - 18:00		15	20					17	
18:00 - 19:00		37	49					43	
19:00 - 20:00		26	37					31	
20:00 - 21:00		14	17					15	
21:00 - 22:00		13	7					10	
22:00 - 23:00		7	6					6	
23:00 - 24:00		2	0					1	
TOTAL		221	399	214				399	

24 HOURS FACTOR:

FACTORED ADT:

REMARKS:

CORRECTED AADT:

DATA FILE --> A:\51GARDEN.da4