

**EXISTING**

HCM Signalized Intersection Capacity Analysis  
1: Livingston Street & Randolph Road

Existing Conditions - AM Peak Hour

08/30/2023



| Movement               | EBL  | EBT  | EBR  | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL  | SBT   | SBR  |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations    | ↗    | ↑↑↑  |      | ↗    | ↑↑↑   |      |      | ↕    |      |      | ↕     |      |
| Traffic Volume (vph)   | 12   | 892  | 7    | 111  | 1404  | 5    | 7    | 3    | 42   | 17   | 21    | 18   |
| Future Volume (vph)    | 12   | 892  | 7    | 111  | 1404  | 5    | 7    | 3    | 42   | 17   | 21    | 18   |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 6.0  | 6.0  |      | 6.0  | 6.0   |      |      | 6.5  |      |      | 6.5   |      |
| Lane Util. Factor      | 1.00 | 0.91 |      | 1.00 | 0.91  |      |      | 1.00 |      |      | 1.00  |      |
| Frbp, ped/bikes        | 1.00 | 1.00 |      | 1.00 | 1.00  |      |      | 0.98 |      |      | 0.99  |      |
| Flpb, ped/bikes        | 1.00 | 1.00 |      | 1.00 | 1.00  |      |      | 1.00 |      |      | 1.00  |      |
| Frt                    | 1.00 | 1.00 |      | 1.00 | 1.00  |      |      | 0.89 |      |      | 0.96  |      |
| Flt Protected          | 0.95 | 1.00 |      | 0.95 | 1.00  |      |      | 0.99 |      |      | 0.98  |      |
| Satd. Flow (prot)      | 1767 | 5051 |      | 1768 | 5055  |      |      | 1620 |      |      | 1742  |      |
| Flt Permitted          | 0.14 | 1.00 |      | 0.27 | 1.00  |      |      | 0.95 |      |      | 0.90  |      |
| Satd. Flow (perm)      | 265  | 5051 |      | 510  | 5055  |      |      | 1545 |      |      | 1591  |      |
| Peak-hour factor, PHF  | 0.90 | 0.90 | 0.90 | 0.90 | 0.90  | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90  | 0.90 |
| Adj. Flow (vph)        | 13   | 991  | 8    | 123  | 1560  | 6    | 8    | 3    | 47   | 19   | 23    | 20   |
| RTOR Reduction (vph)   | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 42   | 0    | 0    | 17    | 0    |
| Lane Group Flow (vph)  | 13   | 999  | 0    | 123  | 1566  | 0    | 0    | 16   | 0    | 0    | 45    | 0    |
| Confl. Peds. (#/hr)    | 5    |      | 1    | 1    |       | 5    | 3    |      | 6    | 6    |       | 3    |
| Bus Blockages (#/hr)   | 0    | 4    | 0    | 0    | 4     | 0    | 0    | 0    | 0    | 0    | 0     | 0    |
| Turn Type              | Perm | NA   |      | Perm | NA    |      | Perm | NA   |      | Perm | NA    |      |
| Protected Phases       |      | 2    |      |      | 6     |      |      | 4    |      |      | 8     |      |
| Permitted Phases       | 2    |      |      | 6    |       |      | 4    |      |      | 8    |       |      |
| Actuated Green, G (s)  | 95.8 | 95.8 |      | 95.8 | 95.8  |      |      | 11.7 |      |      | 11.7  |      |
| Effective Green, g (s) | 95.8 | 95.8 |      | 95.8 | 95.8  |      |      | 11.7 |      |      | 11.7  |      |
| Actuated g/C Ratio     | 0.80 | 0.80 |      | 0.80 | 0.80  |      |      | 0.10 |      |      | 0.10  |      |
| Clearance Time (s)     | 6.0  | 6.0  |      | 6.0  | 6.0   |      |      | 6.5  |      |      | 6.5   |      |
| Vehicle Extension (s)  | 0.2  | 0.2  |      | 0.2  | 0.2   |      |      | 5.0  |      |      | 5.0   |      |
| Lane Grp Cap (vph)     | 211  | 4032 |      | 407  | 4035  |      |      | 150  |      |      | 155   |      |
| v/s Ratio Prot         |      | 0.20 |      |      | c0.31 |      |      |      |      |      |       |      |
| v/s Ratio Perm         | 0.05 |      |      | 0.24 |       |      |      | 0.01 |      |      | c0.03 |      |
| v/c Ratio              | 0.06 | 0.25 |      | 0.30 | 0.39  |      |      | 0.10 |      |      | 0.29  |      |
| Uniform Delay, d1      | 2.6  | 3.0  |      | 3.2  | 3.5   |      |      | 49.4 |      |      | 50.3  |      |
| Progression Factor     | 1.00 | 1.00 |      | 1.00 | 1.00  |      |      | 1.00 |      |      | 1.00  |      |
| Incremental Delay, d2  | 0.6  | 0.1  |      | 1.9  | 0.3   |      |      | 0.6  |      |      | 2.2   |      |
| Delay (s)              | 3.1  | 3.2  |      | 5.1  | 3.8   |      |      | 50.0 |      |      | 52.4  |      |
| Level of Service       | A    | A    |      | A    | A     |      |      | D    |      |      | D     |      |
| Approach Delay (s)     |      | 3.2  |      |      | 3.9   |      |      | 50.0 |      |      | 52.4  |      |
| Approach LOS           |      | A    |      |      | A     |      |      | D    |      |      | D     |      |

| Intersection Summary              |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 5.7   | HCM 2000 Level of Service | A    |
| HCM 2000 Volume to Capacity ratio | 0.38  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 12.5 |
| Intersection Capacity Utilization | 59.8% | ICU Level of Service      | B    |
| Analysis Period (min)             | 15    |                           |      |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: Georgia Avenue & Randolph Road

Existing Conditions - AM Peak Hour

08/30/2023

| Movement                          | EBL2 | EBL   | EBR    | NBL   | NBT                       | NBR  | SBL  | SBT   | SBR  | SWL   | SWR  | SWR2   |  |
|-----------------------------------|------|-------|--------|-------|---------------------------|------|------|-------|------|-------|------|--------|--|
| Lane Configurations               |      |       |        |       |                           |      |      |       |      |       |      |        |  |
| Traffic Volume (vph)              | 174  | 38    | 211    | 152   | 786                       | 178  | 55   | 1578  | 112  | 733   | 51   | 131    |  |
| Future Volume (vph)               | 174  | 38    | 211    | 152   | 786                       | 178  | 55   | 1578  | 112  | 733   | 51   | 131    |  |
| Ideal Flow (vphpl)                | 1900 | 1900  | 1900   | 1900  | 1900                      | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900   |  |
| Total Lost time (s)               | 12.0 | 12.0  | 12.0   | 7.0   | 9.0                       | 9.0  | 7.0  | 9.0   | 9.0  | 12.0  | 12.0 | 12.0   |  |
| Lane Util. Factor                 | 1.00 | 0.95  | 1.00   | 0.97  | 0.91                      | 1.00 | 0.97 | 0.91  | 1.00 | 0.97  | 1.00 | 1.00   |  |
| Frpb, ped/bikes                   | 1.00 | 1.00  | 1.00   | 1.00  | 1.00                      | 0.88 | 1.00 | 1.00  | 0.97 | 1.00  | 1.00 | 1.00   |  |
| Flpb, ped/bikes                   | 1.00 | 1.00  | 1.00   | 1.00  | 1.00                      | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00   |  |
| Frt                               | 1.00 | 1.00  | 0.85   | 1.00  | 1.00                      | 0.85 | 1.00 | 1.00  | 0.85 | 1.00  | 0.85 | 0.85   |  |
| Flt Protected                     | 0.95 | 0.95  | 1.00   | 0.95  | 1.00                      | 1.00 | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00   |  |
| Satd. Flow (prot)                 | 1770 | 1681  | 1583   | 3433  | 5085                      | 1394 | 3433 | 5058  | 1535 | 3433  | 1583 | 1583   |  |
| Flt Permitted                     | 0.95 | 0.95  | 1.00   | 0.95  | 1.00                      | 1.00 | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00   |  |
| Satd. Flow (perm)                 | 1770 | 1681  | 1583   | 3433  | 5085                      | 1394 | 3433 | 5058  | 1535 | 3433  | 1583 | 1583   |  |
| Peak-hour factor, PHF             | 0.97 | 0.97  | 0.97   | 0.97  | 0.97                      | 0.97 | 0.97 | 0.97  | 0.97 | 0.97  | 0.97 | 0.97   |  |
| Adj. Flow (vph)                   | 179  | 39    | 218    | 157   | 810                       | 184  | 57   | 1627  | 115  | 756   | 53   | 135    |  |
| RTOR Reduction (vph)              | 0    | 0     | 113    | 0     | 0                         | 0    | 0    | 0     | 35   | 0     | 0    | 99     |  |
| Lane Group Flow (vph)             | 109  | 109   | 105    | 157   | 810                       | 184  | 57   | 1627  | 80   | 756   | 53   | 36     |  |
| Confl. Peds. (#/hr)               |      | 12    | 2      | 8     |                           | 26   | 26   |       | 8    | 8     | 26   |        |  |
| Bus Blockages (#/hr)              | 0    | 0     | 0      | 0     | 0                         | 0    | 0    | 4     | 0    | 0     | 0    | 0      |  |
| Turn Type                         | Prot | Prot  | pt+ov  | Prot  | NA                        | Perm | Prot | NA    | Perm | Prot  | Prot | custom |  |
| Protected Phases                  | 4    | 4     | 4 1    | 1     | 6                         |      | 5    | 2     |      | 3     | 3    | 3 5    |  |
| Permitted Phases                  |      |       |        |       |                           | 6    |      |       | 2    |       |      | 3      |  |
| Actuated Green, G (s)             | 20.1 | 20.1  | 45.8   | 13.7  | 71.9                      | 71.9 | 8.0  | 66.2  | 66.2 | 40.0  | 40.0 | 48.0   |  |
| Effective Green, g (s)            | 20.1 | 20.1  | 45.8   | 13.7  | 71.9                      | 71.9 | 8.0  | 66.2  | 66.2 | 40.0  | 40.0 | 48.0   |  |
| Actuated g/C Ratio                | 0.11 | 0.11  | 0.25   | 0.08  | 0.40                      | 0.40 | 0.04 | 0.37  | 0.37 | 0.22  | 0.22 | 0.27   |  |
| Clearance Time (s)                | 12.0 | 12.0  |        | 7.0   | 9.0                       | 9.0  | 7.0  | 9.0   | 9.0  | 12.0  | 12.0 |        |  |
| Vehicle Extension (s)             | 3.5  | 3.5   |        | 4.0   | 0.2                       | 0.2  | 4.0  | 0.2   | 0.2  | 3.0   | 3.0  |        |  |
| Lane Grp Cap (vph)                | 197  | 187   | 402    | 261   | 2031                      | 556  | 152  | 1860  | 564  | 762   | 351  | 422    |  |
| v/s Ratio Prot                    | 0.06 | c0.06 | 0.07   | c0.05 | c0.16                     |      | 0.02 | c0.32 |      | c0.22 | 0.03 | 0.02   |  |
| v/s Ratio Perm                    |      |       |        |       |                           | 0.13 |      |       | 0.05 |       |      |        |  |
| v/c Ratio                         | 0.55 | 0.58  | 0.26   | 0.60  | 0.40                      | 0.33 | 0.38 | 0.87  | 0.14 | 0.99  | 0.15 | 0.09   |  |
| Uniform Delay, d1                 | 75.7 | 76.0  | 53.6   | 80.5  | 38.6                      | 37.4 | 83.6 | 53.0  | 37.9 | 69.8  | 56.3 | 49.5   |  |
| Progression Factor                | 1.00 | 1.00  | 1.00   | 1.00  | 1.00                      | 1.00 | 0.85 | 1.44  | 1.94 | 1.00  | 1.00 | 1.00   |  |
| Incremental Delay, d2             | 3.7  | 4.9   | 0.4    | 4.5   | 0.6                       | 1.6  | 1.8  | 5.2   | 0.4  | 30.5  | 0.2  | 0.1    |  |
| Delay (s)                         | 79.4 | 80.8  | 54.0   | 85.0  | 39.2                      | 39.0 | 72.4 | 81.3  | 74.2 | 100.3 | 56.5 | 49.6   |  |
| Level of Service                  | E    | F     | D      | F     | D                         | D    | E    | F     | E    | F     | E    | D      |  |
| Approach Delay (s)                |      |       |        |       | 45.4                      |      |      | 80.6  |      | 90.6  |      |        |  |
| Approach LOS                      |      |       |        |       | D                         |      |      | F     |      | F     |      |        |  |
| <b>Intersection Summary</b>       |      |       |        |       |                           |      |      |       |      |       |      |        |  |
| HCM 2000 Control Delay            |      |       | 72.1   |       | HCM 2000 Level of Service |      |      |       | E    |       |      |        |  |
| HCM 2000 Volume to Capacity ratio |      |       | 0.84   |       |                           |      |      |       |      |       |      |        |  |
| Actuated Cycle Length (s)         |      |       | 180.0  |       | Sum of lost time (s)      |      |      |       | 40.0 |       |      |        |  |
| Intersection Capacity Utilization |      |       | 106.9% |       | ICU Level of Service      |      |      |       | G    |       |      |        |  |
| Analysis Period (min)             |      |       | 15     |       |                           |      |      |       |      |       |      |        |  |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Glenmont Circle/Shopping Center & Randolph Road

Existing Conditions - AM Peak Hour

08/30/2023



| Movement               | EBL   | EBT  | EBR  | WBL  | WBT   | WBR  | NBL  | NBT   | NBR  | SBL  | SBT   | SBR  |
|------------------------|-------|------|------|------|-------|------|------|-------|------|------|-------|------|
| Lane Configurations    | ↘     | ↑↑↑  | ↗    | ↘↗   | ↑↑↑   |      |      | ↖     | ↗    |      | ↖     | ↗    |
| Traffic Volume (vph)   | 18    | 822  | 32   | 19   | 1979  | 30   | 56   | 9     | 17   | 42   | 7     | 46   |
| Future Volume (vph)    | 18    | 822  | 32   | 19   | 1979  | 30   | 56   | 9     | 17   | 42   | 7     | 46   |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  | 6.0  | 6.0  | 6.0   |      |      | 7.0   | 7.0  |      | 7.0   | 7.0  |
| Lane Util. Factor      | 1.00  | 0.91 | 1.00 | 0.97 | 0.86  |      |      | 1.00  | 1.00 |      | 1.00  | 1.00 |
| Frbp, ped/bikes        | 1.00  | 1.00 | 0.97 | 1.00 | 1.00  |      |      | 1.00  | 1.00 |      | 1.00  | 1.00 |
| Flpb, ped/bikes        | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  |      |      | 1.00  | 1.00 |      | 0.99  | 1.00 |
| Frt                    | 1.00  | 1.00 | 0.85 | 1.00 | 1.00  |      |      | 1.00  | 0.85 |      | 1.00  | 0.85 |
| Flt Protected          | 0.95  | 1.00 | 1.00 | 0.95 | 1.00  |      |      | 0.96  | 1.00 |      | 0.96  | 1.00 |
| Satd. Flow (prot)      | 1770  | 5085 | 1542 | 3433 | 6390  |      |      | 1785  | 1583 |      | 1769  | 1583 |
| Flt Permitted          | 0.95  | 1.00 | 1.00 | 0.95 | 1.00  |      |      | 0.72  | 1.00 |      | 0.29  | 1.00 |
| Satd. Flow (perm)      | 1770  | 5085 | 1542 | 3433 | 6390  |      |      | 1340  | 1583 |      | 528   | 1583 |
| Peak-hour factor, PHF  | 0.97  | 0.97 | 0.97 | 0.97 | 0.97  | 0.97 | 0.97 | 0.97  | 0.97 | 0.97 | 0.97  | 0.97 |
| Adj. Flow (vph)        | 19    | 847  | 33   | 20   | 2040  | 31   | 58   | 9     | 18   | 43   | 7     | 47   |
| RTOR Reduction (vph)   | 0     | 0    | 14   | 0    | 1     | 0    | 0    | 0     | 16   | 0    | 0     | 43   |
| Lane Group Flow (vph)  | 19    | 847  | 19   | 20   | 2070  | 0    | 0    | 67    | 2    | 0    | 50    | 4    |
| Confl. Peds. (#/hr)    | 5     |      | 6    | 6    |       | 5    |      |       | 12   | 12   |       |      |
| Turn Type              | Prot  | NA   | Perm | Prot | NA    |      | Perm | NA    | Prot | Perm | NA    | Prot |
| Protected Phases       | 1     | 6    |      | 5    | 2     |      |      | 4     | 4    |      | 3     | 3    |
| Permitted Phases       |       |      | 6    |      |       |      | 4    |       |      | 3    |       |      |
| Actuated Green, G (s)  | 4.8   | 87.8 | 87.8 | 4.1  | 87.1  |      |      | 19.1  | 19.1 |      | 13.0  | 13.0 |
| Effective Green, g (s) | 4.8   | 87.8 | 87.8 | 4.1  | 87.1  |      |      | 19.1  | 19.1 |      | 13.0  | 13.0 |
| Actuated g/C Ratio     | 0.03  | 0.59 | 0.59 | 0.03 | 0.58  |      |      | 0.13  | 0.13 |      | 0.09  | 0.09 |
| Clearance Time (s)     | 6.0   | 6.0  | 6.0  | 6.0  | 6.0   |      |      | 7.0   | 7.0  |      | 7.0   | 7.0  |
| Vehicle Extension (s)  | 3.0   | 0.2  | 0.2  | 3.0  | 0.2   |      |      | 3.0   | 3.0  |      | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 56    | 2976 | 902  | 93   | 3710  |      |      | 170   | 201  |      | 45    | 137  |
| v/s Ratio Prot         | c0.01 | 0.17 |      | 0.01 | c0.32 |      |      |       | 0.00 |      |       | 0.00 |
| v/s Ratio Perm         |       |      | 0.01 |      |       |      |      | c0.05 |      |      | c0.09 |      |
| v/c Ratio              | 0.34  | 0.28 | 0.02 | 0.22 | 0.56  |      |      | 0.39  | 0.01 |      | 1.11  | 0.03 |
| Uniform Delay, d1      | 71.0  | 15.5 | 13.1 | 71.4 | 19.5  |      |      | 60.1  | 57.2 |      | 68.5  | 62.7 |
| Progression Factor     | 1.00  | 1.00 | 1.00 | 1.16 | 0.58  |      |      | 1.00  | 1.00 |      | 1.00  | 1.00 |
| Incremental Delay, d2  | 3.6   | 0.2  | 0.0  | 0.5  | 0.3   |      |      | 1.5   | 0.0  |      | 168.6 | 0.1  |
| Delay (s)              | 74.6  | 15.7 | 13.1 | 83.0 | 11.6  |      |      | 61.6  | 57.2 |      | 237.1 | 62.8 |
| Level of Service       | E     | B    | B    | F    | B     |      |      | E     | E    |      | F     | E    |
| Approach Delay (s)     |       | 16.9 |      |      | 12.2  |      |      | 60.7  |      |      | 152.7 |      |
| Approach LOS           |       | B    |      |      | B     |      |      | E     |      |      | F     |      |

Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 19.1  | HCM 2000 Level of Service | B    |
| HCM 2000 Volume to Capacity ratio | 0.58  |                           |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s)      | 26.0 |
| Intersection Capacity Utilization | 62.7% | ICU Level of Service      | B    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

HCM Unsignalized Intersection Capacity Analysis  
4: Residential Driveway & Randolph Road

Existing Conditions - AM Peak Hour  
08/30/2023



| Movement                          | EBT  | EBR  | WBL  | WBT   | NBL  | NBR  |                      |      |
|-----------------------------------|------|------|------|-------|------|------|----------------------|------|
| Lane Configurations               | ↑↑↑  |      |      | ↑↑↑   |      | ↗    |                      |      |
| Traffic Volume (veh/h)            | 928  | 2    | 0    | 2064  | 0    | 32   |                      |      |
| Future Volume (Veh/h)             | 928  | 2    | 0    | 2064  | 0    | 32   |                      |      |
| Sign Control                      | Free |      |      | Free  | Stop |      |                      |      |
| Grade                             | 0%   |      |      | 0%    | 0%   |      |                      |      |
| Peak Hour Factor                  | 0.93 | 0.93 | 0.93 | 0.93  | 0.93 | 0.93 |                      |      |
| Hourly flow rate (vph)            | 998  | 2    | 0    | 2219  | 0    | 34   |                      |      |
| Pedestrians                       |      |      |      |       |      | 8    |                      |      |
| Lane Width (ft)                   |      |      |      |       |      | 12.0 |                      |      |
| Walking Speed (ft/s)              |      |      |      |       |      | 3.5  |                      |      |
| Percent Blockage                  |      |      |      |       |      | 1    |                      |      |
| Right turn flare (veh)            |      |      |      |       |      |      |                      |      |
| Median type                       | None |      |      | None  |      |      |                      |      |
| Median storage (veh)              |      |      |      |       |      |      |                      |      |
| Upstream signal (ft)              | 462  |      |      | 470   |      |      |                      |      |
| pX, platoon unblocked             |      |      |      | 0.92  | 0.65 | 0.92 |                      |      |
| vC, conflicting volume            |      |      |      | 1008  | 1562 | 342  |                      |      |
| vC1, stage 1 conf vol             |      |      |      |       |      |      |                      |      |
| vC2, stage 2 conf vol             |      |      |      |       |      |      |                      |      |
| vCu, unblocked vol                |      |      |      | 713   | 0    | 0    |                      |      |
| tC, single (s)                    |      |      |      | 4.1   | 6.8  | 6.9  |                      |      |
| tC, 2 stage (s)                   |      |      |      |       |      |      |                      |      |
| tF (s)                            |      |      |      | 2.2   | 3.5  | 3.3  |                      |      |
| p0 queue free %                   |      |      |      | 100   | 100  | 97   |                      |      |
| cM capacity (veh/h)               |      |      |      | 808   | 657  | 992  |                      |      |
| Direction, Lane #                 | EB 1 | EB 2 | EB 3 | WB 1  | WB 2 | WB 3 | WB 4                 | NB 1 |
| Volume Total                      | 399  | 399  | 202  | 555   | 555  | 555  | 555                  | 34   |
| Volume Left                       | 0    | 0    | 0    | 0     | 0    | 0    | 0                    | 0    |
| Volume Right                      | 0    | 0    | 2    | 0     | 0    | 0    | 0                    | 34   |
| cSH                               | 1700 | 1700 | 1700 | 1700  | 1700 | 1700 | 1700                 | 992  |
| Volume to Capacity                | 0.23 | 0.23 | 0.12 | 0.33  | 0.33 | 0.33 | 0.33                 | 0.03 |
| Queue Length 95th (ft)            | 0    | 0    | 0    | 0     | 0    | 0    | 0                    | 3    |
| Control Delay (s)                 | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0                  | 8.8  |
| Lane LOS                          |      |      |      |       |      |      |                      |      |
| Approach Delay (s)                | 0.0  |      |      | 0.0   |      |      | 8.8                  |      |
| Approach LOS                      |      |      |      |       |      |      |                      |      |
| <b>Intersection Summary</b>       |      |      |      |       |      |      |                      |      |
| Average Delay                     |      |      |      | 0.1   |      |      |                      |      |
| Intersection Capacity Utilization |      |      |      | 33.2% |      |      | ICU Level of Service |      |
| Analysis Period (min)             |      |      |      | 15    |      |      | A                    |      |

HCM Signalized Intersection Capacity Analysis  
5: Glenallan Avenue & Randolph Road

Existing Conditions - AM Peak Hour

08/30/2023



| Movement               | EBL   | EBT   | EBR  | WBL   | WBT   | WBR  | NBL   | NBT   | NBR  | SBL   | SBT  | SBR  |
|------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|------|------|
| Lane Configurations    |       |       |      |       |       |      |       |       |      |       |      |      |
| Traffic Volume (vph)   | 33    | 839   | 35   | 2     | 1923  | 198  | 55    | 106   | 0    | 288   | 55   | 86   |
| Future Volume (vph)    | 33    | 839   | 35   | 2     | 1923  | 198  | 55    | 106   | 0    | 288   | 55   | 86   |
| Ideal Flow (vphp)      | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 5.5   | 6.5   |      | 5.5   | 6.5   |      |       | 7.0   |      | 7.0   | 7.0  |      |
| Lane Util. Factor      | 1.00  | 0.91  |      | 1.00  | 0.91  |      |       | 1.00  |      | 0.95  | 0.95 |      |
| Frbp, ped/bikes        | 1.00  | 1.00  |      | 1.00  | 1.00  |      |       | 1.00  |      | 1.00  | 0.99 |      |
| Flpb, ped/bikes        | 1.00  | 1.00  |      | 1.00  | 1.00  |      |       | 1.00  |      | 1.00  | 1.00 |      |
| Frt                    | 1.00  | 0.99  |      | 1.00  | 0.99  |      |       | 1.00  |      | 1.00  | 0.94 |      |
| Flt Protected          | 0.95  | 1.00  |      | 0.95  | 1.00  |      |       | 0.98  |      | 0.95  | 0.98 |      |
| Satd. Flow (prot)      | 1770  | 5039  |      | 1763  | 4998  |      |       | 1831  |      | 1681  | 1622 |      |
| Flt Permitted          | 0.05  | 1.00  |      | 0.28  | 1.00  |      |       | 0.98  |      | 0.95  | 0.98 |      |
| Satd. Flow (perm)      | 100   | 5039  |      | 511   | 4998  |      |       | 1831  |      | 1681  | 1622 |      |
| Peak-hour factor, PHF  | 0.96  | 0.96  | 0.96 | 0.96  | 0.96  | 0.96 | 0.96  | 0.96  | 0.96 | 0.96  | 0.96 | 0.96 |
| Adj. Flow (vph)        | 34    | 874   | 36   | 2     | 2003  | 206  | 57    | 110   | 0    | 300   | 57   | 90   |
| RTOR Reduction (vph)   | 0     | 2     | 0    | 0     | 6     | 0    | 0     | 0     | 0    | 0     | 17   | 0    |
| Lane Group Flow (vph)  | 34    | 908   | 0    | 2     | 2203  | 0    | 0     | 167   | 0    | 228   | 202  | 0    |
| Confl. Peds. (#/hr)    | 11    |       | 17   | 17    |       | 11   | 4     |       | 12   | 12    |      | 4    |
| Turn Type              | pm+pt | NA    |      | pm+pt | NA    |      | Split | NA    | Prot | Split | NA   |      |
| Protected Phases       | 1     | 6     |      | 5     | 2     |      | 3     | 3     | 3    | 4     | 4    |      |
| Permitted Phases       | 6     |       |      | 2     |       |      |       |       |      |       |      |      |
| Actuated Green, G (s)  | 80.4  | 74.5  |      | 71.0  | 69.8  |      |       | 22.7  |      | 25.6  | 25.6 |      |
| Effective Green, g (s) | 80.4  | 74.5  |      | 71.0  | 69.8  |      |       | 22.7  |      | 25.6  | 25.6 |      |
| Actuated g/C Ratio     | 0.54  | 0.50  |      | 0.47  | 0.47  |      |       | 0.15  |      | 0.17  | 0.17 |      |
| Clearance Time (s)     | 5.5   | 6.5   |      | 5.5   | 6.5   |      |       | 7.0   |      | 7.0   | 7.0  |      |
| Vehicle Extension (s)  | 3.0   | 5.0   |      | 3.0   | 5.0   |      |       | 3.0   |      | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     | 119   | 2502  |      | 251   | 2325  |      |       | 277   |      | 286   | 276  |      |
| v/s Ratio Prot         | c0.01 | c0.18 |      | 0.00  | c0.44 |      |       | c0.09 |      | c0.14 | 0.12 |      |
| v/s Ratio Perm         | 0.14  |       |      | 0.00  |       |      |       |       |      |       |      |      |
| v/c Ratio              | 0.29  | 0.36  |      | 0.01  | 0.95  |      |       | 0.60  |      | 0.80  | 0.73 |      |
| Uniform Delay, d1      | 30.7  | 23.2  |      | 20.9  | 38.3  |      |       | 59.4  |      | 59.7  | 58.9 |      |
| Progression Factor     | 1.70  | 0.57  |      | 0.69  | 0.46  |      |       | 1.00  |      | 1.00  | 1.00 |      |
| Incremental Delay, d2  | 1.3   | 0.4   |      | 0.0   | 7.1   |      |       | 3.7   |      | 14.3  | 9.5  |      |
| Delay (s)              | 53.4  | 13.7  |      | 14.5  | 24.6  |      |       | 63.1  |      | 74.0  | 68.5 |      |
| Level of Service       | D     | B     |      | B     | C     |      |       | E     |      | E     | E    |      |
| Approach Delay (s)     |       | 15.1  |      |       | 24.6  |      |       | 63.1  |      |       | 71.3 |      |
| Approach LOS           |       | B     |      |       | C     |      |       | E     |      |       | E    |      |

Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 29.5  | HCM 2000 Level of Service | C    |
| HCM 2000 Volume to Capacity ratio | 0.82  |                           |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s)      | 26.0 |
| Intersection Capacity Utilization | 87.6% | ICU Level of Service      | E    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

HCM Signalized Intersection Capacity Analysis  
7: Georgia Avenue & Layhill Road

Existing Conditions - AM Peak Hour

08/30/2023

























| Movement                          | EBL                 | EBT   | EBR   | WBL   | WBT  | WBR  | NBL  | NBT  | NBR   | SBL   | SBT   | SBR                       |      |
|-----------------------------------|---------------------|-------|-------|-------|------|------|------|------|-------|-------|-------|---------------------------|------|
| Lane Configurations               |                     | ↕     | ↗     | ↘     |      | ↗    |      | ↕↕↕  | ↗     | ↘     | ↕↕↕   |                           |      |
| Traffic Volume (vph)              | 9                   | 7     | 15    | 866   | 0    | 30   | 0    | 686  | 377   | 53    | 951   | 0                         |      |
| Future Volume (vph)               | 9                   | 7     | 15    | 866   | 0    | 30   | 0    | 686  | 377   | 53    | 951   | 0                         |      |
| Ideal Flow (vphp)                 | 1900                | 1900  | 1900  | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900  | 1900  | 1900                      |      |
| Total Lost time (s)               |                     | 6.5   | 6.5   | 6.5   |      | 6.5  |      | 6.5  | 6.5   | 5.5   | 6.5   |                           |      |
| Lane Util. Factor                 |                     | 1.00  | 1.00  | 0.97  |      | 1.00 |      | 0.91 | 1.00  | 1.00  | 0.91  |                           |      |
| Frbp, ped/bikes                   |                     | 1.00  | 1.00  | 1.00  |      | 0.97 |      | 1.00 | 1.00  | 1.00  | 1.00  |                           |      |
| Flpb, ped/bikes                   |                     | 1.00  | 1.00  | 1.00  |      | 1.00 |      | 1.00 | 1.00  | 1.00  | 1.00  |                           |      |
| Frt                               |                     | 1.00  | 0.85  | 1.00  |      | 0.85 |      | 1.00 | 0.85  | 1.00  | 1.00  |                           |      |
| Flt Protected                     |                     | 0.97  | 1.00  | 0.95  |      | 1.00 |      | 1.00 | 1.00  | 0.95  | 1.00  |                           |      |
| Satd. Flow (prot)                 |                     | 1812  | 1583  | 3433  |      | 1543 |      | 5085 | 1583  | 1765  | 5038  |                           |      |
| Flt Permitted                     |                     | 0.97  | 1.00  | 0.95  |      | 1.00 |      | 1.00 | 1.00  | 0.32  | 1.00  |                           |      |
| Satd. Flow (perm)                 |                     | 1812  | 1583  | 3433  |      | 1543 |      | 5085 | 1583  | 594   | 5038  |                           |      |
| Peak-hour factor, PHF             | 0.99                | 0.99  | 0.99  | 0.99  | 0.99 | 0.99 | 0.99 | 0.99 | 0.99  | 0.99  | 0.99  | 0.99                      |      |
| Adj. Flow (vph)                   | 9                   | 7     | 15    | 875   | 0    | 30   | 0    | 693  | 381   | 54    | 961   | 0                         |      |
| RTOR Reduction (vph)              | 0                   | 0     | 15    | 0     | 0    | 21   | 0    | 0    | 50    | 0     | 0     | 0                         |      |
| Lane Group Flow (vph)             | 0                   | 16    | 0     | 875   | 0    | 9    | 0    | 693  | 331   | 54    | 961   | 0                         |      |
| Confl. Peds. (#/hr)               | 8                   |       | 1     | 1     |      | 8    | 7    |      | 22    | 22    |       | 7                         |      |
| Confl. Bikes (#/hr)               |                     |       | 1     |       |      |      |      |      |       |       |       |                           |      |
| Bus Blockages (#/hr)              | 0                   | 0     | 0     | 0     | 0    | 0    | 0    | 0    | 0     | 0     | 7     | 0                         |      |
| Turn Type                         | Split               | NA    | Prot  | Prot  |      | Perm |      | NA   | Prot  | pm+pt | NA    |                           |      |
| Protected Phases                  | 3                   | 3     | 3     | 4     |      |      |      | 6    | 6     | 5     | 2     |                           |      |
| Permitted Phases                  |                     |       |       |       |      | 4    |      |      |       | 2     |       |                           |      |
| Actuated Green, G (s)             |                     | 4.8   | 4.8   | 55.5  |      | 55.5 |      | 88.0 | 88.0  | 100.2 | 100.2 |                           |      |
| Effective Green, g (s)            |                     | 4.8   | 4.8   | 55.5  |      | 55.5 |      | 88.0 | 88.0  | 100.2 | 100.2 |                           |      |
| Actuated g/C Ratio                |                     | 0.03  | 0.03  | 0.31  |      | 0.31 |      | 0.49 | 0.49  | 0.56  | 0.56  |                           |      |
| Clearance Time (s)                |                     | 6.5   | 6.5   | 6.5   |      | 6.5  |      | 6.5  | 6.5   | 5.5   | 6.5   |                           |      |
| Vehicle Extension (s)             |                     | 3.0   | 3.0   | 5.0   |      | 5.0  |      | 0.2  | 0.2   | 3.0   | 0.2   |                           |      |
| Lane Grp Cap (vph)                |                     | 48    | 42    | 1058  |      | 475  |      | 2486 | 773   | 374   | 2804  |                           |      |
| v/s Ratio Prot                    |                     | c0.01 | 0.00  | c0.25 |      |      |      | 0.14 | c0.21 | 0.01  | c0.19 |                           |      |
| v/s Ratio Perm                    |                     |       |       |       |      | 0.01 |      |      |       | 0.07  |       |                           |      |
| v/c Ratio                         |                     | 0.33  | 0.01  | 0.83  |      | 0.02 |      | 0.28 | 0.43  | 0.14  | 0.34  |                           |      |
| Uniform Delay, d1                 |                     | 86.0  | 85.3  | 57.8  |      | 43.3 |      | 27.2 | 29.7  | 18.8  | 21.9  |                           |      |
| Progression Factor                |                     | 1.00  | 1.00  | 1.00  |      | 1.00 |      | 1.36 | 1.60  | 1.00  | 1.00  |                           |      |
| Incremental Delay, d2             |                     | 4.1   | 0.1   | 6.1   |      | 0.0  |      | 0.3  | 1.6   | 0.2   | 0.3   |                           |      |
| Delay (s)                         |                     | 90.1  | 85.4  | 63.9  |      | 43.4 |      | 37.2 | 49.2  | 19.0  | 22.2  |                           |      |
| Level of Service                  |                     | F     | F     | E     |      | D    |      | D    | D     | B     | C     |                           |      |
| Approach Delay (s)                |                     | 87.8  |       |       | 63.2 |      |      | 41.5 |       |       | 22.0  |                           |      |
| Approach LOS                      |                     | F     |       |       | E    |      |      | D    |       |       | C     |                           |      |
| <b>Intersection Summary</b>       |                     |       |       |       |      |      |      |      |       |       |       |                           |      |
| HCM 2000 Control Delay            |                     |       | 41.9  |       |      |      |      |      |       |       |       | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio |                     |       | 0.57  |       |      |      |      |      |       |       |       |                           |      |
| Actuated Cycle Length (s)         |                     |       | 180.0 |       |      |      |      |      |       |       |       | Sum of lost time (s)      | 25.0 |
| Intersection Capacity Utilization |                     |       | 80.5% |       |      |      |      |      |       |       |       | ICU Level of Service      | D    |
| Analysis Period (min)             |                     |       | 15    |       |      |      |      |      |       |       |       |                           |      |
| c                                 | Critical Lane Group |       |       |       |      |      |      |      |       |       |       |                           |      |

HCM Signalized Intersection Capacity Analysis  
10: Glenallan Avenue & Layhill Road

Existing Conditions - AM Peak Hour

08/30/2023

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |      |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |      |
| Lane Configurations               |  |  |   |  |  |  |  |  |   |  |  |  |      |
| Traffic Volume (vph)              | 29  | 378   | 28  | 103   | 848   | 262   | 19   | 318   | 49  | 129   | 252   | 47  |      |
| Future Volume (vph)               | 29  | 378   | 28  | 103   | 848   | 262   | 19   | 318   | 49  | 129   | 252   | 47  |      |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |      |
| Total Lost time (s)               | 6.5   | 7.0   |   | 6.5   | 7.0   | 7.0   | 6.0  | 6.0   |   | 6.0   | 6.0   | 6.0   |      |
| Lane Util. Factor                 | 1.00  | 0.91  |   | 1.00  | 0.95  | 1.00  | 1.00   | 0.95  |   | 1.00  | 1.00  | 1.00  |      |
| Frbp, ped/bikes                   | 1.00  | 1.00  |   | 1.00  | 1.00  | 0.98  | 1.00   | 1.00  |   | 1.00  | 1.00  | 0.95  |      |
| Flpb, ped/bikes                   | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  | 0.99   | 1.00  |   | 1.00  | 1.00  | 1.00  |      |
| Frt                               | 1.00  | 0.99  |   | 1.00  | 1.00  | 0.85  | 1.00   | 0.98  |   | 1.00  | 1.00  | 0.85  |      |
| Flt Protected                     | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95   | 1.00  |   | 0.95  | 1.00  | 1.00  |      |
| Satd. Flow (prot)                 | 1769  | 5026  |   | 1767  | 3539  | 1556  | 1746   | 3460  |   | 1767  | 1863  | 1511  |      |
| Flt Permitted                     | 0.15  | 1.00  |   | 0.41  | 1.00  | 1.00  | 0.58   | 1.00  |   | 0.40  | 1.00  | 1.00  |      |
| Satd. Flow (perm)                 | 276   | 5026  |   | 762   | 3539  | 1556  | 1072   | 3460  |   | 751   | 1863  | 1511  |      |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |      |
| Adj. Flow (vph)                   | 32  | 411   | 30  | 112   | 922   | 285   | 21   | 346   | 53  | 140   | 274   | 51  |      |
| RTOR Reduction (vph)              | 0   | 7   | 0   | 0   | 0   | 192   | 0  | 10  | 0   | 0   | 0   | 31  |      |
| Lane Group Flow (vph)             | 32  | 434   | 0   | 112   | 922   | 93  | 21   | 389   | 0   | 140   | 274   | 20  |      |
| Confl. Peds. (#/hr)               | 5   |   | 8   | 8   |   | 5   | 24   |   | 5   | 5   |   | 24  |      |
| Confl. Bikes (#/hr)               |   |   | 1   |   |   | 1   |  |   |   |   |   |   |      |
| Turn Type                         | pm+pt   | NA  |   | pm+pt   | NA  | Perm  | pm+pt  | NA  |   | pm+pt   | NA  | Perm  |      |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 1  | 6   |   | 5   | 2   |   |      |
| Permitted Phases                  | 4   |   |   | 8   |   | 8   | 6  |   |   | 2   |   | 2   |      |
| Actuated Green, G (s)             | 39.1  | 34.5  |   | 48.7  | 39.3  | 39.3  | 44.2   | 41.4  |   | 56.6  | 47.8  | 47.8  |      |
| Effective Green, g (s)            | 39.1  | 34.5  |   | 48.7  | 39.3  | 39.3  | 44.2   | 41.4  |   | 56.6  | 47.8  | 47.8  |      |
| Actuated g/C Ratio                | 0.33  | 0.29  |   | 0.41  | 0.33  | 0.33  | 0.37   | 0.34  |   | 0.47  | 0.40  | 0.40  |      |
| Clearance Time (s)                | 6.5   | 7.0   |   | 6.5   | 7.0   | 7.0   | 6.0  | 6.0   |   | 6.0   | 6.0   | 6.0   |      |
| Vehicle Extension (s)             | 3.0   | 5.0   |   | 3.0   | 5.0   | 5.0   | 3.0  | 0.2   |   | 3.0   | 0.2   | 0.2   |      |
| Lane Grp Cap (vph)                | 147   | 1444  |   | 387   | 1159  | 509   | 410  | 1193  |   | 432   | 742   | 601   |      |
| v/s Ratio Prot                    | 0.01  | 0.09  |   | c0.02   | c0.26   |   | 0.00   | 0.11  |   | c0.02   | c0.15   |   |      |
| v/s Ratio Perm                    | 0.06  |   |   | 0.09  |   | 0.06  | 0.02   |   |   | 0.13  |   | 0.01  |      |
| v/c Ratio                         | 0.22  | 0.30  |   | 0.29  | 0.80  | 0.18  | 0.05   | 0.33  |   | 0.32  | 0.37  | 0.03  |      |
| Uniform Delay, d1                 | 29.2  | 33.3  |   | 22.8  | 36.7  | 28.9  | 24.2   | 29.0  |   | 18.7  | 25.5  | 22.0  |      |
| Progression Factor                | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  |   | 1.00  | 1.00  | 1.00  |      |
| Incremental Delay, d2             | 0.7   | 0.2   |   | 0.4   | 4.4   | 0.4   | 0.1  | 0.7   |   | 0.4   | 1.4   | 0.1   |      |
| Delay (s)                         | 29.9  | 33.6  |   | 23.2  | 41.1  | 29.2  | 24.3   | 29.7  |   | 19.2  | 26.9  | 22.1  |      |
| Level of Service                  | C   | C   |   | C   | D   | C   | C  | C   |   | B   | C   | C   |      |
| Approach Delay (s)                |   | 33.3  |   |   | 37.0  |   |  | 29.5  |   |   | 24.0  |   |      |
| Approach LOS                      |   | C   |   |   | D   |   |  | C   |   |   | C   |   |      |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |      |
| HCM 2000 Control Delay            |   |   | 32.9  |   |   |   |  |   |   |   |   | HCM 2000 Level of Service   | C    |
| HCM 2000 Volume to Capacity ratio |   |   | 0.57  |   |   |   |  |   |   |   |   |   |      |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   |  |   |   |   |   | Sum of lost time (s)  | 25.5 |
| Intersection Capacity Utilization |   |   | 77.0%   |   |   |   |  |   |   |   |   | ICU Level of Service  | D    |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |      |

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 12: Glenallan Avenue & Erskine Avenue

Existing Conditions - AM Peak Hour  
 08/30/2023



| Movement                          | EBL         | EBR         | NBL         | NBT                  | SBT  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             |             |             |                      |      |      |
| Traffic Volume (veh/h)            | 1           | 0           | 0           | 222                  | 115  | 1    |
| Future Volume (Veh/h)             | 1           | 0           | 0           | 222                  | 115  | 1    |
| Sign Control                      | Stop        |             |             | Free                 | Free |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Peak Hour Factor                  | 0.77        | 0.77        | 0.77        | 0.77                 | 0.77 | 0.77 |
| Hourly flow rate (vph)            | 1           | 0           | 0           | 288                  | 149  | 1    |
| <b>Pedestrians</b>                |             |             |             |                      |      |      |
| Lane Width (ft)                   |             |             |             |                      |      |      |
| Walking Speed (ft/s)              |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             |             |             | None                 | None |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              |             |             |             |                      |      | 350  |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 438         | 150         | 150         |                      |      |      |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 438         | 150         | 150         |                      |      |      |
| tC, single (s)                    | 6.4         | 6.2         | 4.1         |                      |      |      |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 3.5         | 3.3         | 2.2         |                      |      |      |
| p0 queue free %                   | 100         | 100         | 100         |                      |      |      |
| cM capacity (veh/h)               | 576         | 897         | 1431        |                      |      |      |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>NB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 1           | 288         | 150         |                      |      |      |
| Volume Left                       | 1           | 0           | 0           |                      |      |      |
| Volume Right                      | 0           | 0           | 1           |                      |      |      |
| cSH                               | 576         | 1431        | 1700        |                      |      |      |
| Volume to Capacity                | 0.00        | 0.00        | 0.09        |                      |      |      |
| Queue Length 95th (ft)            | 0           | 0           | 0           |                      |      |      |
| Control Delay (s)                 | 11.3        | 0.0         | 0.0         |                      |      |      |
| Lane LOS                          | B           |             |             |                      |      |      |
| Approach Delay (s)                | 11.3        | 0.0         | 0.0         |                      |      |      |
| Approach LOS                      | B           |             |             |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.0         |                      |      |      |
| Intersection Capacity Utilization |             |             | 21.7%       | ICU Level of Service | A    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Signalized Intersection Capacity Analysis  
1: Livingston Street & Randolph Road

Existing PM  
08/30/2023



| Movement                          | EBL  | EBT   | EBR   | WBL  | WBT  | WBR  | NBL  | NBT   | NBR  | SBL  | SBT  | SBR  |
|-----------------------------------|------|-------|-------|------|------|------|------|-------|------|------|------|------|
| Lane Configurations               | ↗    | ↑↑↑   |       | ↗    | ↑↑↑  |      |      | ↕     |      |      | ↕    |      |
| Traffic Volume (vph)              | 29   | 1479  | 7     | 79   | 901  | 12   | 14   | 3     | 37   | 4    | 12   | 8    |
| Future Volume (vph)               | 29   | 1479  | 7     | 79   | 901  | 12   | 14   | 3     | 37   | 4    | 12   | 8    |
| Ideal Flow (vphpl)                | 1900 | 1900  | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s)               | 6.0  | 6.0   |       | 6.0  | 6.0  |      |      | 6.5   |      |      | 6.5  |      |
| Lane Util. Factor                 | 1.00 | 0.91  |       | 1.00 | 0.91 |      |      | 1.00  |      |      | 1.00 |      |
| Frbp, ped/bikes                   | 1.00 | 1.00  |       | 1.00 | 1.00 |      |      | 0.99  |      |      | 0.99 |      |
| Flpb, ped/bikes                   | 0.99 | 1.00  |       | 1.00 | 1.00 |      |      | 1.00  |      |      | 1.00 |      |
| Frt                               | 1.00 | 1.00  |       | 1.00 | 1.00 |      |      | 0.91  |      |      | 0.95 |      |
| Flt Protected                     | 0.95 | 1.00  |       | 0.95 | 1.00 |      |      | 0.99  |      |      | 0.99 |      |
| Satd. Flow (prot)                 | 1759 | 5054  |       | 1768 | 5046 |      |      | 1639  |      |      | 1747 |      |
| Flt Permitted                     | 0.29 | 1.00  |       | 0.15 | 1.00 |      |      | 0.92  |      |      | 0.95 |      |
| Satd. Flow (perm)                 | 545  | 5054  |       | 278  | 5046 |      |      | 1522  |      |      | 1677 |      |
| Peak-hour factor, PHF             | 0.98 | 0.98  | 0.98  | 0.98 | 0.98 | 0.98 | 0.98 | 0.98  | 0.98 | 0.98 | 0.98 | 0.98 |
| Adj. Flow (vph)                   | 30   | 1509  | 7     | 81   | 919  | 12   | 14   | 3     | 38   | 4    | 12   | 8    |
| RTOR Reduction (vph)              | 0    | 0     | 0     | 0    | 1    | 0    | 0    | 34    | 0    | 0    | 7    | 0    |
| Lane Group Flow (vph)             | 30   | 1516  | 0     | 81   | 930  | 0    | 0    | 21    | 0    | 0    | 17   | 0    |
| Confl. Peds. (#/hr)               | 6    |       | 2     | 2    |      | 6    | 11   |       | 6    | 6    |      | 11   |
| Bus Blockages (#/hr)              | 0    | 4     | 0     | 0    | 4    | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| Turn Type                         | Perm | NA    |       | Perm | NA   |      | Perm | NA    |      | Perm | NA   |      |
| Protected Phases                  |      | 2     |       |      | 6    |      |      | 4     |      |      | 8    |      |
| Permitted Phases                  | 2    |       |       | 6    |      |      | 4    |       |      | 8    |      |      |
| Actuated Green, G (s)             | 93.4 | 93.4  |       | 93.4 | 93.4 |      |      | 14.1  |      |      | 14.1 |      |
| Effective Green, g (s)            | 93.4 | 93.4  |       | 93.4 | 93.4 |      |      | 14.1  |      |      | 14.1 |      |
| Actuated g/C Ratio                | 0.78 | 0.78  |       | 0.78 | 0.78 |      |      | 0.12  |      |      | 0.12 |      |
| Clearance Time (s)                | 6.0  | 6.0   |       | 6.0  | 6.0  |      |      | 6.5   |      |      | 6.5  |      |
| Vehicle Extension (s)             | 0.2  | 0.2   |       | 0.2  | 0.2  |      |      | 5.0   |      |      | 5.0  |      |
| Lane Grp Cap (vph)                | 424  | 3933  |       | 216  | 3927 |      |      | 178   |      |      | 197  |      |
| v/s Ratio Prot                    |      | c0.30 |       |      | 0.18 |      |      |       |      |      |      |      |
| v/s Ratio Perm                    | 0.06 |       |       | 0.29 |      |      |      | c0.01 |      |      | 0.01 |      |
| v/c Ratio                         | 0.07 | 0.39  |       | 0.38 | 0.24 |      |      | 0.12  |      |      | 0.09 |      |
| Uniform Delay, d1                 | 3.1  | 4.2   |       | 4.2  | 3.6  |      |      | 47.4  |      |      | 47.2 |      |
| Progression Factor                | 1.00 | 1.00  |       | 1.00 | 1.00 |      |      | 1.00  |      |      | 1.00 |      |
| Incremental Delay, d2             | 0.3  | 0.3   |       | 4.9  | 0.1  |      |      | 0.6   |      |      | 0.4  |      |
| Delay (s)                         | 3.4  | 4.5   |       | 9.1  | 3.8  |      |      | 48.0  |      |      | 47.6 |      |
| Level of Service                  | A    | A     |       | A    | A    |      |      | D     |      |      | D    |      |
| Approach Delay (s)                |      | 4.5   |       |      | 4.2  |      |      | 48.0  |      |      | 47.6 |      |
| Approach LOS                      |      | A     |       |      | A    |      |      | D     |      |      | D    |      |
| <b>Intersection Summary</b>       |      |       |       |      |      |      |      |       |      |      |      |      |
| HCM 2000 Control Delay            |      |       | 5.7   |      |      |      |      |       |      |      |      | A    |
| HCM 2000 Volume to Capacity ratio |      |       | 0.35  |      |      |      |      |       |      |      |      |      |
| Actuated Cycle Length (s)         |      |       | 120.0 |      |      |      |      |       |      |      | 12.5 |      |
| Intersection Capacity Utilization |      |       | 63.4% |      |      |      |      |       |      |      |      | B    |
| Analysis Period (min)             |      |       | 15    |      |      |      |      |       |      |      |      |      |
| c Critical Lane Group             |      |       |       |      |      |      |      |       |      |      |      |      |

# HCM Signalized Intersection Capacity Analysis

## 2: Georgia Avenue & Randolph Road

Existing PM  
08/30/2023



| Movement                          | EBL2 | EBL   | EBR   | NBL   | NBT                       | NBR  | SBL  | SBT  | SBR  | SWL   | SWR  | SWR2   |
|-----------------------------------|------|-------|-------|-------|---------------------------|------|------|------|------|-------|------|--------|
| Lane Configurations               |      |       |       |       |                           |      |      |      |      |       |      |        |
| Traffic Volume (vph)              | 270  | 48    | 145   | 159   | 1423                      | 349  | 90   | 994  | 150  | 347   | 59   | 124    |
| Future Volume (vph)               | 270  | 48    | 145   | 159   | 1423                      | 349  | 90   | 994  | 150  | 347   | 59   | 124    |
| Ideal Flow (vphpl)                | 1900 | 1900  | 1900  | 1900  | 1900                      | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900   |
| Total Lost time (s)               | 12.0 | 12.0  | 12.0  | 7.0   | 9.0                       | 9.0  | 7.0  | 9.0  | 9.0  | 12.0  | 12.0 | 12.0   |
| Lane Util. Factor                 | 1.00 | 0.95  | 1.00  | 0.97  | 0.91                      | 1.00 | 0.97 | 0.91 | 1.00 | 0.97  | 1.00 | 1.00   |
| Frpb, ped/bikes                   | 1.00 | 1.00  | 1.00  | 1.00  | 1.00                      | 0.83 | 1.00 | 1.00 | 0.96 | 1.00  | 1.00 | 1.00   |
| Flpb, ped/bikes                   | 1.00 | 1.00  | 1.00  | 1.00  | 1.00                      | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00   |
| Frt                               | 1.00 | 1.00  | 0.85  | 1.00  | 1.00                      | 0.85 | 1.00 | 1.00 | 0.85 | 1.00  | 0.85 | 0.85   |
| Flt Protected                     | 0.95 | 0.95  | 1.00  | 0.95  | 1.00                      | 1.00 | 0.95 | 1.00 | 1.00 | 0.95  | 1.00 | 1.00   |
| Satd. Flow (prot)                 | 1770 | 1681  | 1583  | 3433  | 5085                      | 1321 | 3433 | 5058 | 1521 | 3433  | 1583 | 1583   |
| Flt Permitted                     | 0.95 | 0.95  | 1.00  | 0.95  | 1.00                      | 1.00 | 0.95 | 1.00 | 1.00 | 0.95  | 1.00 | 1.00   |
| Satd. Flow (perm)                 | 1770 | 1681  | 1583  | 3433  | 5085                      | 1321 | 3433 | 5058 | 1521 | 3433  | 1583 | 1583   |
| Peak-hour factor, PHF             | 0.95 | 0.95  | 0.95  | 0.95  | 0.95                      | 0.95 | 0.95 | 0.95 | 0.95 | 0.95  | 0.95 | 0.95   |
| Adj. Flow (vph)                   | 284  | 51    | 153   | 167   | 1498                      | 367  | 95   | 1046 | 158  | 365   | 62   | 131    |
| RTOR Reduction (vph)              | 0    | 0     | 78    | 0     | 0                         | 0    | 0    | 0    | 44   | 0     | 0    | 105    |
| Lane Group Flow (vph)             | 168  | 167   | 75    | 167   | 1498                      | 367  | 95   | 1046 | 114  | 365   | 62   | 26     |
| Confl. Peds. (#/hr)               |      | 9     | 6     | 12    |                           | 38   | 38   |      | 12   |       |      |        |
| Bus Blockages (#/hr)              | 0    | 0     | 0     | 0     | 0                         | 0    | 0    | 4    | 0    | 0     | 0    | 0      |
| Turn Type                         | Prot | Prot  | pt+ov | Prot  | NA                        | Perm | Prot | NA   | Perm | Prot  | Prot | custom |
| Protected Phases                  | 4    | 4     | 4 1   | 1     | 6                         |      | 5    | 2    |      | 3     | 3    | 3 5    |
| Permitted Phases                  |      |       |       |       |                           | 6    |      |      | 2    |       |      | 3      |
| Actuated Green, G (s)             | 24.8 | 24.8  | 51.9  | 15.1  | 79.3                      | 79.3 | 11.3 | 75.5 | 75.5 | 24.6  | 24.6 | 35.9   |
| Effective Green, g (s)            | 24.8 | 24.8  | 51.9  | 15.1  | 79.3                      | 79.3 | 11.3 | 75.5 | 75.5 | 24.6  | 24.6 | 35.9   |
| Actuated g/C Ratio                | 0.14 | 0.14  | 0.29  | 0.08  | 0.44                      | 0.44 | 0.06 | 0.42 | 0.42 | 0.14  | 0.14 | 0.20   |
| Clearance Time (s)                | 12.0 | 12.0  |       | 7.0   | 9.0                       | 9.0  | 7.0  | 9.0  | 9.0  | 12.0  | 12.0 |        |
| Vehicle Extension (s)             | 3.5  | 3.5   |       | 4.0   | 0.2                       | 0.2  | 4.0  | 0.2  | 0.2  | 3.0   | 3.0  |        |
| Lane Grp Cap (vph)                | 243  | 231   | 456   | 287   | 2240                      | 581  | 215  | 2121 | 637  | 469   | 216  | 315    |
| v/s Ratio Prot                    | 0.09 | c0.10 | 0.05  | c0.05 | c0.29                     |      | 0.03 | 0.21 |      | c0.11 | 0.04 | 0.02   |
| v/s Ratio Perm                    |      |       |       |       |                           | 0.28 |      |      | 0.08 |       |      |        |
| v/c Ratio                         | 0.69 | 0.72  | 0.17  | 0.58  | 0.67                      | 0.63 | 0.44 | 0.49 | 0.18 | 0.78  | 0.29 | 0.08   |
| Uniform Delay, d1                 | 74.0 | 74.3  | 47.9  | 79.4  | 39.9                      | 39.0 | 81.3 | 38.2 | 32.8 | 75.1  | 69.8 | 58.7   |
| Progression Factor                | 1.00 | 1.00  | 1.00  | 1.00  | 1.00                      | 1.00 | 0.97 | 1.20 | 1.49 | 1.00  | 1.00 | 1.00   |
| Incremental Delay, d2             | 8.5  | 11.0  | 0.2   | 3.5   | 1.6                       | 5.2  | 1.8  | 0.7  | 0.6  | 8.0   | 0.7  | 0.1    |
| Delay (s)                         | 82.5 | 85.3  | 48.1  | 82.9  | 41.5                      | 44.2 | 80.6 | 46.5 | 49.4 | 83.0  | 70.6 | 58.8   |
| Level of Service                  | F    | F     | D     | F     | D                         | D    | F    | D    | D    | F     | E    | E      |
| Approach Delay (s)                |      |       |       |       | 45.4                      |      |      | 49.4 |      | 75.9  |      |        |
| Approach LOS                      |      |       |       |       | D                         |      |      | D    |      | E     |      |        |
| <b>Intersection Summary</b>       |      |       |       |       |                           |      |      |      |      |       |      |        |
| HCM 2000 Control Delay            |      |       | 53.5  |       | HCM 2000 Level of Service |      |      |      |      | D     |      |        |
| HCM 2000 Volume to Capacity ratio |      |       | 0.71  |       |                           |      |      |      |      |       |      |        |
| Actuated Cycle Length (s)         |      |       | 180.0 |       | Sum of lost time (s)      |      |      |      |      | 40.0  |      |        |
| Intersection Capacity Utilization |      |       | 86.2% |       | ICU Level of Service      |      |      |      |      | E     |      |        |
| Analysis Period (min)             |      |       | 15    |       |                           |      |      |      |      |       |      |        |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Glenmont Circle/Shopping Center & Randolph Road

Existing PM  
 08/30/2023



| Movement               | EBL   | EBT   | EBR  | WBL  | WBT  | WBR  | NBL  | NBT   | NBR  | SBL  | SBT   | SBR  |
|------------------------|-------|-------|------|------|------|------|------|-------|------|------|-------|------|
| Lane Configurations    | ↙     | ↑↑↑   | ↗    | ↙    | ↑↑↑  |      |      | ↗     | ↗    |      | ↗     | ↗    |
| Traffic Volume (vph)   | 34    | 1507  | 64   | 28   | 1011 | 75   | 60   | 19    | 12   | 77   | 26    | 100  |
| Future Volume (vph)    | 34    | 1507  | 64   | 28   | 1011 | 75   | 60   | 19    | 12   | 77   | 26    | 100  |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0   | 6.0  | 6.0  | 6.0  |      |      | 7.0   | 7.0  |      | 7.0   | 7.0  |
| Lane Util. Factor      | 1.00  | 0.91  | 1.00 | 1.00 | 0.86 |      |      | 1.00  | 1.00 |      | 1.00  | 1.00 |
| Frbp, ped/bikes        | 1.00  | 1.00  | 0.95 | 1.00 | 1.00 |      |      | 1.00  | 1.00 |      | 1.00  | 1.00 |
| Flpb, ped/bikes        | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 |      |      | 1.00  | 1.00 |      | 0.97  | 1.00 |
| Frt                    | 1.00  | 1.00  | 0.85 | 1.00 | 0.99 |      |      | 1.00  | 0.85 |      | 1.00  | 0.85 |
| Flt Protected          | 0.95  | 1.00  | 1.00 | 0.95 | 1.00 |      |      | 0.96  | 1.00 |      | 0.96  | 1.00 |
| Satd. Flow (prot)      | 1770  | 5085  | 1497 | 1770 | 6318 |      |      | 1793  | 1583 |      | 1746  | 1583 |
| Flt Permitted          | 0.95  | 1.00  | 1.00 | 0.95 | 1.00 |      |      | 0.71  | 1.00 |      | 0.21  | 1.00 |
| Satd. Flow (perm)      | 1770  | 5085  | 1497 | 1770 | 6318 |      |      | 1322  | 1583 |      | 372   | 1583 |
| Peak-hour factor, PHF  | 0.97  | 0.97  | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97  | 0.97 | 0.97 | 0.97  | 0.97 |
| Adj. Flow (vph)        | 35    | 1554  | 66   | 29   | 1042 | 77   | 62   | 20    | 12   | 79   | 27    | 103  |
| RTOR Reduction (vph)   | 0     | 0     | 35   | 0    | 6    | 0    | 0    | 0     | 10   | 0    | 0     | 91   |
| Lane Group Flow (vph)  | 35    | 1554  | 31   | 29   | 1113 | 0    | 0    | 82    | 2    | 0    | 106   | 12   |
| Confl. Peds. (#/hr)    | 9     |       | 9    | 9    |      | 9    | 1    |       | 44   | 44   |       | 1    |
| Confl. Bikes (#/hr)    |       |       |      |      |      |      |      |       |      |      |       | 1    |
| Turn Type              | Prot  | NA    | Perm | Prot | NA   |      | Perm | NA    | Prot | Perm | NA    | Prot |
| Protected Phases       | 1     | 6     |      | 5    | 2    |      |      | 4     | 4    |      | 3     | 3    |
| Permitted Phases       |       |       | 6    |      |      |      | 4    |       |      | 3    |       |      |
| Actuated Green, G (s)  | 7.3   | 71.1  | 71.1 | 5.5  | 69.3 |      |      | 30.4  | 30.4 |      | 17.0  | 17.0 |
| Effective Green, g (s) | 7.3   | 71.1  | 71.1 | 5.5  | 69.3 |      |      | 30.4  | 30.4 |      | 17.0  | 17.0 |
| Actuated g/C Ratio     | 0.05  | 0.47  | 0.47 | 0.04 | 0.46 |      |      | 0.20  | 0.20 |      | 0.11  | 0.11 |
| Clearance Time (s)     | 6.0   | 6.0   | 6.0  | 6.0  | 6.0  |      |      | 7.0   | 7.0  |      | 7.0   | 7.0  |
| Vehicle Extension (s)  | 3.0   | 0.2   | 0.2  | 3.0  | 0.2  |      |      | 3.0   | 3.0  |      | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 86    | 2410  | 709  | 64   | 2918 |      |      | 267   | 320  |      | 42    | 179  |
| v/s Ratio Prot         | c0.02 | c0.31 |      | 0.02 | 0.18 |      |      |       | 0.00 |      |       | 0.01 |
| v/s Ratio Perm         |       |       | 0.02 |      |      |      |      | c0.06 |      |      | c0.29 |      |
| v/c Ratio              | 0.41  | 0.64  | 0.04 | 0.45 | 0.38 |      |      | 0.31  | 0.01 |      | 2.52  | 0.07 |
| Uniform Delay, d1      | 69.2  | 29.9  | 21.2 | 70.8 | 26.3 |      |      | 50.8  | 47.8 |      | 66.5  | 59.4 |
| Progression Factor     | 1.00  | 1.00  | 1.00 | 1.16 | 1.01 |      |      | 1.00  | 1.00 |      | 1.00  | 1.00 |
| Incremental Delay, d2  | 3.1   | 1.3   | 0.1  | 4.6  | 0.3  |      |      | 0.7   | 0.0  |      | 750.6 | 0.2  |
| Delay (s)              | 72.4  | 31.2  | 21.3 | 86.7 | 27.1 |      |      | 51.5  | 47.8 |      | 817.1 | 59.6 |
| Level of Service       | E     | C     | C    | F    | C    |      |      | D     | D    |      | F     | E    |
| Approach Delay (s)     |       | 31.7  |      |      | 28.6 |      |      | 51.0  |      |      | 443.7 |      |
| Approach LOS           |       | C     |      |      | C    |      |      | D     |      |      | F     |      |

| Intersection Summary              |       |                             |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay            | 58.9  | HCM 2000 Level of Service E |
| HCM 2000 Volume to Capacity ratio | 0.81  |                             |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s) 26.0   |
| Intersection Capacity Utilization | 75.5% | ICU Level of Service D      |
| Analysis Period (min)             | 15    |                             |

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Residential Driveway & Randolph Road

Existing PM  
08/30/2023



| Movement                          | EBT   | EBR  | WBL  | WBT                  | NBL  | NBR  |      |      |
|-----------------------------------|-------|------|------|----------------------|------|------|------|------|
| Lane Configurations               | ↑↑↑   |      |      | ↑↑↑                  |      | ↗    |      |      |
| Traffic Volume (veh/h)            | 1595  | 14   | 0    | 1155                 | 0    | 23   |      |      |
| Future Volume (Veh/h)             | 1595  | 14   | 0    | 1155                 | 0    | 23   |      |      |
| Sign Control                      | Free  |      |      | Free                 | Stop |      |      |      |
| Grade                             | 0%    |      |      | 0%                   | 0%   |      |      |      |
| Peak Hour Factor                  | 0.93  | 0.93 | 0.93 | 0.93                 | 0.93 | 0.93 |      |      |
| Hourly flow rate (vph)            | 1715  | 15   | 0    | 1242                 | 0    | 25   |      |      |
| Pedestrians                       | 2     |      |      | 1                    |      |      |      |      |
| Lane Width (ft)                   | 12.0  |      |      | 12.0                 |      |      |      |      |
| Walking Speed (ft/s)              | 3.5   |      |      | 3.5                  |      |      |      |      |
| Percent Blockage                  | 0     |      |      | 0                    |      |      |      |      |
| Right turn flare (veh)            |       |      |      |                      |      |      |      |      |
| Median type                       | None  |      |      | None                 |      |      |      |      |
| Median storage (veh)              |       |      |      |                      |      |      |      |      |
| Upstream signal (ft)              | 462   |      |      | 470                  |      |      |      |      |
| pX, platoon unblocked             |       |      |      | 0.77                 | 0.82 | 0.77 |      |      |
| vC, conflicting volume            |       |      |      | 1731                 | 2036 | 580  |      |      |
| vC1, stage 1 conf vol             |       |      |      |                      |      |      |      |      |
| vC2, stage 2 conf vol             |       |      |      |                      |      |      |      |      |
| vCu, unblocked vol                |       |      |      | 897                  | 457  | 0    |      |      |
| tC, single (s)                    |       |      |      | 4.1                  | 6.8  | 6.9  |      |      |
| tC, 2 stage (s)                   |       |      |      |                      |      |      |      |      |
| tF (s)                            |       |      |      | 2.2                  | 3.5  | 3.3  |      |      |
| p0 queue free %                   |       |      |      | 100                  | 100  | 97   |      |      |
| cM capacity (veh/h)               |       |      |      | 578                  | 435  | 832  |      |      |
| Direction, Lane #                 | EB 1  | EB 2 | EB 3 | WB 1                 | WB 2 | WB 3 | WB 4 | NB 1 |
| Volume Total                      | 686   | 686  | 358  | 310                  | 310  | 310  | 310  | 25   |
| Volume Left                       | 0     | 0    | 0    | 0                    | 0    | 0    | 0    | 0    |
| Volume Right                      | 0     | 0    | 15   | 0                    | 0    | 0    | 0    | 25   |
| cSH                               | 1700  | 1700 | 1700 | 1700                 | 1700 | 1700 | 1700 | 832  |
| Volume to Capacity                | 0.40  | 0.40 | 0.21 | 0.18                 | 0.18 | 0.18 | 0.18 | 0.03 |
| Queue Length 95th (ft)            | 0     | 0    | 0    | 0                    | 0    | 0    | 0    | 2    |
| Control Delay (s)                 | 0.0   | 0.0  | 0.0  | 0.0                  | 0.0  | 0.0  | 0.0  | 9.5  |
| Lane LOS                          |       |      |      |                      |      |      |      | A    |
| Approach Delay (s)                | 0.0   |      |      | 0.0                  |      |      |      | 9.5  |
| Approach LOS                      |       |      |      |                      |      |      |      | A    |
| Intersection Summary              |       |      |      |                      |      |      |      |      |
| Average Delay                     | 0.1   |      |      |                      |      |      |      |      |
| Intersection Capacity Utilization | 41.1% |      |      | ICU Level of Service |      |      | A    |      |
| Analysis Period (min)             | 15    |      |      |                      |      |      |      |      |

# HCM Signalized Intersection Capacity Analysis

## 5: Glenallan Avenue & Randolph Road

Existing PM  
08/30/2023



| Movement               | EBL   | EBT   | EBR  | WBL   | WBT  | WBR  | NBL   | NBT   | NBR  | SBL   | SBT  | SBR  |
|------------------------|-------|-------|------|-------|------|------|-------|-------|------|-------|------|------|
| Lane Configurations    | ↖     | ↑↑↑   |      | ↖     | ↑↑↑  |      |       | ↑     | ↗    | ↖     | ↕    |      |
| Traffic Volume (vph)   | 76    | 1504  | 30   | 5     | 1060 | 213  | 31    | 26    | 5    | 251   | 25   | 64   |
| Future Volume (vph)    | 76    | 1504  | 30   | 5     | 1060 | 213  | 31    | 26    | 5    | 251   | 25   | 64   |
| Ideal Flow (vphp)      | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 5.5   | 6.5   |      | 5.5   | 6.5  |      |       | 7.0   | 7.0  | 7.0   | 7.0  |      |
| Lane Util. Factor      | 1.00  | 0.91  |      | 1.00  | 0.91 |      |       | 1.00  | 1.00 | 0.95  | 0.95 |      |
| Frbp, ped/bikes        | 1.00  | 1.00  |      | 1.00  | 0.99 |      |       | 1.00  | 1.00 | 1.00  | 0.99 |      |
| Flpb, ped/bikes        | 1.00  | 1.00  |      | 1.00  | 1.00 |      |       | 1.00  | 1.00 | 1.00  | 1.00 |      |
| Frt                    | 1.00  | 1.00  |      | 1.00  | 0.97 |      |       | 1.00  | 0.85 | 1.00  | 0.94 |      |
| Flt Protected          | 0.95  | 1.00  |      | 0.95  | 1.00 |      |       | 0.97  | 1.00 | 0.95  | 0.98 |      |
| Satd. Flow (prot)      | 1770  | 5067  |      | 1770  | 4922 |      |       | 1814  | 1583 | 1681  | 1622 |      |
| Flt Permitted          | 0.14  | 1.00  |      | 0.12  | 1.00 |      |       | 0.97  | 1.00 | 0.95  | 0.98 |      |
| Satd. Flow (perm)      | 270   | 5067  |      | 228   | 4922 |      |       | 1814  | 1583 | 1681  | 1622 |      |
| Peak-hour factor, PHF  | 0.98  | 0.98  | 0.98 | 0.98  | 0.98 | 0.98 | 0.98  | 0.98  | 0.98 | 0.98  | 0.98 | 0.98 |
| Adj. Flow (vph)        | 78    | 1535  | 31   | 5     | 1082 | 217  | 32    | 27    | 5    | 256   | 26   | 65   |
| RTOR Reduction (vph)   | 0     | 1     | 0    | 0     | 13   | 0    | 0     | 0     | 5    | 0     | 16   | 0    |
| Lane Group Flow (vph)  | 78    | 1565  | 0    | 5     | 1286 | 0    | 0     | 59    | 0    | 177   | 154  | 0    |
| Confl. Peds. (#/hr)    | 15    |       | 2    | 2     |      | 15   | 1     |       | 2    | 2     |      | 1    |
| Confl. Bikes (#/hr)    |       |       | 1    |       |      | 1    |       |       |      |       |      |      |
| Turn Type              | pm+pt | NA    |      | pm+pt | NA   |      | Split | NA    | Prot | Split | NA   |      |
| Protected Phases       | 1     | 6     |      | 5     | 2    |      | 3     | 3     | 3    | 4     | 4    |      |
| Permitted Phases       | 6     |       |      | 2     |      |      |       |       |      |       |      |      |
| Actuated Green, G (s)  | 94.7  | 87.9  |      | 82.0  | 80.7 |      |       | 12.8  | 12.8 | 22.0  | 22.0 |      |
| Effective Green, g (s) | 94.7  | 87.9  |      | 82.0  | 80.7 |      |       | 12.8  | 12.8 | 22.0  | 22.0 |      |
| Actuated g/C Ratio     | 0.63  | 0.59  |      | 0.55  | 0.54 |      |       | 0.09  | 0.09 | 0.15  | 0.15 |      |
| Clearance Time (s)     | 5.5   | 6.5   |      | 5.5   | 6.5  |      |       | 7.0   | 7.0  | 7.0   | 7.0  |      |
| Vehicle Extension (s)  | 3.0   | 5.0   |      | 3.0   | 5.0  |      |       | 3.0   | 3.0  | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     | 255   | 2969  |      | 138   | 2648 |      |       | 154   | 135  | 246   | 237  |      |
| v/s Ratio Prot         | c0.02 | c0.31 |      | 0.00  | 0.26 |      |       | c0.03 | 0.00 | c0.11 | 0.09 |      |
| v/s Ratio Perm         | 0.18  |       |      | 0.02  |      |      |       |       |      |       |      |      |
| v/c Ratio              | 0.31  | 0.53  |      | 0.04  | 0.49 |      |       | 0.38  | 0.00 | 0.72  | 0.65 |      |
| Uniform Delay, d1      | 13.1  | 18.6  |      | 16.3  | 21.7 |      |       | 64.9  | 62.8 | 61.1  | 60.4 |      |
| Progression Factor     | 0.64  | 0.30  |      | 1.14  | 0.86 |      |       | 1.00  | 1.00 | 1.00  | 1.00 |      |
| Incremental Delay, d2  | 0.5   | 0.5   |      | 0.1   | 0.6  |      |       | 1.6   | 0.0  | 9.7   | 6.0  |      |
| Delay (s)              | 8.9   | 6.1   |      | 18.6  | 19.3 |      |       | 66.5  | 62.8 | 70.7  | 66.4 |      |
| Level of Service       | A     | A     |      | B     | B    |      |       | E     | E    | E     | E    |      |
| Approach Delay (s)     |       | 6.3   |      |       | 19.3 |      |       | 66.2  |      |       | 68.6 |      |
| Approach LOS           |       | A     |      |       | B    |      |       | E     |      |       | E    |      |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 18.9  | HCM 2000 Level of Service | B    |
| HCM 2000 Volume to Capacity ratio | 0.55  |                           |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s)      | 26.0 |
| Intersection Capacity Utilization | 66.3% | ICU Level of Service      | C    |
| Analysis Period (min)             | 15    |                           |      |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
7: Georgia Avenue & Layhill Road

Existing PM  
08/30/2023



| Movement                          | EBL                 | EBT   | EBR   | WBL   | WBT  | WBR  | NBL  | NBT   | NBR   | SBL   | SBT                       | SBR  |
|-----------------------------------|---------------------|-------|-------|-------|------|------|------|-------|-------|-------|---------------------------|------|
| Lane Configurations               |                     | ↕     | ↗     | ↘     |      | ↗    |      | ↕↕↕   | ↗     | ↘     | ↕↕↕                       |      |
| Traffic Volume (vph)              | 13                  | 18    | 7     | 515   | 0    | 48   | 0    | 1141  | 638   | 107   | 797                       | 0    |
| Future Volume (vph)               | 13                  | 18    | 7     | 515   | 0    | 48   | 0    | 1141  | 638   | 107   | 797                       | 0    |
| Ideal Flow (vphp)                 | 1900                | 1900  | 1900  | 1900  | 1900 | 1900 | 1900 | 1900  | 1900  | 1900  | 1900                      | 1900 |
| Total Lost time (s)               |                     | 6.5   | 6.5   | 6.5   |      | 6.5  |      | 6.5   | 6.5   | 5.5   | 6.5                       |      |
| Lane Util. Factor                 |                     | 1.00  | 1.00  | 0.97  |      | 1.00 |      | 0.91  | 1.00  | 1.00  | 0.91                      |      |
| Frbp, ped/bikes                   |                     | 1.00  | 1.00  | 1.00  |      | 0.96 |      | 1.00  | 1.00  | 1.00  | 1.00                      |      |
| Flpb, ped/bikes                   |                     | 1.00  | 1.00  | 1.00  |      | 1.00 |      | 1.00  | 1.00  | 1.00  | 1.00                      |      |
| Frt                               |                     | 1.00  | 0.85  | 1.00  |      | 0.85 |      | 1.00  | 0.85  | 1.00  | 1.00                      |      |
| Flt Protected                     |                     | 0.98  | 1.00  | 0.95  |      | 1.00 |      | 1.00  | 1.00  | 0.95  | 1.00                      |      |
| Satd. Flow (prot)                 |                     | 1824  | 1583  | 3433  |      | 1524 |      | 5085  | 1583  | 1769  | 5038                      |      |
| Flt Permitted                     |                     | 0.98  | 1.00  | 0.95  |      | 1.00 |      | 1.00  | 1.00  | 0.17  | 1.00                      |      |
| Satd. Flow (perm)                 |                     | 1824  | 1583  | 3433  |      | 1524 |      | 5085  | 1583  | 314   | 5038                      |      |
| Peak-hour factor, PHF             | 0.94                | 0.94  | 0.94  | 0.94  | 0.94 | 0.94 | 0.94 | 0.94  | 0.94  | 0.94  | 0.94                      | 0.94 |
| Adj. Flow (vph)                   | 14                  | 19    | 7     | 548   | 0    | 51   | 0    | 1214  | 679   | 114   | 848                       | 0    |
| RTOR Reduction (vph)              | 0                   | 0     | 7     | 0     | 0    | 41   | 0    | 0     | 51    | 0     | 0                         | 0    |
| Lane Group Flow (vph)             | 0                   | 33    | 0     | 548   | 0    | 10   | 0    | 1214  | 628   | 114   | 848                       | 0    |
| Confl. Peds. (#/hr)               | 15                  |       |       |       |      | 15   | 8    |       | 25    | 25    |                           | 8    |
| Confl. Bikes (#/hr)               |                     |       |       |       |      |      |      |       | 1     |       |                           | 1    |
| Bus Blockages (#/hr)              | 0                   | 0     | 0     | 0     | 0    | 0    | 0    | 0     | 0     | 0     | 7                         | 0    |
| Turn Type                         | Split               | NA    | Prot  | Prot  |      | Perm |      | NA    | Prot  | pm+pt | NA                        |      |
| Protected Phases                  | 3                   | 3     | 3     | 4     |      |      |      | 6     | 6     | 5     | 2                         |      |
| Permitted Phases                  |                     |       |       |       |      | 4    |      |       |       | 2     |                           |      |
| Actuated Green, G (s)             |                     | 7.6   | 7.6   | 36.1  |      | 36.1 |      | 101.4 | 101.4 | 116.8 | 116.8                     |      |
| Effective Green, g (s)            |                     | 7.6   | 7.6   | 36.1  |      | 36.1 |      | 101.4 | 101.4 | 116.8 | 116.8                     |      |
| Actuated g/C Ratio                |                     | 0.04  | 0.04  | 0.20  |      | 0.20 |      | 0.56  | 0.56  | 0.65  | 0.65                      |      |
| Clearance Time (s)                |                     | 6.5   | 6.5   | 6.5   |      | 6.5  |      | 6.5   | 6.5   | 5.5   | 6.5                       |      |
| Vehicle Extension (s)             |                     | 3.0   | 3.0   | 5.0   |      | 5.0  |      | 0.2   | 0.2   | 3.0   | 0.2                       |      |
| Lane Grp Cap (vph)                |                     | 77    | 66    | 688   |      | 305  |      | 2864  | 891   | 283   | 3269                      |      |
| v/s Ratio Prot                    |                     | c0.02 | 0.00  | c0.16 |      |      |      | 0.24  | c0.40 | c0.02 | 0.17                      |      |
| v/s Ratio Perm                    |                     |       |       |       |      | 0.01 |      |       |       | 0.24  |                           |      |
| v/c Ratio                         |                     | 0.43  | 0.00  | 0.80  |      | 0.03 |      | 0.42  | 0.71  | 0.40  | 0.26                      |      |
| Uniform Delay, d1                 |                     | 84.1  | 82.6  | 68.5  |      | 57.9 |      | 22.5  | 28.5  | 14.2  | 13.3                      |      |
| Progression Factor                |                     | 1.00  | 1.00  | 1.00  |      | 1.00 |      | 1.95  | 2.06  | 1.00  | 1.00                      |      |
| Incremental Delay, d2             |                     | 3.8   | 0.0   | 7.3   |      | 0.1  |      | 0.4   | 3.7   | 0.9   | 0.2                       |      |
| Delay (s)                         |                     | 87.9  | 82.6  | 75.8  |      | 58.0 |      | 44.3  | 62.3  | 15.2  | 13.5                      |      |
| Level of Service                  |                     | F     | F     | E     |      | E    |      | D     | E     | B     | B                         |      |
| Approach Delay (s)                |                     | 87.0  |       |       | 74.2 |      |      | 50.7  |       |       | 13.7                      |      |
| Approach LOS                      |                     | F     |       |       | E    |      |      | D     |       |       | B                         |      |
| <b>Intersection Summary</b>       |                     |       |       |       |      |      |      |       |       |       |                           |      |
| HCM 2000 Control Delay            |                     |       | 45.0  |       |      |      |      |       |       |       | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio |                     |       | 0.69  |       |      |      |      |       |       |       |                           |      |
| Actuated Cycle Length (s)         |                     |       | 180.0 |       |      |      |      |       |       | 25.0  |                           |      |
| Intersection Capacity Utilization |                     |       | 72.3% |       |      |      |      |       |       |       | ICU Level of Service      | C    |
| Analysis Period (min)             |                     |       | 15    |       |      |      |      |       |       |       |                           |      |
| c                                 | Critical Lane Group |       |       |       |      |      |      |       |       |       |                           |      |

HCM Signalized Intersection Capacity Analysis  
10: Glenallan Avenue & Layhill Road

Existing PM  
08/30/2023



| Movement               | EBL   | EBT   | EBR  | WBL   | WBT  | WBR  | NBL   | NBT  | NBR  | SBL   | SBT  | SBR  |
|------------------------|-------|-------|------|-------|------|------|-------|------|------|-------|------|------|
| Lane Configurations    | ↗     | ↗↗↗   |      | ↗     | ↗↗   | ↗    | ↗     | ↗↗   |      | ↗     | ↗    | ↗    |
| Traffic Volume (vph)   | 71    | 701   | 50   | 78    | 465  | 119  | 28    | 222  | 72   | 178   | 218  | 56   |
| Future Volume (vph)    | 71    | 701   | 50   | 78    | 465  | 119  | 28    | 222  | 72   | 178   | 218  | 56   |
| Ideal Flow (vphp)      | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 6.5   | 7.0   |      | 6.5   | 7.0  | 7.0  | 6.0   | 6.0  |      | 6.0   | 6.0  | 6.0  |
| Lane Util. Factor      | 1.00  | 0.91  |      | 1.00  | 0.95 | 1.00 | 1.00  | 0.95 |      | 1.00  | 1.00 | 1.00 |
| Frbp, ped/bikes        | 1.00  | 1.00  |      | 1.00  | 1.00 | 0.98 | 1.00  | 1.00 |      | 1.00  | 1.00 | 0.97 |
| Flpb, ped/bikes        | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00 | 0.99  | 1.00 |      | 1.00  | 1.00 | 1.00 |
| Frt                    | 1.00  | 0.99  |      | 1.00  | 1.00 | 0.85 | 1.00  | 0.96 |      | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00 |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1767  | 5027  |      | 1769  | 3539 | 1547 | 1752  | 3394 |      | 1767  | 1863 | 1529 |
| Flt Permitted          | 0.36  | 1.00  |      | 0.23  | 1.00 | 1.00 | 0.62  | 1.00 |      | 0.48  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 671   | 5027  |      | 428   | 3539 | 1547 | 1137  | 3394 |      | 895   | 1863 | 1529 |
| Peak-hour factor, PHF  | 0.96  | 0.96  | 0.96 | 0.96  | 0.96 | 0.96 | 0.96  | 0.96 | 0.96 | 0.96  | 0.96 | 0.96 |
| Adj. Flow (vph)        | 74    | 730   | 52   | 81    | 484  | 124  | 29    | 231  | 75   | 185   | 227  | 58   |
| RTOR Reduction (vph)   | 0     | 8     | 0    | 0     | 0    | 92   | 0     | 22   | 0    | 0     | 0    | 33   |
| Lane Group Flow (vph)  | 74    | 774   | 0    | 81    | 484  | 32   | 29    | 284  | 0    | 185   | 227  | 25   |
| Confl. Peds. (#/hr)    | 11    |       | 11   | 11    |      | 11   | 16    |      | 4    | 4     |      | 16   |
| Turn Type              | pm+pt | NA    |      | pm+pt | NA   | Perm | pm+pt | NA   |      | pm+pt | NA   | Perm |
| Protected Phases       | 7     | 4     |      | 3     | 8    |      | 1     | 6    |      | 5     | 2    |      |
| Permitted Phases       | 4     |       |      | 8     |      | 8    | 6     |      |      | 2     |      | 2    |
| Actuated Green, G (s)  | 37.9  | 30.6  |      | 38.5  | 30.9 | 30.9 | 48.3  | 44.0 |      | 62.3  | 52.0 | 52.0 |
| Effective Green, g (s) | 37.9  | 30.6  |      | 38.5  | 30.9 | 30.9 | 48.3  | 44.0 |      | 62.3  | 52.0 | 52.0 |
| Actuated g/C Ratio     | 0.32  | 0.26  |      | 0.32  | 0.26 | 0.26 | 0.40  | 0.37 |      | 0.52  | 0.43 | 0.43 |
| Clearance Time (s)     | 6.5   | 7.0   |      | 6.5   | 7.0  | 7.0  | 6.0   | 6.0  |      | 6.0   | 6.0  | 6.0  |
| Vehicle Extension (s)  | 3.0   | 5.0   |      | 3.0   | 5.0  | 5.0  | 3.0   | 0.2  |      | 3.0   | 0.2  | 0.2  |
| Lane Grp Cap (vph)     | 278   | 1281  |      | 222   | 911  | 398  | 479   | 1244 |      | 554   | 807  | 662  |
| v/s Ratio Prot         | 0.02  | c0.15 |      | c0.02 | 0.14 |      | 0.00  | 0.08 |      | c0.03 | 0.12 |      |
| v/s Ratio Perm         | 0.07  |       |      | 0.09  |      | 0.02 | 0.02  |      |      | c0.14 |      | 0.02 |
| v/c Ratio              | 0.27  | 0.60  |      | 0.36  | 0.53 | 0.08 | 0.06  | 0.23 |      | 0.33  | 0.28 | 0.04 |
| Uniform Delay, d1      | 29.6  | 39.4  |      | 29.5  | 38.3 | 33.8 | 21.8  | 26.3 |      | 15.8  | 21.9 | 19.6 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 |      | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 0.5   | 1.2   |      | 1.0   | 1.1  | 0.2  | 0.1   | 0.4  |      | 0.4   | 0.9  | 0.1  |
| Delay (s)              | 30.1  | 40.6  |      | 30.5  | 39.4 | 34.0 | 21.8  | 26.7 |      | 16.1  | 22.8 | 19.7 |
| Level of Service       | C     | D     |      | C     | D    | C    | C     | C    |      | B     | C    | B    |
| Approach Delay (s)     |       | 39.7  |      |       | 37.4 |      |       | 26.3 |      |       | 19.8 |      |
| Approach LOS           |       | D     |      |       | D    |      |       | C    |      |       | B    |      |

| Intersection Summary              |                     |                           |      |
|-----------------------------------|---------------------|---------------------------|------|
| HCM 2000 Control Delay            | 33.1                | HCM 2000 Level of Service | C    |
| HCM 2000 Volume to Capacity ratio | 0.44                |                           |      |
| Actuated Cycle Length (s)         | 120.0               | Sum of lost time (s)      | 25.5 |
| Intersection Capacity Utilization | 75.7%               | ICU Level of Service      | D    |
| Analysis Period (min)             | 15                  |                           |      |
| c                                 | Critical Lane Group |                           |      |



HCM Unsignalized Intersection Capacity Analysis  
 12: Glenallan Avenue & Erskine Avenue

Existing PM  
 08/30/2023



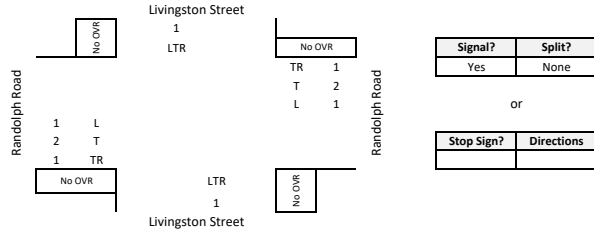
| Movement                          | EBL   | EBR  | NBL  | NBT                  | SBT  | SBR  |
|-----------------------------------|-------|------|------|----------------------|------|------|
| Lane Configurations               |       |      |      |                      |      |      |
| Traffic Volume (veh/h)            | 2     | 0    | 0    | 100                  | 120  | 1    |
| Future Volume (Veh/h)             | 2     | 0    | 0    | 100                  | 120  | 1    |
| Sign Control                      | Stop  |      |      | Free                 | Free |      |
| Grade                             | 0%    |      |      | 0%                   | 0%   |      |
| Peak Hour Factor                  | 0.77  | 0.77 | 0.77 | 0.77                 | 0.77 | 0.77 |
| Hourly flow rate (vph)            | 3     | 0    | 0    | 130                  | 156  | 1    |
| Pedestrians                       |       |      |      |                      |      |      |
| Lane Width (ft)                   |       |      |      |                      |      |      |
| Walking Speed (ft/s)              |       |      |      |                      |      |      |
| Percent Blockage                  |       |      |      |                      |      |      |
| Right turn flare (veh)            |       |      |      |                      |      |      |
| Median type                       |       |      |      | None                 | None |      |
| Median storage (veh)              |       |      |      |                      |      |      |
| Upstream signal (ft)              | 350   |      |      |                      |      |      |
| pX, platoon unblocked             |       |      |      |                      |      |      |
| vC, conflicting volume            | 286   | 156  | 157  |                      |      |      |
| vC1, stage 1 conf vol             |       |      |      |                      |      |      |
| vC2, stage 2 conf vol             |       |      |      |                      |      |      |
| vCu, unblocked vol                | 286   | 156  | 157  |                      |      |      |
| tC, single (s)                    | 6.4   | 6.2  | 4.1  |                      |      |      |
| tC, 2 stage (s)                   |       |      |      |                      |      |      |
| tF (s)                            | 3.5   | 3.3  | 2.2  |                      |      |      |
| p0 queue free %                   | 100   | 100  | 100  |                      |      |      |
| cM capacity (veh/h)               | 704   | 889  | 1423 |                      |      |      |
| Direction, Lane #                 | EB 1  | NB 1 | SB 1 |                      |      |      |
| Volume Total                      | 3     | 130  | 157  |                      |      |      |
| Volume Left                       | 3     | 0    | 0    |                      |      |      |
| Volume Right                      | 0     | 0    | 1    |                      |      |      |
| cSH                               | 704   | 1423 | 1700 |                      |      |      |
| Volume to Capacity                | 0.00  | 0.00 | 0.09 |                      |      |      |
| Queue Length 95th (ft)            | 0     | 0    | 0    |                      |      |      |
| Control Delay (s)                 | 10.1  | 0.0  | 0.0  |                      |      |      |
| Lane LOS                          | B     |      |      |                      |      |      |
| Approach Delay (s)                | 10.1  | 0.0  | 0.0  |                      |      |      |
| Approach LOS                      | B     |      |      |                      |      |      |
| Intersection Summary              |       |      |      |                      |      |      |
| Average Delay                     | 0.1   |      |      |                      |      |      |
| Intersection Capacity Utilization | 16.4% |      |      | ICU Level of Service | A    |      |
| Analysis Period (min)             | 15    |      |      |                      |      |      |

**1**  
Critical Lane Volume  
and  
Level of Service Calculations

Intersection: **01. Randolph Road / Livingston Street**  
 Jurisdiction: **Montgomery County, MD**  
 Scenario/Design Year: **Existing Conditions**  
 Computed by: **W+A**



**Intersection Lane Use & Traffic Control**



**AM Peak Hour Critical Lane Volume Analysis**

| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | TR         | 899               |                    | 0.37                  | 333    | 111            | 1.00                  | 111             | 444                        |                 |
|                   | L          | 12                |                    | 1.00                  | 12     |                |                       |                 | 123                        |                 |
| WB                | TR         | 1409              |                    | 0.37                  | 521    | 12             | 1.00                  | 12              | 533                        | *               |
|                   | L          | 111               |                    | 1.00                  | 111    |                |                       |                 | 123                        |                 |
| NB                | LTR        | 52                |                    | 1.00                  | 52     | 17             | 1.00                  | 17              | 69                         | *               |
|                   |            |                   |                    |                       | 0      |                |                       |                 | 17                         |                 |
| SB                | LTR        | 56                |                    | 1.00                  | 56     | 7              | 1.00                  | 7               | 63                         |                 |
|                   |            |                   |                    |                       | 0      |                |                       |                 | 7                          |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 602             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.334           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**PM Peak Hour Critical Lane Volume Analysis**

| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | TR         | 1486              |                    | 0.37                  | 550    | 79             | 1.00                  | 79              | 629                        | *               |
|                   | L          | 29                |                    | 1.00                  | 29     |                |                       |                 | 108                        |                 |
| WB                | TR         | 913               |                    | 0.37                  | 338    | 29             | 1.00                  | 29              | 367                        |                 |
|                   | L          | 79                |                    | 1.00                  | 79     |                |                       |                 | 108                        |                 |
| NB                | LTR        | 54                |                    | 1.00                  | 54     | 4              | 1.00                  | 4               | 58                         | *               |
|                   |            |                   |                    |                       | 0      |                |                       |                 | 4                          |                 |
| SB                | LTR        | 24                |                    | 1.00                  | 24     | 14             | 1.00                  | 14              | 38                         |                 |
|                   |            |                   |                    |                       | 0      |                |                       |                 | 14                         |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 687             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.382           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**Right Turn Overlap**

| Approach   | Excl. Right | Right Vol. |     |     | Adjacent Overlap Vol. |     |     | Overlap |    |
|------------|-------------|------------|-----|-----|-----------------------|-----|-----|---------|----|
|            |             | AM         | PM  | LUF | AM                    | PM  | LUF | AM      | PM |
| Eastbound  | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Westbound  | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Northbound | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Southbound | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |

**Montgomery County LATR**

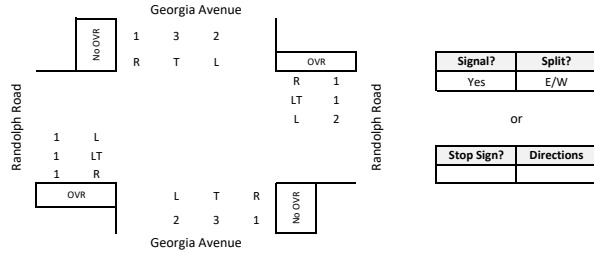
| Number of Lanes | Lane Use Factors |             |
|-----------------|------------------|-------------|
|                 | Left Turn LUF    | Through LUF |
| 1               | 1                | 1.00        |
| 2               | 0.53             | 0.53        |
| 3               | 0.37             | 0.37        |
| 4               |                  | 0.30        |
| 5               |                  | 0.25        |

**2**  
Critical Lane Volume  
and  
Level of Service Calculations

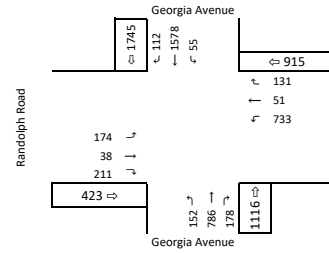
Intersection: **02. Georgia Avenue / Randolph Road**  
 Jurisdiction: **Montgomery County, MD**  
 Scenario/Design Year: **Existing Conditions**  
 Computed by: **W+A**



**Intersection Lane Use & Traffic Control**

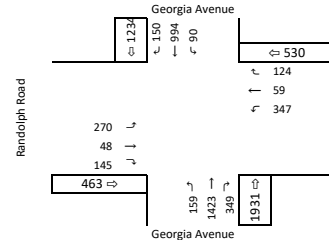


**AM Peak Hour Critical Lane Volume Analysis**



| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | LT         | 212               |                    | 0.37                  | 78     |                |                       | 0               | 78                         | *               |
|                   | R          | 211               | 81                 | 1.00                  | 130    |                |                       | 0               | 130                        | *               |
| WB                | LT         | 784               |                    | 0.37                  | 290    |                |                       | 0               | 290                        | *               |
|                   | R          | 131               | 29                 | 1.00                  | 102    |                |                       | 0               | 102                        |                 |
| NB                | T          | 786               |                    | 0.37                  | 291    | 55             | 0.53                  | 29              | 320                        | *               |
|                   | R          | 178               | 0                  | 1.00                  | 178    |                |                       | 29              | 207                        |                 |
| SB                | T          | 1578              |                    | 0.37                  | 584    | 152            | 0.53                  | 81              | 665                        | *               |
|                   | R          | 112               | 0                  | 1.00                  | 112    |                |                       | 81              | 193                        |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 1085            |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.603           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**PM Peak Hour Critical Lane Volume Analysis**



| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | LT         | 318               |                    | 0.37                  | 118    |                |                       | 0               | 118                        | *               |
|                   | R          | 145               | 84                 | 1.00                  | 61     |                |                       | 0               | 61                         | *               |
| WB                | LT         | 406               |                    | 0.37                  | 150    |                |                       | 0               | 150                        | *               |
|                   | R          | 124               | 48                 | 1.00                  | 76     |                |                       | 0               | 76                         | *               |
| NB                | T          | 1423              |                    | 0.37                  | 527    | 90             | 0.53                  | 48              | 575                        | *               |
|                   | R          | 349               | 0                  | 1.00                  | 349    |                |                       | 48              | 397                        | *               |
| SB                | T          | 994               |                    | 0.37                  | 368    | 159            | 0.53                  | 84              | 452                        | *               |
|                   | R          | 150               | 0                  | 1.00                  | 150    |                |                       | 84              | 234                        | *               |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 843             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.468           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**Right Turn Overlap**

| Approach   | Excl. Right | Right Vol. |     |      | Adjacent Overlap Vol. |     |      | Overlap |    |
|------------|-------------|------------|-----|------|-----------------------|-----|------|---------|----|
|            |             | AM         | PM  | LUF  | AM                    | PM  | LUF  | AM      | PM |
| Eastbound  | Yes         | 211        | 145 | 1.00 | 152                   | 159 | 0.53 | 81      | 84 |
| Westbound  | Yes         | 131        | 124 | 1.00 | 55                    | 90  | 0.53 | 29      | 48 |
| Northbound | No          | n/a        | n/a | n/a  | n/a                   | n/a | n/a  | 0       | 0  |
| Southbound | No          | n/a        | n/a | n/a  | n/a                   | n/a | n/a  | 0       | 0  |

**Montgomery County LATR**

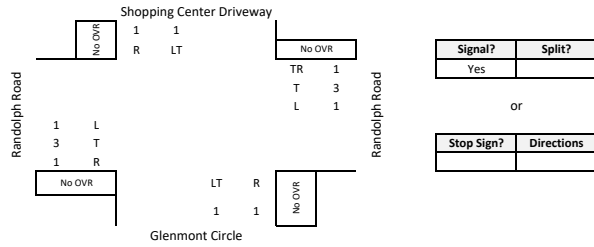
|   | Lane Use Factors |               |             |
|---|------------------|---------------|-------------|
|   | Number of Lanes  | Left Turn LUF | Through LUF |
| 1 | 1                | 1.00          |             |
| 2 | 0.53             | 0.53          |             |
| 3 | 0.37             | 0.37          |             |
| 4 |                  | 0.30          |             |
| 5 |                  | 0.25          |             |

**3**  
**Critical Lane Volume and Level of Service Calculations**

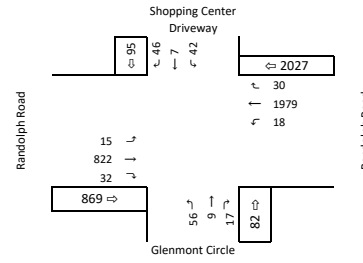
Intersection: **03. Randolph Road / Glenmont Circle**  
 Jurisdiction: **Montgomery County, MD**  
 Scenario/Design Year: **Existing Conditions**  
 Computed by: **W+A**



**Intersection Lane Use & Traffic Control**

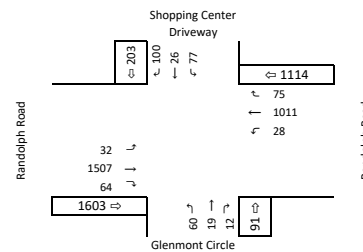


**AM Peak Hour Critical Lane Volume Analysis**



| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | LT         | 837               |                    | 0.30                  | 251    | 18             | 1.00                  | 18              | 269                        |                 |
|                   | R          | 32                |                    | 1.00                  | 32     |                |                       |                 | 50                         |                 |
| WB                | TR         | 2009              |                    | 0.30                  | 603    | 15             | 1.00                  | 15              | 618                        | *               |
|                   | L          | 18                |                    | 1.00                  | 18     |                |                       |                 | 33                         |                 |
| NB                | LT         | 65                |                    | 1.00                  | 65     |                |                       |                 | 107                        | *               |
|                   | R          | 17                |                    | 1.00                  | 17     | 42             | 1.00                  | 42              | 59                         |                 |
| SB                | LT         | 49                |                    | 1.00                  | 49     |                |                       |                 | 105                        |                 |
|                   | R          | 46                |                    | 1.00                  | 46     | 56             | 1.00                  | 56              | 102                        |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 725             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.403           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**PM Peak Hour Critical Lane Volume Analysis**



| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | LT         | 1539              |                    | 0.30                  | 462    | 28             | 1.00                  | 28              | 490                        | *               |
|                   | R          | 64                |                    | 1.00                  | 64     |                |                       |                 | 92                         |                 |
| WB                | TR         | 1086              |                    | 0.30                  | 326    | 32             | 1.00                  | 32              | 358                        |                 |
|                   | L          | 28                |                    | 1.00                  | 28     |                |                       |                 | 60                         |                 |
| NB                | LT         | 79                |                    | 1.00                  | 79     | 77             | 1.00                  | 77              | 156                        |                 |
|                   | R          | 12                |                    | 1.00                  | 12     |                |                       |                 | 89                         |                 |
| SB                | LT         | 103               |                    | 1.00                  | 103    |                |                       |                 | 163                        | *               |
|                   | R          | 100               |                    | 1.00                  | 100    | 60             | 1.00                  | 60              | 160                        |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 653             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.363           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**Right Turn Overlap**

| Approach   | Excl. Right | Right Vol. |     |     | Adjacent Overlap Vol. |     |     | Overlap |    |
|------------|-------------|------------|-----|-----|-----------------------|-----|-----|---------|----|
|            |             | AM         | PM  | LUF | AM                    | PM  | LUF | AM      | PM |
| Eastbound  | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Westbound  | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Northbound | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Southbound | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |

**Montgomery County LATR**

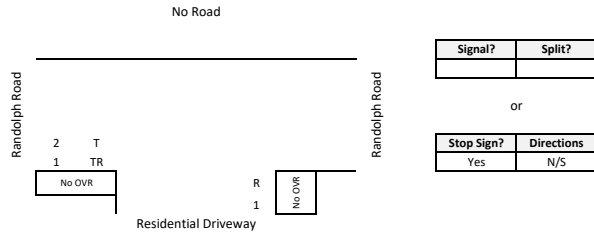
|   | Lane Use Factors |               |             |
|---|------------------|---------------|-------------|
|   | Number of Lanes  | Left Turn LUF | Through LUF |
| 1 | 1                | 1.00          |             |
| 2 | 0.53             | 0.53          |             |
| 3 | 0.37             | 0.37          |             |
| 4 |                  | 0.30          |             |
| 5 |                  | 0.25          |             |

**4**  
Critical Lane Volume  
and  
Level of Service Calculations

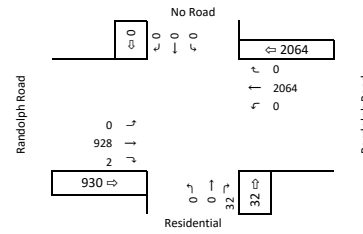
Intersection: **04. Randolph Road / Residential Driveway**  
 Jurisdiction: Montgomery County, MD  
 Scenario/Design Year: Existing Conditions  
 Computed by: W+A



**Intersection Lane Use & Traffic Control**

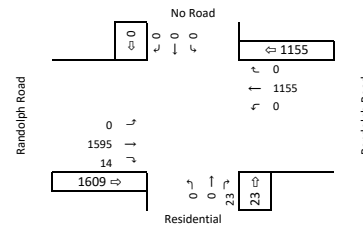


**AM Peak Hour Critical Lane Volume Analysis**



| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | TR         | 930               |                    | 0.37                  | 344    | 0              |                       | 0               | 344                        | *               |
| WB                |            |                   |                    |                       | 0      | 0              |                       | 0               | 0                          |                 |
| NB                | R          | 32                |                    | 1.00                  | 32     | 0              |                       | 0               | 32                         | *               |
| SB                |            |                   |                    |                       | 0      | 0              |                       | 0               | 0                          |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 376             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.209           |
| 1800              |            |                   |                    |                       |        |                |                       |                 |                            |                 |

**PM Peak Hour Critical Lane Volume Analysis**



| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | TR         | 1609              |                    | 0.37                  | 595    | 0              |                       | 0               | 595                        | *               |
| WB                |            |                   |                    |                       | 0      | 0              |                       | 0               | 0                          |                 |
| NB                | R          | 23                |                    | 1.00                  | 23     | 0              |                       | 0               | 23                         | *               |
| SB                |            |                   |                    |                       | 0      | 0              |                       | 0               | 0                          |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 618             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.343           |
| 1800              |            |                   |                    |                       |        |                |                       |                 |                            |                 |

**Right Turn Overlap**

| Approach   | Loc. Right | Right Vol. |     |     |     | Adjacent Overlap Vol. |     |     |    | Overlap |  |
|------------|------------|------------|-----|-----|-----|-----------------------|-----|-----|----|---------|--|
|            |            | AM         | PM  | LUF | AM  | PM                    | LUF | AM  | PM |         |  |
| Eastbound  | No         | n/a        | n/a | n/a | n/a | n/a                   | n/a | n/a | 0  | 0       |  |
| Westbound  | No         | n/a        | n/a | n/a | n/a | n/a                   | n/a | n/a | 0  | 0       |  |
| Northbound | No         | n/a        | n/a | n/a | n/a | n/a                   | n/a | n/a | 0  | 0       |  |
| Southbound | No         | n/a        | n/a | n/a | n/a | n/a                   | n/a | n/a | 0  | 0       |  |

**Montgomery County LATR**

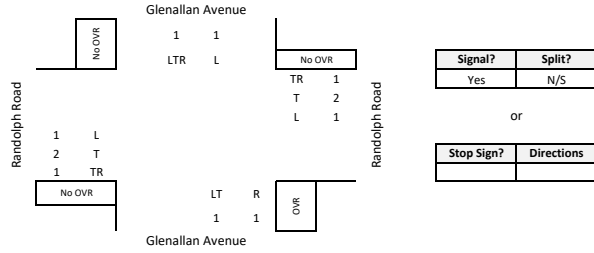
| Number of Lanes | Lane Use Factors |             |
|-----------------|------------------|-------------|
|                 | Left Turn LUF    | Through LUF |
| 1               | 1                | 1.00        |
| 2               | 0.53             | 0.53        |
| 3               | 0.37             | 0.37        |
| 4               |                  | 0.30        |
| 5               |                  | 0.25        |

**5**  
Critical Lane Volume  
and  
Level of Service Calculations

Intersection: **05. Randolph Road / Glenallan Avenue**  
Jurisdiction: **Montgomery County, MD**  
Scenario/Design Year: **Existing Conditions**  
Computed by: **W+A**



**Intersection Lane Use & Traffic Control**



**AM Peak Hour Critical Lane Volume Analysis**

| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | TR         | 874               | 0                  | 0.37                  | 323    | 2              | 1.00                  | 2               | 325                        |                 |
|                   | L          | 33                | 0                  | 1.00                  | 33     |                |                       |                 | 35                         |                 |
| WB                | TR         | 2121              | 0                  | 0.37                  | 785    | 33             | 1.00                  | 33              | 818                        | *               |
|                   | L          | 2                 | 0                  | 1.00                  | 2      |                |                       |                 | 35                         |                 |
| NB                | LT         | 161               | 0                  | 1.00                  | 161    | 0              | 0.53                  | 153             | 314                        | *               |
|                   | R          | 0                 | 0                  | 1.00                  | 0      | 288            |                       |                 | 153                        |                 |
| SB                | LTR        | 429               | 0                  | 0.53                  | 227    | 55             | 1.00                  | 55              | 282                        | *               |
|                   | L          | 288               | 0                  | 1.00                  | 288    |                |                       |                 | 343                        | *               |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 1475            |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.819           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**PM Peak Hour Critical Lane Volume Analysis**

| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | TR         | 1534              | 0                  | 0.37                  | 568    | 5              | 1.00                  | 5               | 573                        | *               |
|                   | L          | 76                | 0                  | 1.00                  | 76     |                |                       |                 | 81                         |                 |
| WB                | TR         | 1273              | 0                  | 0.37                  | 471    | 76             | 1.00                  | 76              | 547                        | *               |
|                   | L          | 5                 | 0                  | 1.00                  | 5      |                |                       |                 | 81                         |                 |
| NB                | LT         | 57                | 0                  | 1.00                  | 57     | 0              | 0.53                  | 133             | 190                        | *               |
|                   | R          | 5                 | 5                  | 1.00                  | 0      | 251            |                       |                 | 133                        |                 |
| SB                | LTR        | 340               | 0                  | 0.53                  | 180    | 31             | 1.00                  | 31              | 211                        | *               |
|                   | L          | 251               | 0                  | 1.00                  | 251    |                |                       |                 | 282                        | *               |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 1045            |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.581           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**Right Turn Overlap**

| Approach   | Excl. Right | Right Vol. |     |      |     | Adjacent Overlap Vol. |      |     |    | Overlap |  |
|------------|-------------|------------|-----|------|-----|-----------------------|------|-----|----|---------|--|
|            |             | AM         | PM  | LUF  | AM  | PM                    | LUF  | AM  | PM |         |  |
| Eastbound  | No          | n/a        | n/a | n/a  | n/a | n/a                   | n/a  | n/a | 0  | 0       |  |
| Westbound  | No          | n/a        | n/a | n/a  | n/a | n/a                   | n/a  | n/a | 0  | 0       |  |
| Northbound | Yes         | 0          | 5   | 1.00 | 2   | 5                     | 1.00 | 0   | 5  |         |  |
| Southbound | No          | n/a        | n/a | n/a  | n/a | n/a                   | n/a  | n/a | 0  | 0       |  |

**Montgomery County LATR**

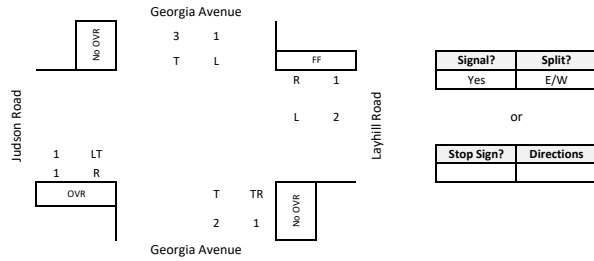
|   | Lane Use Factors |               |             |
|---|------------------|---------------|-------------|
|   | Number of Lanes  | Left Turn LUF | Through LUF |
| 1 | 1                | 1.00          |             |
| 2 | 0.53             | 0.53          |             |
| 3 | 0.37             | 0.37          |             |
| 4 | 0.30             |               |             |
| 5 | 0.25             |               |             |

**7**  
Critical Lane Volume  
and  
Level of Service Calculations

Intersection: **07. Georgia Avenue / Layhill Road**  
Jurisdiction: **Montgomery County, MD**  
Scenario/Design Year: **Existing Conditions**  
Computed by: **W+A**



**Intersection Lane Use & Traffic Control**



**AM Peak Hour Critical Lane Volume Analysis**

| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | LT         | 16                |                    | 1.00                  | 16     |                |                       |                 | 475                        | *               |
|                   | R          | 15                | 0                  | 1.00                  | 15     | 866            | 0.53                  | 459             | 474                        | *               |
| WB                | L          | 866               |                    | 0.53                  | 459    | 0              | 1.00                  | 9               | 468                        | *               |
|                   | R          | 0                 |                    |                       | 0      |                |                       |                 | 9                          |                 |
| NB                | TR         | 1063              |                    | 0.37                  | 393    | 0              | 1.00                  | 53              | 446                        | *               |
|                   | L          | 0                 |                    |                       | 0      |                |                       |                 | 53                         |                 |
| SB                | T          | 951               |                    | 0.37                  | 352    | 0              | 1.00                  | 0               | 352                        |                 |
|                   | L          | 53                | 0                  | 1.00                  | 53     | 0              |                       |                 | 53                         |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 1389            |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.772           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**PM Peak Hour Critical Lane Volume Analysis**

| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | LT         | 31                |                    | 1.00                  | 31     |                |                       |                 | 304                        | *               |
|                   | R          | 7                 | 0                  | 1.00                  | 7      | 515            | 0.53                  | 273             | 280                        | *               |
| WB                | L          | 515               |                    | 0.53                  | 273    | 13             | 1.00                  | 13              | 286                        | *               |
|                   | R          | 48                | 0                  | 1.00                  | 48     |                |                       |                 | 61                         |                 |
| NB                | TR         | 1779              |                    | 0.37                  | 658    | 0              | 1.00                  | 107             | 765                        | *               |
|                   | L          | 0                 |                    |                       | 0      |                |                       |                 | 107                        |                 |
| SB                | T          | 797               |                    | 0.37                  | 295    | 1              | 1.00                  | 1               | 296                        |                 |
|                   | L          | 107               | 0                  | 1.00                  | 107    |                |                       |                 | 108                        |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 1355            |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.753           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**Right Turn Overlap**

| Approach   | Excl. Right | Right Vol. |     |      |     | Adjacent Overlap Vol. |      |    |    | Overlap |  |
|------------|-------------|------------|-----|------|-----|-----------------------|------|----|----|---------|--|
|            |             | AM         | PM  | LUF  | AM  | PM                    | LUF  | AM | PM |         |  |
| Eastbound  | Yes         | 15         | 7   | 1.00 | 0   | 1                     | 0.00 | 0  | 0  |         |  |
| Westbound  | No          | n/a        | n/a | n/a  | n/a | n/a                   | n/a  | 0  | 0  |         |  |
| Northbound | No          | n/a        | n/a | n/a  | n/a | n/a                   | n/a  | 0  | 0  |         |  |
| Southbound | No          | n/a        | n/a | n/a  | n/a | n/a                   | n/a  | 0  | 0  |         |  |

**Montgomery County LATR**

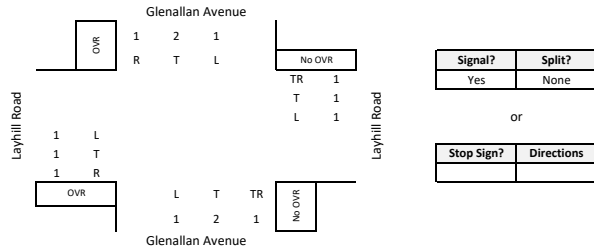
|   | Lane Use Factors |             |
|---|------------------|-------------|
|   | Number of Lanes  | Through LUF |
| 1 | 1                | 1.00        |
| 2 | 0.53             | 0.53        |
| 3 | 0.37             | 0.37        |
| 4 |                  | 0.30        |
| 5 |                  | 0.25        |

**10**  
Critical Lane Volume  
and  
Level of Service Calculations

Intersection: **10. Layhill Road / Glenallan Avenue**  
Jurisdiction: Montgomery County, MD  
Scenario/Design Year: Existing Conditions  
Computed by: W+A



**Intersection Lane Use & Traffic Control**



**AM Peak Hour Critical Lane Volume Analysis**

| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | T          | 378               |                    | 1.00                  | 378    |                |                       |                 | 481                        |                 |
|                   | R          | 28                | 19                 | 1.00                  | 9      | 103            | 1.00                  | 103             | 112                        |                 |
| WB                | TR         | 1110              |                    | 0.53                  | 588    | 29             | 1.00                  | 29              | 617                        | *               |
|                   | L          | 103               | 0                  | 1.00                  | 103    |                |                       |                 | 132                        |                 |
| NB                | TR         | 367               |                    | 0.37                  | 136    | 129            | 1.00                  | 129             | 265                        | *               |
|                   | L          | 19                | 0                  | 1.00                  | 19     |                |                       |                 | 148                        |                 |
| SB                | T          | 252               |                    | 0.53                  | 134    |                |                       |                 | 153                        |                 |
|                   | L          | 129               | 29                 | 1.00                  | 100    | 19             | 1.00                  | 19              | 119                        |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 882             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.490           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**PM Peak Hour Critical Lane Volume Analysis**

| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | T          | 701               |                    | 1.00                  | 701    |                |                       |                 | 779                        | *               |
|                   | R          | 50                | 0                  | 1.00                  | 50     | 78             | 1.00                  | 78              | 128                        |                 |
| WB                | TR         | 584               |                    | 0.53                  | 310    | 71             | 1.00                  | 71              | 381                        |                 |
|                   | L          | 78                | 0                  | 1.00                  | 78     |                |                       |                 | 149                        |                 |
| NB                | TR         | 294               |                    | 0.37                  | 109    | 178            | 1.00                  | 178             | 287                        | *               |
|                   | L          | 28                | 0                  | 1.00                  | 28     |                |                       |                 | 206                        |                 |
| SB                | T          | 218               |                    | 0.53                  | 116    |                |                       |                 | 144                        |                 |
|                   | L          | 178               | 0                  | 1.00                  | 178    | 28             | 1.00                  | 28              | 206                        |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 1066            |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.592           |
|                   |            |                   |                    |                       |        |                |                       |                 |                            | 1800            |

**Right Turn Overlap**

| Approach   | Occ. Right | Right Vol. |     |      | Adjacent Overlap Vol. |     |      | Overlap |    |
|------------|------------|------------|-----|------|-----------------------|-----|------|---------|----|
|            |            | AM         | PM  | LUF  | AM                    | PM  | LUF  | AM      | PM |
| Eastbound  | Yes        | 28         | 50  | 1.00 | 19                    | 28  | 1.00 | 19      | 28 |
| Westbound  | No         | n/a        | n/a | n/a  | n/a                   | n/a | n/a  | 0       | 0  |
| Northbound | No         | n/a        | n/a | n/a  | n/a                   | n/a | n/a  | 0       | 0  |
| Southbound | Yes        | 47         | 56  | 1.00 | 29                    | 71  | 1.00 | 29      | 56 |

**Montgomery County LATR**

|   | Lane Use Factors |               |             |
|---|------------------|---------------|-------------|
|   | Number of Lanes  | Left Turn LUF | Through LUF |
| 1 | 1                | 1.00          |             |
| 2 | 0.53             | 0.53          |             |
| 3 | 0.37             | 0.37          |             |
| 4 |                  | 0.30          |             |
| 5 |                  | 0.25          |             |



# 12

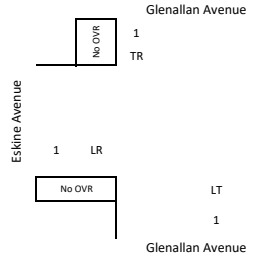
## Critical Lane Volume and Level of Service Calculations

Intersection: 12. Glenallan Avenue / Eskine Avenue

Jurisdiction: Montgomery County, MD  
 Scenario/Design Year: Existing Conditions  
 Computed by: W+A



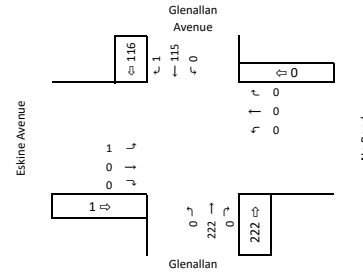
### Intersection Lane Use & Traffic Control



|         |        |
|---------|--------|
| Signal? | Split? |
|         |        |

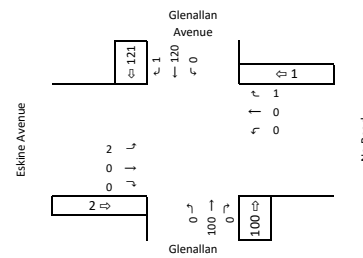
|            |            |
|------------|------------|
| Stop Sign? | Directions |
| Yes        | E/W        |

### AM Peak Hour Critical Lane Volume Analysis



| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | LR         | 1                 |                    | 1.00                  | 1      |                |                       | 0               | 1                          | *               |
| WB                |            |                   |                    |                       | 0      |                |                       | 0               | 0                          |                 |
| NB                | LT         | 222               |                    | 1.00                  | 222    |                |                       | 0               | 222                        | *               |
| SB                | TR         | 116               |                    | 1.00                  | 116    | 0              | 1.00                  | 0               | 116                        |                 |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 223             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.139           |
| 1600              |            |                   |                    |                       |        |                |                       |                 |                            |                 |

### PM Peak Hour Critical Lane Volume Analysis



| Direction         | Lane Group | Lane Group Volume | Right Turn Overlap | Lane Use Factor (LUF) | Volume | Opposing Lefts | Lane Use Factor (LUF) | Opposing Volume | Critical Lane Volume (CLV) | Included in CLV |
|-------------------|------------|-------------------|--------------------|-----------------------|--------|----------------|-----------------------|-----------------|----------------------------|-----------------|
| EB                | LR         | 2                 |                    | 1.00                  | 2      |                |                       | 0               | 2                          | *               |
| WB                |            |                   |                    |                       | 0      |                |                       | 0               | 0                          |                 |
| NB                | LT         | 100               |                    | 1.00                  | 100    |                |                       | 0               | 100                        |                 |
| SB                | TR         | 121               |                    | 1.00                  | 121    | 0              | 1.00                  | 0               | 121                        | *               |
| Note:             |            |                   |                    |                       |        |                |                       |                 | CLV                        | 123             |
| Congestion Equiv. |            |                   |                    |                       |        |                |                       |                 | v/c                        | 0.077           |
| 1600              |            |                   |                    |                       |        |                |                       |                 |                            |                 |

### Right Turn Overlap

| Approach   | Excl. Right | Right Vol. |     |     | Adjacent Overlap Vol. |     |     | Overlap |    |
|------------|-------------|------------|-----|-----|-----------------------|-----|-----|---------|----|
|            |             | AM         | PM  | LUF | AM                    | PM  | LUF | AM      | PM |
| Eastbound  | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Westbound  | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Northbound | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |
| Southbound | No          | n/a        | n/a | n/a | n/a                   | n/a | n/a | 0       | 0  |

### Montgomery County LATR

|   | Lane Use Factors |               |             |
|---|------------------|---------------|-------------|
|   | Number of Lanes  | Left Turn LUF | Through LUF |
| 1 | 1                | 1.00          |             |
| 2 | 0.53             | 0.53          |             |
| 3 | 0.37             | 0.37          |             |
| 4 |                  | 0.30          |             |
| 5 |                  | 0.25          |             |