

final report

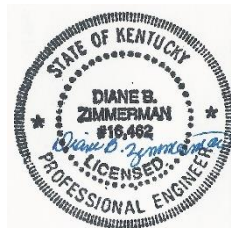
November 10, 2020

Traffic Impact Study

*Warehouse Complex
Minor Lane
Louisville, KY*

Prepared for

Louisville Metro Planning Commission



DIANE B. ZIMMERMAN
Traffic Engineering, LLC

12803 High Meadows Pike
Prospect, KY 40059
502.648.1858
dianezim@att.net



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INTRODUCTION

The development plan for a warehouse complex on Minor Lane in Louisville, KY shows 1,355,000 square feet. The site currently has 85 manufactured home sites, which will be removed. **Figure 1** displays a map of the site. Access to the development will be from two entrances on Minor Lane. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study, the impact area was defined to be the intersection of Minor Lane at Outer Loop and the proposed entrances.

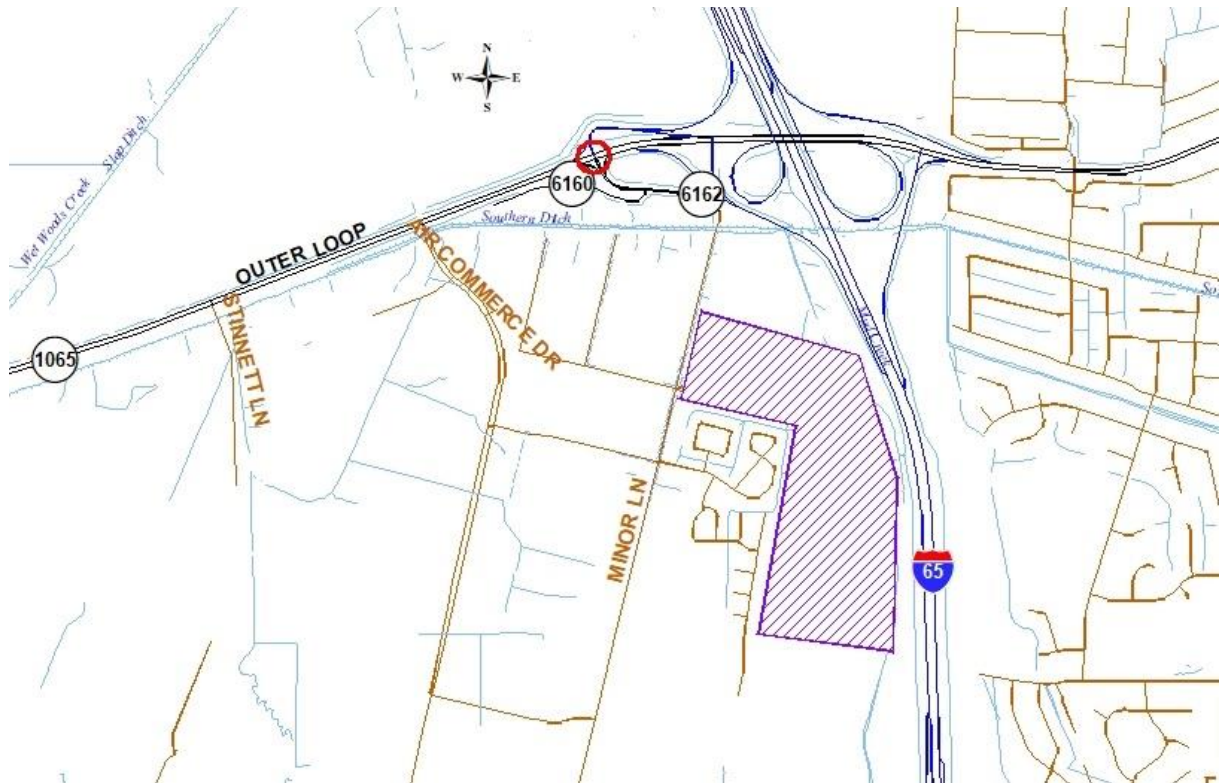


Figure 1. Site Map

EXISTING CONDITIONS

Minor Lane is maintained by the Louisville Metro with an estimated 2020 ADT of 6,000 vehicles per day between Outer Loop and Transglobal Drive as estimated from a 2016 turning movement count at Outer Loop. The road is a two-lane roadway with twelve-foot lanes, with a two-foot shoulder. The speed limit is 35 mph. There are no sidewalks. The intersection with Outer Loop is controlled with a traffic signal. At the intersection there are dual left turn lanes. All right turn lanes at the intersection operate as free-flow.

Peak hour traffic count for the intersections was obtained from the Traffic Impact Study for Louisville Renaissance Zone Renaissance Business Park dated October 2016 and prepared by The Corradino Group. The counts were collected in August 2016. **Figure 2** illustrates the 2016 a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data from that study.

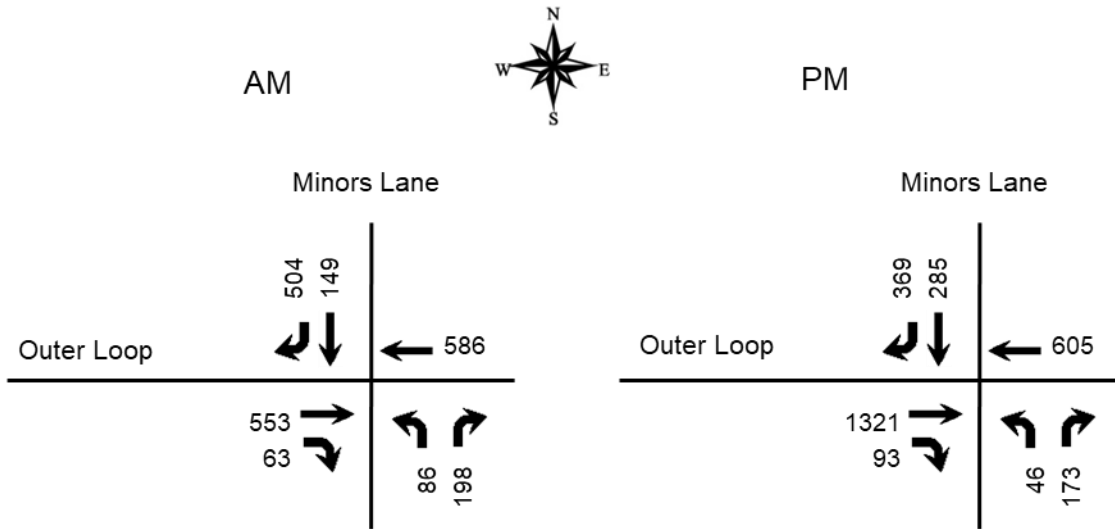


Figure 2. Existing (2016) Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2022. An annual growth rate of 0.5 percent was applied to the 2016 volumes. This was determined by the historical growth at KYTC stations 632. The trip generation from the Louisville Renaissance Business Park has been included as fully completed. **Figure 3** displays the 2022 No Build peak hour volumes.

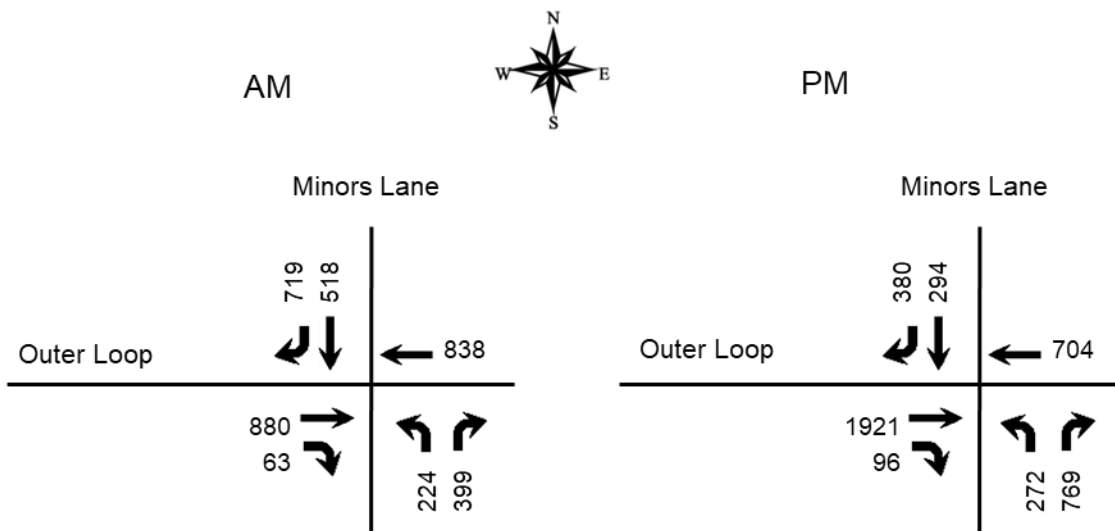


Figure 3. No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 10th Edition contains trip generation rates for a wide range of developments. The land use “Warehouse (150)” was used. The trip generation results are listed in **Table 1**. The new trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows the trips generated by this development and distributed throughout the road network during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

| Land Use | A.M. Peak Hour | | | P.M. Peak Hour | | |
|-----------------------|----------------|-----|-----|----------------|----|-----|
| | Trips | In | Out | Trips | In | Out |
| Warehouse (1,355,000) | 188 | 144 | 44 | 190 | 51 | 139 |

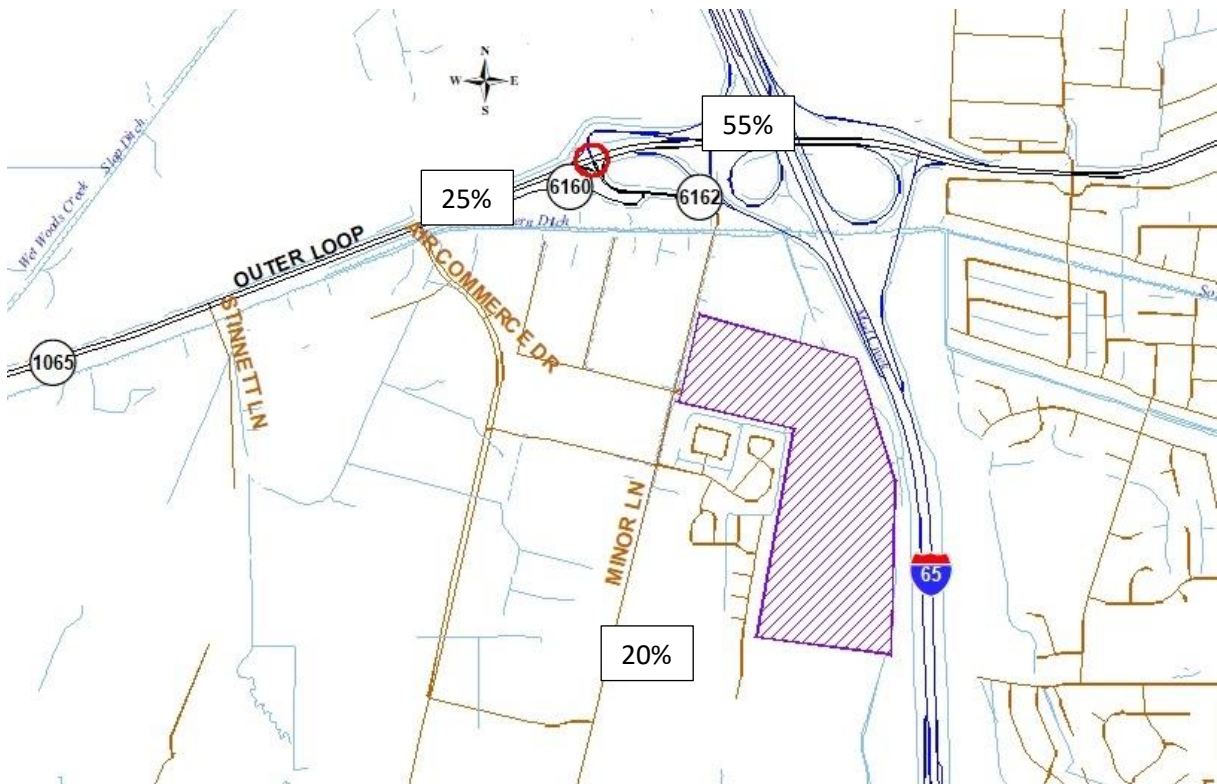


Figure 4. Trip Distribution Percentages

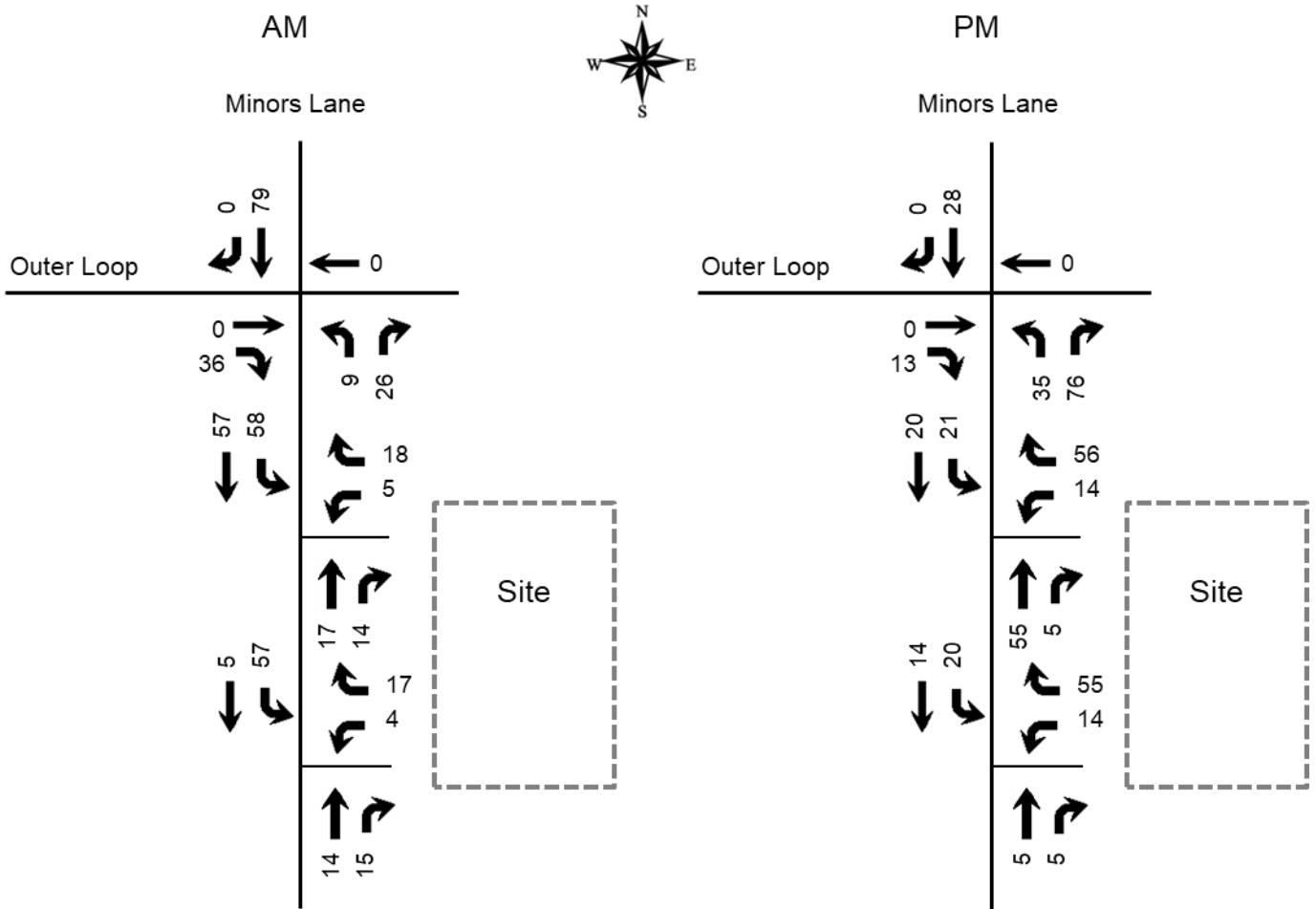


Figure 5. Peak Hour Trips Generated by Site

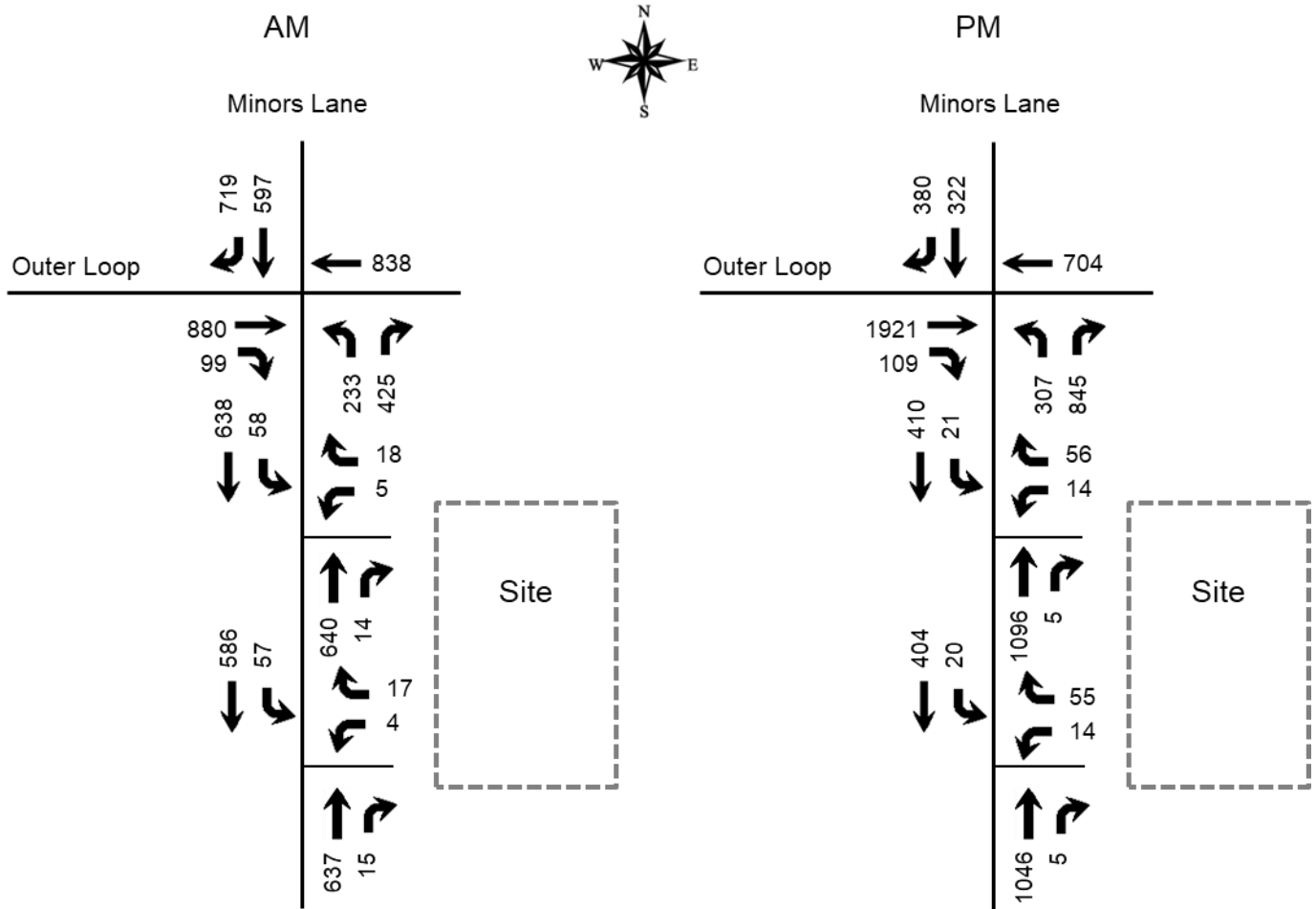


Figure 6. Build Peak Hour Volumes

ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a “Level of Service”. Level of Service is a ranking scale from A through F, “A” is the best operating condition and “F” is the worst. Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 6th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 7.9) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

| Approach | A.M. | | | P.M. | | |
|---------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | 2018 Existing | 2022 No Build | 2022 Build | 2018 Existing | 2022 No Build | 2022 Build |
| Outer Loop at Minor Lane | B 17.5 | C 28.5 | C 33.8 | C 21.5 | C 28.9 | C 28.7 |
| Outer Loop Westbound | B 17.5 | C 22.5 | C 21.5 | C 21.0 | D 37.7 | D 36.7 |
| Outer Loop Eastbound | B 18.8 | C 22.7 | C 22.7 | B 16.6 | B 19.5 | B 19.5 |
| Minor Lane Northbound | B 19.3 | C 22.2 | C 22.0 | B 16.1 | B 19.3 | B 20.0 |
| I 65 Ramp Southbound | B 15.7 | D 40.3 | E 55.7 | C 29.1 | C 29.3 | C 31.2 |
| Minor Lane at Entrance (North) | | | | | | |
| Entrance Westbound | | | C 15.0 | | | C 24.5 |
| Minor Lane Southbound | | | A 9.4 | | | B 11.2 |
| Minor Lane at Entrance (South) | | | | | | |
| Entrance Westbound | | | B 14.7 | | | C 22.8 |
| Minor Lane Southbound | | | A 9.4 | | | B 10.9 |

Key: Level of Service, Delay in seconds per vehicle

The entrance was evaluated for turn lanes using the Kentucky Transportation Cabinet [Highway Design Guidance Manual](#) dated July, 2020. Left turn lanes are required at the entrances.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2022, there will be a manageable impact to the existing highway network, with Levels of Service remaining within acceptable limits. The delays experienced in the area will increase within acceptable limits. Left turn lanes will be required at the entrances.

APPENDIX

Traffic Counts

Cummins Consulting Services, PLLC
4661 Mariberry Place
Lexington, Kentucky, United States 40509
859.361.2589
You can count on CCS

Rain - 80 Degrees
JCPS in Session

Count Name: Minors at Outer Loop
Site Code: Site 4
Start Date: 08/18/2016
Page No: 1

Turning Movement Data

| Start Time | Minors Lane Ramp Southbound | | | | KY1065 - Outer Loop Road Westbound | | | | Minors Lane Northbound | | | | KY1065 - Outer Loop Road Eastbound | | | | Int. Total |
|------------------------|-----------------------------|------|-------|------------|------------------------------------|------|-------|------------|------------------------|------|-------|------------|------------------------------------|------|-------|------------|------------|
| | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | |
| 7:00 AM | 0 | 38 | 78 | 116 | 0 | 105 | 0 | 105 | 9 | 0 | 56 | 65 | 0 | 131 | 7 | 138 | 424 |
| 7:15 AM | 0 | 34 | 120 | 154 | 0 | 113 | 0 | 113 | 24 | 0 | 54 | 78 | 0 | 128 | 7 | 135 | 480 |
| 7:30 AM | 0 | 37 | 133 | 170 | 0 | 154 | 0 | 154 | 13 | 0 | 66 | 79 | 0 | 152 | 13 | 165 | 568 |
| 7:45 AM | 0 | 43 | 144 | 187 | 0 | 164 | 0 | 164 | 32 | 0 | 47 | 79 | 0 | 129 | 21 | 150 | 580 |
| Hourly Total | 0 | 152 | 475 | 627 | 0 | 536 | 0 | 536 | 78 | 0 | 223 | 301 | 0 | 540 | 48 | 588 | 2052 |
| 8:00 AM | 0 | 33 | 115 | 148 | 0 | 126 | 0 | 126 | 26 | 0 | 37 | 63 | 0 | 134 | 15 | 149 | 486 |
| 8:15 AM | 0 | 36 | 112 | 148 | 0 | 142 | 0 | 142 | 15 | 0 | 48 | 63 | 0 | 138 | 14 | 152 | 505 |
| 8:30 AM | 0 | 43 | 97 | 140 | 0 | 130 | 0 | 130 | 13 | 0 | 37 | 50 | 0 | 133 | 15 | 148 | 468 |
| 8:45 AM | 0 | 27 | 97 | 124 | 1 | 109 | 0 | 110 | 14 | 0 | 53 | 67 | 0 | 207 | 21 | 228 | 529 |
| Hourly Total | 0 | 139 | 421 | 560 | 1 | 507 | 0 | 508 | 68 | 0 | 175 | 243 | 0 | 612 | 65 | 677 | 1988 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4:00 PM | 0 | 56 | 87 | 143 | 0 | 113 | 0 | 113 | 20 | 0 | 53 | 73 | 0 | 310 | 20 | 330 | 659 |
| 4:15 PM | 0 | 66 | 79 | 145 | 0 | 120 | 0 | 120 | 10 | 0 | 34 | 44 | 0 | 300 | 20 | 320 | 629 |
| 4:30 PM | 0 | 64 | 74 | 138 | 0 | 116 | 0 | 116 | 19 | 0 | 41 | 60 | 0 | 330 | 30 | 360 | 674 |
| 4:45 PM | 0 | 61 | 93 | 154 | 0 | 136 | 0 | 136 | 10 | 0 | 49 | 59 | 0 | 331 | 23 | 354 | 703 |
| Hourly Total | 0 | 247 | 333 | 580 | 0 | 485 | 0 | 485 | 59 | 0 | 177 | 236 | 0 | 1271 | 93 | 1364 | 2665 |
| 5:00 PM | 0 | 67 | 78 | 145 | 0 | 154 | 0 | 154 | 10 | 0 | 48 | 58 | 0 | 380 | 27 | 407 | 764 |
| 5:15 PM | 0 | 83 | 91 | 174 | 0 | 148 | 0 | 148 | 18 | 0 | 42 | 60 | 0 | 271 | 27 | 298 | 680 |
| 5:30 PM | 0 | 74 | 107 | 181 | 0 | 167 | 0 | 167 | 8 | 0 | 34 | 42 | 0 | 339 | 16 | 355 | 745 |
| 5:45 PM | 0 | 47 | 97 | 144 | 1 | 183 | 0 | 184 | 10 | 0 | 35 | 45 | 0 | 277 | 18 | 295 | 668 |
| Hourly Total | 0 | 271 | 373 | 644 | 1 | 652 | 0 | 653 | 46 | 0 | 159 | 205 | 0 | 1267 | 88 | 1355 | 2857 |
| Grand Total | 0 | 809 | 1602 | 2411 | 2 | 2180 | 0 | 2182 | 251 | 0 | 734 | 985 | 0 | 3690 | 294 | 3984 | 9562 |
| Approach % | 0.0 | 33.6 | 66.4 | - | 0.1 | 99.9 | 0.0 | - | 25.5 | 0.0 | 74.5 | - | 0.0 | 92.6 | 7.4 | - | - |
| Total % | 0.0 | 8.5 | 16.8 | 25.2 | 0.0 | 22.8 | 0.0 | 22.8 | 2.6 | 0.0 | 7.7 | 10.3 | 0.0 | 38.6 | 3.1 | 41.7 | - |
| Motorcycles | 0 | 2 | 1 | 3 | 0 | 6 | 0 | 6 | 0 | 0 | 2 | 2 | 0 | 7 | 2 | 9 | 20 |
| % Motorcycles | - | 0.2 | 0.1 | 0.1 | 0.0 | 0.3 | - | 0.3 | 0.0 | - | 0.3 | 0.2 | - | 0.2 | 0.7 | 0.2 | 0.2 |
| Cars | 0 | 579 | 1260 | 1839 | 2 | 1646 | 0 | 1648 | 182 | 0 | 565 | 747 | 0 | 2615 | 209 | 2824 | 7058 |
| % Cars | - | 71.6 | 78.7 | 76.3 | 100.0 | 75.5 | - | 75.5 | 72.5 | - | 77.0 | 75.8 | - | 70.9 | 71.1 | 70.9 | 73.8 |
| Light Goods Vehicles | 0 | 174 | 64 | 238 | 0 | 338 | 0 | 338 | 48 | 0 | 105 | 153 | 0 | 605 | 52 | 657 | 1386 |
| % Light Goods Vehicles | - | 21.5 | 4.0 | 9.9 | 0.0 | 15.5 | - | 15.5 | 19.1 | - | 14.3 | 15.5 | - | 16.4 | 17.7 | 16.5 | 14.5 |
| Buses | 0 | 13 | 15 | 28 | 0 | 7 | 0 | 7 | 3 | 0 | 10 | 13 | 0 | 10 | 9 | 19 | 67 |
| % Buses | - | 1.6 | 0.9 | 1.2 | 0.0 | 0.3 | - | 0.3 | 1.2 | - | 1.4 | 1.3 | - | 0.3 | 3.1 | 0.5 | 0.7 |
| Single-Unit Trucks | 0 | 15 | 150 | 165 | 0 | 99 | 0 | 99 | 10 | 0 | 25 | 35 | 0 | 271 | 14 | 285 | 584 |
| % Single-Unit Trucks | - | 1.9 | 9.4 | 6.8 | 0.0 | 4.5 | - | 4.5 | 4.0 | - | 3.4 | 3.6 | - | 7.3 | 4.8 | 7.2 | 6.1 |
| Articulated Trucks | 0 | 26 | 112 | 138 | 0 | 84 | 0 | 84 | 8 | 0 | 27 | 35 | 0 | 182 | 8 | 190 | 447 |
| % Articulated Trucks | - | 3.2 | 7.0 | 5.7 | 0.0 | 3.9 | - | 3.8 | 3.2 | - | 3.7 | 3.6 | - | 4.9 | 2.7 | 4.8 | 4.7 |

Trip Distribution from Louisville Renaissance Business Park

Table 7 - Outer Loop and Air Commerce Drive Trip Distribution Results

| | NBL | NBT | NBR | SBL | SBT | SBR | EBL | EBT | EBR | WBL | WBT | WBR |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| AM Cars | 67 | -- | 118 | -- | -- | -- | -- | 133 | 76 | 378 | 128 | -- |
| AM Trucks | 19 | -- | 37 | -- | -- | -- | -- | 22 | 27 | 56 | 7 | -- |
| PM Cars | 132 | -- | 379 | -- | -- | -- | -- | 52 | 22 | 98 | 217 | -- |
| PM Trucks | 25 | -- | 126 | -- | -- | -- | -- | 3 | 8 | 26 | 8 | -- |

Table 8 - Outer Loop and Minors Lane Trip Distribution Results

| | NBL | NBT | NBR | SBL | SBT | SBR | EBL | EBT | EBR | WBL | WBT | WBR |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| AM Cars | 128 | -- | 181 | -- | 329 | 176 | -- | 202 | -- | -- | 118 | -- |
| AM Trucks | 7 | -- | 14 | -- | 40 | 24 | -- | 32 | -- | -- | 37 | -- |
| PM Cars | 217 | -- | 549 | -- | 128 | 35 | -- | 63 | -- | -- | 379 | -- |
| PM Trucks | 8 | -- | 42 | -- | 11 | 8 | -- | 18 | -- | -- | 126 | -- |

At Minor Lane EB and WB columns are reversed when compared with Air Commerce Drive trips.

HCS Reports

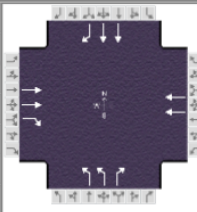
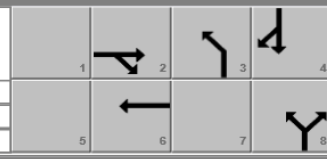
| HCS7 Signalized Intersection Results Summary | | | | | | | | | | | | | | | |
|--|--|-----------------|---------------|-----------|-------|---------------------------------|---------|-----|------|------|-------|-----|----|--|--|
| General Information | | | | | | Intersection Information | | | | | | | | | |
| Agency | Diane B. Zimmerman Traffic Engineering | | | | | Duration, h | 0.250 | | | | | | | | |
| Analyst | DBZ | | Analysis Date | 11/4/2020 | | Area Type | Other | | | | | | | | |
| Jurisdiction | | | Time Period | AM Peak | | PHF | 0.92 | | | | | | | | |
| Urban Street | Outer Loop | | Analysis Year | 2016 | | Analysis Period | 1> 7:30 | | | | | | | | |
| Intersection | Minors Ln/I 65 SB | | File Name | AM 16.xus | | | | | | | | | | | |
| Project Description | Minor Warehouses | | | | | | | | | | | | | | |
| Demand Information | | | | EB | | | WB | | | NB | | | SB | | |
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R | | | |
| Demand (v), veh/h | | 553 | 63 | | 586 | | 86 | | 198 | | 149 | 504 | | | |
| Signal Information | | | | | | | | | | | | | | | |
| Cycle, s | 140.0 | Reference Phase | 2 | Green | 75.2 | 22.9 | 21.1 | 0.0 | 0.0 | 0.0 | | | | | |
| Offset, s | 0 | Reference Point | End | Yellow | 5.1 | 5.1 | 3.6 | 0.0 | 0.0 | 0.0 | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Red | 2.0 | 2.0 | 3.0 | 0.0 | 0.0 | 0.0 | | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | | | | | | | | | | | | |
| Timer Results | | | | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT | | | | |
| Assigned Phase | | | | | 2 | | 6 | | 8 | | 4 | | | | |
| Case Number | | | | | 7.0 | | 8.0 | | 9.0 | | 11.0 | | | | |
| Phase Duration, s | | | | | 82.3 | | 82.3 | | 27.7 | | 30.0 | | | | |
| Change Period, (Y+R _c), s | | | | | 7.1 | | 7.1 | | 6.6 | | 7.1 | | | | |
| Max Allow Headway (MAH), s | | | | | 0.0 | | 0.0 | | 5.2 | | 5.3 | | | | |
| Queue Clearance Time (g _s), s | | | | | | | | | 20.7 | | 24.9 | | | | |
| Green Extension Time (g _e), s | | | | | 0.0 | | 0.0 | | 0.5 | | 0.0 | | | | |
| Phase Call Probability | | | | | | | | | 1.00 | | 1.00 | | | | |
| Max Out Probability | | | | | | | | | 1.00 | | 1.00 | | | | |
| Movement Group Results | | | | EB | | | WB | | | NB | | | SB | | |
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R | | | |
| Assigned Movement | | 2 | 12 | | 6 | | 3 | | 18 | | 4 | 14 | | | |
| Adjusted Flow Rate (v), veh/h | | 634 | 72 | | 637 | | 93 | | 215 | | 162 | 548 | | | |
| Adjusted Saturation Flow Rate (s), veh/h/ln | | 1696 | | | 1752 | | 1743 | | | | 1766 | | | | |
| Queue Service Time (g _s), s | | 14.9 | | | 14.4 | | 3.3 | | | | 5.6 | | | | |
| Cycle Queue Clearance Time (g _c), s | | 14.9 | | | 14.4 | | 3.3 | | | | 5.6 | | | | |
| Green Ratio (g/C) | | 0.54 | | | 0.54 | | 0.15 | | | | 0.16 | | | | |
| Capacity (c), veh/h | | 1821 | | | 1882 | | 526 | | | | 578 | | | | |
| Volume-to-Capacity Ratio (X) | | 0.348 | | | 0.338 | | 0.178 | | | | 0.280 | | | | |
| Back of Queue (Q), ft/ln (50 th percentile) | | 148.7 | | | 144.1 | | 36.1 | | | | 64.7 | | | | |
| Back of Queue (Q), veh/ln (50 th percentile) | | 5.6 | | | 5.6 | | 1.4 | | | | 2.5 | | | | |
| Queue Storage Ratio (RQ) (50 th percentile) | | 0.10 | | | 0.16 | | 0.09 | | | | 0.09 | | | | |
| Uniform Delay (d ₁), s/veh | | 18.5 | | | 18.3 | | 51.9 | | | | 51.3 | | | | |
| Incremental Delay (d ₂), s/veh | | 0.5 | | | 0.5 | | 0.2 | | | | 0.4 | | | | |
| Initial Queue Delay (d ₃), s/veh | | 0.0 | | | 0.0 | | 0.0 | | | | 0.0 | | | | |
| Control Delay (d), s/veh | | 19.0 | 5.0 | | 18.8 | | 52.1 | | 5.0 | | 51.7 | 5.0 | | | |
| Level of Service (LOS) | | B | A | | B | | D | | A | | D | A | | | |
| Approach Delay, s/veh / LOS | 17.5 | | B | 18.8 | | B | 19.3 | | B | 15.7 | | B | | | |
| Intersection Delay, s/veh / LOS | 17.5 | | | | | | B | | | | | | | | |
| Multimodal Results | | | | EB | | | WB | | | NB | | | SB | | |
| Pedestrian LOS Score / LOS | 2.27 | | B | 1.91 | | B | 2.16 | | B | 2.31 | | B | | | |
| Bicycle LOS Score / LOS | 1.04 | | A | 1.01 | | A | | | F | 1.07 | | A | | | |

| HCS7 Signalized Intersection Results Summary | | | | | | | | | | | | | | | | | | | |
|---|--|-----------------|---------------|---------------|-------|---------------------------------|---------|-------|-----|-------|---|-----|------|-------|-----|-----|--|------|--|
| General Information | | | | | | Intersection Information | | | | | | | | | | | | | |
| Agency | Diane B. Zimmerman Traffic Engineering | | | | | Duration, h | 0.250 | | | | | | | | | | | | |
| Analyst | DBZ | | Analysis Date | Nov 11, 2020 | | Area Type | Other | | | | | | | | | | | | |
| Jurisdiction | | | Time Period | AM Peak | | PHF | 0.92 | | | | | | | | | | | | |
| Urban Street | Outer Loop | | Analysis Year | 2022 No Build | | Analysis Period | 1> 7:30 | | | | | | | | | | | | |
| Intersection | Minors Ln/I 65 SB | | File Name | AM 22 NB.xus | | | | | | | | | | | | | | | |
| Project Description | Minor Warehouses | | | | | | | | | | | | | | | | | | |
| Demand Information | | | | EB | | | WB | | | NB | | | SB | | | | | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R | | | | |
| Demand (v), veh/h | | | | | 880 | 63 | | 838 | | 224 | | 399 | | 518 | 719 | | | | |
| Signal Information | | | | | | | | | | | | | | | | | | | |
| Cycle, s | 140.0 | Reference Phase | 2 | | | | | | | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Green | 72.9 | 22.9 | 23.4 | 0.0 | 0.0 | 0.0 | | | | | | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Yellow | 5.1 | 5.1 | 3.6 | 0.0 | 0.0 | 0.0 | | | | | | | | | |
| | | | | Red | 2.0 | 2.0 | 3.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | |
| Timer Results | | | | EBL | | EBT | | WBL | | WBT | | NBL | | NBT | | SBL | | SBT | |
| Assigned Phase | | | | | | 2 | | | | 6 | | | | 8 | | | | 4 | |
| Case Number | | | | | | 7.0 | | | | 8.0 | | | | 9.0 | | | | 11.0 | |
| Phase Duration, s | | | | | | 80.0 | | | | 80.0 | | | | 30.0 | | | | 30.0 | |
| Change Period, (Y+R c), s | | | | | | 7.1 | | | | 7.1 | | | | 6.6 | | | | 7.1 | |
| Max Allow Headway (MAH), s | | | | | | 0.0 | | | | 0.0 | | | | 5.2 | | | | 5.2 | |
| Queue Clearance Time (g s), s | | | | | | | | | | | | | | 25.4 | | | | 24.9 | |
| Green Extension Time (g e), s | | | | | | 0.0 | | | | 0.0 | | | | 0.0 | | | | 0.0 | |
| Phase Call Probability | | | | | | | | | | | | | | 1.00 | | | | 1.00 | |
| Max Out Probability | | | | | | | | | | | | | | 1.00 | | | | 1.00 | |
| Movement Group Results | | | | EB | | | WB | | | NB | | | SB | | | | | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R | | | | |
| Assigned Movement | | | | | 2 | 12 | | 6 | | 3 | | 18 | | 4 | 14 | | | | |
| Adjusted Flow Rate (v), veh/h | | | | | 981 | 70 | | 911 | | 243 | | 434 | | 563 | 782 | | | | |
| Adjusted Saturation Flow Rate (s), veh/h/ln | | | | | 1696 | | | 1752 | | 1743 | | | | 1766 | | | | | |
| Queue Service Time (g s), s | | | | | 27.3 | | | 23.6 | | 8.8 | | | | 22.2 | | | | | |
| Cycle Queue Clearance Time (g c), s | | | | | 27.3 | | | 23.6 | | 8.8 | | | | 22.2 | | | | | |
| Green Ratio (g/C) | | | | | 0.52 | | | 0.52 | | 0.17 | | | | 0.16 | | | | | |
| Capacity (c), veh/h | | | | | 1766 | | | 1825 | | 583 | | | | 578 | | | | | |
| Volume-to-Capacity Ratio (X) | | | | | 0.555 | | | 0.499 | | 0.418 | | | | 0.974 | | | | | |
| Back of Queue (Q), ft/ln (90 th percentile) | | | | | 379.5 | | | 339.3 | | 159.7 | | | | 431 | | | | | |
| Back of Queue (Q), veh/ln (90 th percentile) | | | | | 14.3 | | | 13.1 | | 6.3 | | | | 16.8 | | | | | |
| Queue Storage Ratio (RQ) (90 th percentile) | | | | | 0.25 | | | 0.38 | | 0.40 | | | | 0.60 | | | | | |
| Uniform Delay (d 1), s/veh | | | | | 22.6 | | | 21.7 | | 52.2 | | | | 58.3 | | | | | |
| Incremental Delay (d 2), s/veh | | | | | 1.1 | | | 1.0 | | 0.7 | | | | 31.0 | | | | | |
| Initial Queue Delay (d 3), s/veh | | | | | 0.0 | | | 0.0 | | 0.0 | | | | 0.0 | | | | | |
| Control Delay (d), s/veh | | | | | 23.7 | 5.0 | | 22.7 | | 52.9 | | 5.0 | | 89.2 | 5.0 | | | | |
| Level of Service (LOS) | | | | | C | A | | C | | D | | A | | F | A | | | | |
| Approach Delay, s/veh / LOS | | | | 22.5 | | C | 22.7 | | C | 22.2 | | C | 40.3 | | D | | | | |
| Intersection Delay, s/veh / LOS | | | | 28.5 | | | | | | C | | | | | | | | | |
| Multimodal Results | | | | EB | | | WB | | | NB | | | SB | | | | | | |
| Pedestrian LOS Score / LOS | | | | 2.27 | | B | 1.91 | | B | 2.16 | | B | 2.31 | | B | | | | |
| Bicycle LOS Score / LOS | | | | 1.33 | | A | 1.24 | | A | | | F | 1.60 | | B | | | | |

Warehouse Complex Minor Lane
Traffic Impact Study

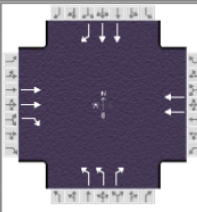
| HCS7 Signalized Intersection Results Summary | | | | | | | | | | | | | | | | | | | |
|---|--|-----------------|---------------|-------------|--------|---------------------------------|---------|-------|-----|-------|-----|-----|------|-------|-----|-----|--|------|--|
| General Information | | | | | | Intersection Information | | | | | | | | | | | | | |
| Agency | Diane B. Zimmerman Traffic Engineering | | | | | Duration, h | 0.250 | | | | | | | | | | | | |
| Analyst | DBZ | Analysis Date | Nov 11, 2020 | | | Area Type | Other | | | | | | | | | | | | |
| Jurisdiction | | Time Period | AM Peak | | | PHF | 0.92 | | | | | | | | | | | | |
| Urban Street | Outer Loop | | Analysis Year | 2022 Build | | Analysis Period | 1> 7:30 | | | | | | | | | | | | |
| Intersection | Minors Ln/I 65 SB | | File Name | AM 22 B.xus | | | | | | | | | | | | | | | |
| Project Description | Minor Warehouses | | | | | | | | | | | | | | | | | | |
| Demand Information | | | | EB | | | WB | | | NB | | | SB | | | | | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R | | | | |
| Demand (v), veh/h | | | | | 880 | 99 | | 838 | | 233 | | 425 | | 597 | 719 | | | | |
| Signal Information | | | | | | | | | | | | | | | | | | | |
| Cycle, s | 140.0 | Reference Phase | 2 | | | | | | | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | | Green | 72.9 | 22.9 | 23.4 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | | Yellow | 5.1 | 5.1 | 3.6 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| | | | | | Red | 2.0 | 2.0 | 3.0 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Timer Results | | | | EBL | | EBT | | WBL | | WBT | | NBL | | NBT | | SBL | | SBT | |
| Assigned Phase | | | | | | 2 | | | | 6 | | | | 8 | | | | 4 | |
| Case Number | | | | | | 7.0 | | | | 8.0 | | | | 9.0 | | | | 11.0 | |
| Phase Duration, s | | | | | | 80.0 | | | | 80.0 | | | | 30.0 | | | | 30.0 | |
| Change Period, (Y+R _c), s | | | | | | 7.1 | | | | 7.1 | | | | 6.6 | | | | 7.1 | |
| Max Allow Headway (MAH), s | | | | | | 0.0 | | | | 0.0 | | | | 5.2 | | | | 5.2 | |
| Queue Clearance Time (g _s), s | | | | | | | | | | | | | | 25.4 | | | | 25.9 | |
| Green Extension Time (g _e), s | | | | | | 0.0 | | | | 0.0 | | | | 0.0 | | | | 0.0 | |
| Phase Call Probability | | | | | | | | | | | | | | 1.00 | | | | 1.00 | |
| Max Out Probability | | | | | | | | | | | | | | 1.00 | | | | 1.00 | |
| Movement Group Results | | | | EB | | | WB | | | NB | | | SB | | | | | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R | | | | |
| Assigned Movement | | | | | 2 | 12 | | 6 | | 3 | | 18 | | 4 | 14 | | | | |
| Adjusted Flow Rate (v), veh/h | | | | | 945 | 106 | | 911 | | 253 | | 462 | | 649 | 782 | | | | |
| Adjusted Saturation Flow Rate (s), veh/h/ln | | | | | 1696 | | | 1752 | | 1743 | | | | 1766 | | | | | |
| Queue Service Time (g _s), s | | | | | 25.9 | | | 23.6 | | 9.1 | | | | 23.9 | | | | | |
| Cycle Queue Clearance Time (g _c), s | | | | | 25.9 | | | 23.6 | | 9.1 | | | | 23.9 | | | | | |
| Green Ratio (g/C) | | | | | 0.52 | | | 0.52 | | 0.17 | | | | 0.17 | | | | | |
| Capacity (c), veh/h | | | | | 1766 | | | 1825 | | 583 | | | | 603 | | | | | |
| Volume-to-Capacity Ratio (X) | | | | | 0.535 | | | 0.499 | | 0.435 | | | | 1.076 | | | | | |
| Back of Queue (Q), ft/ln (90 th percentile) | | | | | 362.1 | | | 339.3 | | 165.3 | | | | 546.5 | | | | | |
| Back of Queue (Q), veh/ln (90 th percentile) | | | | | 13.6 | | | 13.1 | | 6.6 | | | | 21.3 | | | | | |
| Queue Storage Ratio (RQ) (90 th percentile) | | | | | 0.24 | | | 0.38 | | 0.41 | | | | 0.76 | | | | | |
| Uniform Delay (d ₁), s/veh | | | | | 22.3 | | | 21.7 | | 52.4 | | | | 58.1 | | | | | |
| Incremental Delay (d ₂), s/veh | | | | | 1.0 | | | 1.0 | | 0.7 | | | | 58.8 | | | | | |
| Initial Queue Delay (d ₃), s/veh | | | | | 0.0 | | | 0.0 | | 0.0 | | | | 0.0 | | | | | |
| Control Delay (d), s/veh | | | | | 23.3 | 5.0 | | 22.7 | | 53.1 | | 5.0 | | 116.8 | 5.0 | | | | |
| Level of Service (LOS) | | | | | C | A | | C | | D | | A | | F | A | | | | |
| Approach Delay, s/veh / LOS | | | | 21.5 | | C | 22.7 | | C | 22.0 | | C | 55.7 | | E | | | | |
| Intersection Delay, s/veh / LOS | | | | 33.8 | | | | | C | | | | | | | | | | |
| Multimodal Results | | | | EB | | | WB | | | NB | | | SB | | | | | | |
| Pedestrian LOS Score / LOS | | | | 2.27 | | B | 1.91 | | B | 2.16 | | B | 2.31 | | B | | | | |
| Bicycle LOS Score / LOS | | | | 1.37 | | A | 1.24 | | A | | | F | 1.67 | | B | | | | |

Warehouse Complex Minor Lane
Traffic Impact Study

| HCS7 Signalized Intersection Results Summary | | | | | | | | | | | | | | | |
|--|--|-----------------|---------------|-----------|-------|---------------------------------|---------|-------|------|---|---|------|------|-------|-----|
| General Information | | | | | | Intersection Information | | | |  | | | | | |
| Agency | Diane B. Zimmerman Traffic Engineering | | | | | Duration, h | 0.250 | | | | | | | | |
| Analyst | DBZ | | Analysis Date | 11/4/2020 | | Area Type | Other | | | | | | | | |
| Jurisdiction | | | Time Period | PM Peak | | PHF | 0.95 | | | | | | | | |
| Urban Street | Outer Loop | | Analysis Year | 2016 | | Analysis Period | 1> 5:00 | | | | | | | | |
| Intersection | Minors Ln/I 65 SB | | File Name | PM 16.xus | | | | | | | | | | | |
| Project Description | Minor Warehouses | | | | | | | | | | | | | | |
| Demand Information | | | | EB | | | WB | | | NB | | | SB | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand (v), veh/h | | | | | 1321 | 93 | | 605 | | 46 | | 173 | | 285 | 369 |
| Signal Information | | | | | | | | | | | | | | | |
| Cycle, s | 150.0 | Reference Phase | 2 | | | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Green | 86.9 | 22.9 | 19.4 | 0.0 | 0.0 | 0.0 |  | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Yellow | 5.1 | 5.1 | 3.6 | 0.0 | 0.0 | 0.0 | | | | | |
| | | | | Red | 2.0 | 2.0 | 3.0 | 0.0 | 0.0 | 0.0 | | | | | |
| Timer Results | | | | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT | | | | |
| Assigned Phase | | | | | 2 | | 6 | | 8 | | 4 | | | | |
| Case Number | | | | | 7.0 | | 8.0 | | 9.0 | | 11.0 | | | | |
| Phase Duration, s | | | | | 94.0 | | 94.0 | | 26.0 | | 30.0 | | | | |
| Change Period, (Y+R _c), s | | | | | 7.1 | | 7.1 | | 6.6 | | 7.1 | | | | |
| Max Allow Headway (MAH), s | | | | | 0.0 | | 0.0 | | 5.2 | | 5.2 | | | | |
| Queue Clearance Time (g _s), s | | | | | | | | | 19.0 | | 24.9 | | | | |
| Green Extension Time (g _e), s | | | | | 0.0 | | 0.0 | | 0.5 | | 0.0 | | | | |
| Phase Call Probability | | | | | | | | | 1.00 | | 1.00 | | | | |
| Max Out Probability | | | | | | | | | 1.00 | | 1.00 | | | | |
| Movement Group Results | | | | EB | | | WB | | | NB | | | SB | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | | | | | 2 | 12 | | 6 | | 3 | | 18 | | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | | | | | 1286 | 91 | | 637 | | 48 | | 182 | | 300 | 388 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | | | | | 1766 | | | 1781 | | 1730 | | | | 1781 | |
| Queue Service Time (g _s), s | | | | | 36.1 | | | 13.7 | | 1.9 | | | | 11.7 | |
| Cycle Queue Clearance Time (g _c), s | | | | | 36.1 | | | 13.7 | | 1.9 | | | | 11.7 | |
| Green Ratio (g/C) | | | | | 0.58 | | | 0.58 | | 0.13 | | | | 0.15 | |
| Capacity (c), veh/h | | | | | 2046 | | | 2063 | | 448 | | | | 544 | |
| Volume-to-Capacity Ratio (X) | | | | | 0.628 | | | 0.309 | | 0.108 | | | | 0.552 | |
| Back of Queue (Q), ft/ln (90 th percentile) | | | | | 472.1 | | | 211.3 | | 37.1 | | | | 212.4 | |
| Back of Queue (Q), veh/ln (90 th percentile) | | | | | 18.4 | | | 8.3 | | 1.5 | | | | 8.4 | |
| Queue Storage Ratio (RQ) (90 th percentile) | | | | | 0.31 | | | 0.23 | | 0.09 | | | | 0.30 | |
| Uniform Delay (d ₁), s/veh | | | | | 20.9 | | | 16.2 | | 57.6 | | | | 58.8 | |
| Incremental Delay (d ₂), s/veh | | | | | 1.2 | | | 0.4 | | 0.2 | | | | 1.5 | |
| Initial Queue Delay (d ₃), s/veh | | | | | 0.0 | | | 0.0 | | 0.0 | | | | 0.0 | |
| Control Delay (d), s/veh | | | | | 22.1 | 5.0 | | 16.6 | | 57.8 | 5.0 | | | 60.3 | 5.0 |
| Level of Service (LOS) | | | | | C | A | | B | | E | A | | E | A | |
| Approach Delay, s/veh / LOS | | | | 21.0 | C | | 16.6 | B | | 16.1 | B | | 29.1 | C | |
| Intersection Delay, s/veh / LOS | | | | 21.5 | | | | C | | | | | | | |
| Multimodal Results | | | | EB | | | WB | | | NB | | | SB | | |
| Pedestrian LOS Score / LOS | | | | 2.26 | B | | 1.90 | B | | 2.17 | B | | 2.32 | B | |
| Bicycle LOS Score / LOS | | | | 1.72 | B | | 1.01 | A | | F | | 1.06 | A | | |

Warehouse Complex Minor Lane
Traffic Impact Study

HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |  | | | | | | | | | | | | | | | | | | | |
|---|--|-----------------|-----|--------------------------|---------------|------|-------|---|-----|-------|-----|-----|-------|-----|-----|-----|--|--|-----|--|--|-----|--|--|-----|--|--|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 | | | | | | | | | | | | | | | | | | | | | | |
| Analyst | DBZ | | | Analysis Date | 11/4/2020 | | | | | | | | | | | | | | | | | | | | | | |
| Jurisdiction | | | | Area Type | Other | | | | | | | | | | | | | | | | | | | | | | |
| Urban Street | Outer Loop | | | Time Period | PM Peak | | | | | | | | | | | | | | | | | | | | | | |
| Intersection | Minors Ln/I 65 SB | | | PHF | 0.95 | | | | | | | | | | | | | | | | | | | | | | |
| Project Description | Minor Warehouses | | | Analysis Year | 2022 No Build | | | | | | | | | | | | | | | | | | | | | | |
| | | | | File Name | PM 22 NB.xus | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Analysis Period | 1> 5:00 | | | | | | | | | | | | | | | | | | | | | | |
| Demand Information | | | | EB | | | WB | | | NB | | | SB | | | | | | | | | | | | | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R | | | | | | | | | | | | |
| Demand (v), veh/h | | | | 1921 | 96 | | 704 | | | 272 | | 769 | | 294 | 380 | | | | | | | | | | | | |
| Signal Information | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cycle, s | 150.0 | Reference Phase | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | | | | | | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Green | 82.9 | 22.9 | 23.4 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Yellow | 5.1 | 5.1 | 3.6 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | |
| | | | | Red | 2.0 | 2.0 | 3.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | |
| Timer Results | | | | EBL | | | EBT | | | WBL | | | WBT | | | NBL | | | NBT | | | SBL | | | SBT | | |
| Assigned Phase | | | | 2 | | | 6 | | | 8 | | | 4 | | | | | | | | | | | | | | |
| Case Number | | | | 7.0 | | | 8.0 | | | 9.0 | | | 11.0 | | | | | | | | | | | | | | |
| Phase Duration, s | | | | 90.0 | | | 90.0 | | | 30.0 | | | 30.0 | | | | | | | | | | | | | | |
| Change Period, (Y+R c), s | | | | 7.1 | | | 7.1 | | | 6.6 | | | 7.1 | | | | | | | | | | | | | | |
| Max Allow Headway (MAH), s | | | | 0.0 | | | 0.0 | | | 5.2 | | | 5.2 | | | | | | | | | | | | | | |
| Queue Clearance Time (g s), s | | | | | | | | | | 25.4 | | | 24.9 | | | | | | | | | | | | | | |
| Green Extension Time (g e), s | | | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | | | | | | | | | | | | | | |
| Phase Call Probability | | | | | | | | | | 1.00 | | | 1.00 | | | | | | | | | | | | | | |
| Max Out Probability | | | | | | | | | | 1.00 | | | 1.00 | | | | | | | | | | | | | | |
| Movement Group Results | | | | EB | | | WB | | | NB | | | SB | | | | | | | | | | | | | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R | | | | | | | | | | | | |
| Assigned Movement | | | | 2 | 12 | | 6 | | | 3 | | 18 | 4 | | 14 | | | | | | | | | | | | |
| Adjusted Flow Rate (v), veh/h | | | | 1861 | 93 | | 741 | | | 286 | | 809 | 309 | | 400 | | | | | | | | | | | | |
| Adjusted Saturation Flow Rate (s), veh/h/ln | | | | 1766 | | | 1781 | | | 1730 | | | 1781 | | | | | | | | | | | | | | |
| Queue Service Time (g s), s | | | | 74.7 | | | 17.6 | | | 11.4 | | | 12.1 | | | | | | | | | | | | | | |
| Cycle Queue Clearance Time (g c), s | | | | 74.7 | | | 17.6 | | | 11.4 | | | 12.1 | | | | | | | | | | | | | | |
| Green Ratio (g/C) | | | | 0.55 | | | 0.55 | | | 0.16 | | | 0.15 | | | | | | | | | | | | | | |
| Capacity (c), veh/h | | | | 1953 | | | 1968 | | | 540 | | | 544 | | | | | | | | | | | | | | |
| Volume-to-Capacity Ratio (X) | | | | 0.953 | | | 0.377 | | | 0.531 | | | 0.569 | | | | | | | | | | | | | | |
| Back of Queue (Q), ft/ln (90 th percentile) | | | | 926.5 | | | 264 | | | 200.7 | | | 218.9 | | | | | | | | | | | | | | |
| Back of Queue (Q), veh/ln (90 th percentile) | | | | 36.2 | | | 10.4 | | | 7.9 | | | 8.6 | | | | | | | | | | | | | | |
| Queue Storage Ratio (RQ) (90 th percentile) | | | | 0.62 | | | 0.29 | | | 0.50 | | | 0.30 | | | | | | | | | | | | | | |
| Uniform Delay (d 1), s/veh | | | | 31.7 | | | 19.0 | | | 58.2 | | | 59.0 | | | | | | | | | | | | | | |
| Incremental Delay (d 2), s/veh | | | | 7.6 | | | 0.6 | | | 1.3 | | | 1.8 | | | | | | | | | | | | | | |
| Initial Queue Delay (d 3), s/veh | | | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | | | | | | | | | | | | | | |
| Control Delay (d), s/veh | | | | 39.3 | 5.0 | | 19.5 | | | 59.6 | 5.0 | | 60.7 | 5.0 | | | | | | | | | | | | | |
| Level of Service (LOS) | | | | D | A | | B | | | E | A | | E | A | | | | | | | | | | | | | |
| Approach Delay, s/veh / LOS | | | | 37.7 | | D | 19.5 | | B | 19.3 | | B | 29.3 | | C | | | | | | | | | | | | |
| Intersection Delay, s/veh / LOS | | | | 28.9 | | | | | | C | | | | | | | | | | | | | | | | | |
| Multimodal Results | | | | EB | | | WB | | | NB | | | SB | | | | | | | | | | | | | | |
| Pedestrian LOS Score / LOS | | | | 2.27 | B | | 1.91 | B | | 2.17 | B | | 2.32 | B | | | | | | | | | | | | | |
| Bicycle LOS Score / LOS | | | | 2.24 | B | | 1.10 | A | | | F | | 1.07 | A | | | | | | | | | | | | | |

Warehouse Complex Minor Lane
Traffic Impact Study

| HCS7 Signalized Intersection Results Summary | | | | | | | | | | | | | | | | | | | |
|---|--|-----------------|---------------|-------------|-------|---------------------------------|---------|-------|-----|-------|---|------|------|-------|-----|-----|--|------|--|
| General Information | | | | | | Intersection Information | | | | | | | | | | | | | |
| Agency | Diane B. Zimmerman Traffic Engineering | | | | | Duration, h | 0.250 | | | | | | | | | | | | |
| Analyst | DBZ | | Analysis Date | 11/4/2020 | | Area Type | Other | | | | | | | | | | | | |
| Jurisdiction | | | Time Period | PM Peak | | PHF | 0.95 | | | | | | | | | | | | |
| Urban Street | Outer Loop | | Analysis Year | 2022 Build | | Analysis Period | 1> 5:00 | | | | | | | | | | | | |
| Intersection | Minors Ln/I 65 SB | | File Name | PM 22 B.xus | | | | | | | | | | | | | | | |
| Project Description | Minor Warehouses | | | | | | | | | | | | | | | | | | |
| Demand Information | | | | EB | | | WB | | | NB | | SB | | | | | | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R | | | | |
| Demand (v), veh/h | | | | | 1921 | 109 | | 704 | | 307 | | 845 | | 322 | 380 | | | | |
| Signal Information | | | | | | | | | | | | | | | | | | | |
| Cycle, s | 150.0 | Reference Phase | 2 | | | | | | | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Green | 82.9 | 22.9 | 23.4 | 0.0 | 0.0 | 0.0 | | | | | | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Yellow | 5.1 | 5.1 | 3.6 | 0.0 | 0.0 | 0.0 | | | | | | | | | |
| | | | | Red | 2.0 | 2.0 | 3.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | |
| Timer Results | | | | EBL | | EBT | | WBL | | WBT | | NBL | | NBT | | SBL | | SBT | |
| Assigned Phase | | | | | | 2 | | | | 6 | | | | 8 | | | | 4 | |
| Case Number | | | | | | 7.0 | | | | 8.0 | | | | 9.0 | | | | 11.0 | |
| Phase Duration, s | | | | | | 90.0 | | | | 90.0 | | | | 30.0 | | | | 30.0 | |
| Change Period, (Y+R c), s | | | | | | 7.1 | | | | 7.1 | | | | 6.6 | | | | 7.1 | |
| Max Allow Headway (MAH), s | | | | | | 0.0 | | | | 0.0 | | | | 5.2 | | | | 5.2 | |
| Queue Clearance Time (g s), s | | | | | | | | | | | | | | 25.4 | | | | 24.9 | |
| Green Extension Time (g e), s | | | | | | 0.0 | | | | 0.0 | | | | 0.0 | | | | 0.0 | |
| Phase Call Probability | | | | | | | | | | | | | | 1.00 | | | | 1.00 | |
| Max Out Probability | | | | | | | | | | | | | | 1.00 | | | | 1.00 | |
| Movement Group Results | | | | EB | | | WB | | | NB | | | SB | | | | | | |
| Approach Movement | | | | L | T | R | L | T | R | L | T | R | L | T | R | | | | |
| Assigned Movement | | | | | 2 | 12 | | 6 | | 3 | | 18 | | 4 | 14 | | | | |
| Adjusted Flow Rate (v), veh/h | | | | | 1849 | 105 | | 741 | | 323 | | 889 | | 339 | 400 | | | | |
| Adjusted Saturation Flow Rate (s), veh/h/ln | | | | | 1766 | | | 1781 | | 1730 | | | | 1781 | | | | | |
| Queue Service Time (g s), s | | | | | 73.7 | | | 17.6 | | 13.0 | | | | 13.4 | | | | | |
| Cycle Queue Clearance Time (g c), s | | | | | 73.7 | | | 17.6 | | 13.0 | | | | 13.4 | | | | | |
| Green Ratio (g/C) | | | | | 0.55 | | | 0.55 | | 0.16 | | | | 0.15 | | | | | |
| Capacity (c), veh/h | | | | | 1953 | | | 1968 | | 540 | | | | 544 | | | | | |
| Volume-to-Capacity Ratio (X) | | | | | 0.947 | | | 0.377 | | 0.599 | | | | 0.623 | | | | | |
| Back of Queue (Q), ft/ln (90 th percentile) | | | | | 910.5 | | | 264 | | 225.7 | | | | 239.4 | | | | | |
| Back of Queue (Q), veh/ln (90 th percentile) | | | | | 35.6 | | | 10.4 | | 8.9 | | | | 9.4 | | | | | |
| Queue Storage Ratio (RQ) (90 th percentile) | | | | | 0.61 | | | 0.29 | | 0.56 | | | | 0.33 | | | | | |
| Uniform Delay (d 1), s/veh | | | | | 31.5 | | | 19.0 | | 58.9 | | | | 59.5 | | | | | |
| Incremental Delay (d 2), s/veh | | | | | 7.0 | | | 0.6 | | 2.2 | | | | 2.6 | | | | | |
| Initial Queue Delay (d 3), s/veh | | | | | 0.0 | | | 0.0 | | 0.0 | | | | 0.0 | | | | | |
| Control Delay (d), s/veh | | | | | 38.5 | 5.0 | | 19.5 | | 61.1 | | 5.0 | | 62.1 | 5.0 | | | | |
| Level of Service (LOS) | | | | | D | A | | B | | E | | A | | E | A | | | | |
| Approach Delay, s/veh / LOS | | | | 36.7 | | D | 19.5 | | B | 20.0 | | B | 31.2 | | C | | | | |
| Intersection Delay, s/veh / LOS | | | | 28.7 | | | | | C | | | | | | | | | | |
| Multimodal Results | | | | EB | | | WB | | | NB | | | SB | | | | | | |
| Pedestrian LOS Score / LOS | | | | 2.27 | | B | 1.91 | | B | 2.17 | | B | 2.32 | | B | | | | |
| Bicycle LOS Score / LOS | | | | 2.25 | | B | 1.10 | | A | | F | 1.10 | | A | | | | | |

| HCS7 Two-Way Stop-Control Report | | | | | | | | | | | | | | | | |
|--|---------------------------------------|----|----|----|-----------|-----------|----|----------------------------|----------------|---|------|----|------------|------|-----|---|
| General Information | | | | | | | | Site Information | | | | | | | | |
| Analyst | DBZ | | | | | | | Intersection | Entrance North | | | | | | | |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | | | | | | | Jurisdiction | | | | | | | | |
| Date Performed | 11/11/2020 | | | | | | | East/West Street | Entrance | | | | | | | |
| Analysis Year | 2022 | | | | | | | North/South Street | Minor Lane | | | | | | | |
| Time Analyzed | PM Peak | | | | | | | Peak Hour Factor | 0.95 | | | | | | | |
| Intersection Orientation | North-South | | | | | | | Analysis Time Period (hrs) | 0.25 | | | | | | | |
| Project Description | Warehouse Complex | | | | | | | | | | | | | | | |
| Lanes | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">Major Street: North-South</p> | | | | | | | | | | | | | | | | |
| Vehicle Volumes and Adjustments | | | | | | | | | | | | | | | | |
| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| Configuration | | | | | | L | | R | | | | TR | | L | T | |
| Volume (veh/h) | | | | | | 14 | | 56 | | | 1096 | 5 | | 21 | 410 | |
| Percent Heavy Vehicles (%) | | | | | | 3 | | 3 | | | | | | 3 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | 0 | | | | | | | | | |
| Right Turn Channelized | | | | | | | No | | | | | | | | | |
| Median Type Storage | | | | | | Left Only | | | | | | | 1 | | | |
| Critical and Follow-up Headways | | | | | | | | | | | | | | | | |
| Base Critical Headway (sec) | | | | | | 7.1 | | 6.2 | | | | | | 4.1 | | |
| Critical Headway (sec) | | | | | | 6.43 | | 6.23 | | | | | | 4.13 | | |
| Base Follow-Up Headway (sec) | | | | | | 3.5 | | 3.3 | | | | | | 2.2 | | |
| Follow-Up Headway (sec) | | | | | | 3.53 | | 3.33 | | | | | | 2.23 | | |
| Delay, Queue Length, and Level of Service | | | | | | | | | | | | | | | | |
| Flow Rate, v (veh/h) | | | | | | 15 | | 59 | | | | | | 22 | | |
| Capacity, c (veh/h) | | | | | | 223 | | 238 | | | | | | 599 | | |
| v/c Ratio | | | | | | 0.07 | | 0.25 | | | | | | 0.04 | | |
| 95% Queue Length, Q ₉₅ (veh) | | | | | | 0.2 | | 0.9 | | | | | | 0.1 | | |
| Control Delay (s/veh) | | | | | | 22.3 | | 25.0 | | | | | | 11.2 | | |
| Level of Service (LOS) | | | | | | C | | D | | | | | | B | | |
| Approach Delay (s/veh) | | | | | | 24.5 | | | | | | | | 0.5 | | |
| Approach LOS | | | | | | C | | | | | | | | | | |

| HCS7 Two-Way Stop-Control Report | | | | | | | | | | | | | | | | | |
|--|---------------------------------------|----|----|----|-----------|-----------|----|----------------------------|----------------|---|------|----|------------|------|---|-----|---|
| General Information | | | | | | | | Site Information | | | | | | | | | |
| Analyst | DBZ | | | | | | | Intersection | Entrance North | | | | | | | | |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | | | | | | | Jurisdiction | | | | | | | | | |
| Date Performed | 11/11/2020 | | | | | | | East/West Street | Entrance | | | | | | | | |
| Analysis Year | 2022 | | | | | | | North/South Street | Minor Lane | | | | | | | | |
| Time Analyzed | PM Peak | | | | | | | Peak Hour Factor | 0.95 | | | | | | | | |
| Intersection Orientation | North-South | | | | | | | Analysis Time Period (hrs) | 0.25 | | | | | | | | |
| Project Description | Warehouse Complex | | | | | | | | | | | | | | | | |
| Lanes | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">Major Street: North-South</p> | | | | | | | | | | | | | | | | | |
| Vehicle Volumes and Adjustments | | | | | | | | | | | | | | | | | |
| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | |
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R | |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | |
| Number of Lanes | | 0 | 0 | 0 | | 1 | 0 | 1 | | 0 | 1 | 0 | | 0 | 1 | 1 | 0 |
| Configuration | | | | | | L | | R | | | | TR | | L | | T | |
| Volume (veh/h) | | | | | | 14 | | 56 | | | 1096 | 5 | | 21 | | 410 | |
| Percent Heavy Vehicles (%) | | | | | | 3 | | 3 | | | | | | 3 | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | 0 | | | | | | | | | | |
| Right Turn Channelized | | | | | | | No | | | | | | | | | | |
| Median Type Storage | | | | | | Left Only | | | | | | | | | 1 | | |
| Critical and Follow-up Headways | | | | | | | | | | | | | | | | | |
| Base Critical Headway (sec) | | | | | | 7.1 | | 6.2 | | | | | | 4.1 | | | |
| Critical Headway (sec) | | | | | | 6.43 | | 6.23 | | | | | | 4.13 | | | |
| Base Follow-Up Headway (sec) | | | | | | 3.5 | | 3.3 | | | | | | 2.2 | | | |
| Follow-Up Headway (sec) | | | | | | 3.53 | | 3.33 | | | | | | 2.23 | | | |
| Delay, Queue Length, and Level of Service | | | | | | | | | | | | | | | | | |
| Flow Rate, v (veh/h) | | | | | | 15 | | 59 | | | | | | 22 | | | |
| Capacity, c (veh/h) | | | | | | 223 | | 238 | | | | | | 599 | | | |
| v/c Ratio | | | | | | 0.07 | | 0.25 | | | | | | 0.04 | | | |
| 95% Queue Length, Q ₉₅ (veh) | | | | | | 0.2 | | 0.9 | | | | | | 0.1 | | | |
| Control Delay (s/veh) | | | | | | 22.3 | | 25.0 | | | | | | 11.2 | | | |
| Level of Service (LOS) | | | | | | C | | D | | | | | | B | | | |
| Approach Delay (s/veh) | | | | | | 24.5 | | | | | | | | 0.5 | | | |
| Approach LOS | | | | | | C | | | | | | | | | | | |

| HCS7 Two-Way Stop-Control Report | | | | | | | | | | | | | | | | |
|---|---------------------------------------|----|----|----|-----------|-----------|----|----------------------------|----------------|---|-----|----|------------|------|-----|---|
| General Information | | | | | | | | Site Information | | | | | | | | |
| Analyst | DBZ | | | | | | | Intersection | Entrance South | | | | | | | |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | | | | | | | Jurisdiction | | | | | | | | |
| Date Performed | 11/11/2020 | | | | | | | East/West Street | Entrance | | | | | | | |
| Analysis Year | 2022 | | | | | | | North/South Street | Minor Lane | | | | | | | |
| Time Analyzed | AM Peak | | | | | | | Peak Hour Factor | 0.91 | | | | | | | |
| Intersection Orientation | North-South | | | | | | | Analysis Time Period (hrs) | 0.25 | | | | | | | |
| Project Description | Warehouse Complex | | | | | | | | | | | | | | | |
| Lanes | | | | | | | | | | | | | | | | |
| <p>Major Street: North-South</p> | | | | | | | | | | | | | | | | |
| Vehicle Volumes and Adjustments | | | | | | | | | | | | | | | | |
| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| Configuration | | | | | | L | | R | | | | TR | | L | T | |
| Volume (veh/h) | | | | | | 4 | | 17 | | | 637 | 15 | | 57 | 586 | |
| Percent Heavy Vehicles (%) | | | | | | 3 | | 3 | | | | | | 3 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | 0 | | | | | | | | | |
| Right Turn Channelized | | | | | | | No | | | | | | | | | |
| Median Type Storage | | | | | | Left Only | | | | | | | 1 | | | |
| Critical and Follow-up Headways | | | | | | | | | | | | | | | | |
| Base Critical Headway (sec) | | | | | | 7.1 | | 6.2 | | | | | | 4.1 | | |
| Critical Headway (sec) | | | | | | 6.43 | | 6.23 | | | | | | 4.13 | | |
| Base Follow-Up Headway (sec) | | | | | | 3.5 | | 3.3 | | | | | | 2.2 | | |
| Follow-Up Headway (sec) | | | | | | 3.53 | | 3.33 | | | | | | 2.23 | | |
| Delay, Queue Length, and Level of Service | | | | | | | | | | | | | | | | |
| Flow Rate, v (veh/h) | | | | | | 4 | | 19 | | | | | | 63 | | |
| Capacity, c (veh/h) | | | | | | 265 | | 433 | | | | | | 880 | | |
| v/c Ratio | | | | | | 0.02 | | 0.04 | | | | | | 0.07 | | |
| 95% Queue Length, Q ₉₅ (veh) | | | | | | 0.1 | | 0.1 | | | | | | 0.2 | | |
| Control Delay (s/veh) | | | | | | 18.8 | | 13.7 | | | | | | 9.4 | | |
| Level of Service (LOS) | | | | | | C | | B | | | | | | A | | |
| Approach Delay (s/veh) | | | | | | 14.7 | | | | | | | 0.8 | | | |
| Approach LOS | | | | | | B | | | | | | | | | | |

| HCS7 Two-Way Stop-Control Report | | | | | | | | | | | | | | | | |
|---|---------------------------------------|----|----|----|-----------|-----------|----|----------------------------|----------------|---|------|----|------------|------|-----|---|
| General Information | | | | | | | | Site Information | | | | | | | | |
| Analyst | DBZ | | | | | | | Intersection | Entrance South | | | | | | | |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | | | | | | | Jurisdiction | | | | | | | | |
| Date Performed | 11/11/2020 | | | | | | | East/West Street | Entrance | | | | | | | |
| Analysis Year | 2022 | | | | | | | North/South Street | Minor Lane | | | | | | | |
| Time Analyzed | PM Peak | | | | | | | Peak Hour Factor | 0.95 | | | | | | | |
| Intersection Orientation | North-South | | | | | | | Analysis Time Period (hrs) | 0.25 | | | | | | | |
| Project Description | Warehouse Complex | | | | | | | | | | | | | | | |
| Lanes | | | | | | | | | | | | | | | | |
| <p>Major Street: North-South</p> | | | | | | | | | | | | | | | | |
| Vehicle Volumes and Adjustments | | | | | | | | | | | | | | | | |
| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| Configuration | | | | | | L | | R | | | | TR | | L | T | |
| Volume (veh/h) | | | | | | 14 | | 55 | | | 1046 | 5 | | 20 | 404 | |
| Percent Heavy Vehicles (%) | | | | | | 3 | | 3 | | | | | | 3 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | 0 | | | | | | | | | |
| Right Turn Channelized | | | | | | | No | | | | | | | | | |
| Median Type Storage | | | | | | Left Only | | | | | | | 1 | | | |
| Critical and Follow-up Headways | | | | | | | | | | | | | | | | |
| Base Critical Headway (sec) | | | | | | 7.1 | | 6.2 | | | | | | 4.1 | | |
| Critical Headway (sec) | | | | | | 6.43 | | 6.23 | | | | | | 4.13 | | |
| Base Follow-Up Headway (sec) | | | | | | 3.5 | | 3.3 | | | | | | 2.2 | | |
| Follow-Up Headway (sec) | | | | | | 3.53 | | 3.33 | | | | | | 2.23 | | |
| Delay, Queue Length, and Level of Service | | | | | | | | | | | | | | | | |
| Flow Rate, v (veh/h) | | | | | | 15 | | 58 | | | | | | 21 | | |
| Capacity, c (veh/h) | | | | | | 236 | | 256 | | | | | | 627 | | |
| v/c Ratio | | | | | | 0.06 | | 0.23 | | | | | | 0.03 | | |
| 95% Queue Length, Q ₉₅ (veh) | | | | | | 0.2 | | 0.8 | | | | | | 0.1 | | |
| Control Delay (s/veh) | | | | | | 21.3 | | 23.2 | | | | | | 10.9 | | |
| Level of Service (LOS) | | | | | | C | | C | | | | | | B | | |
| Approach Delay (s/veh) | | | | | | 22.8 | | | | | | | | 0.5 | | |
| Approach LOS | | | | | | C | | | | | | | | | | |