



February 22, 2024

Luke Taylor
KT Development
12000 E 47th Avenue, Suite 101
Denver, Colorado 80239

**RE: Colfax & Norfolk Woodspring Suites
Warrant Analysis
Aurora, Colorado**

Signal warrant analysis needs more information.
Discuss how you derived volumes.
City typically uses 50% of the right turn volume for analysis. This doesn't break out right turn volume.
Provide 8 hour analysis for each hour evaluated.
Describe all assumptions and how you obtained your volumes.

Dear Luke,

SM ROCHA, LLC is pleased to provide traffic analysis for the proposed development at Colfax & Norfolk Woodspring Suites. This development is located at Colfax Avenue (U.S. Highway 40) and Norfolk Street.

The intent of this analysis is to present traffic volume data and provide a traffic volume comparison to previous data for the site, and consider potential impacts to the adjacent street network to conduct a signal warrant analysis for the intersection.

The following is a summary of analysis results:

Additional tables have been added to Appendix B which show an hourly breakdown of the volumes used.

It is noted that no right turn reduction was applied which provides for a conservative analysis. Additionally, it is noted that use of 50% reduction does not alter the analysis findings.

Wording which describes the newly collected traffic counts and how they were adjusted to get total traffic volumes is already provided in the letter. If more specific information is being requested please specify what is needed.

Site Description and Access

Land for the development is currently vacant and surrounded by a mix of residential, industrial, commercial, and institutional land uses. The proposed development is understood to entail the new construction of an approximate 48,650 square-foot hotel supporting 122 rooms.

Proposed access to the development is provided at the following locations: one right-in / right-out access onto Norfolk Street (referred to as Access A) and one full-movement access onto the private drive along the north side of the property (referred to as Access B). It is noted that additional access drives are being proposed into the overall development area. However, these access drives were excluded from this analysis given their distance from the proposed site. It is believed likely that the majority of site-generated traffic will favor utilizing Accesses A and B. This assumption provides for a conservative analysis.

General site and access locations are shown on Figure 1. A site plan, as prepared by Entitlement and Engineering Solutions, Inc., is shown on Figure 2. This plan is provided for illustrative purposes only.



Not to Scale



COLFAX & NORFOLK WOODSPRING SUITES
Traffic Generation Analysis

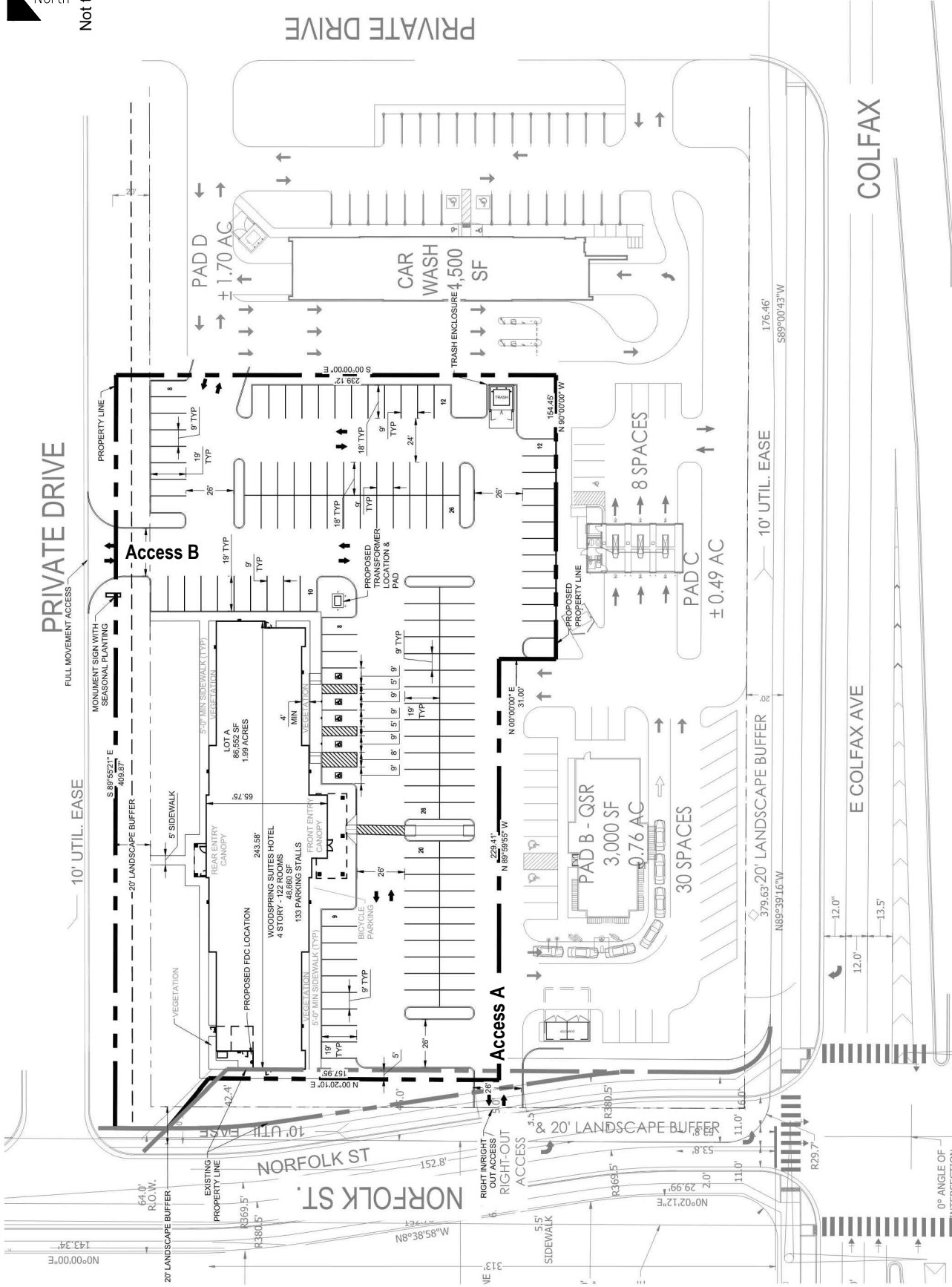
SM ROCHA, LLC
Traffic and Transportation Consultants

Figure 1
SITE LOCATION

February 2024
Page 2



Not to Scale



Vehicle Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation Manual, 11th Edition, were applied to the proposed land use in order to estimate the average daily traffic (ADT) and peak hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from point of origin to point of destination.

Table 1 presents average trip generation rates for the development area proposed. Use of average trip generation rates presents a conservative analysis. ITE land use code 310 (Hotel) was used for analysis because of its conservative rates and best fit to the proposed land use.

Table 1 – Trip Generation Rates

| ITE CODE LAND USE UNIT | | | TRIP GENERATION RATES | | | | | | |
|---|-------|-----|-----------------------|--------------|------|-------|--------------|------|-------|
| | | | 24 HOUR | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | | | ENTER | EXIT | TOTAL | ENTER | EXIT | TOTAL |
| 310 | Hotel | RMS | 7.99 | 0.26 | 0.20 | 0.46 | 0.30 | 0.29 | 0.59 |

Key: RMS = Rooms.

Note: All data and calculations above are subject to being rounded to nearest value.

Table 2 summarizes the projected ADT and peak hour traffic volumes likely generated by the land use area proposed and provides comparison to traffic volume estimates for the previously approved land use as shown within the Station 60 Traffic Impact Study¹.

Table 2 – Trip Generation Summary

| ITE CODELAND USESIZE | | | TOTAL TRIPS GENERATED | | | | | | |
|---|----------------|----------|-----------------------|--------------|------|-------|--------------|------|-------|
| | | | 24 HOUR | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | | | ENTER | EXIT | TOTAL | ENTER | EXIT | TOTAL |
| <u>Site Development - Previously Approved *</u> | | | | | | | | | |
| 821 | Shopping Plaza | 48.7 KSF | 3,286 | 52 | 32 | 84 | 124 | 129 | 253 |
| Previously Approved Total: | | | 3,286 | 52 | 32 | 84 | 124 | 129 | 253 |
| <u>Site Development - Proposed</u> | | | | | | | | | |
| 310 | Hotel | 122 RMS | 975 | 31 | 25 | 56 | 37 | 35 | 72 |
| Proposed Total: | | | 975 | 31 | 25 | 56 | 37 | 35 | 72 |
| Difference Total: | | | -2,311 | -21 | -8 | -28 | -87 | -93 | -181 |

Key: KSF = Thousand Square Feet Gross Floor Area. RMS = Rooms.

* = Trip generation referenced from Station 60: Traffic Impact Study, Kimley-Horn and Associates, Inc., June 2022.

Note: All data and calculations above are subject to being rounded to nearest value.

¹ Station 60: Traffic Impact Study, Kimley-Horn and Associates, Inc., June 2022.

As Table 2 shows, the proposed development area has the potential to generate approximately 975 daily trips with 56 of those occurring during the morning peak hour and 72 during the afternoon peak hour. Table 2 further shows how proposed development traffic volumes do not exceed those approved in the Station 60 traffic study for an equivalent size of assumed shopping plaza.

Adjustments to Trip Generation Rates

A development of this type is not likely to attract trips from within area land uses nor pass-by or diverted link trips from the adjacent roadway system, therefore no trip reduction was taken in this analysis.

Vehicle Trip Generation Comparison & Development Impacts

As Table 2 shows, the proposed development does not exceed traffic volumes approved for the area in comparison to previously projected volumes likely generated by the originally anticipated land use at comparable density. These volumes are not likely to negatively impact operations of E Colfax Avenue, Norfolk Street, nor other adjacent roadways or intersections.

Signal Warrant Analysis

A signal warrant analysis was conducted for the E Colfax Avenue intersection with Norfolk Street in order to review potential for traffic signal control. Signal warrants were performed for Year 2024 existing traffic volumes, as well as for existing volumes with the addition of site generated traffic.

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at the intersection of E Colfax Avenue and Norfolk Street. Average daily traffic (ADT) volumes were collected over a 72-hour period on E Colfax Avenue and Norfolk Street. Counts were collected beginning on Tuesday, February 13, 2024, with AM peak hour counts being collected during the period of 7:00 a.m. to 9:00 a.m. and PM peak hour counts being collected during the period of 4:00 p.m. to 6:00 p.m. Traffic count data is included for reference in Attachment A.

Warrant analysis was performed using Warrant 1 – Eight-Hour Vehicular Volume, Warrant 2 – Four-Hour Vehicular Volumes, and Warrant 3 – Peak Hour, from the Manual on Uniform Traffic Control Devices (MUTCD). Daily traffic patterns for the proposed land use were referenced from the ITE Trip Generation Manual, which includes percentages of daily traffic on a per hour basis for select land use codes.

Analysis results conclude that under existing Year 2024 conditions the study intersection was found to be below the minimum vehicle volumes required to meet Warrant 1, Warrant 2, and Warrant 3, for the installation of a traffic signal at E Colfax Avenue and Norfolk Street. With the addition of site generated traffic from the proposed hotel, the study intersection is shown to be above the minimum volumes to meet Warrant 2 and Warrant 3. Warrant study worksheets are provided for reference in Attachment B.

Based upon the above analysis results, it is anticipated the signal installation will likely be warranted upon build-out of the proposed development.

Conclusion

This analysis assessed traffic generation for the Colfax & Norfolk Woodspring Suites development, provided a traffic volume comparison to previous land use assumptions approved for the development site, and considered potential impacts to the adjacent roadway network.

It is our professional opinion that the proposed site-generated traffic resulting from the development is expected to create no negative impact to traffic operations for the surrounding roadway network and proposed site accesses, nor at the E Colfax Avenue intersection with Norfolk Street and is in compliance with the Station 60 Traffic Impact Study.

Traffic signal warrants conclude that the intersection of E Colfax Avenue and Norfolk Street will likely meet warrants for installation of a traffic signal upon buildout of the proposed development.

We trust that our findings will assist in the planning and approval of the Colfax & Norfolk Woodspring Suites development. Please contact us should further assistance be needed.

Sincerely,

SM ROCHA, LLC

Traffic and Transportation Consultants



Megan Bock, EIT
Traffic Engineer



Fred Lantz, PE
Traffic Engineer

ATTACHMENT A

Traffic Count Data



ALL TRAFFIC DATA SERVICES

(303) 216-2439

www.alltrafficdata.net

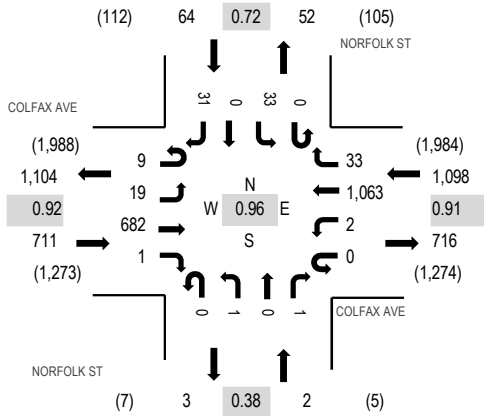
Location: 1 NORFOLK ST & COLFAX AVE AM

Date: Tuesday, February 13, 2024

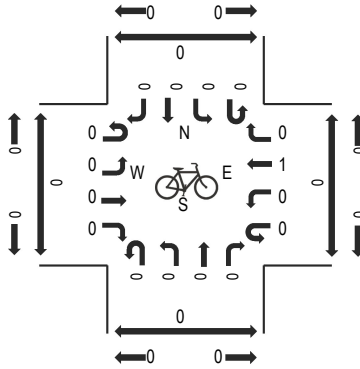
Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:30 AM - 07:45 AM

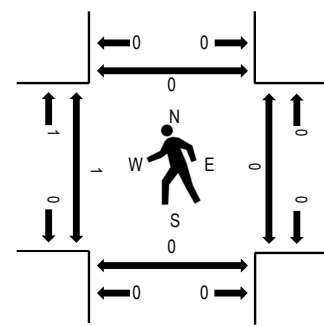
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

| Interval Start Time | COLFAX AVE Eastbound | | | | COLFAX AVE Westbound | | | | NORFOLK ST Northbound | | | | NORFOLK ST Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|-------------------------|------|-------|-------|-------------------------|------|-------|-------|--------------------------|------|------|-------|--------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 7:00 AM | 1 | 2 | 156 | 0 | 0 | 0 | 206 | 13 | 0 | 1 | 0 | 1 | 0 | 8 | 0 | 4 | 392 | 1,844 | 0 | 0 | 0 | 1 |
| 7:15 AM | 3 | 2 | 182 | 0 | 0 | 0 | 265 | 3 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 16 | 478 | 1,875 | 0 | 0 | 0 | 0 |
| 7:30 AM | 2 | 4 | 163 | 0 | 0 | 0 | 291 | 11 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 3 | 489 | 1,787 | 1 | 0 | 0 | 0 |
| 7:45 AM | 3 | 9 | 180 | 1 | 0 | 2 | 267 | 9 | 0 | 0 | 0 | 1 | 0 | 7 | 0 | 6 | 485 | 1,704 | 0 | 0 | 0 | 0 |
| 8:00 AM | 1 | 4 | 157 | 0 | 0 | 0 | 240 | 10 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 6 | 423 | 1,530 | 0 | 0 | 0 | 0 |
| 8:15 AM | 6 | 4 | 130 | 2 | 0 | 1 | 225 | 8 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 7 | 390 | | 1 | 0 | 0 | 1 |
| 8:30 AM | 3 | 7 | 132 | 0 | 0 | 0 | 239 | 11 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 9 | 406 | | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | 2 | 114 | 1 | 0 | 0 | 177 | 6 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 4 | 311 | | 0 | 0 | 1 | 0 |
| Count Total | 21 | 34 | 1,214 | 4 | 0 | 3 | 1,910 | 71 | 0 | 2 | 0 | 3 | 0 | 57 | 0 | 55 | 3,374 | | 2 | 0 | 1 | 2 |
| Peak Hour | 9 | 19 | 682 | 1 | 0 | 2 | 1,063 | 33 | 0 | 1 | 0 | 1 | 0 | 33 | 0 | 31 | 1,875 | | 1 | 0 | 0 | 0 |



ALL TRAFFIC DATA SERVICES

(303) 216-2439

www.alltrafficdata.net

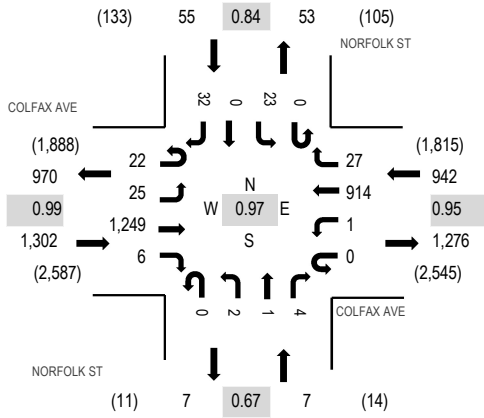
Location: 1 NORFOLK ST & COLFAX AVE PM

Date: Tuesday, February 13, 2024

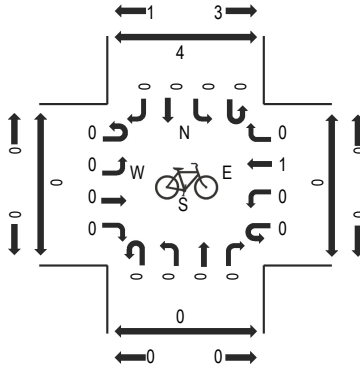
Peak Hour: 04:15 PM - 05:15 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

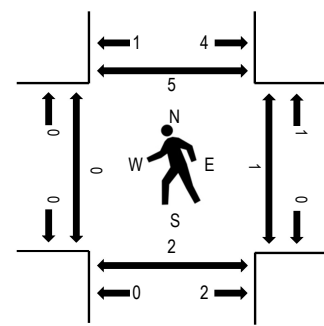
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

| Interval Start Time | COLFAX AVE Eastbound | | | | COLFAX AVE Westbound | | | | NORFOLK ST Northbound | | | | NORFOLK ST Southbound | | | | Total | Rolling Hour | Pedestrian Crossings | | | |
|------------------------|-------------------------|------|-------|-------|-------------------------|------|-------|-------|--------------------------|------|------|-------|--------------------------|------|------|-------|-------|-----------------|----------------------|------|-------|-------|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | | | West | East | South | North |
| 4:00 PM | 6 | 11 | 291 | 0 | 0 | 2 | 208 | 10 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 14 | 551 | 2,262 | 0 | 0 | 0 | 0 |
| 4:15 PM | 7 | 8 | 307 | 1 | 0 | 0 | 238 | 9 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 5 | 581 | 2,306 | 0 | 0 | 1 | 3 |
| 4:30 PM | 8 | 8 | 300 | 3 | 0 | 1 | 222 | 7 | 0 | 0 | 0 | 2 | 0 | 7 | 0 | 8 | 566 | 2,262 | 0 | 0 | 0 | 1 |
| 4:45 PM | 4 | 3 | 322 | 0 | 0 | 0 | 216 | 5 | 0 | 1 | 1 | 1 | 0 | 6 | 0 | 5 | 564 | 2,279 | 0 | 0 | 1 | 1 |
| 5:00 PM | 3 | 6 | 320 | 2 | 0 | 0 | 238 | 6 | 0 | 0 | 0 | 1 | 0 | 5 | 0 | 14 | 595 | 2,287 | 0 | 1 | 0 | 0 |
| 5:15 PM | 2 | 9 | 309 | 0 | 0 | 0 | 193 | 6 | 0 | 0 | 0 | 1 | 0 | 8 | 0 | 9 | 537 | | 0 | 2 | 2 | 0 |
| 5:30 PM | 8 | 3 | 318 | 1 | 0 | 0 | 222 | 6 | 0 | 3 | 0 | 0 | 0 | 10 | 0 | 12 | 583 | | 0 | 0 | 1 | 0 |
| 5:45 PM | 9 | 6 | 311 | 1 | 0 | 0 | 225 | 1 | 0 | 0 | 0 | 3 | 0 | 9 | 0 | 7 | 572 | | 0 | 0 | 1 | 0 |
| Count Total | 47 | 54 | 2,478 | 8 | 0 | 3 | 1,762 | 50 | 0 | 5 | 1 | 8 | 0 | 59 | 0 | 74 | 4,549 | | 0 | 3 | 6 | 5 |
| Peak Hour | 22 | 25 | 1,249 | 6 | 0 | 1 | 914 | 27 | 0 | 2 | 1 | 4 | 0 | 23 | 0 | 32 | 2,306 | | 0 | 1 | 2 | 5 |

| Start Time | 13-Feb-24 Tue | NB | SB | Total |
|------------|------------------|-------|-------|-------|
| 12:00 AM | | 10 | 7 | 17 |
| 01:00 | | 8 | 2 | 10 |
| 02:00 | | 7 | 9 | 16 |
| 03:00 | | 6 | 6 | 12 |
| 04:00 | | 6 | 10 | 16 |
| 05:00 | | 16 | 35 | 51 |
| 06:00 | | 62 | 28 | 90 |
| 07:00 | | 53 | 66 | 119 |
| 08:00 | | 52 | 46 | 98 |
| 09:00 | | 36 | 39 | 75 |
| 10:00 | | 37 | 45 | 82 |
| 11:00 | | 33 | 43 | 76 |
| 12:00 PM | | 51 | 46 | 97 |
| 01:00 | | 30 | 39 | 69 |
| 02:00 | | 39 | 55 | 94 |
| 03:00 | | 55 | 63 | 118 |
| 04:00 | | 62 | 59 | 121 |
| 05:00 | | 43 | 74 | 117 |
| 06:00 | | 45 | 44 | 89 |
| 07:00 | | 47 | 33 | 80 |
| 08:00 | | 43 | 15 | 58 |
| 09:00 | | 33 | 22 | 55 |
| 10:00 | | 24 | 11 | 35 |
| 11:00 | | 22 | 6 | 28 |
| Total | | 820 | 803 | 1623 |
| Percent | | 50.5% | 49.5% | |
| AM Peak | - | 06:00 | 07:00 | - |
| Vol. | - | 62 | 66 | - |
| PM Peak | - | 16:00 | 17:00 | - |
| Vol. | - | 62 | 74 | - |

| Start Time | 14-Feb-24 Wed | NB | SB | Total |
|------------|------------------|-------|-------|-------|
| 12:00 AM | | 13 | 10 | 23 |
| 01:00 | | 9 | 4 | 13 |
| 02:00 | | 6 | 10 | 16 |
| 03:00 | | 3 | 3 | 6 |
| 04:00 | | 3 | 11 | 14 |
| 05:00 | | 14 | 32 | 46 |
| 06:00 | | 77 | 34 | 111 |
| 07:00 | | 47 | 71 | 118 |
| 08:00 | | 38 | 40 | 78 |
| 09:00 | | 52 | 48 | 100 |
| 10:00 | | 40 | 49 | 89 |
| 11:00 | | 39 | 49 | 88 |
| 12:00 PM | | 54 | 66 | 120 |
| 01:00 | | 54 | 42 | 96 |
| 02:00 | | 53 | 56 | 109 |
| 03:00 | | 66 | 58 | 124 |
| 04:00 | | 64 | 56 | 120 |
| 05:00 | | 56 | 81 | 137 |
| 06:00 | | 53 | 42 | 95 |
| 07:00 | | 34 | 35 | 69 |
| 08:00 | | 36 | 27 | 63 |
| 09:00 | | 34 | 21 | 55 |
| 10:00 | | 24 | 8 | 32 |
| 11:00 | | 16 | 14 | 30 |
| Total | | 885 | 867 | 1752 |
| Percent | | 50.5% | 49.5% | |
| AM Peak | - | 06:00 | 07:00 | - |
| Vol. | - | 77 | 71 | - |
| PM Peak | - | 15:00 | 17:00 | - |
| Vol. | - | 66 | 81 | - |

| Start Time | 15-Feb-24 Thu | NB | SB | Total |
|-------------|------------------|-----------|-------|------------|
| 12:00 AM | | 15 | 6 | 21 |
| 01:00 | | 8 | 1 | 9 |
| 02:00 | | 7 | 7 | 14 |
| 03:00 | | 9 | 10 | 19 |
| 04:00 | | 7 | 8 | 15 |
| 05:00 | | 9 | 25 | 34 |
| 06:00 | | 69 | 32 | 101 |
| 07:00 | | 43 | 59 | 102 |
| 08:00 | | 48 | 42 | 90 |
| 09:00 | | 48 | 52 | 100 |
| 10:00 | | 38 | 47 | 85 |
| 11:00 | | 42 | 48 | 90 |
| 12:00 PM | | 65 | 53 | 118 |
| 01:00 | | 38 | 45 | 83 |
| 02:00 | | 46 | 54 | 100 |
| 03:00 | | 65 | 67 | 132 |
| 04:00 | | 73 | 64 | 137 |
| 05:00 | | 57 | 84 | 141 |
| 06:00 | | 54 | 34 | 88 |
| 07:00 | | 46 | 35 | 81 |
| 08:00 | | 29 | 17 | 46 |
| 09:00 | | 19 | 16 | 35 |
| 10:00 | | 28 | 11 | 39 |
| 11:00 | | 16 | 8 | 24 |
| Total | | 879 | 825 | 1704 |
| Percent | | 51.6% | 48.4% | |
| AM Peak | - | 06:00 | 07:00 | - |
| Vol. | - | 69 | 59 | - |
| PM Peak | - | 16:00 | 17:00 | - |
| Vol. | - | 73 | 84 | - |
| Grand Total | | 2584 | 2495 | 5079 |
| Percent | | 50.9% | 49.1% | |
| ADT | | ADT 1,693 | | AADT 1,693 |

| Start Time | 13-Feb-24 Tue | EB | WB | Total |
|------------|------------------|-------------|-------------|-------------|
| 12:00 AM | | 97 | 76 | 173 |
| 01:00 | | 58 | 70 | 128 |
| 02:00 | | 81 | 56 | 137 |
| 03:00 | | 71 | 108 | 179 |
| 04:00 | | 145 | 177 | 322 |
| 05:00 | | 327 | 368 | 695 |
| 06:00 | | 561 | 737 | 1298 |
| 07:00 | | 720 | 1067 | 1787 |
| 08:00 | | 554 | 917 | 1471 |
| 09:00 | | 500 | 663 | 1163 |
| 10:00 | | 564 | 635 | 1199 |
| 11:00 | | 580 | 636 | 1216 |
| 12:00 PM | | 657 | 688 | 1345 |
| 01:00 | | 724 | 617 | 1341 |
| 02:00 | | 929 | 709 | 1638 |
| 03:00 | | 1108 | 949 | 2057 |
| 04:00 | | 1250 | 918 | 2168 |
| 05:00 | | 1295 | 897 | 2192 |
| 06:00 | | 946 | 748 | 1694 |
| 07:00 | | 622 | 508 | 1130 |
| 08:00 | | 447 | 320 | 767 |
| 09:00 | | 335 | 323 | 658 |
| 10:00 | | 219 | 212 | 431 |
| 11:00 | | 149 | 154 | 303 |
| Total | | 12939 | 12553 | 25492 |
| Percent | | 50.8% | 49.2% | |
| AM Peak | - | 07:00 | 07:00 | - |
| Vol. | - | 720 | 1067 | - |
| PM Peak | - | 17:00 | 15:00 | - |
| Vol. | - | 1295 | 949 | - |

| Start Time | 14-Feb-24 Wed | EB | WB | Total |
|------------|------------------|-------|-------|-------|
| 12:00 AM | | 89 | 87 | 176 |
| 01:00 | | 65 | 82 | 147 |
| 02:00 | | 97 | 68 | 165 |
| 03:00 | | 66 | 97 | 163 |
| 04:00 | | 140 | 174 | 314 |
| 05:00 | | 336 | 366 | 702 |
| 06:00 | | 677 | 617 | 1294 |
| 07:00 | | 861 | 990 | 1851 |
| 08:00 | | 634 | 888 | 1522 |
| 09:00 | | 524 | 683 | 1207 |
| 10:00 | | 515 | 647 | 1162 |
| 11:00 | | 600 | 625 | 1225 |
| 12:00 PM | | 671 | 706 | 1377 |
| 01:00 | | 690 | 681 | 1371 |
| 02:00 | | 926 | 848 | 1774 |
| 03:00 | | 1254 | 974 | 2228 |
| 04:00 | | 1172 | 981 | 2153 |
| 05:00 | | 1235 | 956 | 2191 |
| 06:00 | | 889 | 794 | 1683 |
| 07:00 | | 600 | 542 | 1142 |
| 08:00 | | 493 | 318 | 811 |
| 09:00 | | 341 | 284 | 625 |
| 10:00 | | 243 | 211 | 454 |
| 11:00 | | 171 | 166 | 337 |
| Total | | 13289 | 12785 | 26074 |
| Percent | | 51.0% | 49.0% | |
| AM Peak | - | 07:00 | 07:00 | - |
| Vol. | - | 861 | 990 | - |
| PM Peak | - | 15:00 | 16:00 | - |
| Vol. | - | 1254 | 981 | - |

| Start Time | 15-Feb-24 Thu | EB | WB | Total |
|-------------|------------------|-------------|-------------|-------------|
| 12:00 AM | | 120 | 97 | 217 |
| 01:00 | | 62 | 89 | 151 |
| 02:00 | | 95 | 78 | 173 |
| 03:00 | | 78 | 104 | 182 |
| 04:00 | | 157 | 156 | 313 |
| 05:00 | | 351 | 365 | 716 |
| 06:00 | | 584 | 660 | 1244 |
| 07:00 | | 759 | 1061 | 1820 |
| 08:00 | | 564 | 877 | 1441 |
| 09:00 | | 438 | 627 | 1065 |
| 10:00 | | 472 | 587 | 1059 |
| 11:00 | | 569 | 579 | 1148 |
| 12:00 PM | | 673 | 677 | 1350 |
| 01:00 | | 628 | 684 | 1312 |
| 02:00 | | 896 | 831 | 1727 |
| 03:00 | | 1200 | 929 | 2129 |
| 04:00 | | 1203 | 938 | 2141 |
| 05:00 | | 1203 | 923 | 2126 |
| 06:00 | | 833 | 719 | 1552 |
| 07:00 | | 581 | 484 | 1065 |
| 08:00 | | 382 | 309 | 691 |
| 09:00 | | 282 | 272 | 554 |
| 10:00 | | 223 | 196 | 419 |
| 11:00 | | 148 | 136 | 284 |
| Total | | 12501 | 12378 | 24879 |
| Percent | | 50.2% | 49.8% | |
| AM Peak | - | 07:00 | 07:00 | - |
| Vol. | - | 759 | 1061 | - |
| PM Peak | - | 16:00 | 16:00 | - |
| Vol. | - | 1203 | 938 | - |
| Grand Total | | 38729 | 37716 | 76445 |
| Percent | | 50.7% | 49.3% | |
| ADT | | ADT 25,482 | ADT 25,482 | |

ATTACHMENT B

Warrant Analysis Forms

Standard:

04 The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

06 The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Standard:

07 The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and
- B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

| Number of lanes for moving traffic on each approach | | Vehicles per hour on major street (total of both approaches) | | | | Vehicles per hour on higher-volume minor-street approach (one direction only) | | | |
|---|--------------|--|------------------|------------------|------------------|---|------------------|------------------|------------------|
| Major Street | Minor Street | 100% ^a | 80% ^b | 70% ^c | 56% ^d | 100% ^a | 80% ^b | 70% ^c | 56% ^d |
| 1 | 1 | 500 | 400 | 350 | 280 | 150 | 120 | 105 | 84 |
| 2 or more | 1 | 600 | 480 | 420 | 336 | 150 | 120 | 105 | 84 |
| 2 or more | 2 or more | 600 | 480 | 420 | 336 | 200 | 160 | 140 | 112 |
| 1 | 2 or more | 500 | 400 | 350 | 280 | 200 | 160 | 140 | 112 |

Condition B—Interruption of Continuous Traffic

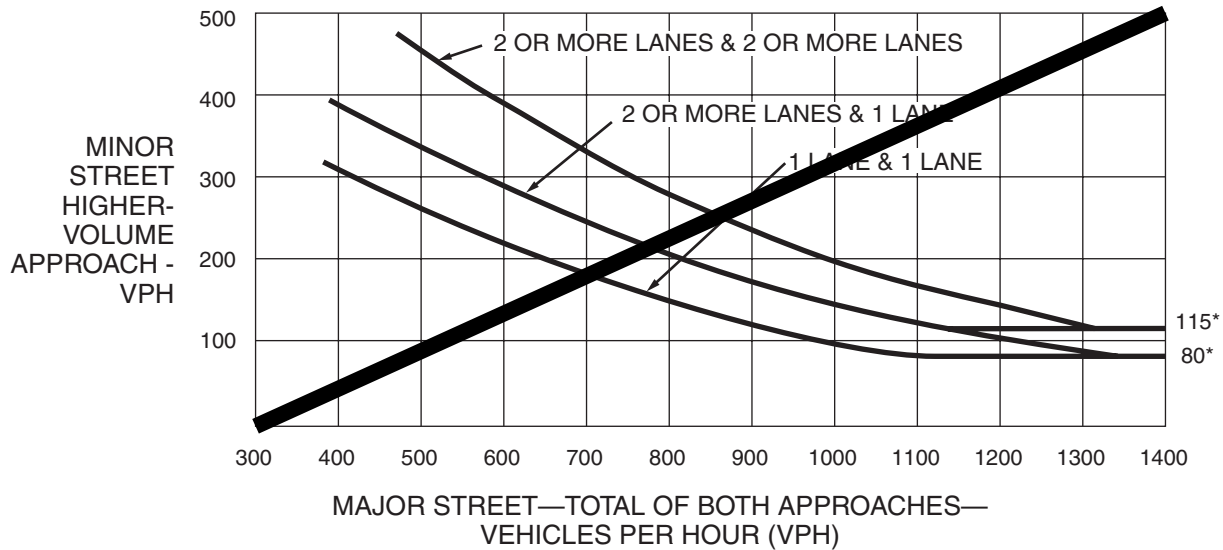
| Number of lanes for moving traffic on each approach | | Vehicles per hour on major street (total of both approaches) | | | | Vehicles per hour on higher-volume minor-street approach (one direction only) | | | |
|---|--------------|--|------------------|------------------|------------------|---|------------------|------------------|------------------|
| Major Street | Minor Street | 100% ^a | 80% ^b | 70% ^c | 56% ^d | 100% ^a | 80% ^b | 70% ^c | 56% ^d |
| 1 | 1 | 750 | 600 | 525 | 420 | 75 | 60 | 53 | 42 |
| 2 or more | 1 | 900 | 720 | 630 | 504 | 75 | 60 | 53 | 42 |
| 2 or more | 2 or more | 900 | 720 | 630 | 504 | 100 | 80 | 70 | 56 |
| 1 | 2 or more | 750 | 600 | 525 | 420 | 100 | 80 | 70 | 56 |

^a Basic minimum hourly volume

^b Used for combination of Conditions A and B after adequate trial of other remedial measures

^c May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

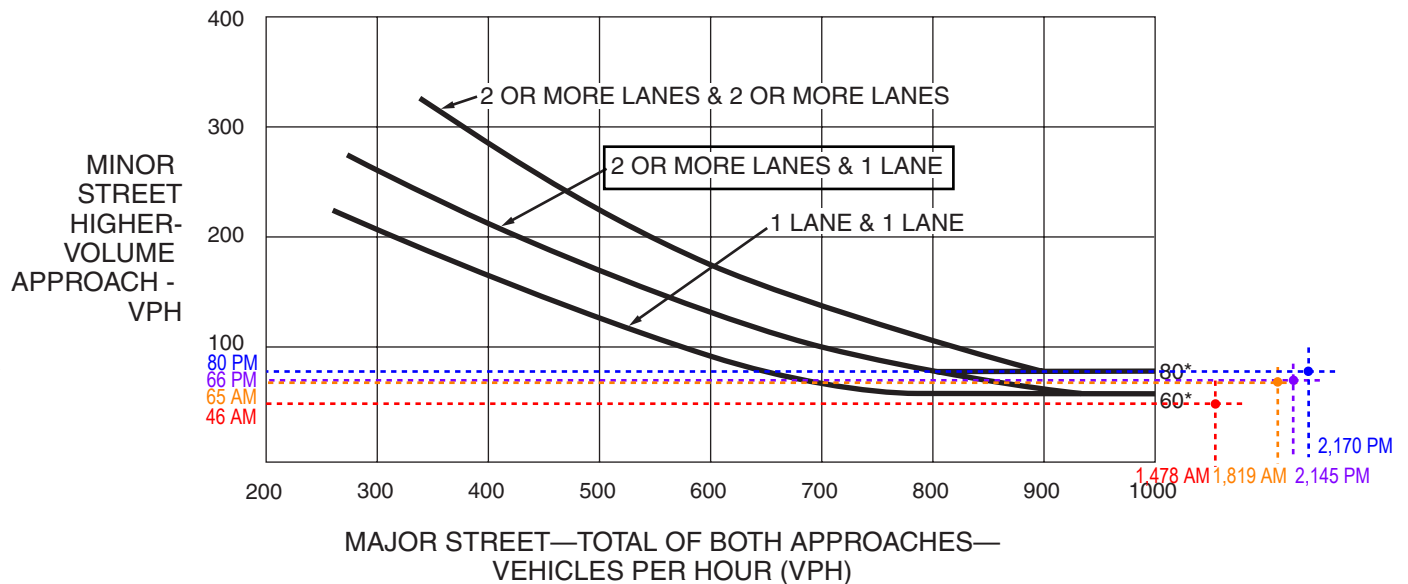
^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

Key:

7:00 AM - 8:00 AM

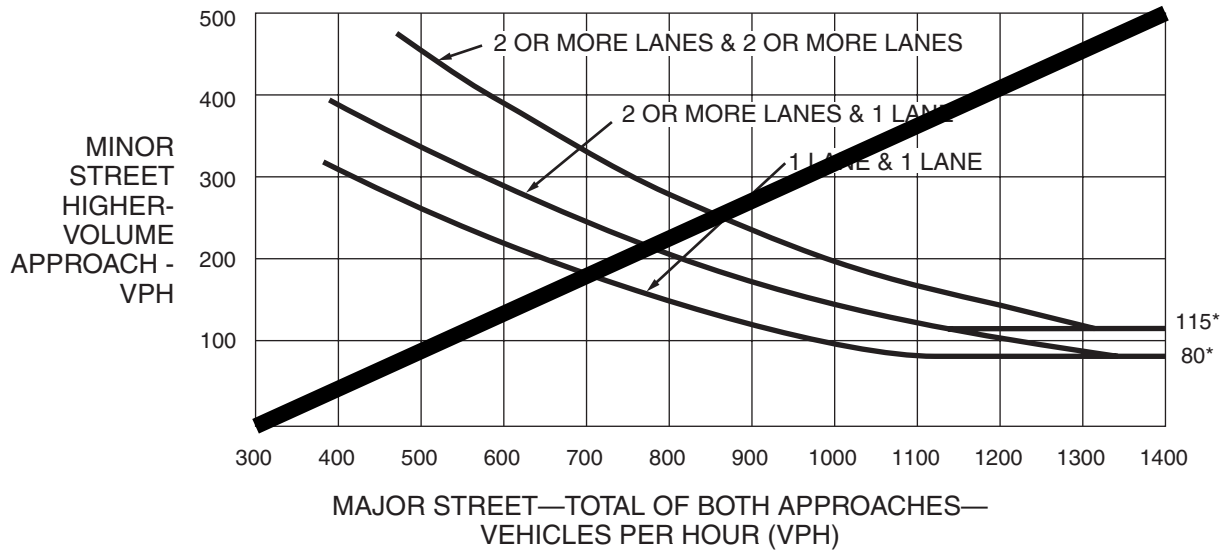
8:00 AM - 9:00 AM

4:00 PM - 5:00 PM

5:00 PM - 6:00 PM

E COLFAX AVENUE (45 MPH)

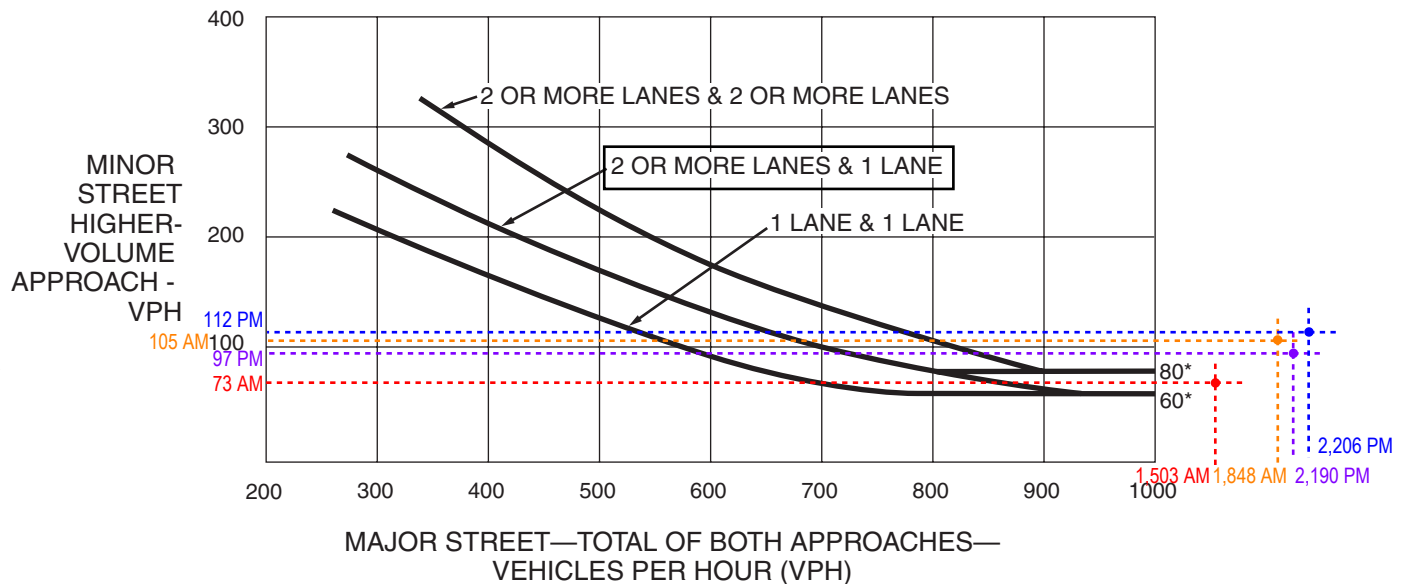
December 2009

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

Key:

7:00 AM - 8:00 AM

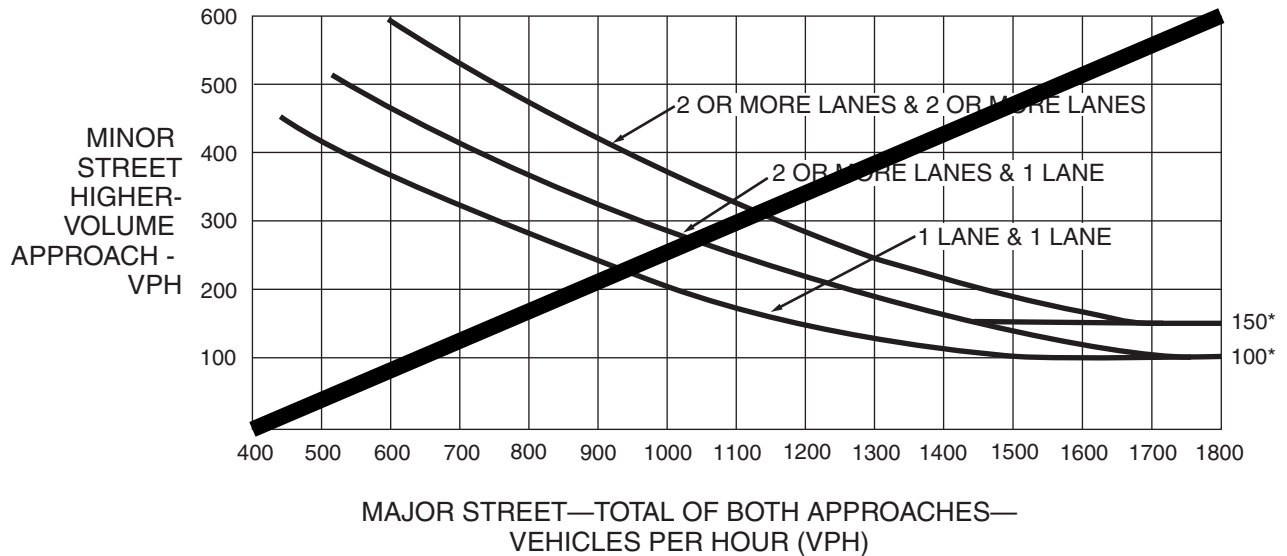
8:00 AM - 9:00 AM

4:00 PM - 5:00 PM

5:00 PM - 6:00 PM

E COLFAX AVENUE (45 MPH)

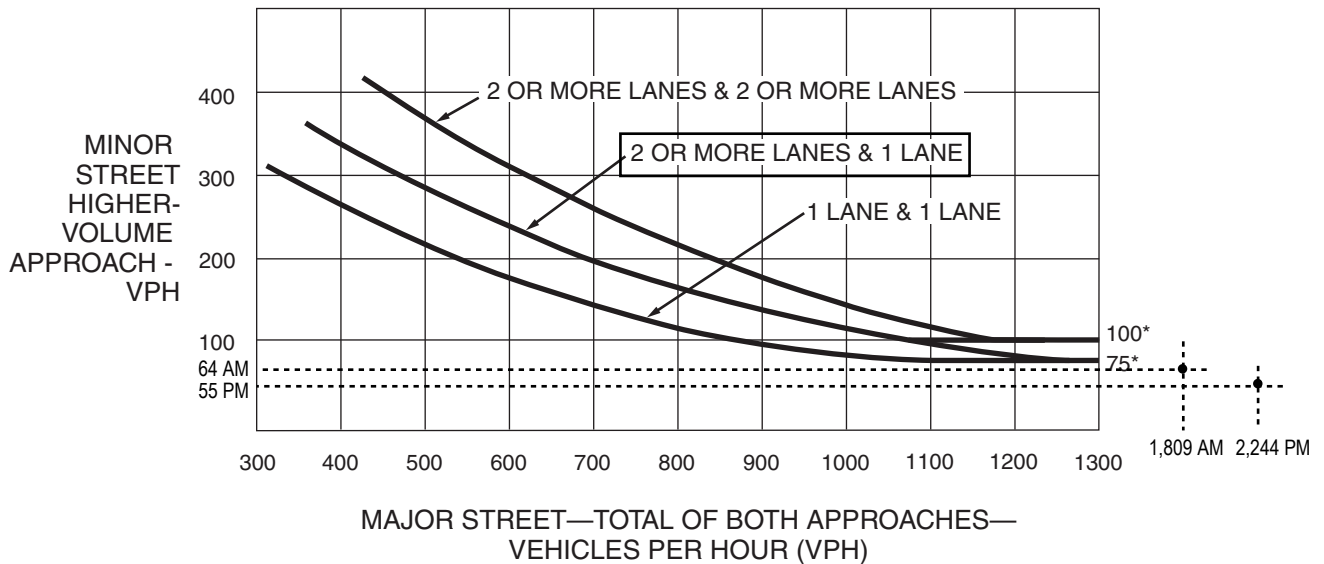
December 2009

Figure 4C-3. Warrant 3, Peak Hour

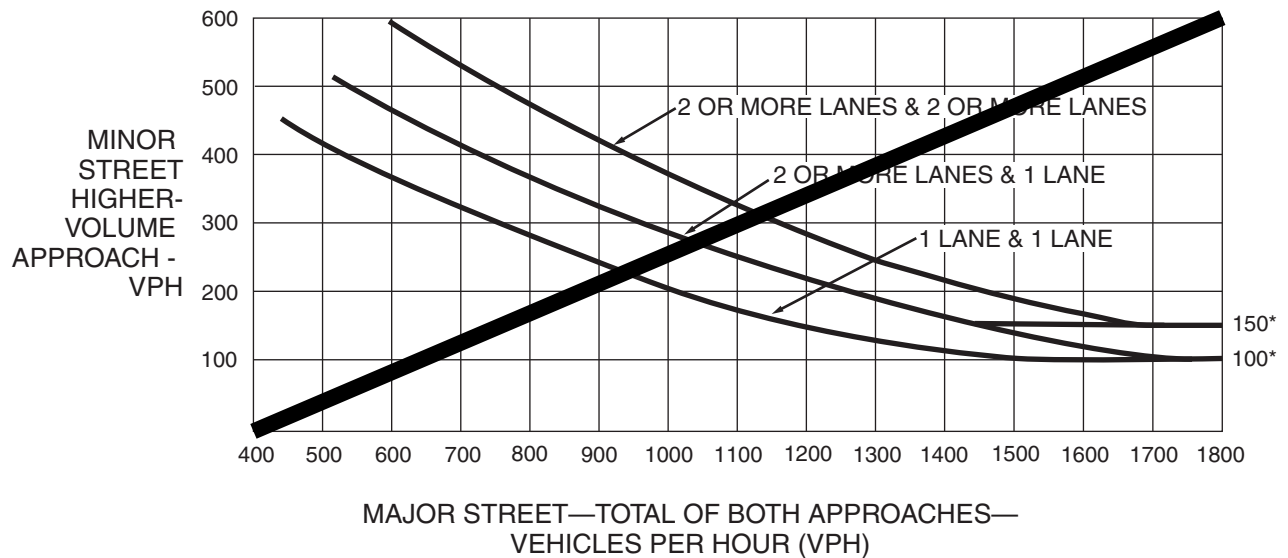
*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



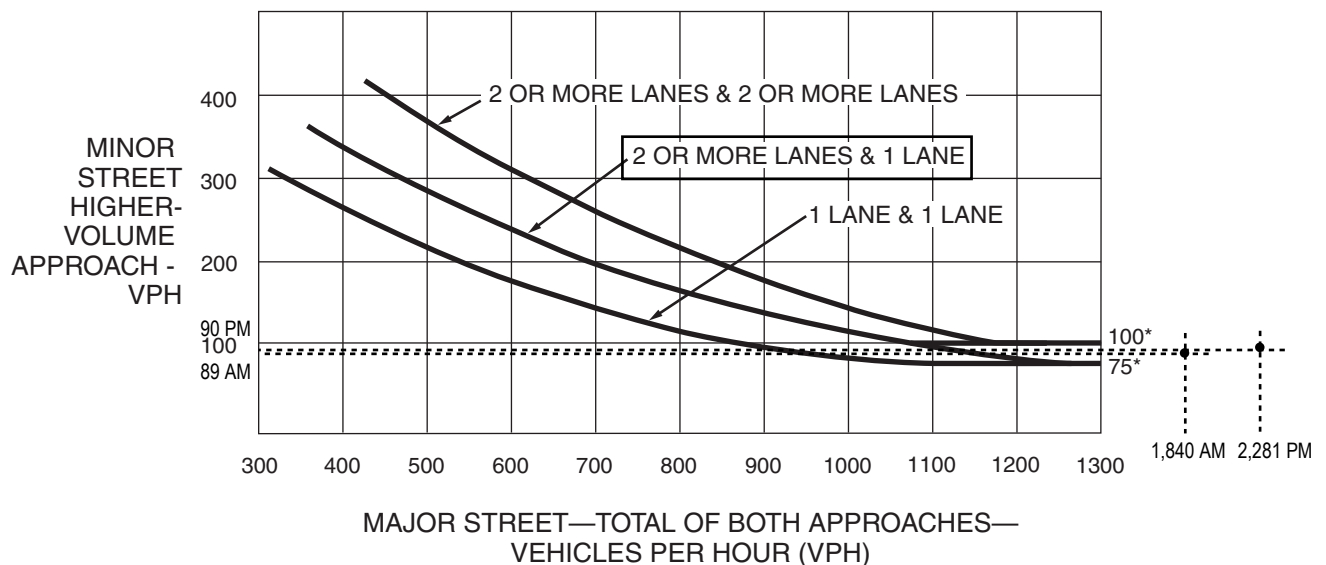
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.