



MINNESOTA DEPARTMENT OF TRANSPORTATION

METRO DIVISION - TRAFFIC ENGINEERING

SIGNAL WARRANTS ANALYSIS

LOCATION: TH-212 LEG RT FROM TH 812C

COUNTY: CARVER

REF. POINT: 151.894

DATE: 7/19/1995

OPERATOR: DR

| Speed | Approach Description | Lanes |
|-------|------------------------------------|-------|
| 50 | Major App1: TH-169 NB, S OF TH-212 | 2 |
| 50 | Major App3: TH-169 SB, N OF TH-212 | 2 |
| 50 | Minor App2: TH-212 WB, W OF TH-169 | 2 |
| 0 | Minor App4: N/A | 0 |

0.70 FACTOR USED? YES

POPULATION < 10,000? NO

EXISTING SIGNAL ? NO

| HOUR | 420/630 | | | 140/70 | | | 0/0 | | 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 | 109 | 123 | 232 | / | 37 | 0 | / | / | / |
| 1:00 - 2:00 | 99 | 92 | 191 | / | 21 | 0 | / | / | / |
| 2:00 - 3:00 | 81 | 76 | 157 | / | 21 | 0 | / | / | / |
| 3:00 - 4:00 | 99 | 53 | 152 | / | 31 | 0 | / | / | / |
| 4:00 - 5:00 | 147 | 64 | 211 | / | 66 | 0 | / | / | / |
| 5:00 - 6:00 | 468 | 165 | 633 | X/X | 219 | 0 | X/X | / | X/X |
| 6:00 - 7:00 | 996 | 321 | 1317 | X/X | 476 | 0 | X/X | / | X/X |
| 7:00 - 8:00 | 1103 | 449 | 1552 | X/X | 551 | 0 | X/X | / | X/X |
| 8:00 - 9:00 | 773 | 443 | 1216 | X/X | 337 | 0 | X/X | / | X/X |
| 9:00 - 10:00 | 589 | 615 | 1204 | X/X | 271 | 0 | X/X | / | X/X |
| 10:00 - 11:00 | 613 | 566 | 1179 | X/X | 254 | 0 | X/X | / | X/X |
| 11:00 - 12:00 | 597 | 628 | 1225 | X/X | 240 | 0 | X/X | / | X/X |
| 12:00 - 13:00 | 543 | 597 | 1140 | X/X | 254 | 0 | X/X | / | X/X |
| 13:00 - 14:00 | 594 | 611 | 1205 | X/X | 234 | 0 | X/X | / | X/X |
| 14:00 - 15:00 | 606 | 677 | 1283 | X/X | 251 | 0 | X/X | / | X/X |
| 15:00 - 16:00 | 591 | 878 | 1469 | X/X | 241 | 0 | X/X | / | X/X |
| 16:00 - 17:00 | 552 | 1142 | 1694 | X/X | 229 | 0 | X/X | / | X/X |
| 17:00 - 18:00 | 577 | 1154 | 1731 | X/X | 233 | 0 | X/X | / | X/X |
| 18:00 - 19:00 | 526 | 745 | 1271 | X/X | 210 | 0 | X/X | / | X/X |
| 19:00 - 20:00 | 387 | 476 | 863 | X/X | 168 | 0 | X/X | / | X/X |
| 20:00 - 21:00 | 363 | 386 | 749 | X/X | 136 | 0 | /X | / | /X |
| 21:00 - 22:00 | 344 | 404 | 748 | X/X | 125 | 0 | /X | / | /X |
| 22:00 - 23:00 | 318 | 284 | 602 | X/ | 95 | 0 | /X | / | / |
| 23:00 - 24:00 | 199 | 195 | 394 | / | 51 | 0 | / | / | / |

| | Met (Hr) | Required (Hr) | |
|------------|----------|---------------|----------------------------------|
| Warrant 1 | 15 | 8 | Satisfied |
| Warrant 2 | 17 | 8 | Satisfied |
| Warrant 6 | 18 | 8 | Satisfied, check accident record |
| Warrant 8 | 17 | 8 | Satisfied |
| Warrant 9 | 17 | 4 | Satisfied |
| Warrant 11 | 13 | 1 | Satisfied |

LOCATION: TH-212 LEG RT FROM TH 812C

COUNTY: CARVER

REF. POINT: 151.894

DATE: 7/19/1995

OPERATOR: DR

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

| Speed | Approach Description | Lanes |
|-------|------------------------------------|-------|
| 50 | Major App1: TH-169 NB, S OF TH-212 | 2 |
| 50 | Major App3: TH-169 SB, N OF TH-212 | 2 |
| 50 | Minor App2: TH-212 WB, W OF TH-169 | 2 |
| 0 | Minor App4: N/A | 0 |

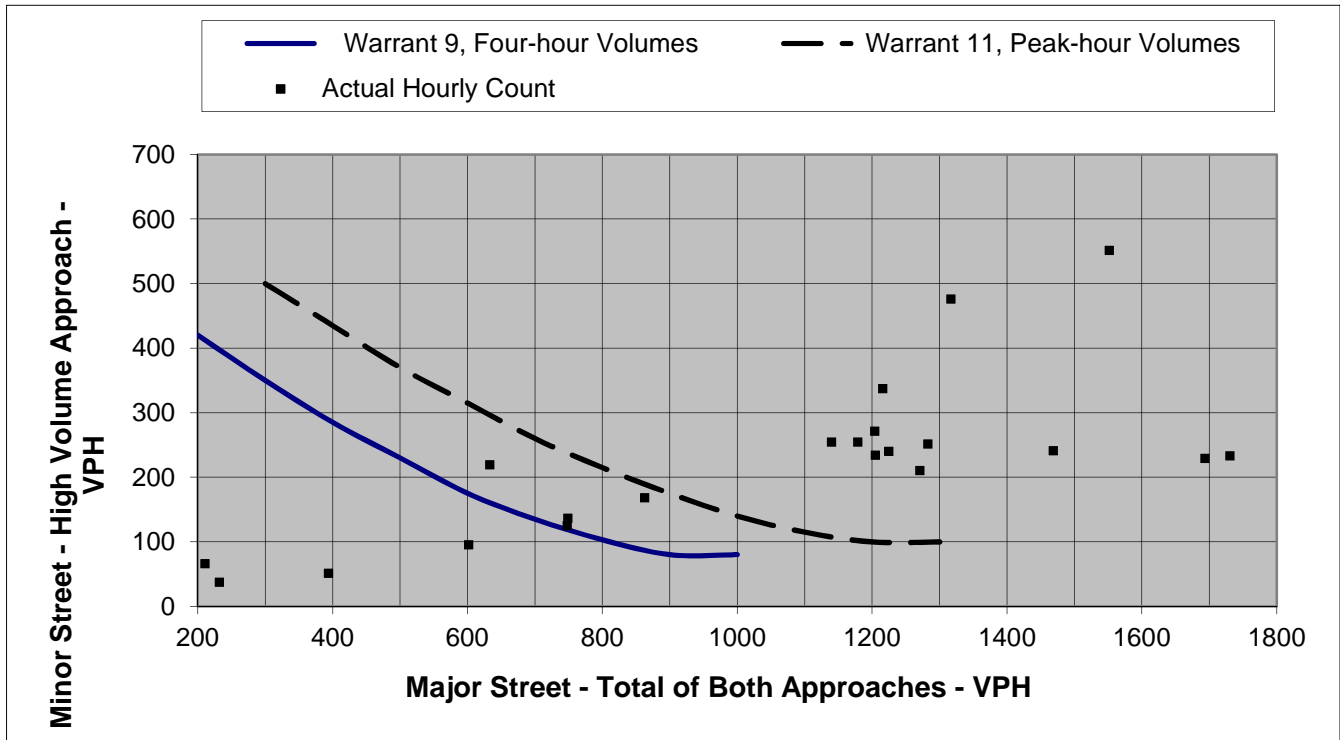


Figure 1. Four Hour and Peak Hour Warrant Analysis

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 | 420 | | 232 | 37 |
| 300 | 350 | 500 | 191 | 21 |
| 400 | 285 | 435 | 157 | 21 |
| 500 | 230 | 370 | 152 | 31 |
| 600 | 175 | 315 | 211 | 66 |
| 700 | 135 | 260 | 633 | 219 |
| 800 | 103 | 215 | 1317 | 476 |
| 900 | 80 | 175 | 1552 | 551 |
| 1000 | 80 | 140 | 1216 | 337 |
| 1100 | | 115 | 1204 | 271 |
| 1200 | | 100 | 1179 | 254 |
| 1300 | | 100 | 1225 | 240 |
| 1400 | | | 1140 | 254 |
| 1500 | | | 1205 | 234 |
| 1600 | | | 1283 | 251 |
| 1700 | | | 1469 | 241 |
| 1800 | | | 1694 | 229 |
| | | | 1731 | 233 |
| | | | 1271 | 210 |
| | | | 863 | 168 |
| | | | 749 | 136 |
| | | | 748 | 125 |
| | | | 602 | 95 |
| | | | 394 | 51 |

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-212 & TH-169 LEG RT FROM MN 901D

COUNTY: CARVER

REF. POINT: 151.894

DATE: 7/19/1995

OPERATOR: DR

| Speed | Approach Description | Lanes |
|-------|------------------------------------|-------|
| 50 | Major App1: TH-169 NB, S OF TH-212 | 2 |
| 50 | Major App3: TH-169 SB, N OF TH-212 | 2 |
| 50 | Minor App2: TH-212 WB, W OF TH-169 | 2 |
| 0 | Minor App4: N/A | 0 |

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 | 109 | 123 | 37 | 0 | 269 | 37 | / |
| 1:00 - 2:00 | 99 | 92 | 21 | 0 | 212 | 21 | / |
| 2:00 - 3:00 | 81 | 76 | 21 | 0 | 178 | 21 | / |
| 3:00 - 4:00 | 99 | 53 | 31 | 0 | 183 | 31 | / |
| 4:00 - 5:00 | 147 | 64 | 66 | 0 | 277 | 66 | / |
| 5:00 - 6:00 | 468 | 165 | 219 | 0 | 852 | 219 | X/X |
| 6:00 - 7:00 | 996 | 321 | 476 | 0 | 1793 | 476 | X/X |
| 7:00 - 8:00 | 1103 | 449 | 551 | 0 | 2103 | 551 | X/X |
| 8:00 - 9:00 | 773 | 443 | 337 | 0 | 1553 | 337 | X/X |
| 9:00 - 10:00 | 589 | 615 | 271 | 0 | 1475 | 271 | X/X |
| 10:00 - 11:00 | 613 | 566 | 254 | 0 | 1433 | 254 | X/X |
| 11:00 - 12:00 | 597 | 628 | 240 | 0 | 1465 | 240 | X/X |
| 12:00 - 13:00 | 543 | 597 | 254 | 0 | 1394 | 254 | X/X |
| 13:00 - 14:00 | 594 | 611 | 234 | 0 | 1439 | 234 | X/X |
| 14:00 - 15:00 | 606 | 677 | 251 | 0 | 1534 | 251 | X/X |
| 15:00 - 16:00 | 591 | 878 | 241 | 0 | 1710 | 241 | X/X |
| 16:00 - 17:00 | 552 | 1142 | 229 | 0 | 1923 | 229 | X/X |
| 17:00 - 18:00 | 577 | 1154 | 233 | 0 | 1964 | 233 | X/X |
| 18:00 - 19:00 | 526 | 745 | 210 | 0 | 1481 | 210 | X/X |
| 19:00 - 20:00 | 387 | 476 | 168 | 0 | 1031 | 168 | X/X |
| 20:00 - 21:00 | 363 | 386 | 136 | 0 | 885 | 136 | X/ |
| 21:00 - 22:00 | 344 | 404 | 125 | 0 | 873 | 125 | X/ |
| 22:00 - 23:00 | 318 | 284 | 95 | 0 | 697 | 95 | X/ |
| 23:00 - 24:00 | 199 | 195 | 51 | 0 | 445 | 51 | X/ |

Met (Hr) Required (Hr)

Allway Stop Warrant: **15** 8 **Satisfied**

REMARKS: _____

