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MEMORANDUM

To: Michael J. Gallagher, PE
Town of Vienna

From: Michael R. Pinkoske, PTP
John A. Schick

Re: Maple Avenue Consolidation (Marco Polo Site)

Subject: Multimodal Traffic Impact Analysis

Date: March 17, 2016
Updated: December 12, 2017

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INTRODUCTION

This technical memorandum provides an update to the multimodal traffic impact analysis prepared for the rezoning application of the Maple Avenue Consolidation (Marco Polo restaurant) site, dated March 17, 2016. The site is generally located in the northeast quadrant of the Maple Avenue W/Pleasant Street intersection in the Town of Vienna, Virginia. This update reflects a revised development program and site plan which now includes 44 residential dwelling units (DU) and 8,200 square feet (SF) of retail uses.

The Applicant, Vienna Visions LLC, is seeking to consolidate and rezone the subject site to the Maple Avenue Corridor (MAC) zone from the existing C-1A commercial zoning and redevelop the existing retail property with a new mixed-use development. The Town of Vienna's *"Assessment of Regulatory Options for Maple Avenue Commercial Area Feasibility Study"* allows for mixed-use development if the majority of the building's uses are retail oriented and accessible at street level. The study also recommends Maple Avenue frontage improvements with an emphasis on promoting walkability and less dependence on vehicular traffic.

The subject site is bounded by Maple Avenue (VA 123) to the south, Pleasant Street NW to the west, Church Street NW to the north, and a private alley to the east as shown on Figure 1. It includes five (5) parcels (Tax Map 38-4 ((4)) Parcels 2 and 4, and 38-4 ((2)) Parcels 15, 16 and 17) and is occupied with approximately 41,000 square (SF) of retail/restaurant uses and surface parking. These existing uses are partially occupied with underperforming retail uses with approximately 22,000 SF of vacant space including the former Marco Polo Restaurant.



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The Applicant proposes to raze the existing uses and redevelop the site with approximate 8,200 SF of retail uses and 44 condominium units. The proposed development would include one (1) level of structured parking to serve the retail uses, individual garages (2 spaces each) to serve the condominiums, and surface parking spaces to serve the residential guest parking. As will be discussed herein, the currently proposed development is a less intense mix of uses than the previous application and the by-right option.

Existing access to the site is currently provided via two (2) driveways on Maple Avenue W, two (2) driveways on Pleasant Street NW, and four (4) driveways on Church Street NW. All of the existing driveways operate as stop-controlled, full movement access points to/from the property. As proposed, access would be consolidated to one (1) driveway on Maple Avenue W and two (2) driveways on Church Street NW. Residential access would be provided at the site driveways along Church Street NW and retail access to the parking garage would be from the Maple Avenue W driveway.

The redeveloped site would consolidate the existing access points and result in five (5) fewer driveways than the current site. An off-street loading zone will be provided internal to the building which would be access from Maple Avenue W to accommodate retail deliveries and trash collection. New sidewalks will be provided along the site frontage as well as curb and gutter installation along Pleasant Avenue and Church Street, where no pedestrian facilities currently exist.

A copy of the site plan is shown on Figure 2.

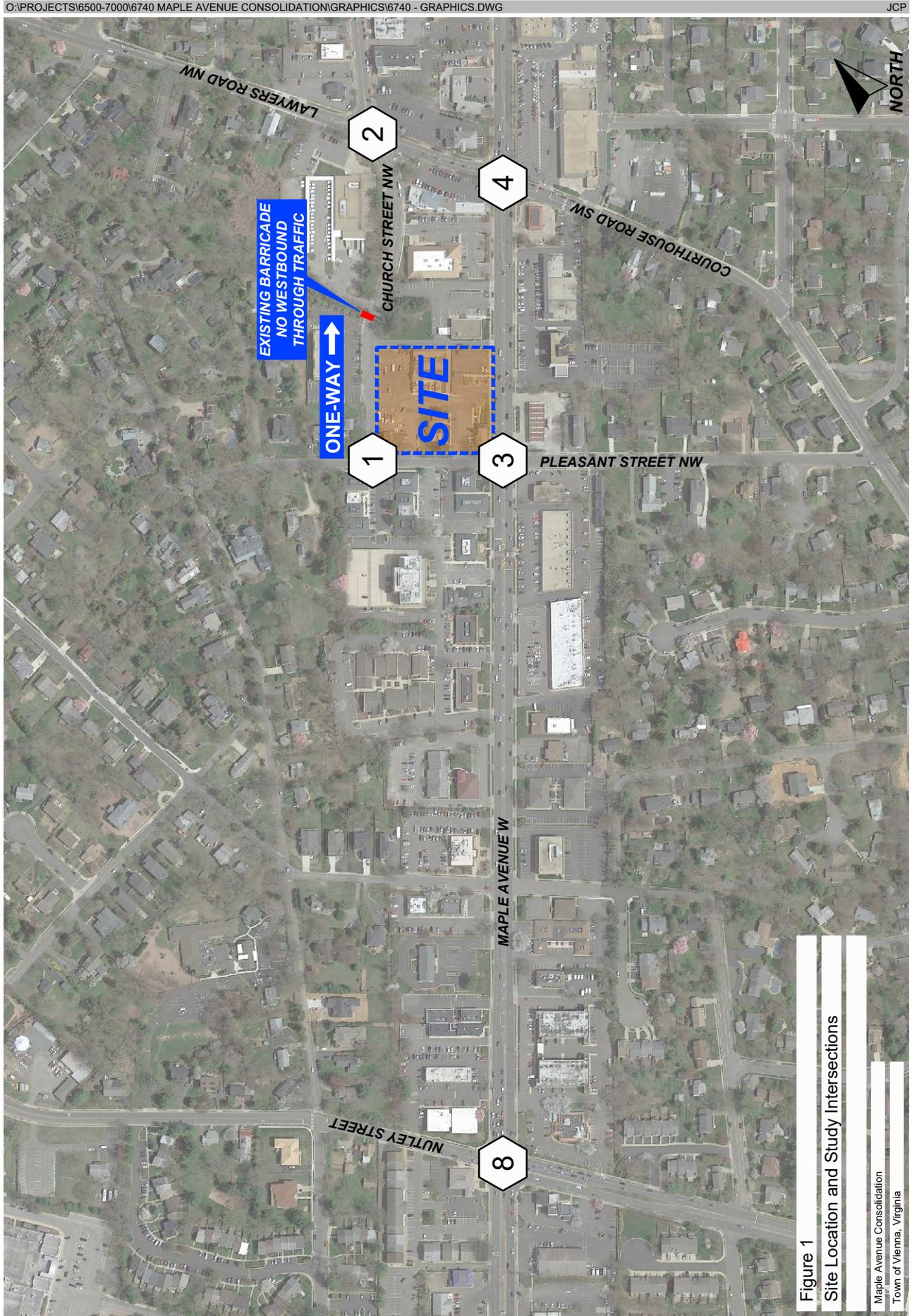


Figure 1
Site Location and Study Intersections

Maple Avenue Consolidation
 Town of Vienna, Virginia



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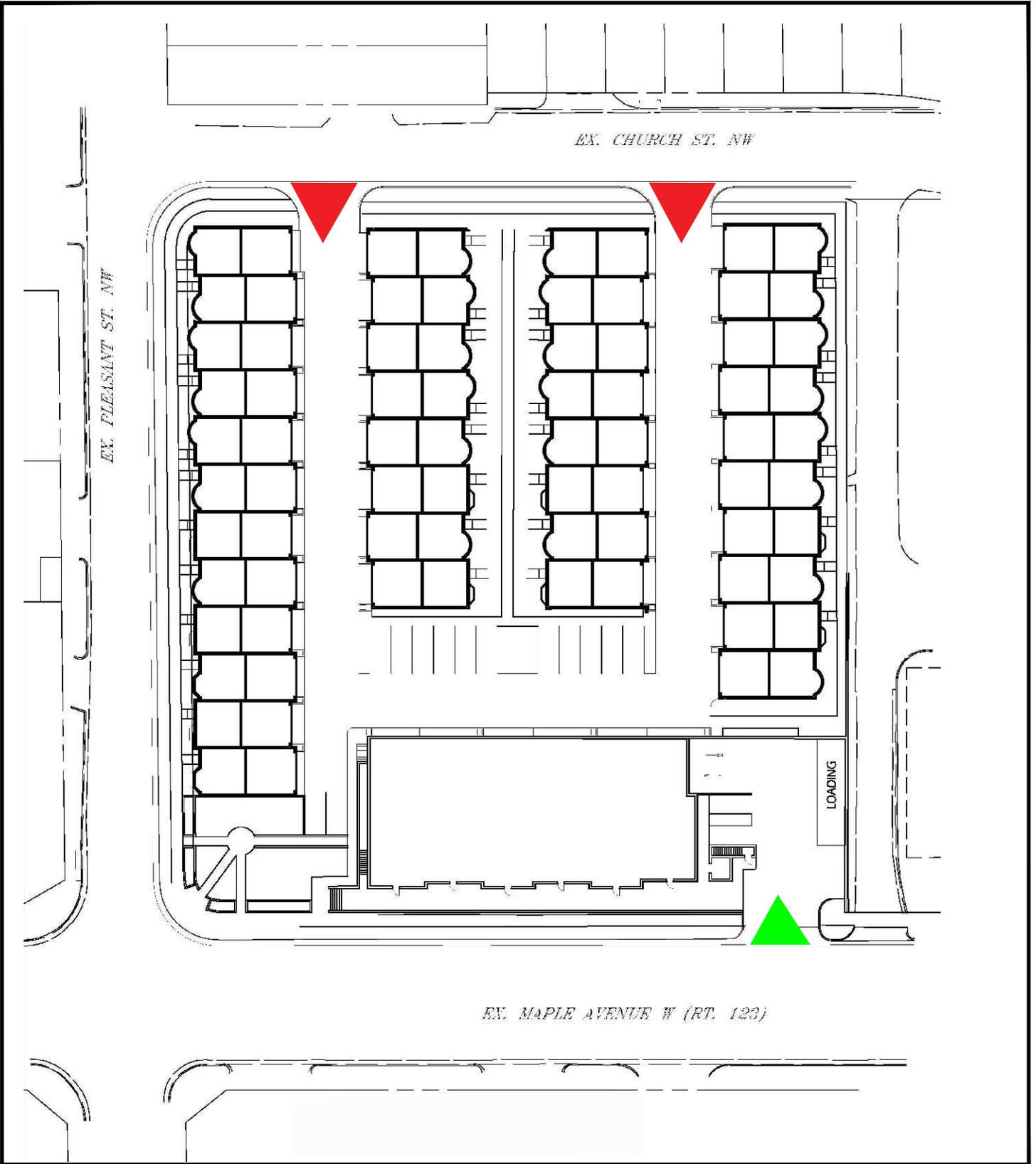


Figure 2
Conceptual Plan (Grade Level)

Maple Avenue Consolidation
Town of Vienna, Virginia

-  - Residential Access
-  - Retail Access

SOURCE: SMITH ENGINEERING





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This multimodal traffic study is based on a traffic scoping agreement with the Town of Vienna Public Works staff which is included in Appendix A. A build out year of 2018 was assumed for purposes of this analysis and assumes the full buildout and occupancy of the property.

Tasks undertaken in this study included the following:

1. Confirmation of the traffic study scope with Town Vienna (see Appendix A).
2. Collection of existing 2016 vehicular, pedestrian, and bicycle counts during the AM and PM peak hours at Church Street/Pleasant Street and Church Street/Lawyers Road intersections and all existing site driveways. The intersections of Maple Avenue/Lawyers Road and Pleasant Street/Maple Avenue were also analyzed using peak hour traffic counts provided by the Town of Vienna from the *Traffic Signal System Review and Optimization Study*.
3. Capacity analyses for existing AM and PM peak hour conditions at each of the site driveways and study intersections utilizing the Synchro 9.1 analysis software and the Highway Capacity Manual (HCM) 2000 methodology.
4. Preparation of the AM and PM peak hour traffic forecasts for future conditions without development (2018) that include existing traffic, an ambient growth rate of 1.0 percent, compounded annually, for two (2) years, and the by-right 41,000 SF of retail use.
5. Capacity analyses for future conditions without development (2018) based on the peak hour traffic forecasts without development and the HCM 2000 methodology computed by Synchro 9.1 and the planned traffic signal timings for the Maple Avenue corridor.
6. Calculation of the number of AM and PM peak hour trips that would be generated by the proposed development based on standard Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition rates and equations.
7. Preparation of the AM and PM peak hour traffic forecasts for future conditions with development (2018).
8. Capacity analyses for future conditions with development (2018) based on the peak hour traffic forecasts without development and the HCM 2000 methodology computed by Synchro 9.1 and the planned traffic signal timings for the Maple Avenue W corridor.



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Sources of data for this analysis included previous traffic study information, the Virginia Department of Transportation (VDOT); ITE; The Town of Vienna; *Traffic Signal System Review and Optimization Study*, by Gorove Slade; Smith Engineering; Kylo + Pattana Architects; and the files of Wells + Associates Inc. (W+A).

BACKGROUND INFORMATION

Compliance with VDOT Chapter 870 Guidelines

As confirmed during the scoping process and summarized later in this document, the proposed development is estimated to generate less than 5,000 daily (24-hour) trips and is therefore exempt from the VDOT Chapter 870 Guidelines.

Study Area and Road Network

The following intersections were included as part of this traffic study:

1. Church Street NW/Pleasant Street NW
2. Church Street NW/Lawyers Road NW (Route 673)
3. Maple Avenue W (Route 123)/Pleasant Street NW**
4. Maple Avenue W/Lawyers Road NW/Courthouse Road SW**
5. Church Street NW/Residential Site Driveway (Future)
6. Church Street NW/Retail Site Driveway (Future)
7. Pleasant Street NW/Residential Site Driveway (Future)
8. Maple Avenue W/Retail Site Driveway (Future)
9. Maple Avenue W/Nutley Street**

** Traffic count data provided by the Town of Vienna in the *Traffic Signal System Review and Optimization Study*.

Existing Road Network

The existing lane use and traffic controls at key study intersections in the site vicinity are shown on Figure 3.

Maple Avenue W (Route 123) is a four-lane, undivided, Urban Principal Arterial with a posted speed limit of 30 mph adjacent to the site. A two-way left turn lane is provided the length of Maple Avenue along the site frontage. A traffic signal and turn left-lanes exist at the Lawyers Road NW intersection. Maple Avenue W in the area of the site carries 33,000 average daily vehicles.



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Lawyers Road NW (Route 673) is a two-lane, undivided, Minor Arterial with a posted speed limit of 25 mph in the vicinity of the site. Lawyers Road NW in the area of the site carries 13,000 average daily vehicles.

Pleasant Street NW is a two-lane local street with a posted speed limit of 25.

Church Street NW is a two-lane local street with a posted speed limit of 25. Church Street NW is one-way eastbound between Pleasant Street NW and a midblock barricade then becomes two-way between the barricade and Lawyers Road NW. The barricade restricts westbound through traffic to eliminate a potential cut-through route for vehicles attempting to avoid the signalized intersection of Maple Avenue W/Lawyers Road NW.

Nutley Street (Route 243) is a is a four-lane, undivided, Urban Minor Arterial with a posted speed limit of 30 mph east of the Maple Avenue intersection and an Urban Collector with a speed limit of 30 mph to the west of the Maple Avenue intersection. Nutley Street in the area of the site carries 18,000 average daily trips.

Existing Traffic Counts

W+A conducted AM and PM peak hour vehicular, pedestrian, and bicycle counts at the aforementioned intersections on Wednesday, February 17, 2016 from 6:00 to 9:00 AM and 4:00 to 7:00 PM. Traffic data provided by the Town of Vienna for the intersections of Maple Avenue W/Lawyers Road/Courthouse Road and Maple Avenue W/Pleasant Street were collected on Thursday May 8, 2014 as part of the Gorove Slade optimization study. Traffic count information for the Maple Avenue/Nutley Street intersection was provided by the Town of Vienna. The existing thru traffic counts along Maple Avenue W and Lawyers Road were balanced up to within 10 percent to account for the different count dates. The baseline AM and PM peak hour traffic volumes are summarized on Figure 4 and detailed count data is provided in Appendix B.



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Multimodal Facilities

Sidewalks are provided along both sides of Maple Avenue W and Lawyers Road NW, but are not currently provided along Pleasant Street and Church Street. At the signalized intersection of Maple Avenue W/Lawyers Road crosswalks with pedestrian countdown signal heads are provided on all legs of the intersection.

Within the study area *Bike Fairfax* does not identify any of the streets as bicycle routes. To the east of the site Center Street is identified as a Preferred Route as well as the Washington Old Dominion Trail. To the south Courthouse Road W and Locust Street SW are identified as Preferred Routes.

The existing pedestrian and bicycle counts at the study intersections are summarized on Figures 5 and 6, and the detailed count data is included in Appendix B.

In addition to the above described pedestrian and bicycle infrastructure that exists nearby the site, three (3) bus lines have stops within close proximity. The list below provides a summary of bus lines located within a half-mile or 10-minute walk.

[Fairfax Connector 461 \(Flint Hill - Vienna\)](#) is a weekday rush hour service route that has stops located approximately a ½ mile west of the site along Maple Avenue W and Nutley Street SW and a ½ east of the site along Maple Avenue E. This route operates in a loop beginning and ending at the Vienna Metro Station. It runs primarily along Virginia Center Boulevard, Nutley Street, Maple Avenue, Malcolm Road, Park Street and Tapawingo Road. The route operates on weekday mornings with 5 to 7-minute headways and weekday afternoons with 6 to 10 minute headways.

[Fairfax Connector 463 \(Maple Avenue - Vienna\)](#) has multiple stops located within ¼ mile to the east and west of the site along Maple Avenue W. This route operates between the Vienna Metro Station and the Tysons Corner Metro Station. It runs primarily along Nutley Street, Maple Avenue, Chain Bridge Road and Gosnell Road. The route operates on weekdays, Saturdays, and Sundays with approximately 7 to 11-minute headways.

[Fairfax Connector 466 \(Vienna - Oakton\)](#) has stops located approximately a ½ mile west of the site along Nutley Street and Maple Avenue W. This route operates in a loop beginning and ending at the Vienna Metro Station. It runs primarily along Chain Bridge Road, Nutley Street, and Blake Lane. The route operates on weekdays only with approximately 7 to 10-minute headways.

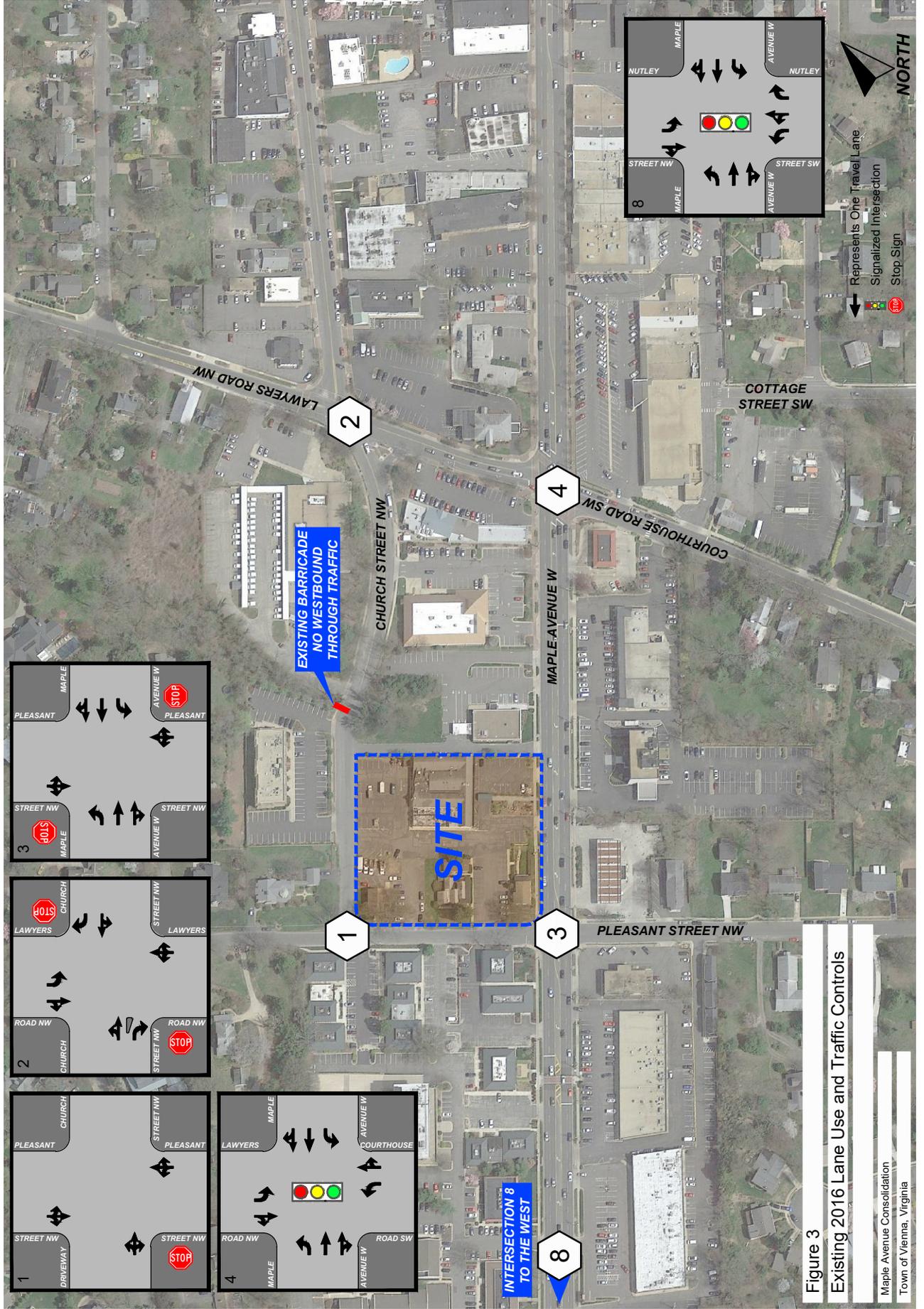
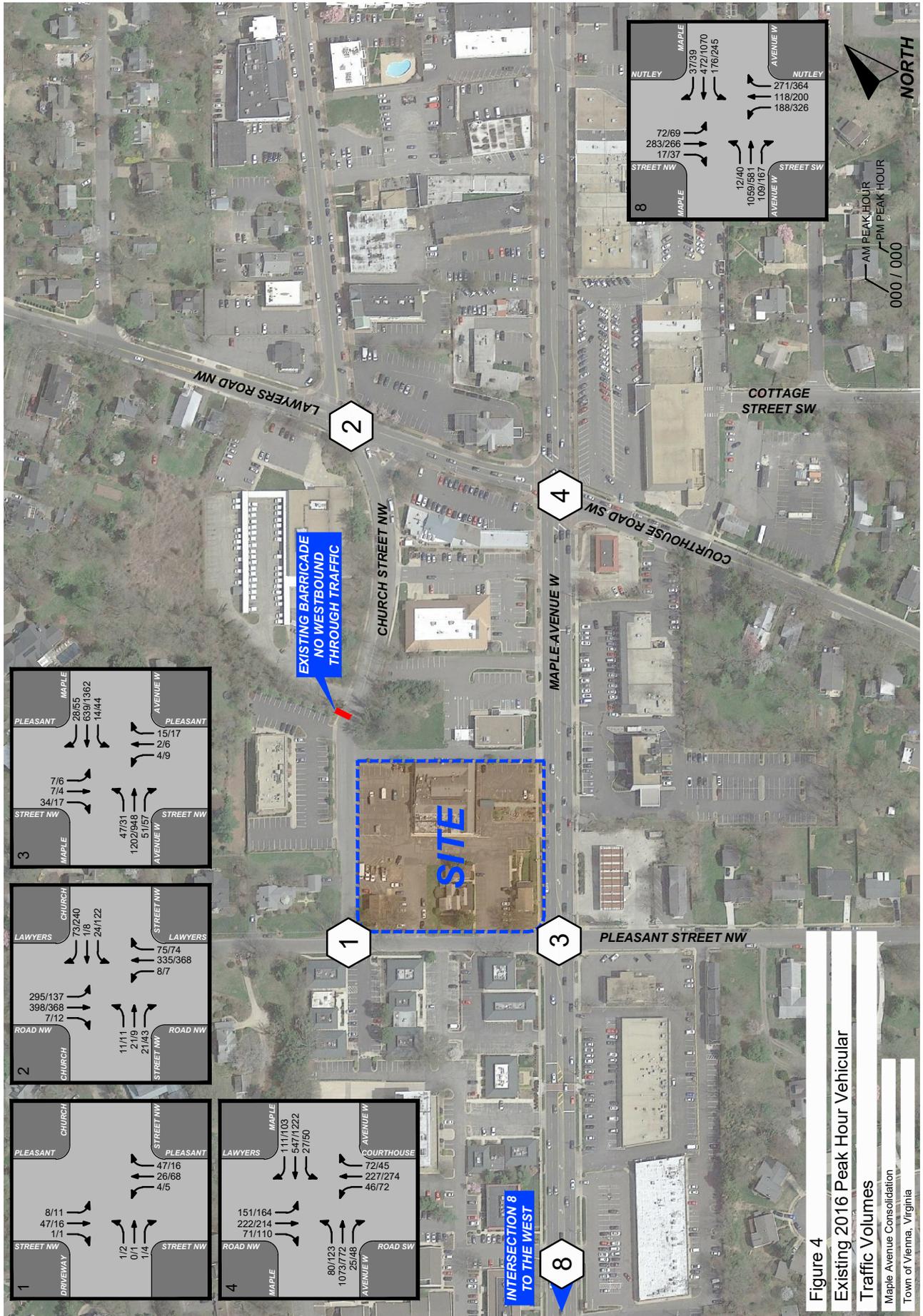
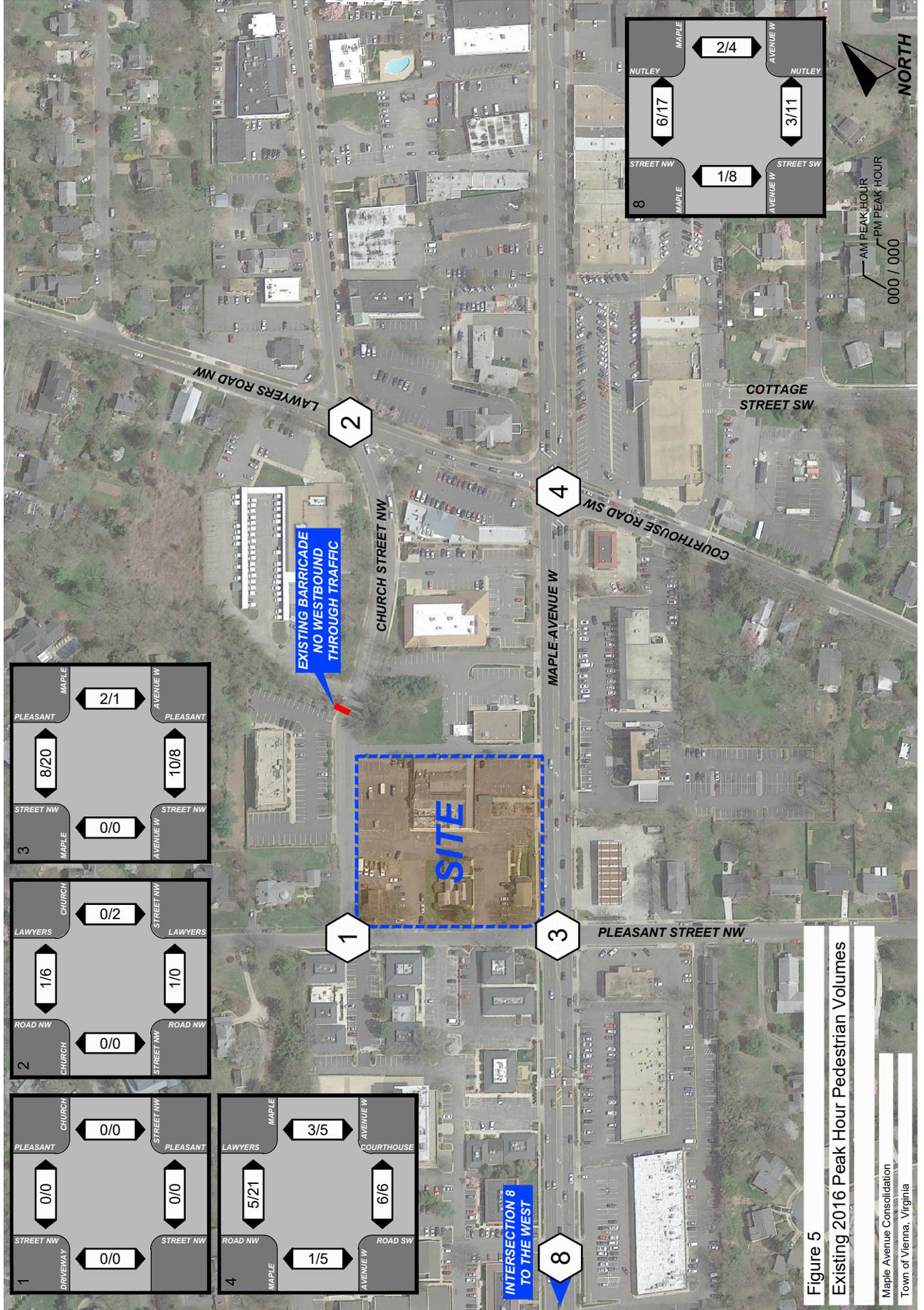


Figure 3 Existing 2016 Lane Use and Traffic Controls

Maple Avenue Consolidation
Town of Vienna, Virginia





NORTH

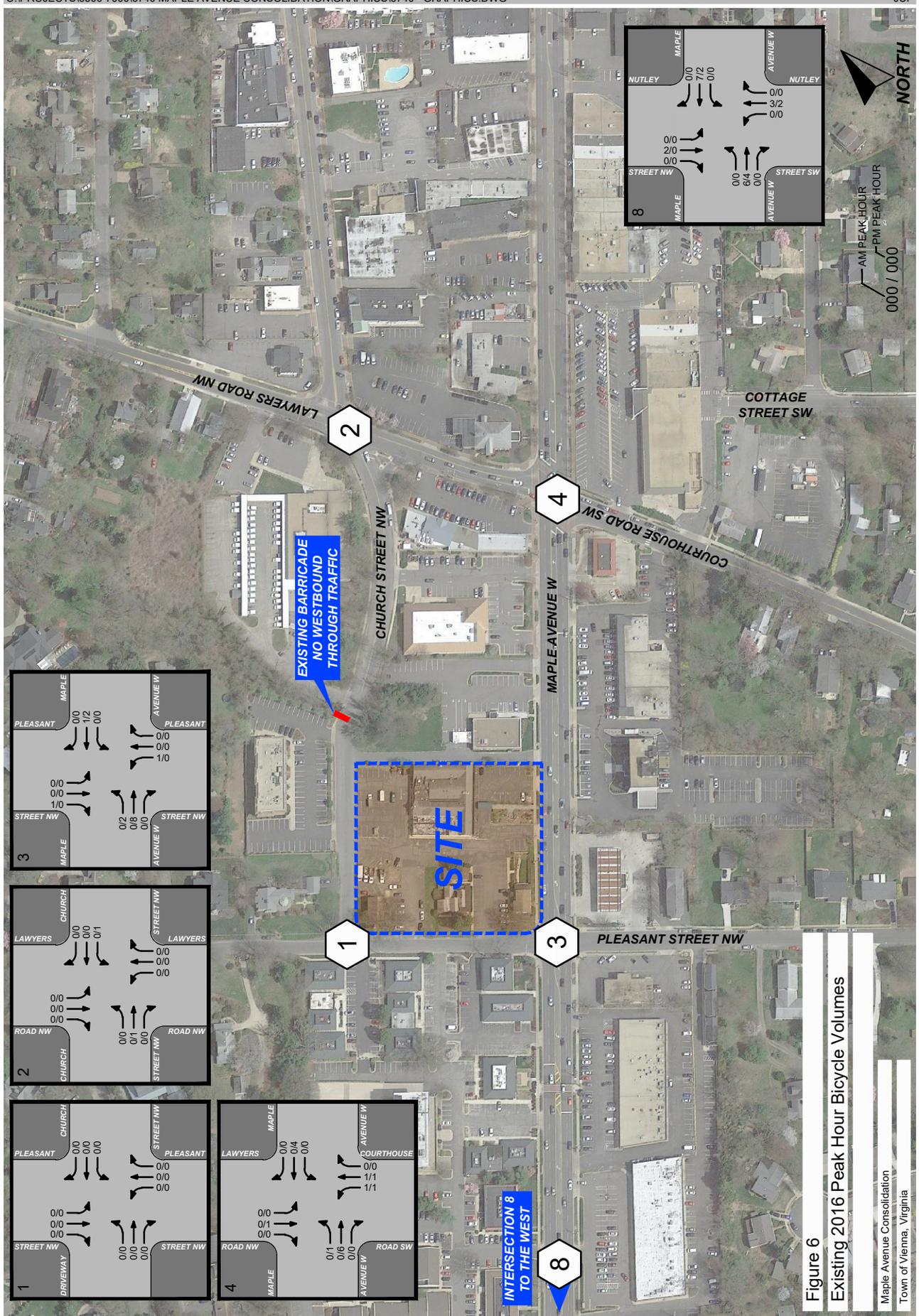


Figure 6
Existing 2016 Peak Hour Bicycle Volumes

Maple Avenue Consolidation
Town of Vienna, Virginia



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ANALYSIS OF EXISTING CONDITIONS

Existing Conditions Operational Analysis

Existing peak hour levels of service (LOS) and the 50th and 95th percentile queues were estimated at the study intersections based on the existing lane usage and traffic control, baseline traffic volumes, and the 2000 HCM methodology using Synchro, version 9.1. The base Synchro files including traffic signal timings at the intersections of Maple Avenue W and Lawyers Road NW were provided by the Town of Vienna. These files were modified account for the effects of peak hour factors, pedestrian calls and bus blockages where applicable. The results are presented in Appendix C and summarized in Tables 1 and 2.

Levels of Service. The existing LOS results are summarized in Table 1 and indicate the following:

- The signalized intersection of Maple Avenue W/Lawyers Road NW currently operates at an overall acceptable LOS “D” during the AM peak hour and near capacity at LOS “E” during the PM peak hour. Most individual movements operate near or at capacity during the peak periods. The deficient levels of service realized at the intersection are partly attributed to the protected left turn phasing on all approaches and the long cycle length.
- The signalized intersection of Maple Avenue W/Nutley Street currently operates at an overall LOS “E” during both the AM and PM peak hours. Some individual movements operate at or beyond capacity during both peak periods. Delay on the Nutley Street approaches is partly due to the north/south split phasing of the traffic signal and time allocated to mainline Maple Avenue.
- At the stop controlled intersection of Church Street NW/Lawyers Road NW the eastbound and westbound stopped controlled approaches currently operate LOS “E” or “F” during the AM peak hour. During the PM peak hour, the westbound approach currently operates at LOS “F”. The stop-controlled side street approaches operate poorly due to the heavy through movement along Lawyers Road NW during the peak periods. Mainline traffic along Lawyers Road operates at acceptable levels of service during both the AM and PM peak hours.
- All of the approaches at the stop controlled intersections of Church Street NW/Pleasant Street NW and Maple Avenue W/Pleasant Street NW currently operate at acceptable levels of service (at LOS “D” or better) during the AM and PM peak hours.



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Queues. The 50th and 95th percentile queues of existing conditions are used to establish a datum against which to compare future conditions. The 50th percentile (or average) queue is defined as the maximum back of queue associated with a typical signal cycle. The 95th percentile queue is defined as the maximum back of queue with 95th percentile traffic volumes. The 95th percentile queue is not necessarily ever observed, it is simply based on statistical calculations¹.

As shown in Table 2, the left/right turn storage at study intersections is currently adequate to accommodate the estimated 95th percentile queue with the following exceptions:

- The southbound left turn from Lawyers Road NW to Maple Avenue W during the AM and PM peak hours.
- The westbound left turn from Maple Avenue to Nutley Street during the AM peak hour.

Based on field observations the southbound queue along Lawyers Road NW at Maple Avenue W generally extended back to or beyond the Church Street NW intersection during a typical cycle during peak periods. This queue clears each cycle and allowed ingress/egress to/from Church Street. At the intersection of Maple Avenue/Nutley Street the peak hour delay extends beyond the delineated exclusive turn lane into the two way left turn lane. The queue does not block westbound through traffic and typically clears each cycle.

¹ Synchro Studio 9, Traffic Signal Software – User Guide

Table 1
 Marco Polo Site
 Existing Intersection Level of Service ¹

| Intersection | Intersection Control | Lane Group/Approach | 2016 Existing Conditions | | | |
|---------------------------------------|----------------------|-------------------------------------|--------------------------|----------------|---------------------|-------------|
| | | | AM Peak Hour | | PM Peak Hour | |
| | | | LOS | Delay | LOS | Delay |
| (1) Church Street/ Pleasant Street | Unsignalized | EB | A | 8.9 | A | 8.9 |
| | | WB | - | - | - | - |
| | | NB | A | 0.4 | A | 0.4 |
| | | SB | A | 1.2 | A | 3.1 |
| (2) Church Street/ Lawyers Road | Unsignalized | EB | F | 84.0 | D | 26.3 |
| | | WB | F | 53.6 | F | 304.2 |
| | | NB | A | 0.3 | A | 0.2 |
| | | SB | A | 4.0 | A | 2.4 |
| (3) Maple Avenue/ Pleasant Street | Unsignalized | EBL | A | 8.8 | B | 11.7 |
| | | EBTR | A | 0.0 | A | 0.0 |
| | | WBL | B | 12.6 | B | 11.2 |
| | | WBTR | A | 0.0 | A | 0.0 |
| | | NBLTR | C | 20.9 | C | 21.7 |
| | | SBLTR | B | 14.3 | C | 18.3 |
| (4) Maple Avenue/ Lawyers Road | Signalized | EBL | F | 63.8 | F | 121.9 |
| | | EBTR | D | 37.4 | C | 33.2 |
| | | WBL | E | 71 | F | 102.5 |
| | | WBTR | C | 34.7 | F | 81.8 |
| | | NBL | E | 72.3 | F | 88.1 |
| | | NBTR | E | 73.4 | F | 94.7 |
| | | SBL | F | 85.6 | F | 115.9 |
| | | SBTR | D | 46.4 | E | 62.4 |
| | | Overall | D | 46.3 | E | 72.5 |
| | | (5) Church Street/ Site Driveway | Unsignalized | EB WB NB | Future Intersection | |
| (6) Church Street/ Site Driveway | Unsignalized | EB WB NB | Future Intersection | | Future Intersection | |
| (7) Pleasant Street/ Site Driveway | Unsignalized | WB NB SB | Future Intersection | | Future Intersection | |
| (8) Maple Avenue/ Site Driveway | Unsignalized | EBL EBT WBTR SBLR | Future Intersection | | Future Intersection | |
| (9) Maple Avenue/ Nutley Street | Signalized | EBL | C | 25.8 | D | 36.8 |
| | | EBTR | D | 54.6 | D | 47 |
| | | WBL | F | 92.9 | D | 47 |
| | | WBTR | C | 26.4 | D | 47.3 |
| | | NBLT | F | 88.6 | F | 109.3 |
| | | NBR | E | 58.9 | D | 54.1 |
| | | SBL | E | 64.2 | E | 63.8 |
| | | SBTR | F | 96.1 | F | 97.7 |
| | | Overall | E | 60.5 | E | 62.3 |

Notes:

1. Analysis performed using Synchro software, version 9.



Table 2
 Marco Polo Site
 Existing Intersection Queuing Summary ¹

| Intersection | Intersection Control | Lane Group/Approach | Storage Length (Feet) | 2016 Existing Conditions | | | |
|---------------------------------------|----------------------|---------------------|-----------------------|--------------------------|-----------------|---------------------|-----------------|
| | | | | AM Peak Hour | | PM Peak Hour | |
| | | | | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile |
| (1) Church Street/ Pleasant Street | Unsignalized | EBLTR | - | - | 0 | - | 1 |
| | | WBLTR | - | - | - | - | - |
| | | NBLTR | - | - | 0 | - | 0 |
| | | SBLTR | - | - | 0 | - | 1 |
| (2) Church Street/ Lawyers Road | Unsignalized | EB | - | - | 75 | - | 26 |
| | | WB | - | - | 94 | - | 612 |
| | | NB | - | - | 1 | - | 1 |
| | | SBL | 50 | - | 30 | - | 13 |
| | | SBTR | - | - | 0 | - | 0 |
| (3) Maple Avenue/ Pleasant Street | Unsignalized | EBL | 50 | - | 4 | - | 5 |
| | | EBTR | - | - | 0 | - | 0 |
| | | WBL | 50 | - | 3 | - | 6 |
| | | WBTR | - | - | 0 | - | 0 |
| | | NBLTR | - | - | 8 | - | 13 |
| | | SBLTR | - | - | 11 | - | 9 |
| (4) Maple Avenue/ Lawyers Road | Signalized | EBL | 140 | 77 | 136 | 144 | #292 |
| | | EBTR | - | 527 | #640 | 374 | 454 |
| | | WBL | 140 | 28 | 60 | 55 | 107 |
| | | WBTR | - | 290 | 341 | ~867 | #1005 |
| | | NBL | 150 | 46 | 91 | 84 | #151 |
| | | NBTR | - | 289 | #447 | 368 | #554 |
| | | SBL | 200 | 157 | #257 | 201 | #335 |
| | | SBTR | - | 265 | 355 | 354 | 457 |
| (5) Church Street/ Site Driveway | Unsignalized | EBTR | - | Future Intersection | | Future Intersection | |
| | | WBT | - | | | | |
| | | NBLR | - | | | | |
| (6) Church Street/ Site Driveway | Unsignalized | EBTR | - | Future Intersection | | Future Intersection | |
| | | WBT | - | | | | |
| | | NBLR | - | | | | |
| (7) Pleasant Street/ Site Driveway | Unsignalized | WBLR | - | Future Intersection | | Future Intersection | |
| | | NBTR | - | | | | |
| | | SBLT | - | | | | |
| (8) Maple Avenue/ Site Driveway | Unsignalized | EBL | - | Future Intersection | | Future Intersection | |
| | | EBT | - | | | | |
| | | WBTR | - | | | | |
| | | SBLR | - | | | | |
| (9) Maple Avenue/ Nutley Street | Signalized | EBL | 60 | 8 | 21 | 27 | 51 |
| | | EBTR | - | 836 | #971 | 428 | 503 |
| | | WBL | 285 | 188 | #346 | 197 | #281 |
| | | WBTR | - | 212 | 289 | 723 | 806 |
| | | NBLT | - | 234 | 297 | 409 | #565 |
| | | NBR | - | 72 | 138 | 108 | 197 |
| | | SBL | - | 82 | 137 | 78 | 132 |
| | | SBTR | - | 395 | #556 | 398 | #566 |

Notes:

1. Analysis performed using Synchro software, version 9.
2. "~" - 50th percentile volume exceeds capacity, queue may be longer.
3. "#" - 95th percentile volume exceeds capacity, queue may be longer.
4. "m" - Volume for 95th percentile queue is metered by upstream signal.





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ANALYSIS OF FUTURE CONDITIONS WITHOUT DEVELOPMENT (2018)

Traffic Volumes

This section presents an analysis of future transportation conditions including projections of 2018 future traffic forecasts without the proposed development, as well as capacity and queuing analyses.

Regional Growth. As identified during the scoping process and detailed in the traffic scoping agreement contained in Appendix A, regional growth of through traffic was included in the future traffic forecasts. A growth rate of one (1.0) percent was applied to all traffic movements along Maple Ave W, Lawyers Road NW, Pleasant Street NW, and Church Street NW to account for ambient growth and for future development not assumed herein and is summarized on Figure 7. It is noted that a review of VDOT Average Annual Daily Traffic (AADT) indicates the traffic volumes on Maple Avenue W and Lawyers Road NW have shown no growth over the past four (4) year period.

Pipeline Developments. Per the scoping document, no pipeline developments were identified for inclusion in this traffic study. As noted above the 1.0 percent growth was assumed to account for future development.

By-Right Development. As mentioned previously the site is currently only partially occupied and generating less peak hour traffic than a typical retail use. As such, the future conditions without the proposed development assume the site would be fully occupied with 41,000 SF of retail uses as permitted by-right.

In order to accurately compare future conditions and isolate the impacts of the site redevelopment, the peak hour trip generation of by-right uses was calculated using the ITE Trip Generation Manual, 9th Edition rates and equations. The site was assumed to be occupied by "General Retail" ITE Land Use Code 820.

As shown in Table 3, the by-right development is estimated to generate 67 AM peak hour trips, 247 PM peak hour trips, and 2,853 daily trips. This assumed a 25 percent pass-by reduction. The observed peak hour traffic was subtracted from the ITE estimates to derive the additional traffic that the site would be generated if fully occupied and operating to the site's full potential. The additional traffic was assigned to the roadway network based on current traffic patterns. Figure 8 summarizes the additional peak hour traffic that was added to the network for the by-right development.

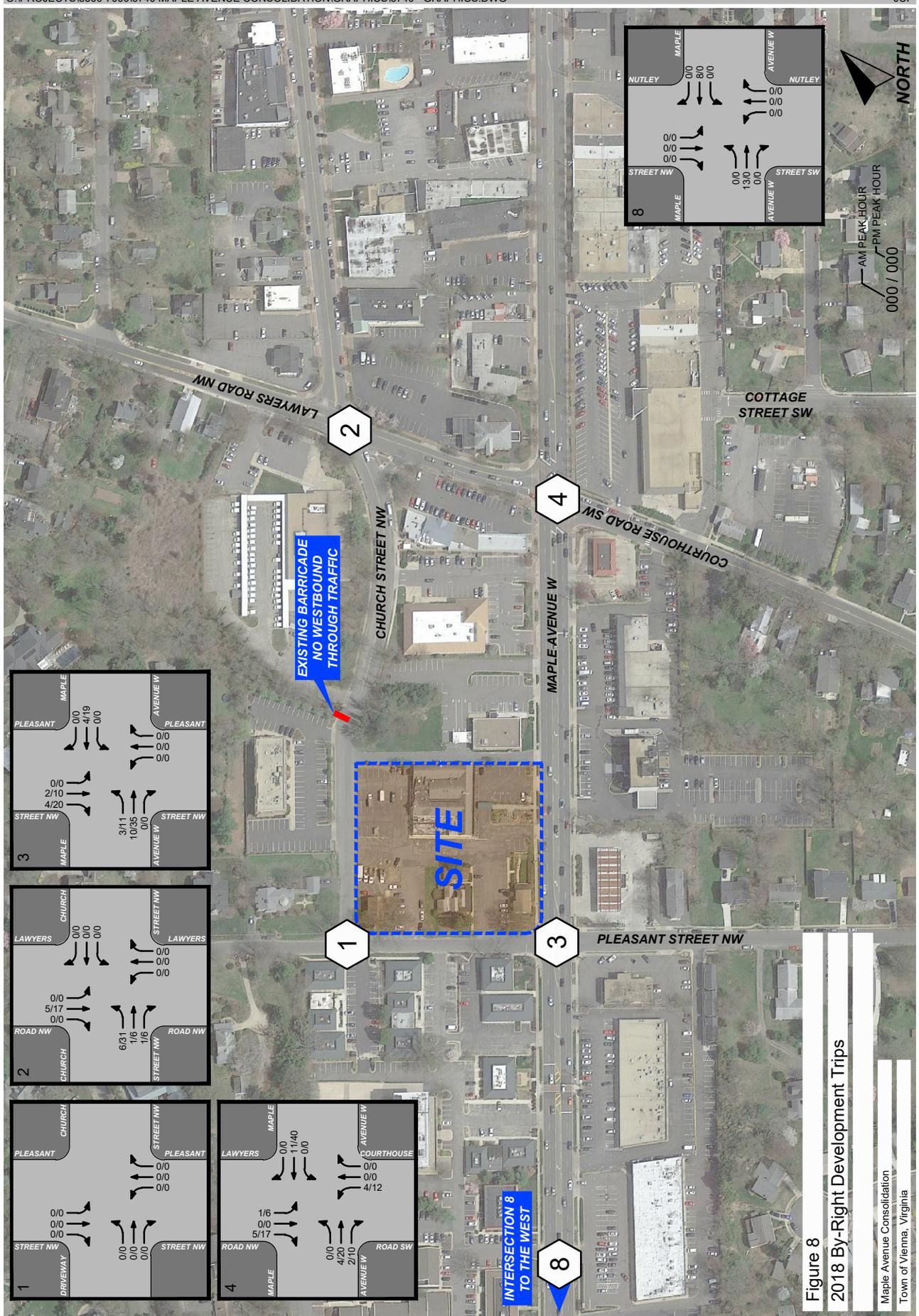
Table 3
 Marco Polo Site
 By-Right Trip Generation Analysis ¹

| Land Use | Land Use Code | Size | Units | AM Peak Hour | | | PM Peak Hour | | | Weekday ADT |
|---|---------------|--------|-------|--------------|------------|-------------|--------------|-------------|-------------|--------------|
| | | | | In | Out | Total | In | Out | Total | |
| Existing Development | | | | | | | | | | |
| Observed Peak Hour Traffic Counts (February 17, 2016) | | | | 12 | 2 | 14 | 4 | 9 | 13 | |
| <i>Pass-by Reduction (25%)</i> ² | | | | <u>(3)</u> | <u>(1)</u> | <u>(4)</u> | <u>(1)</u> | <u>(2)</u> | <u>(3)</u> | |
| ITE - Shopping Center | 820 | 41,000 | SF | 56 | 34 | 90 | 158 | 172 | 330 | 3,804 |
| <i>Pass-by Reduction (25%)</i> ² | | | | <u>(14)</u> | <u>(9)</u> | <u>(23)</u> | <u>(40)</u> | <u>(43)</u> | <u>(83)</u> | <u>(951)</u> |
| Total By-Right Trips | | | | 42 | 25 | 67 | 118 | 129 | 247 | 2,853 |
| Additional Trips (By-Right minus Observed) | | | | 33 | 24 | 57 | 115 | 122 | 237 | 2,853 |

Notes:

1. Trip estimates calculated based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition.
2. Pass-by percentage consistent with the VDOT Traffic Impact Analysis Regulations Administrative Guidelines.







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Future Forecasts without Development (2018)

Future peak hour traffic forecasts without the proposed development are shown on Figure 9 and are a composite of the baseline peak hour traffic volumes, regional growth, and the by-right development.

Maple Avenue Traffic Signal Timings

The Town of Vienna is in the process of implementing traffic signal timing improvements along the Maple Avenue corridor that include, but are not limited to, updated cycle lengths and phasing, and the optimization of the timing to provide improved coordination between adjacent signals. These timing files have been received from the Town and are assumed in place by 2018.

Operational Analysis without Development (2018)

Peak hour levels of service and queuing analyses for future conditions without redevelopment of the site and were estimated at the study intersections based on the existing lane usage, updated traffic signal timings, the future peak hour traffic forecasts without redevelopment, and the 2000 HCM methodology using Synchro version 9.1. The results are presented in Appendix D and summarized in Tables 4 and 5.

Levels of Service. The 2018 LOS results without the proposed development assuming the addition of regional growth and the by-right development are summarized in Table 4 and indicate the following:

- The signalized intersection of Maple Avenue W/Lawyers Road NW would continue to operate at an overall LOS “D” during the AM peak hour and LOS “E” during the PM peak hour. Most individual movements operate would continue to operate LOS “E” or “F” during the peak periods. As mentioned previously the levels of services at the intersection are partly attributed to the protected left turns phasing on all approaches and the cycle length.
- The signalized intersection of Maple Avenue W/Nutley Street would continue to operate at overall LOS “E” during both peak periods, with some individual movements operating beyond capacity consistent with existing conditions.
- At the stop controlled intersection of Church Street NW/Lawyers Road NW the eastbound and westbound stopped controlled approaches would continue to operate LOS “E” or “F” during peak periods. Mainline traffic along Lawyers Road



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would continue to operate at acceptable levels of service during both the AM and PM peak hours.

- The stop controlled intersections of Church Street NW/Pleasant Street NW and Maple Avenue W/Pleasant Street NW would continue to operate at acceptable levels of service during the AM and PM peak hours (LOS “D” or better).

Maple Avenue W and Lawyers Road NW. Consistent with existing conditions the improved traffic signal timings at the intersection include protected left-turn phasing on all approaches. Two improvement scenarios were evaluated in order to mitigate an existing and future condition without the proposed development. The first improvement scenario converted the left-turn phasing for the eastbound and westbound approaches along Maple Avenue W to protected/permitted phasing. The second improvement scenario converted all the left-turn phasing at the intersection to protected/permitted phasing.

As shown in Table 4, converting the eastbound and westbound left-turn phasing from protected only phasing to protected/permitted phasing would reduce the delay on each of the left-turn on from Maple Avenue W substantially. The modified timing would result in a reduction of overall delay per vehicle at the intersection between four (4) and 13 seconds.

The second scenario evaluated the conversion of all the protected left-turns at the intersection to protected/permitted. As shown in Table 4, with the modification to the signal phasing to include protected/permitted phasing on all approaches the AM and PM peak hour would operate at overall acceptable levels of service (LOS “D”), with a further reduction of the overall and lane group delay per vehicle. When compared to the existing phasing at the intersection this improvement would reduce overall delay per vehicle during peak period by approximately 10 to 21 seconds per vehicle.

Queues. The future estimated 50th and 95th percentile peak hour queue results without the proposed development for the turning movements are presented in Table 5. As shown in Table 5, the estimated peak hour queues at study intersections would remain generally consistent with existing condition in future. During peak periods the southbound left turn on Lawyers Road at Maple Avenue and the westbound left turn on Maple Avenue at Nutley Street would continue to exceed the available storage. Implementing the recommended timing improvements at the Maple Avenue W/Lawyers Road NW intersection could reduce peak hour queues.

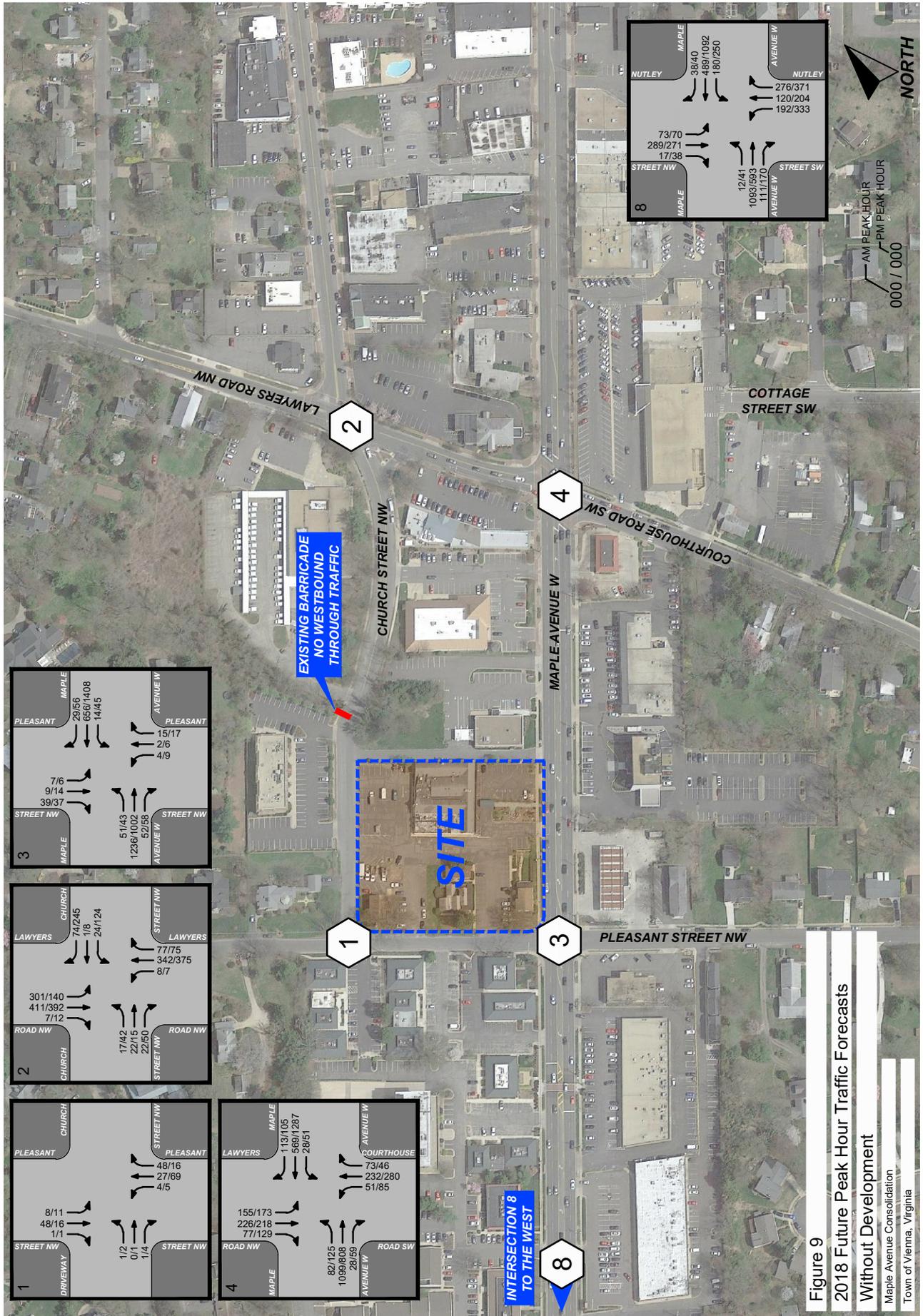


Figure 9
2018 Future Peak Hour Traffic Forecasts
Without Development
Maple Avenue Consolidation
Town of Vienna, Virginia

Table 4
 Marco Polo Site
 Background Intersection Level of Service¹

| Intersection | Intersection Control | Lane Group/Approach | 2016 Existing Conditions | | | | 2018 Background Conditions ² | | | |
|--|----------------------|--|--------------------------|-------------|---------------------|-------------|---|-------------|---------------------|-------------|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | | | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay |
| (1) Church Street/ Pleasant Street | Unsignalized | EB | A | 8.9 | A | 8.9 | A | 8.9 | A | 8.9 |
| | | WB | - | - | - | - | - | - | - | - |
| | | NB | A | 0.4 | A | 0.4 | A | 0.4 | A | 0.4 |
| | | SB | A | 1.2 | A | 3.1 | A | 1.1 | A | 3.0 |
| (2) Church Street/ Lawyers Road | Unsignalized | EB | F | 84.0 | D | 26.3 | F | 112.9 | F | 109.5 |
| | | WB | F | 53.6 | F | 304.2 | F | 57.7 | F | 343.0 |
| | | NB | A | 0.3 | A | 0.2 | A | 0.3 | A | 0.2 |
| | | SB | A | 4.0 | A | 2.4 | A | 4.0 | A | 2.3 |
| (3) Maple Avenue/ Pleasant Street | Unsignalized | EBL | A | 8.8 | B | 11.7 | A | 8.9 | B | 11.9 |
| | | EBTR | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 |
| | | WBL | B | 12.6 | B | 11.2 | B | 12.8 | B | 11.5 |
| | | WBTR | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 |
| | | NBLTR | C | 20.9 | C | 21.7 | C | 21.2 | C | 24.1 |
| | | SBLTR | B | 14.3 | C | 18.3 | C | 15.3 | C | 21.4 |
| (4) Maple Avenue/ Lawyers Road | Signalized | EBL | F | 63.8 | F | 121.9 | F | 93.1 | F | 135.8 |
| | | EBTR | D | 37.4 | C | 33.2 | B | 18.8 | C | 21.0 |
| | | WBL | E | 71 | F | 102.5 | E | 70.3 | F | 102.5 |
| | | WBTR | C | 34.7 | F | 81.8 | C | 33.6 | F | 99.4 |
| | | NBL | E | 72.3 | F | 88.1 | E | 73.6 | F | 97.0 |
| | | NBTR | E | 73.4 | F | 94.7 | E | 72.9 | F | 93.8 |
| | | SBL | F | 85.6 | F | 115.9 | F | 82.5 | F | 113.5 |
| | | SBTR | D | 46.4 | E | 62.4 | D | 46.6 | E | 64.0 |
| | | Overall | D | 46.3 | E | 72.5 | D | 39.0 | E | 77.1 |
| | | <i>Signal Phasing Improvements</i> | | | | | | | | |
| | | <i>Modify eastbound and westbound</i> | EBL | | | | A | 8.0 | F | 113.3 |
| | | <i>Maple Avenue left turns to protected/</i> | EBTR | | | | B | 20.0 | B | 16.5 |
| | | <i>permitted.</i> | WBL | | | | C | 23.9 | B | 15.4 |
| | | | WBTR | | | | C | 30.4 | E | 60.1 |
| | | | NBL | | | | E | 73.6 | F | 122.3 |
| | | | NBTR | | | | E | 75.2 | F | 121.1 |
| | | | SBL | | | | F | 86.6 | F | 125.2 |
| | | | SBTR | | | | D | 47.6 | E | 70.3 |
| | | | Overall | | | | D | 36.3 | E | 62.0 |
| | | <i>Modify all</i> | EBL | | | | A | 7.0 | F | 110.1 |
| <i>Modify all left turns to protected/</i> | EBTR | | | | B | 17.9 | B | 15.6 | | |
| <i>permitted.</i> | WBL | | | | C | 22.0 | B | 14.8 | | |
| | WBTR | | | | C | 28.3 | E | 55.6 | | |
| | NBL | | | | D | 41.3 | D | 53.7 | | |
| | NBTR | | | | E | 70.8 | F | 101.9 | | |
| | SBL | | | | D | 44.4 | F | 83.7 | | |
| | SBTR | | | | D | 47.5 | E | 64.2 | | |
| | Overall | | | | C | 31.3 | D | 53.5 | | |
| (5) Church Street/ Site Driveway | Unsignalized | EB WB NB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | |
| (6) Church Street/ Site Driveway | Unsignalized | EB WB NB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | |
| (7) Pleasant Street/ Site Driveway | Unsignalized | WB NB SB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | |
| (8) Maple Avenue/ Site Driveway | Unsignalized | EBL EBT WBTR SBLR | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | |
| (9) Maple Avenue/ Nutley Street | Signalized | EBL | C | 25.8 | D | 36.8 | C | 24.7 | D | 40.8 |
| | | EBTR | D | 54.6 | D | 47 | E | 57.1 | D | 54.1 |
| | | WBL | F | 92.9 | D | 47 | F | 101.4 | E | 63.0 |
| | | WBTR | C | 26.4 | D | 47.3 | B | 12.3 | D | 37.3 |
| | | NBLT | F | 88.6 | F | 109.3 | E | 70.1 | F | 91.2 |
| | | NBR | E | 58.9 | D | 54.1 | D | 45.2 | D | 38.7 |
| | | SBL | E | 64.2 | E | 63.8 | D | 50.2 | D | 54.7 |
| | | SBTR | F | 96.1 | F | 97.7 | F | 112.8 | F | 96.8 |
| | | Overall | E | 60.5 | E | 62.3 | E | 57.5 | E | 57.0 |

Notes:

1. Analysis performed using Synchro software, version 9.
2. Signal timings for future conditionsthe Maple Avenue signalized intersections utilize the planned signal timings received from the Town of Vienna.

Table 5
 Marco Polo Site
 Background Intersection Queuing Summary ¹

| Intersection | Intersection Control | Lane Group/Approach | Storage Length (Feet) | 2016 Existing Conditions | | | | 2018 Background Conditions ⁵ | | | | |
|--|----------------------|--|-----------------------|--------------------------|-----------------|---------------------|-----------------|---|-----------------|---------------------|-----------------|------|
| | | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | |
| (1) Church Street/ Pleasant Street | Unsignalized | EBLTR | - | - | 0 | - | 1 | - | 0 | - | 1 | |
| | | WBLTR | - | - | - | - | - | - | - | - | - | |
| | | NBLTR | - | - | 0 | - | 0 | - | 0 | - | 0 | |
| | | SBLTR | - | - | 0 | - | 1 | - | 0 | - | 1 | |
| (2) Church Street/ Lawyers Road | Unsignalized | EB | - | - | 75 | - | 26 | - | 95 | - | 140 | |
| | | WB | - | - | 94 | - | 612 | - | 95 | - | 650 | |
| | | NB | - | - | 1 | - | 1 | - | 1 | - | 1 | |
| | | SBL | 50 | - | 30 | - | 13 | - | 31 | - | 13 | |
| | | SBTR | - | - | 0 | - | 0 | - | 0 | - | 0 | |
| (3) Maple Avenue/ Pleasant Street | Unsignalized | EBL | 50 | - | 4 | - | 5 | - | 4 | - | 7 | |
| | | EBTR | - | - | 0 | - | 0 | - | 0 | - | 0 | |
| | | WBL | 50 | - | 3 | - | 6 | - | 2 | - | 7 | |
| | | WBTR | - | - | 0 | - | 0 | - | 0 | - | 0 | |
| | | NBLTR | - | - | 8 | - | 13 | - | 7 | - | 14 | |
| | | SBLTR | - | - | 11 | - | 9 | - | 13 | - | 21 | |
| (4) Maple Avenue/ Lawyers Road | Signalized | EBL | 140 | 77 | 136 | 144 | #292 | 85 | 145 | 148 | #300 | |
| | | EBTR | - | 527 | #640 | 374 | 454 | 293 | #696 | 222 | 283 | |
| | | WBL | 140 | 28 | 60 | 55 | 107 | 26 | 61 | 56 | 111 | |
| | | WBTR | - | 290 | 341 | ~867 | #1005 | 274 | 350 | ~951 | #1088 | |
| | | NBL | 150 | 46 | 91 | 84 | #151 | 49 | 96 | 96 | #186 | |
| | | NBTR | - | 289 | #447 | 368 | #554 | 284 | #447 | 361 | #554 | |
| | | SBL | 200 | 157 | #257 | 201 | #335 | 150 | #259 | 198 | #355 | |
| | | SBTR | - | 265 | 355 | 354 | 457 | 255 | 365 | 353 | 486 | |
| | | Signal Phasing Improvements | EBL | | | | | | 13 | 27 | 103 | #242 |
| | | <i>Modify eastbound and westbound</i> | EBTR | | | | | | 454 | 687 | 183 | 233 |
| | | <i>Maple Avenue left turns to protected/</i> | WBL | | | | | | 12 | 29 | 15 | 32 |
| | | <i>permitted.</i> | WBTR | | | | | | 255 | 318 | 831 | #996 |
| | | | NBL | | | | | | 49 | 96 | 97 | #209 |
| | | | NBTR | | | | | | 286 | #459 | ~390 | #602 |
| | | | SBL | | | | | | 151 | #270 | 199 | #366 |
| | SBTR | | | | | | 260 | 372 | 362 | #534 | | |
| <i>Modify all</i> | EBL | | | | | | 13 | 25 | 102 | #241 | | |
| <i>Modify all left turns to protected/</i> | EBTR | | | | | | 432 | 675 | 179 | 223 | | |
| <i>permitted.</i> | WBL | | | | | | 12 | 27 | 15 | 31 | | |
| | WBTR | | | | | | 252 | 305 | 812 | #974 | | |
| | NBL | | | | | | 32 | 65 | 68 | 114 | | |
| | NBTR | | | | | | 281 | #435 | 367 | #578 | | |
| | SBL | | | | | | 105 | #179 | 148 | #308 | | |
| | SBTR | | | | | | 255 | 365 | 356 | #510 | | |
| (5) Church Street/ Site Driveway | Unsignalized | EBTR WBT NBLR | - - - | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | |
| (6) Church Street/ Site Driveway | Unsignalized | EBTR WBT NBLR | - - - | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | |
| (7) Pleasant Street/ Site Driveway | Unsignalized | WBLR NBTR SBLT | - - - | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | |
| (8) Maple Avenue/ Site Driveway | Unsignalized | EBL EBT WBTR SBLR | - - - - | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | |
| (9) Maple Avenue/ Nutley Street | Signalized | EBL | 60 | 8 | 21 | 27 | 51 | 5 | 17 | 25 | 49 | |
| | | EBTR | - | 836 | #971 | 428 | 503 | 608 | #770 | 409 | 493 | |
| | | WBL | 285 | 188 | #346 | 197 | #281 | 147 | #299 | 168 | #335 | |
| | | WBTR | - | 212 | 289 | 723 | 806 | 72 | 92 | 593 | 737 | |
| | | NBLT | - | 234 | 297 | 409 | #565 | 157 | 242 | 323 | #503 | |
| | | NBR | - | 72 | 138 | 108 | 197 | 72 | 164 | 82 | 187 | |
| | | SBL | - | 82 | 137 | 78 | 132 | 63 | 114 | 68 | 120 | |
| | | SBTR | - | 395 | #556 | 398 | #566 | ~326 | #525 | 348 | #546 | |

Notes:

1. Analysis performed using Synchro software, version 9.
2. "~" - 50th percentile volume exceeds capacity, queue may be longer.
3. "#" - 95th percentile volume exceeds capacity, queue may be longer.
4. "m" - Volume for 95th percentile queue is metered by upstream signal.
5. Signal timings for future conditionthe Maple Avenue signalized intersections utilize the planned signal timings received from the Town of Vienna.



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ANALYSIS OF FUTURE CONDITIONS WITH DEVELOPMENT (2018)

Site Trip Generation

The number of AM and PM peak hour trips that would be generated by the proposed development were estimated based on the ITE *Trip Generation Manual*, 9th Edition trip rates and equations. ITE Land Use Code 820 (Shopping Center) and 230 (Residential Condominium/Townhouse) were used to complete the analysis.

As shown in Table 6, the proposed development is estimated to generate 39 AM peak hour primary trips (13 in and 26 out) and 71 PM peak hour primary trips (40 in and 31 out). The trip generation estimates include a 60 percent pass-by reduction and an internal capture between the residential and retail uses of five (5) percent during the AM peak hour and 10 percent during the PM peak hour.

Pass-by trips are vehicles already driving past the site today that would in the future pull into the site to patronize the retail uses. When departing the site, these vehicles proceed on to their original destination. These trips would account for approximately 20 AM peak hour trips and 66 PM peak hour trips.

The reductions assumed herein are consistent with ITE and VDOT standard practices. Pass-by rates were derived by taking an average of pass-by rates published in the ITE handbook of developments of similar size. It should also be noted that the alternative trip generation model noted in VDOT's *Traffic Impact Analysis Regulations Administrative Guidelines* was reviewed, but were not used to complete this analysis. The alternative trip generation method is better applied to large scale mixed-use developments.

As noted previously, the by-right development is estimated to generate 67 AM peak hour trips and 247 PM peak hour trips. When compared to the by-right development, the proposed redevelopment would generate approximately 28 fewer AM peak hour primary trips, 176 fewer PM peak primary hour trips and 2,069 fewer daily primary trips.

Existing Site Generated Traffic. Peak hour traffic generated by the existing uses on site was removed from the surrounded road network based on the existing travel patterns. These trips are shown on Figure 10.

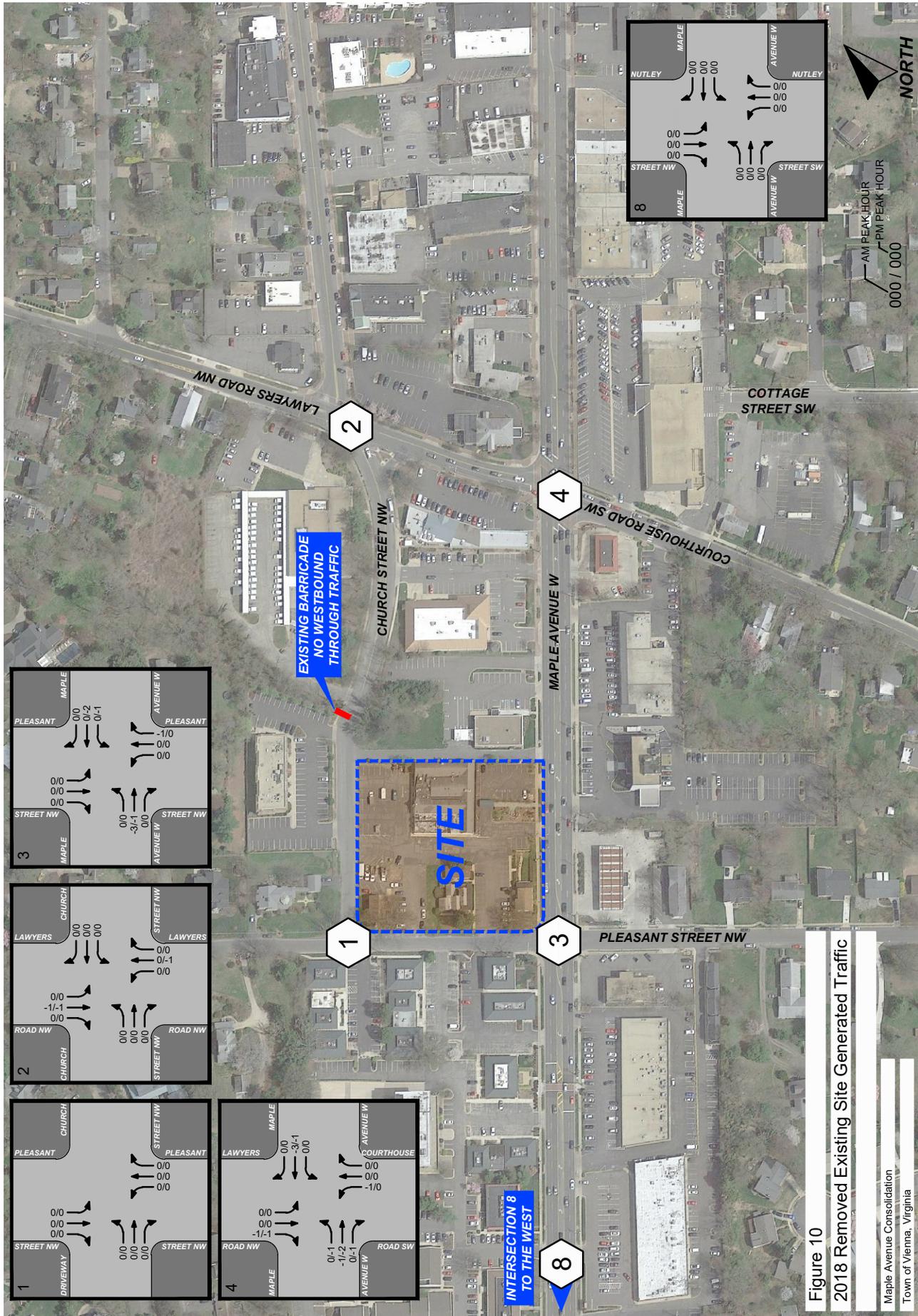
Table 6
 Marco Polo Site
 Site Trip Generation Analysis ¹

| Land Use | Land Use Code | Size | Units | AM Peak Hour | | PM Peak Hour | | Weekday ADT |
|---|---------------|-------|-------|--------------|-----------|--------------|-----------|-------------|
| | | | | In | Out | In | Out | |
| <u>Proposed Development</u> | | | | | | | | |
| ITE - Shopping Center | 820 | 8,200 | SF | 21 | 13 | 54 | 58 | 1,336 |
| <i>Internal Capture (5% AM, 10% PM, 15% ADT) ²</i> | | | | (1) | - | (1) | (2) | (47) |
| | | | | 20 | 13 | 53 | 56 | 1,289 |
| <i>Pass-by Reduction (60%) ³</i> | | | | (12) | (8) | (32) | (34) | (773) |
| Retail Primary Trips | | | | 8 | 5 | 21 | 22 | 516 |
| Townhouses | 230 | 44 | DU | 5 | 22 | 21 | 10 | 315 |
| <i>Internal Capture (5% AM, 10% PM, 15% ADT) ²</i> | | | | - | (1) | (2) | (1) | (47) |
| Residential Subtotal | | | | 5 | 21 | 19 | 9 | 268 |
| Proposed Development (Primary Trips) | | | | 13 | 26 | 40 | 31 | 784 |

Notes:

1. Trip estimates calculated based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition.
2. Internal capture rate based on capture rates provided in the VDOT Traffic Impact Analysis Regulations Administrative Guidelines.
3. Pass-by percentage based on ITE's Trip Generation Handbook, 9th Edition.







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Site Access

As shown on Figure 1 and previously discussed, eight (8) driveways currently serve the site along Maple Avenue W, Pleasant Street NW, and Church Street NW. All of the existing driveways operate under stop-controlled conditions providing full-movement access to/from the site. Two (2) of the site driveways are located along Maple Avenue, two (2) of the site driveways along Pleasant Street, and four (4) site driveways along Church Street. The driveways along Maple Avenue are served by a two-way left turn lane that runs the length of the site frontage.

As proposed, the existing eight (8) driveways will be closed and three (3) new site driveways will be constructed, reducing the number of curb-cuts serving the site by five (5). One (1) full-movement driveway is proposed to be constructed along Maple Avenue W serving the ground floor retail uses and loading/trash. The upper residential portion of the site is proposed to be served by two (2) new driveways along Church Street.

Unlike the previous application, Church Street is proposed to remain under its current one-way configuration. The future lane use and traffic controls with the proposed development are shown on Figure 11.

Once on site, employees and retail patrons would have access to approximately 35 parking spaces provided on the ground level. The Fairfax County Zoning Ordinance (as required by the Town) calls for the site to provide a minimum of 35 parking spaces thus the proposal falls well within these guidelines. Parking for the residential portion of the site will be provided via individual garages beneath each condominium unit and surface parking for the residential visitors.

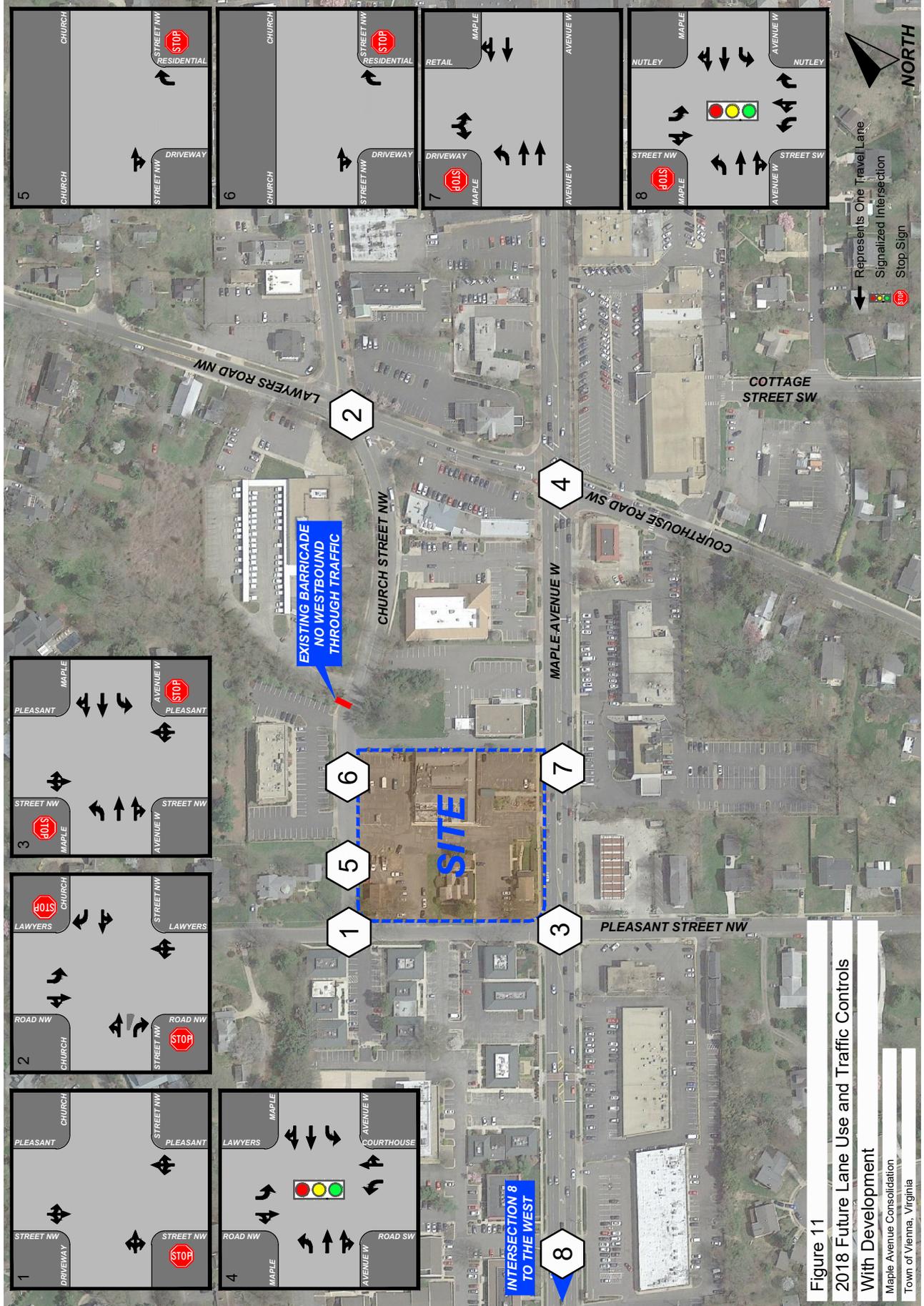


Figure 11
 2018 Future Lane Use and Traffic Controls
 With Development
 Maple Avenue Consolidation
 Town of Vienna, Virginia





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Future Pedestrian and Bicycle Accommodations

The site is currently served by sidewalks along Maple Avenue, but not along Pleasant or Church Streets. The redeveloped site proposes to improve the sidewalks along with installation of landscaping along Maple Avenue and construct new sidewalks along both the Pleasant and Church Street site frontages. In addition to improving the pedestrian facilities, the applicant also proposes to relocate existing utility lines underground that would further reduce conflicts. Bicycle racks to serve both customers and residents of the site will also be installed.

The modifications identified above would improve the appearance of the site from Maple Avenue, improve the pedestrian experience, and create a multi-modal, connected network that promotes pedestrian activity and is consistent with the Maple Avenue Corridor plan.

Site Generated Traffic Distributions and Assignments

Trip distributions for the proposed development are based on recent traffic counts, the surrounding road network, local knowledge and engineering judgement. The following trip distributions were assumed for the proposed development’s retail primary trips.

| | |
|--|------------|
| To/From the North on Lawyers Road: | 15% |
| To/From the East on Maple Avenue: | 35% |
| To/From the South Courthouse: | 25% |
| <u>To/From the West on Maple Avenue:</u> | <u>25%</u> |
| Total: | 100% |

The following distributions were assumed for the proposed development’s primary residential trips.

| | |
|--|------------|
| To/From the North on Lawyers Road: | 10% |
| To/From the East on Maple Avenue: | 35% |
| To/From the South Lawyers Road: | 10% |
| To/From the South Pleasant Street: | 5% |
| To/From the West on Maple Avenue: | 25% |
| <u>To/From the North on Windover Avenue:</u> | <u>15%</u> |
| Total: | 100% |

The peak hour vehicle-trips shown in Table 6 were assigned to the public road network according to the directional distribution described above. These site generated traffic assignments are shown on Figure 12. The site’s pass-by trips are based on the existing travels patterns on Maple Avenue W and are summarized on Figure 13.

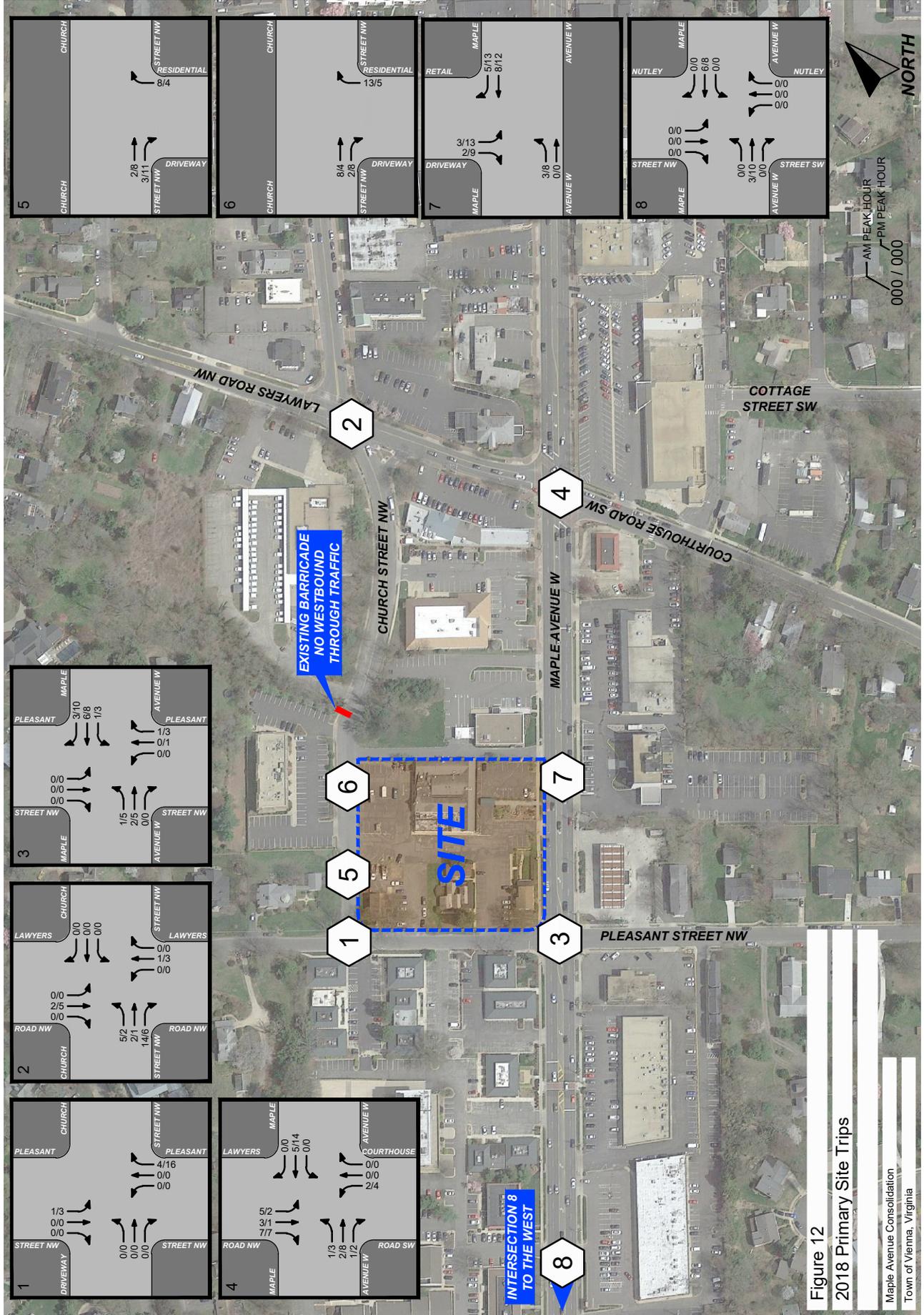


Figure 12
2018 Primary Site Trips

Maple Avenue Consolidation
Town of Vienna, Virginia

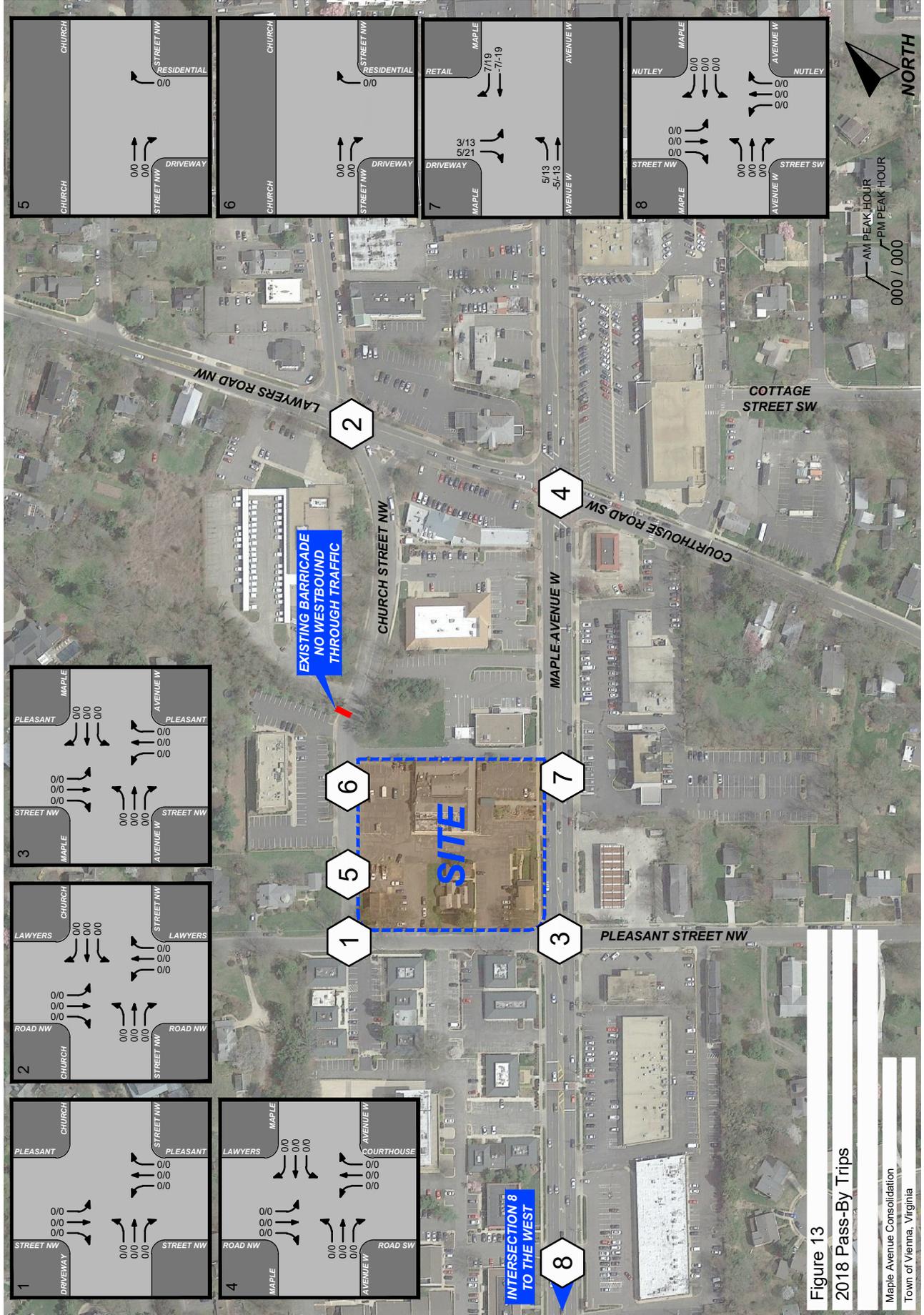


Figure 13
2018 Pass-By Trips

Maple Avenue Consolidation
Town of Vienna, Virginia



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Future Traffic Forecasts with Development (2018)

Future peak hour traffic forecasts with the proposed development were prepared by combining the baseline peak hour traffic volumes with the proposed the development's primary and pass-by trips, and the removal of existing site generated traffic. The resulting future peak hour traffic forecasts with the proposed development are shown on Figure 14.

2018 Operational Analysis with Development

Peak hour levels of service and queuing analyses were prepared for future conditions with development based on the future lane use and traffic controls, the planned traffic signal timings, the future traffic forecasts with development, and the Synchro (version 9.1) capacity analysis using the HCM 2000 methodology. No changes were made to the planned signal timings used to complete the future conditions without development at the study intersections in order to show the impacts of the proposed development. Additionally, both of the signal timing phasing improvements recommended previously in addition to the planned timings were evaluated to show the impacts of the phasing adjustments at the Maple Avenue W/Lawyers Road NW intersection. The results are presented in Appendix E and summarized in Tables 7 and 8.

Levels of Service. The 2018 LOS results with the proposed development are summarized in Table 7 and indicate the following:

- The signalized intersections of Maple Avenue W/Lawyers Road NW and Maple Avenue/Nutley Street would continue to operate at consistent overall levels of service during the AM and PM peak hours as future conditions without development. When compared to existing and future conditions without development, increase in delay would be minimal and not perceived by drivers (four (4) seconds or less).
- At the stop-controlled intersection of Church Street NW/Lawyers Road NW the eastbound and westbound stopped controlled approaches would continue to operate LOS "E" or "F" during peak periods consistent with existing and future conditions without development. Side-street traffic would continue to rely on gaps in through traffic created by the Maple Avenue traffic signal and motorists allowing access between queued vehicles during peak periods.



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- The stop controlled intersections of Church Street NW/Pleasant Street NW, Maple Avenue W/Pleasant Street NW and all future site driveways would continue to operate at acceptable levels of service during the AM and PM peak hours (LOS “D” of better).

As described previously, in order to address the existing delay and capacity constraints, two alternative timing scenarios were reviewed at the intersection of Maple Avenue W and Lawyers Road NW.

Consistent with future conditions without development, the traffic signal phasing adjustment to allow protected/permitted left turn on all four (4) approaches at the intersection would provide the greatest mitigation in overall delay per vehicle (approximately 10 seconds during the AM peak hour and 22 seconds during the PM peak hour). When compared to existing conditions with either timing adjustment (to either Maple Avenue W or all four (4) legs of the intersections) the overall delay per vehicle could be reduced to below the existing average delay per vehicle at the intersection.

The potential traffic signal phasing and timing adjustments, consolidation of site driveways, and non-auto improvements (sidewalk upgrades, utility relocation, and bicycle facilities), would effectively mitigate site generated vehicle trips and is consistent with the goals of the Maple Avenue Corridor Plan.

Queues. The future estimated 50th and 95th percentile peak hour queue results with the proposed development for the turning movements are presented in Table 8. As shown in Table 2, the estimated peak hour queues at study intersections would remain generally consistent to future conditions without development and only increase marginally when compared to existing conditions. Implementing either of the alternative left-turn signal phasing at the intersection of Maple Avenue W and Lawyers Road NW would aid in reducing peak hour queuing. The estimated westbound left turn queue on Maple Avenue at Nutley Street would increase by approximately 20 feet or one (1) vehicle when compared to future conditions without development. This queue extends into the existing two way left turn consistent with existing conditions, but would not block through traffic on mainline Maple Avenue.

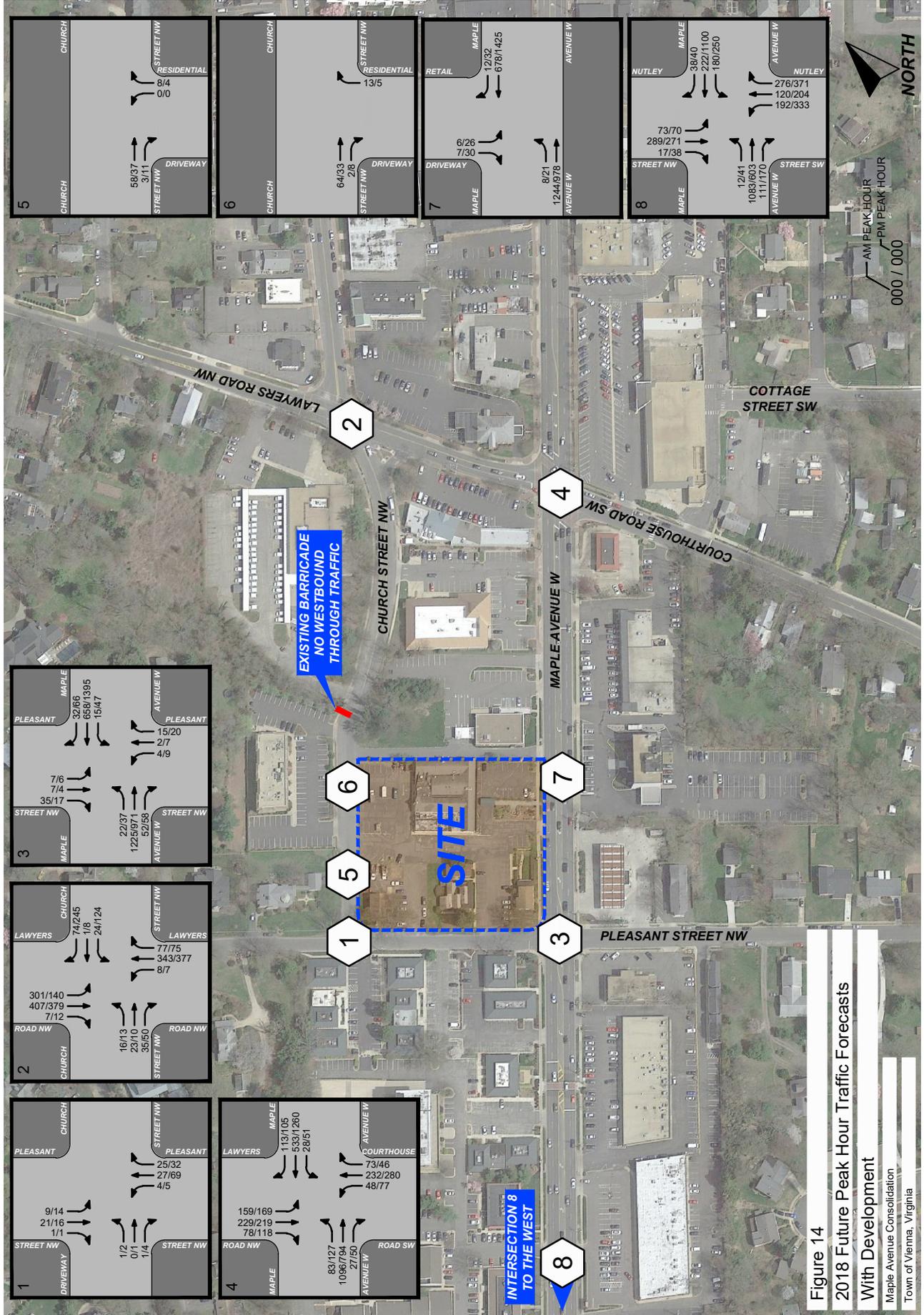


Table 7
 Marco Polo Site
 Total Future Intersection Level of Service ¹

| Intersection | Intersection Control | Lane Group/Approach | 2016 Existing Conditions | | | | 2018 Background Conditions ² | | | | 2018 Total Future Conditions ² | | | |
|---|----------------------|--|--------------------------|-------------|---------------------|-------------|---|-------------|---------------------|-------------|---|-------------|--------------|-------------|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | | | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay |
| (1) Church Street/ Pleasant Street | Unsignalized | EB | A | 8.9 | A | 8.9 | A | 8.9 | A | 8.9 | A | 8.8 | A | 9.0 |
| | | NB | A | 0.4 | A | 0.4 | A | 0.4 | A | 0.4 | A | 0.5 | A | 0.3 |
| | | SB | A | 1.2 | A | 3.1 | A | 1.1 | A | 3.0 | A | 2.2 | A | 3.4 |
| (2) Church Street/ Lawyers Road | Unsignalized | EB | F | 84.0 | D | 26.3 | F | 112.9 | F | 109.5 | F | 93.2 | D | 26.4 |
| | | WB | F | 53.6 | F | 304.2 | F | 57.7 | F | 343.0 | F | 74.7 | F | 301.2 |
| | | NB | A | 0.3 | A | 0.2 | A | 0.3 | A | 0.2 | A | 0.2 | A | 0.2 |
| | | SB | A | 4.0 | A | 2.4 | A | 4.0 | A | 2.3 | A | 9.7 | A | 9.0 |
| (3) Maple Avenue/ Pleasant Street | Unsignalized | EBL | A | 8.8 | B | 11.7 | A | 8.9 | B | 11.9 | A | 8.9 | B | 11.9 |
| | | EBTR | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 |
| | | WBL | B | 12.6 | B | 11.2 | B | 12.8 | B | 11.5 | B | 12.8 | B | 11.3 |
| | | WBTR | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 | A | 0.0 |
| | | NBLTR | C | 20.9 | C | 21.7 | C | 21.2 | C | 24.1 | C | 20.1 | C | 22.7 |
| | | SBLTR | B | 14.3 | C | 18.3 | C | 15.3 | C | 21.4 | B | 14.3 | C | 18.7 |
| (4) Maple Avenue/ Lawyers Road | Signalized | EBL | F | 63.8 | F | 121.9 | F | 93.1 | F | 135.8 | F | 92.5 | F | 135.2 |
| | | EBTR | D | 37.4 | C | 33.2 | B | 18.8 | C | 21.0 | B | 17.9 | C | 20.8 |
| | | WBL | E | 71 | F | 102.5 | E | 70.3 | F | 102.5 | E | 71.9 | F | 102.5 |
| | | WBTR | C | 34.7 | F | 81.8 | C | 33.6 | F | 99.4 | C | 33.2 | F | 92.2 |
| | | NBL | E | 72.3 | F | 88.1 | E | 73.6 | F | 97.0 | E | 72.3 | F | 90.1 |
| | | NBTR | E | 73.4 | F | 94.7 | E | 72.9 | F | 93.8 | E | 72.9 | F | 92.9 |
| | | SBL | F | 85.6 | F | 115.9 | F | 82.5 | F | 113.5 | F | 84.6 | F | 111.2 |
| | | SBTR | D | 46.4 | E | 62.4 | D | 46.6 | E | 64.0 | D | 46.5 | E | 61.8 |
| | | Overall | D | 46.3 | E | 72.5 | D | 39.0 | E | 77.1 | D | 38.8 | E | 73.6 |
| | | <i>Modify eastbound and westbound Maple Avenue left turns to protected/ permitted.</i> | EBL | | | | A | 8.0 | F | 113.3 | A | 8.4 | F | 116.8 |
| | | | EBTR | | | | B | 20.0 | B | 16.5 | C | 20.0 | B | 16.7 |
| | | | WBL | | | | C | 23.9 | B | 15.4 | C | 28.3 | B | 15.3 |
| | | | WBTR | | | | C | 30.4 | E | 60.1 | C | 24.2 | E | 56.2 |
| | | | NBL | | | | E | 73.6 | F | 122.3 | E | 72.3 | F | 122.7 |
| | | | NBTR | | | | E | 75.2 | F | 121.1 | E | 75.2 | F | 120.1 |
| | | | SBL | | | | F | 86.6 | F | 125.2 | F | 84.6 | F | 118.1 |
| | | | SBTR | | | | D | 47.6 | E | 70.3 | D | 46.9 | E | 65.1 |
| | | Overall | D | | | | D | 36.3 | E | 62.0 | C | 34.8 | E | 59.8 |
| | | <i>Modify all Modify all left turns to protected/ permitted.</i> | EBL | | | | A | 7.0 | F | 110.1 | A | 7.3 | F | 114.9 |
| | EBTR | | | | B | 17.9 | B | 15.6 | B | 17.9 | B | 15.4 | | |
| | WBL | | | | C | 22.0 | B | 14.8 | C | 21.3 | B | 14.5 | | |
| | WBTR | | | | C | 28.3 | E | 55.6 | C | 20.2 | D | 51.0 | | |
| | NBL | | | | D | 41.3 | D | 53.7 | D | 41.2 | D | 50.6 | | |
| | NBTR | | | | E | 70.8 | F | 101.9 | E | 70.8 | F | 101.1 | | |
| | SBL | | | | D | 44.4 | F | 83.7 | D | 45.1 | F | 80.6 | | |
| | SBTR | | | | D | 47.5 | E | 64.2 | D | 47.5 | E | 62.6 | | |
| Overall | C | | | | C | 31.3 | D | 53.5 | C | 29.5 | D | 51.4 | | |
| (5) Church Street/ Residential Site Driveway | Unsignalized | EB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 0.0 | A | 0.0 |
| | | WB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 0.0 | A | 0.0 |
| | | NB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 8.6 | A | 8.5 |
| (6) Church Street/ Residential Site Driveway | Unsignalized | EB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 0.0 | A | 0.0 |
| | | WB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 0.0 | A | 0.0 |
| | | NB | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 8.7 | A | 8.5 |
| (7) Maple Avenue/ Retail Site Driveway | Unsignalized | EBL | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 8.6 | B | 11.4 |
| | | EBT | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 0.0 | A | 0.0 |
| | | WBTR | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | A | 0.0 | A | 0.0 |
| | | SBLR | Future Intersection | | Future Intersection | | Future Intersection | | Future Intersection | | B | 11.7 | C | 16.0 |
| (8) Maple Avenue/ Nutley Street | Signalized | EBL | C | 25.8 | D | 36.8 | C | 24.7 | D | 40.8 | C | 24.8 | D | 41.1 |
| | | EBTR | D | 54.6 | D | 47 | E | 57.1 | D | 54.1 | E | 56.4 | D | 54.1 |
| | | WBL | F | 92.9 | D | 47 | F | 101.4 | E | 63.0 | F | 95.6 | E | 65.7 |
| | | WBTR | C | 26.4 | D | 47.3 | B | 12.3 | D | 37.3 | B | 18.4 | D | 37.5 |
| | | NBLT | F | 88.6 | F | 109.3 | E | 70.1 | F | 91.2 | E | 70.1 | F | 91.2 |
| | | NBR | E | 58.9 | D | 54.1 | D | 45.2 | D | 38.7 | D | 45.5 | D | 38.6 |
| | | SBL | E | 64.2 | E | 63.8 | D | 50.2 | D | 54.7 | D | 50.0 | D | 54.8 |
| | | SBTR | F | 96.1 | F | 97.7 | F | 112.8 | F | 96.8 | F | 109.1 | F | 96.8 |
| | | Overall | E | 60.5 | E | 62.3 | E | 57.5 | E | 57.0 | E | 61.5 | E | 57.2 |

Notes:
 1. Analysis performed using Synchro software, version 9.
 2. Signal timings for future conditionsthe Maple Avenue signalized intersections utilize the planned signal timings received from the Town of Vienna.

Table 8
 Marco Polo Site
 Total Future Intersection Queuing Summary ¹

| Intersection | Intersection Control | Lane Group/Approach | Storage Length (Feet) | 2016 Existing Conditions | | | | 2018 Background Conditions ⁵ | | | | 2018 Total Future Conditions ⁵ | | | | |
|--|----------------------|--|-----------------------|--------------------------|-----------------|-----------------|-----------------|---|-----------------|-----------------|-----------------|---|-----------------|-----------------|-----------------|------|
| | | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | |
| (1) Church Street/ Pleasant Street | Unsignalized | EBLTR | - | - | 0 | - | 1 | - | 0 | - | 1 | - | 0 | - | 1 | |
| | | NBLTR | - | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | |
| | | SBLTR | - | - | 0 | - | 1 | - | 0 | - | 1 | - | 0 | - | 1 | |
| (2) Church Street/ Lawyers Road | Unsignalized | EB | - | - | 75 | - | 26 | - | 95 | - | 140 | - | 100 | - | 27 | |
| | | WB | - | - | 94 | - | 612 | - | 95 | - | 650 | - | 106 | - | 613 | |
| | | NB | - | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - | 1 | |
| | | SBL | 50 | - | 30 | - | 13 | - | 31 | - | 13 | - | 31 | - | 13 | |
| | | SBTR | - | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | |
| (3) Maple Avenue/ Pleasant Street | Unsignalized | EBL | 50 | - | 4 | - | 5 | - | 4 | - | 7 | - | 2 | - | 6 | |
| | | EBTR | - | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | |
| | | WBL | 50 | - | 3 | - | 6 | - | 2 | - | 7 | - | 3 | - | 7 | |
| | | WBTR | - | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | |
| | | NBLTR | - | - | 8 | - | 13 | - | 7 | - | 14 | - | 7 | - | 14 | |
| | | SBLTR | - | - | 11 | - | 9 | - | 13 | - | 21 | - | 10 | - | 8 | |
| (4) Maple Avenue/ Lawyers Road | Signalized | EBL | 140 | 77 | 136 | 144 | #292 | 85 | 145 | 148 | #300 | 86 | 146 | ~152 | #305 | |
| | | EBTR | - | 527 | #640 | 374 | 454 | 293 | #696 | 222 | 283 | 203 | #533 | 216 | 262 | |
| | | WBL | 140 | 28 | 60 | 55 | 107 | 26 | 61 | 56 | 111 | 28 | 65 | 56 | 109 | |
| | | WBTR | - | 290 | 341 | ~867 | #1005 | 274 | 350 | ~951 | #1088 | 170 | 274 | ~918 | #1056 | |
| | | NBL | 150 | 46 | 91 | 84 | #151 | 49 | 96 | 96 | #186 | 46 | 92 | 87 | #164 | |
| | | NBTR | - | 289 | #447 | 368 | #554 | 284 | #447 | 361 | #554 | 284 | #447 | 361 | #554 | |
| | | SBL | 200 | 157 | #257 | 201 | #335 | 150 | #259 | 198 | #355 | 155 | #272 | 193 | #344 | |
| | | SBTR | - | 265 | 355 | 354 | 457 | 255 | 365 | 353 | 486 | 258 | 368 | 340 | 469 | |
| | | Signal Phasing Improvements | EBL | - | - | - | - | - | 13 | 27 | 103 | #242 | 15 | 28 | 105 | #248 |
| | | <i>Modify eastbound and westbound</i> | EBTR | - | - | - | - | - | 454 | 687 | 183 | 233 | 434 | #699 | 180 | 233 |
| | | <i>Maple Avenue left turns to protected/</i> | WBL | - | - | - | - | - | 12 | 29 | 15 | 32 | 9 | 33 | 15 | 32 |
| | | <i>permitted.</i> | WBTR | - | - | - | - | - | 255 | 318 | 831 | #996 | 137 | 211 | 804 | #964 |
| | | | NBL | - | - | - | - | - | 49 | 96 | 97 | #209 | 46 | 92 | 89 | #199 |
| | | | NBTR | - | - | - | - | - | 286 | #459 | ~390 | #602 | 286 | #459 | ~390 | #602 |
| | | | SBL | - | - | - | - | - | 151 | #270 | 199 | #366 | 155 | #272 | 194 | #355 |
| | | | SBTR | - | - | - | - | - | 260 | 372 | 362 | #534 | 261 | 372 | 347 | #488 |
| | | <i>Modify all</i> | EBL | - | - | - | - | - | 13 | 25 | 102 | #241 | 14 | 25 | 104 | #247 |
| <i>Modify all left turns to protected/</i> | EBTR | - | - | - | - | - | 432 | 675 | 179 | 223 | 408 | 642 | 175 | 223 | | |
| <i>permitted.</i> | WBL | - | - | - | - | - | 12 | 27 | 15 | 31 | 9 | 24 | 14 | 30 | | |
| | WBTR | - | - | - | - | - | 252 | 305 | 812 | #974 | 134 | 170 | 784 | #941 | | |
| | NBL | - | - | - | - | - | 32 | 65 | 68 | 114 | 30 | 62 | 61 | 106 | | |
| | NBTR | - | - | - | - | - | 281 | #435 | 367 | #578 | 281 | #435 | 367 | #578 | | |
| | SBL | - | - | - | - | - | 105 | #179 | 148 | #308 | 108 | #192 | 144 | #296 | | |
| | SBTR | - | - | - | - | - | 255 | 365 | 356 | #510 | 259 | 368 | 344 | 474 | | |
| (5) Church Street/ Site Driveway | Unsignalized | EBTR | - | - | - | - | - | - | - | - | - | - | 0 | - | 0 | |
| | | WBT | - | - | - | - | - | - | - | - | - | - | 0 | - | 0 | |
| | | NBLR | - | - | - | - | - | - | - | - | - | - | 1 | - | 0 | |
| (6) Church Street/ Site Driveway | Unsignalized | EBTR | - | - | - | - | - | - | - | - | - | - | 0 | - | 0 | |
| | | WBT | - | - | - | - | - | - | - | - | - | - | 0 | - | 0 | |
| | | NBLR | - | - | - | - | - | - | - | - | - | - | 1 | - | 4 | |
| (7) Maple Avenue/ Site Driveway | Unsignalized | EBL | - | - | - | - | - | - | - | - | - | - | 1 | - | 3 | |
| | | EBT | - | - | - | - | - | - | - | - | - | - | 0 | - | 0 | |
| | | WBTR | - | - | - | - | - | - | - | - | - | - | 0 | - | 0 | |
| | | SBLR | - | - | - | - | - | - | - | - | - | - | 2 | - | 14 | |
| (8) Maple Avenue/ Nutley Street | Signalized | EBL | 60 | 8 | 21 | 27 | 51 | 5 | 17 | 25 | 49 | 5 | 17 | 25 | 49 | |
| | | EBTR | - | 836 | #971 | 428 | 503 | 608 | #770 | 409 | 493 | 600 | #757 | 415 | 513 | |
| | | WBL | 285 | 188 | #346 | 197 | #281 | 147 | #299 | 168 | #335 | 147 | #300 | 174 | #356 | |
| | | WBTR | - | 212 | 289 | 723 | 806 | 72 | 92 | 593 | 737 | 52 | 68 | 598 | 761 | |
| | | NBLT | - | 234 | 297 | 409 | #565 | 157 | 242 | 323 | #503 | 153 | 242 | 309 | #503 | |
| | | NBR | - | 72 | 138 | 108 | 197 | 72 | 164 | 82 | 187 | 71 | 164 | 323 | 188 | |
| | | SBL | - | 82 | 137 | 78 | 132 | 63 | 114 | 68 | 120 | 63 | 114 | 80 | 120 | |
| | | SBLR | - | 395 | #556 | 398 | #566 | ~326 | #525 | 348 | #546 | ~325 | #525 | 347 | #545 | |

Notes:

1. Analysis performed using Synchro software, version 9.
2. "-" - 50th percentile volume exceeds capacity, queue may be longer.
3. "#" - 95th percentile volume exceeds capacity, queue may be longer.
4. "m" - Volume for 95th percentile queue is metered by upstream signal.
5. Signal timings for future conditionsthe Maple Avenue signalized intersections utilize the planned signal timings received from the Town of Vienna.



WELLS + ASSOCIATES

MEMORANDUM

CONCLUSIONS

The proposed redevelopment of the Marco Polo site (8,200 SF of retail and 44 residential condominiums) is expected to generate 39 AM peak hour primary trips, 71 PM peak hour primary trips, and 784 daily primary trips. By comparison, the by-right retail uses (41,000 SF) would generate 67 AM peak hour primary trips, 247 PM peak hour primary trips, and 2,853 daily primary trips. Thus, the proposed redevelopment of the site would result in 27 fewer AM peak hour primary trips, 176 fewer PM peak hour primary trips, and 2,069 fewer daily primary trips than 41,000 SF of by-right retail uses.

Based on the analysis contained herein the proposed redevelopment would have a negligible impact on the operations of mainline of Maple Avenue W, Lawyers Road NW, and adjacent signalized intersection of Maple Avenue W and Lawyers Road NW. Minor increases in overall intersection delay (less than four (4) seconds) is expected when compared to existing conditions and future conditions without development. A review of the existing and planned traffic signal phasing and timings at the intersection of Maple Avenue and Lawyers Road indicate that the peak hour overall delay per vehicle and peak hour queuing could be reduced with adjustments to left-turn phasing at the intersection.

As mitigation measures, the potential traffic signal phasing/timing adjustments and consolidation of site driveways (from eight (8) to three (3)) would improve overall traffic operations when compared current conditions. The proposed development would consolidate access, improve connectivity to the adjacent neighborhood with new sidewalks, provide bicycle facilities, and frontage improvements along Maple Avenue to effectively mitigate the proposed development while achieving the goals of the Maple Avenue Corridor (MAC) zone.

Questions regarding this document should be directed to Wells + Associates.

Maple Avenue Consolidation

APPENDIX

A: Appendix A - Scoping Document

B: Appendix B - Traffic Counts

C: Appendix C - Existing Capacity Analysis

D: Appendix D - Background Capacity Analysis

E: Appendix E - Total Future Capacity Analysis



APPENDIX A

Appendix A - Scoping Document



PRE-SCOPE OF WORK MEETING FORM

Information on the Project Traffic Impact Analysis Base Assumptions

The locality will need to send this form to the project applicant at least two (2) weeks prior to the scheduled scope of work meeting on the proposed project. The applicant is responsible for having this form completed and returned to VDOT and the locality no less than three (3) business days prior to the Meeting. If a completed form is not received by this deadline, the scope of work meeting may be postponed.

| Contact Information | |
|---|---|
| Consultant Name: Tele: E-mail: | Michael Pinkoske & John Schick Wells + Associates, Inc. mrpinkoske@wellsandassociates.com & jaschick@wellsandassociates.com 703.676.3609 |
| Developer/Owner Name: Tele: E-mail: | Doug D'Alexander 703.795.5570 Doug.d@icloud.com |

| Project Information | |
|---|--|
| Project Name: | Maple Avenue Consolidation (Marco Polo Site) |
| Project Location: <small>(Attach regional and site specific location map)</small> | The subject site is generally located on the north side of Maple Avenue W (Route 123), south side of Church Street, and the east side of Pleasant Street in Vienna, Virginia as shown in Figure I . |
| Project Description: <small>Including type of application (rezoning, subdivision, site plan), acreage, business square ft, number of dwelling units, access location, etc. Attach additional sheet if necessary)</small> | <p>As proposed the existing site would be razed and redeveloped with approximately 26,000 SF of retail and 49 townhomes. The site is currently improved with approximately 41,000 SF of retail uses. The Marco Polo restaurant (22,660 SF) located on site is currently vacant. The site is served by a total of eight (8) driveways, two (2) on Maple Avenue W, two (2) on Pleasant Street and four (4) on Church Street. As proposed vehicular access would be consolidated to four (4) driveways, one (1) full-movement on Maple Avenue W providing access to the lower retail portion of the site and loading, one (1) on Pleasant Street, and two (2) on Church Street. One (1) driveway on Church Street and the driveway on Pleasant Street will serve the upper level of the site where the townhomes are proposed, the final driveway would be a ramp down to the lower retail level. Each townhouse would be self-parked and a total of 108 parking spaces are planned within the garage to serve the retail and accommodate visitor parking. A copy of the proposed site plan is attached.</p> <p>The proposed development does not meet VDOT Chapter 870 requirements.</p> |

| | | | | |
|---|---|-------------------------------------|---|--------------------------------|
| Locality/County: | Town of Vienna, Virginia | | | |
| Proposed Use: (Check all that apply; attach additional pages as necessary) | Residential <input type="checkbox"/> | Commercial <input type="checkbox"/> | Mixed Use <input checked="" type="checkbox"/> | Other <input type="checkbox"/> |
| | Residential: 49 Townhomes (LU Code 230) | | Commercial: 26,000 SF (LU Code 826) | |

| Traffic Impact Analysis Assumptions | | | | | |
|--|--|---------------------------------|------------------|--------------|--------------|
| Study Period | Existing Year: <u>2016</u> | Build-out Year: <u>2018</u> | Design Year: N/A | | |
| Study Area Boundaries (Attach map) | North: Church Street NW | South: Maple Avenue (Route 123) | | | |
| | East: Lawyers Road NW | West: Pleasant Street NW | | | |
| External Factors That Could Affect Project (Planned road improvements, other nearby developments) | The proposed conversion of Church Street adjacent to the property to two-way traffic. The existing barricade just east of the property on Church Street restricting westbound traffic from traveling through from Lawyers Road to Pleasant Street would remain. No additional roadway planned improvements within the study area. | | | | |
| Consistency With Comprehensive Plan | Yes. | | | | |
| Available Traffic Data (Historical, forecasts) | Existing AM and PM peak hour vehicular, pedestrian and bicycle traffic counts will be provided by the Town for the intersection of Maple Avenue/Lawyers Road/Courthouse Road and Maple Avenue/Pleasant Street (Gorove Slade). The counts were conducted in May 2014. This data will be used and supplemented by additional count data to be collected by Wells + Associates. Traffic volumes will be balanced to within 10 percent of adjacent intersections. For reference only, VDOT published average annual daily traffic AADT for Maple Avenue W & Lawyers Road from 2011 to 2014. | | | | |
| Trip Distribution (Attach sketch) See Figure 1 | Road Name: Maple Avenue W. | N ___% | S ___% | E <u>35%</u> | W <u>25%</u> |
| | Road Name: Lawyers Road/Courthouse Road | N <u>15%</u> | S <u>10%</u> | E ___% | W ___% |
| | Road Name: Pleasant Street SW | N ___% | S <u>15%</u> | E ___% | W ___% |
| Annual Vehicle Trip Growth Rate: | A growth rate of (1.0) percent, to all movements at all study intersections. | Peak Period for Study | AM | PM | SAT |

| | | |
|---|---|---|
| Study Intersections and/or Road Segments (Attach additional sheets as necessary) | 1. Pleasant Street NW/Church Street NW | 4. Maple Avenue/Lawyers Road NW (traffic counts provided by the Town will be used for the weekday peak hours) |
| | 2. Church Street NW/Lawyers Road NW | 5. Future site driveways |
| | 3. Maple Avenue/Pleasant Street NW (traffic counts provided by the Town will be used for the weekday peak hours) | |
| Trip Adjustment Factors | Internal allowance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Reduction: _____ % trips | Pass-by allowance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Reduction: 25% |
| Software Methodology | <input checked="" type="checkbox"/> Synchro <input type="checkbox"/> HCS (v.2000/+) <input type="checkbox"/> aaSIDRA <input type="checkbox"/> CORSIM <input type="checkbox"/> Other | |
| Traffic Signal Proposed or Affected (Analysis software to be used, progression speed, cycle length) | No additional signals are proposed. Synchro version 9 software will be used for intersection analysis. | |
| Improvement(s) Assumed or to be Considered | The proposed conversion of Church Street (future with redevelopment). No roadway other improvements are assumed in the study area. | |
| Background Traffic Studies Considered | No pipeline developments are assumed, a regional growth of 1.0 will be applied to all through movements along Maple Avenue, Lawyers Road, and Courthouse Road. The existing restaurant on-site will be assumed as occupied in the background scenario. | |
| Plan Submission | <input type="checkbox"/> Master Development Plan (MDP) <input checked="" type="checkbox"/> Generalized Development Plan (GDP) <input type="checkbox"/> Preliminary/Sketch Plan | |
| Additional Issues to be addressed | <input checked="" type="checkbox"/> Queuing analysis <input type="checkbox"/> Actuation/Coordination <input type="checkbox"/> Weaving analysis <input type="checkbox"/> Merge analysis <input checked="" type="checkbox"/> Bike/Ped Accommodations <input checked="" type="checkbox"/> Intersection(s) <input type="checkbox"/> TDM Measures <input type="checkbox"/> Other _____ | |

NOTES on ASSUMPTIONS:

1. Specific Synchro parameters will be applied to the model consistent with the VDOT Traffic Operations and Safety Analysis Manual (TOSAM), version 1.0.
2. Synchro 9.0 will be used to conduct capacity analysis with peak hour factors measured in the field. The field measured PHFs will be adjusted to $0.85 < PHF < 0.92$ under existing conditions. For future conditions (without and with development) analysis, PHFs of 0.92 will be used.
3. Level of service calculations for existing (2015) and projected conditions shall be in accordance with the Highway Capacity Manual (HCM) 2000 methodologies, as computed by Synchro software. Typical Synchro parameters to be utilized in this analysis will be consistent with those values provided in VDOT's Traffic Operations and Safety Analysis Manual, Version 1.0.

4. Percent heavy vehicles used in the Synchro analysis will be based on the 2014 VDOT traffic count data and/or recent traffic counts where available.

SIGNED: 

SIGNED: Michael Pinkoske, PTP DATE: February 3, 2016
Applicant or Consultant

SIGNED:

SIGNED: _____ DATE: _____
Local Government Representative

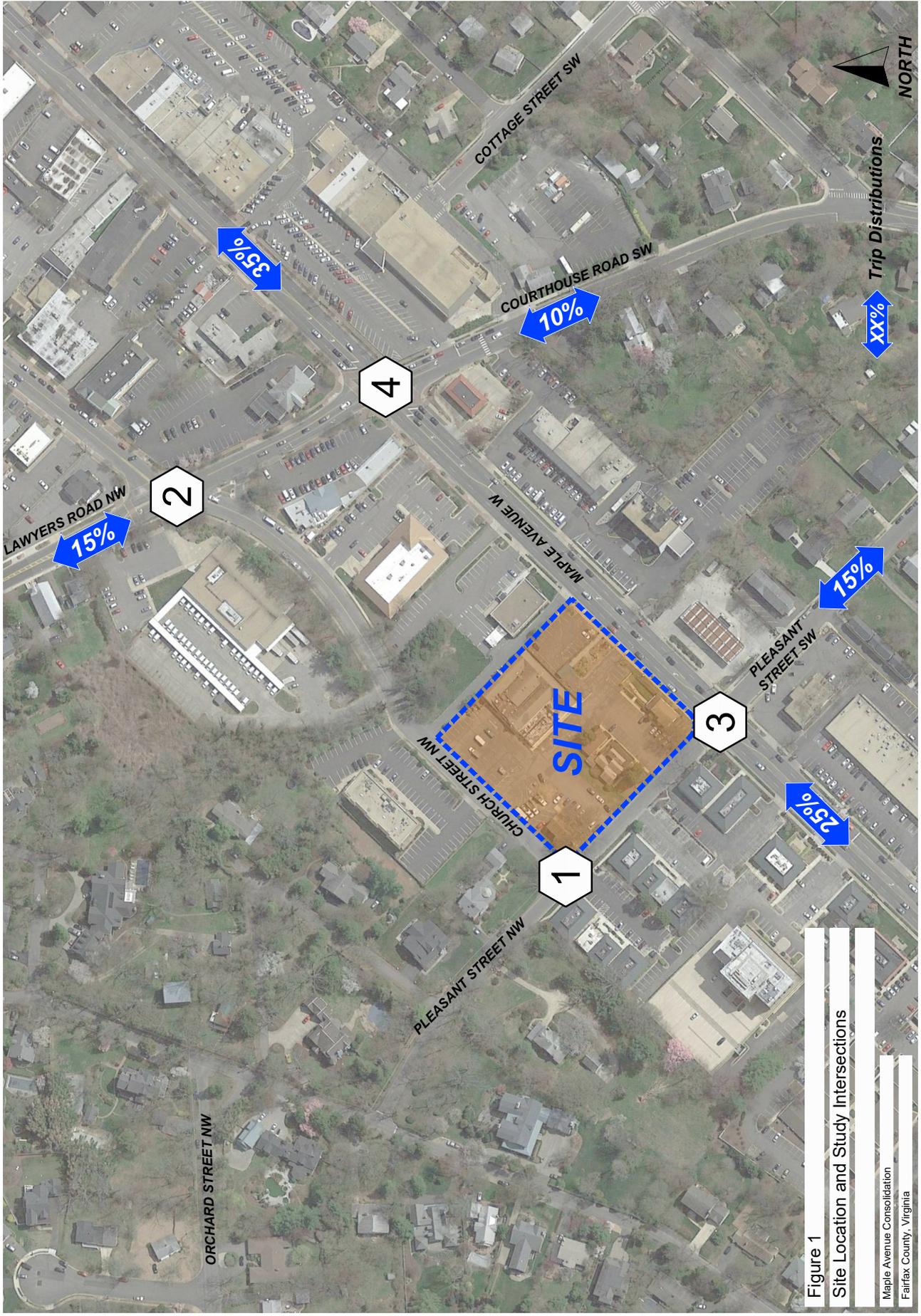
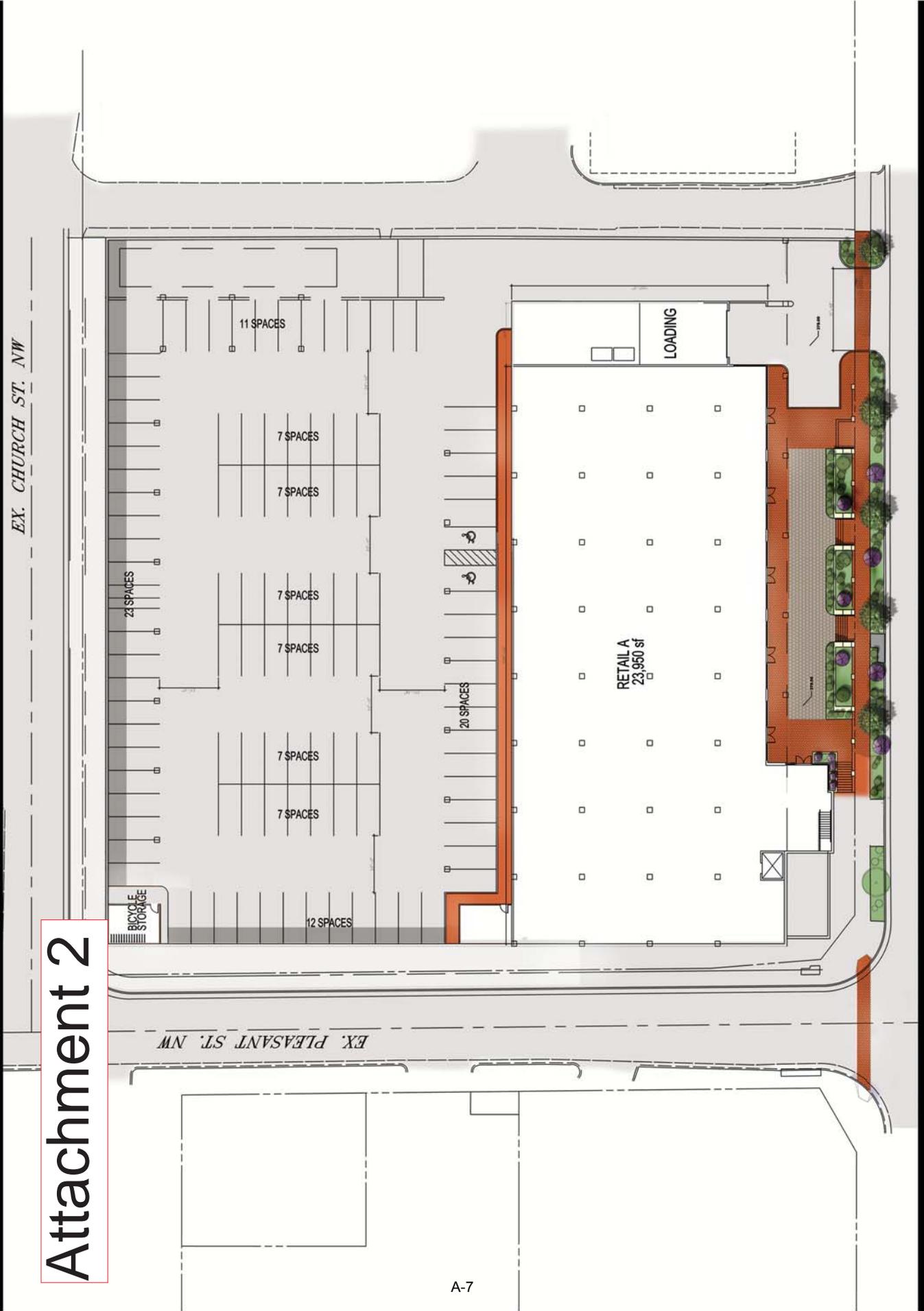
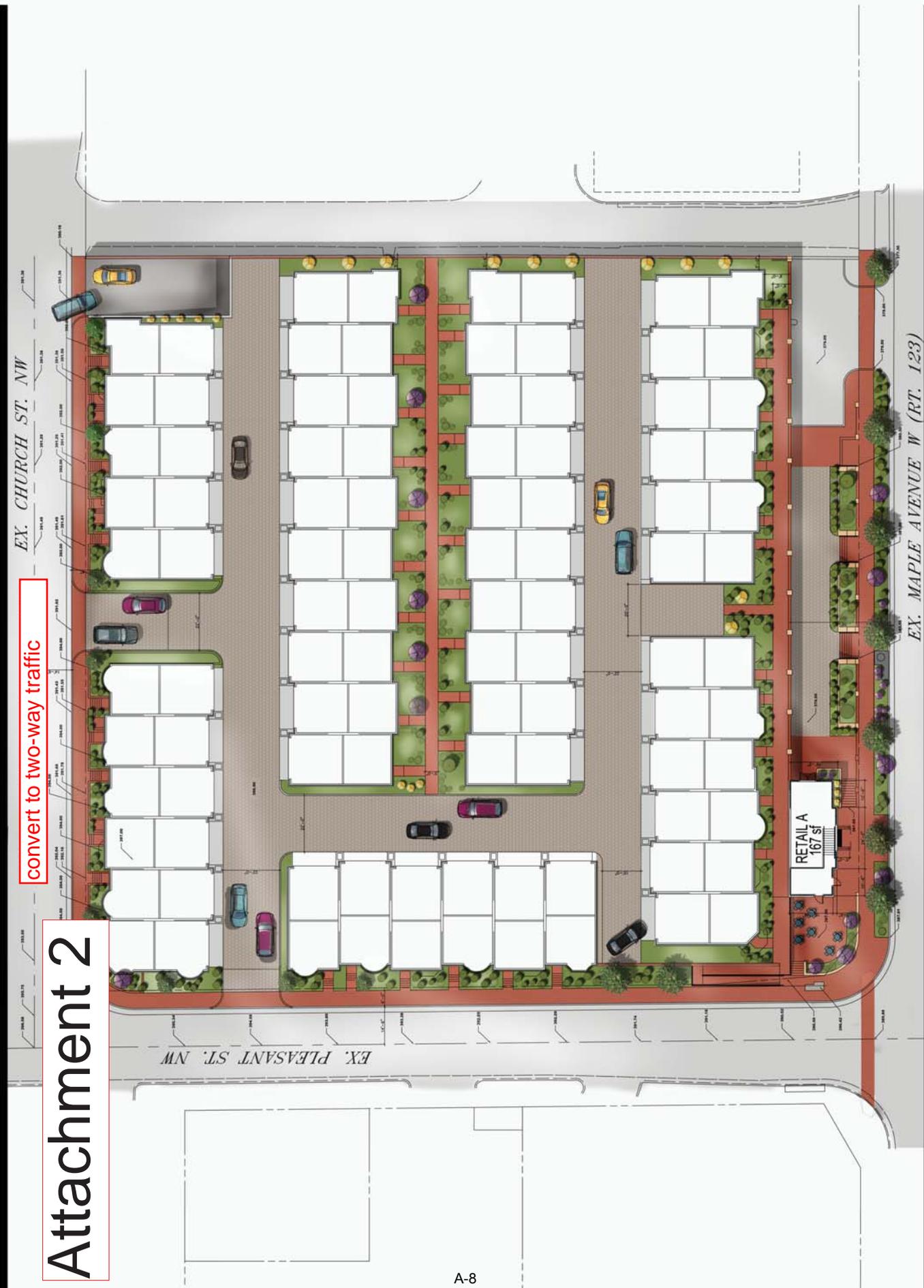


Figure 1
 Site Location and Study Intersections
 Maple Avenue Consolidation
 Fairfax County, Virginia



Attachment 2



convert to two-way traffic

Attachment 2

APPENDIX B

Appendix B - Traffic Counts



Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - All Vehicles

| Time Period | | Southbound Pleasant Avenue | | | | | Westbound Church Street | | | | | Northbound Pleasant Avenue | | | | | Eastbound Church Street | | | | | North & South | East & West | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|----------------------------|------|------|-------|------|-------------------------|------|------|-------|------|----------------------------|------|------|-------|------|-------------------------|------|------|-------|------|-----------------------------|-------------|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROJECT: Maple Avenue Consolidation | | | | | | | | | | | | | | | | | | | | | | DATE: 2/17/2016 | | | | | | | | | | | | | | | | | | | | | | SOUTHBOUND ROAD: Pleasant Avenue | | | | | | | | | | | | | | | | | | | | | |
| W+A JOB NO: 6740 | | | | | | | | | | | | | | | | | | | | | | DAY: Wednesday | | | | | | | | | | | | | | | | | | | | | | NORTHBOUND ROAD: Pleasant Avenue | | | | | | | | | | | | | | | | | | | | | |
| INTERSECTION: Lawyers Road & Maple Avenue | | | | | | | | | | | | | | | | | | | | | | WEATHER: Cloudy | | | | | | | | | | | | | | | | | | | | | | WESTBOUND ROAD: Church Street | | | | | | | | | | | | | | | | | | | | | |
| LOCATION: Vienna, VA | | | | | | | | | | | | | | | | | | | | | | COUNTED BY: Geraldin | | | | | | | | | | | | | | | | | | | | | | EASTBOUND ROAD: Church Street | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | INPUTED BY: JAS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 2 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 2 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:15 AM - 6:30 AM | | 0 | 4 | 2 | 6 | | 0 | 0 | 0 | 0 | | 4 | 0 | 0 | 4 | | 0 | 0 | 0 | 0 | | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:30 AM - 6:45 AM | | 0 | 4 | 0 | 4 | | 0 | 0 | 0 | 0 | | 5 | 1 | 0 | 6 | | 0 | 0 | 0 | 0 | | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:45 AM - 7:00 AM | | 0 | 4 | 0 | 4 | | 0 | 0 | 0 | 0 | | 3 | 2 | 0 | 5 | | 0 | 0 | 0 | 0 | | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:00 AM - 7:15 AM | | 0 | 8 | 2 | 10 | | 0 | 0 | 0 | 0 | | 2 | 3 | 0 | 5 | | 0 | 0 | 0 | 0 | | 15 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM - 7:30 AM | | 0 | 5 | 2 | 7 | | 0 | 0 | 0 | 0 | | 10 | 3 | 1 | 14 | | 0 | 0 | 0 | 0 | | 21 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM - 7:45 AM | | 0 | 7 | 2 | 9 | | 0 | 0 | 0 | 0 | | 7 | 4 | 2 | 13 | | 0 | 0 | 0 | 0 | | 22 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM - 8:00 AM | | 0 | 7 | 0 | 7 | | 0 | 0 | 0 | 0 | | 4 | 5 | 3 | 12 | | 1 | 0 | 0 | 1 | | 19 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM - 8:15 AM | | 0 | 19 | 2 | 21 | | 0 | 0 | 0 | 0 | | 14 | 8 | 1 | 23 | | 1 | 0 | 0 | 1 | | 44 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM - 8:30 AM | | 0 | 8 | 1 | 9 | | 0 | 0 | 0 | 0 | | 11 | 5 | 0 | 16 | | 0 | 0 | 1 | 1 | | 25 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM - 8:45 AM | | 0 | 9 | 0 | 9 | | 0 | 0 | 0 | 0 | | 6 | 1 | 1 | 8 | | 0 | 0 | 0 | 0 | | 17 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM - 9:00 AM | | 1 | 11 | 5 | 17 | | 0 | 0 | 0 | 0 | | 8 | 6 | 1 | 15 | | 0 | 0 | 0 | 0 | | 32 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | 1 | 86 | 16 | 103 | | 0 | 0 | 0 | 0 | | 76 | 38 | 9 | 123 | | 2 | 0 | 1 | 3 | | 226 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | | 0 | 12 | 2 | 14 | 0.58 | 0 | 0 | 0 | 0 | 0.00 | 14 | 3 | 0 | 17 | 0.71 | 0 | 0 | 0 | 0 | 0.00 | 31 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:15 AM - 7:15 AM | | 0 | 20 | 4 | 24 | 0.60 | 0 | 0 | 0 | 0 | 0.00 | 14 | 6 | 0 | 20 | 0.83 | 0 | 0 | 0 | 0 | 0.00 | 44 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:30 AM - 7:30 AM | | 0 | 21 | 4 | 25 | 0.63 | 0 | 0 | 0 | 0 | 0.00 | 20 | 9 | 1 | 30 | 0.54 | 0 | 0 | 0 | 0 | 0.00 | 55 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:45 AM - 7:45 AM | | 0 | 24 | 6 | 30 | 0.75 | 0 | 0 | 0 | 0 | 0.00 | 22 | 12 | 3 | 37 | 0.66 | 0 | 0 | 0 | 0 | 0.00 | 67 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:00 AM - 8:00 AM | | 0 | 27 | 6 | 33 | 0.83 | 0 | 0 | 0 | 0 | 0.00 | 23 | 15 | 6 | 44 | 0.79 | 1 | 0 | 0 | 1 | 0.25 | 77 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM - 8:15 AM | | 0 | 38 | 6 | 44 | 0.52 | 0 | 0 | 0 | 0 | 0.00 | 35 | 20 | 7 | 62 | 0.67 | 2 | 0 | 0 | 2 | 0.50 | 106 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM - 8:30 AM | | 0 | 41 | 5 | 46 | 0.55 | 0 | 0 | 0 | 0 | 0.00 | 36 | 22 | 6 | 64 | 0.70 | 2 | 0 | 1 | 3 | 0.75 | 110 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM - 8:45 AM | | 0 | 43 | 3 | 46 | 0.55 | 0 | 0 | 0 | 0 | 0.00 | 35 | 19 | 5 | 59 | 0.64 | 2 | 0 | 1 | 3 | 0.75 | 105 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM - 9:00 AM | | 1 | 47 | 8 | 56 | 0.67 | 0 | 0 | 0 | 0 | 0.00 | 39 | 20 | 3 | 62 | 0.67 | 1 | 0 | 1 | 2 | 0.50 | 118 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | | 0 | 5 | 5 | 10 | | 0 | 0 | 0 | 0 | | 5 | 9 | 1 | 15 | | 0 | 1 | 1 | 2 | | 25 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM - 4:30 PM | | 1 | 7 | 2 | 10 | | 0 | 0 | 0 | 0 | | 5 | 9 | 2 | 16 | | 3 | 0 | 1 | 4 | | 26 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM - 4:45 PM | | 0 | 4 | 2 | 6 | | 0 | 0 | 0 | 0 | | 1 | 10 | 0 | 11 | | 0 | 0 | 1 | 1 | | 17 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM - 5:00 PM | | 2 | 1 | 1 | 4 | | 0 | 0 | 0 | 0 | | 6 | 14 | 0 | 20 | | 3 | 0 | 0 | 3 | | 24 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM - 5:15 PM | | 0 | 3 | 3 | 6 | | 0 | 0 | 0 | 0 | | 6 | 12 | 2 | 20 | | 1 | 0 | 0 | 1 | | 26 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM - 5:30 PM | | 1 | 4 | 3 | 8 | | 0 | 0 | 0 | 0 | | 2 | 23 | 1 | 26 | | 0 | 0 | 1 | 1 | | 34 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM - 5:45 PM | | 0 | 5 | 3 | 8 | | 0 | 0 | 0 | 0 | | 0 | 14 | 1 | 15 | | 2 | 0 | 1 | 3 | | 23 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM - 6:00 PM | | 0 | 4 | 2 | 6 | | 0 | 0 | 0 | 0 | | 8 | 19 | 1 | 28 | | 1 | 1 | 0 | 2 | | 34 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 PM - 6:15 PM | | 0 | 1 | 5 | 6 | | 0 | 0 | 0 | 0 | | 4 | 23 | 0 | 27 | | 1 | 1 | 1 | 3 | | 33 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:15 PM - 6:30 PM | | 0 | 1 | 2 | 3 | | 0 | 0 | 0 | 0 | | 3 | 15 | 0 | 18 | | 0 | 1 | 0 | 1 | | 21 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:30 PM - 6:45 PM | | 0 | 3 | 1 | 4 | | 0 | 0 | 0 | 0 | | 4 | 20 | 0 | 24 | | 0 | 0 | 1 | 1 | | 28 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:45 PM - 7:00 PM | | 0 | 1 | 3 | 4 | | 0 | 0 | 0 | 0 | | 11 | 16 | 1 | 28 | | 1 | 0 | 1 | 2 | | 32 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | 4 | 39 | 32 | 75 | | 0 | 0 | 0 | 0 | | 55 | 184 | 9 | 248 | | 12 | 4 | 8 | 24 | | 323 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | | 3 | 17 | 10 | 30 | 0.75 | 0 | 0 | 0 | 0 | 0.00 | 17 | 42 | 3 | 62 | 0.78 | 6 | 1 | 3 | 10 | 0.63 | 92 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM - 5:15 PM | | 3 | 15 | 8 | 26 | 0.65 | 0 | 0 | 0 | 0 | 0.00 | 18 | 45 | 4 | 67 | 0.84 | 7 | 0 | 2 | 9 | 0.56 | 93 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM - 5:30 PM | | 3 | 12 | 9 | 24 | 0.75 | 0 | 0 | 0 | 0 | 0.00 | 15 | 59 | 3 | 77 | 0.74 | 4 | 0 | 2 | 6 | 0.50 | 101 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM - 5:45 PM | | 3 | 13 | 10 | 26 | 0.81 | 0 | 0 | 0 | 0 | 0.00 | 14 | 63 | 4 | 81 | 0.78 | 6 | 0 | 2 | 8 | 0.67 | 107 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM - 6:00 PM | | 1 | 16 | 11 | 28 | 0.88 | 0 | 0 | 0 | 0 | 0.00 | 16 | 68 | 5 | 89 | 0.79 | 4 | 1 | 2 | 7 | 0.58 | 117 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM - 6:15 PM | | 1 | 14 | 13 | 28 | 0.88 | 0 | 0 | 0 | 0 | 0.00 | 14 | 79 | 3 | 96 | 0.86 | 4 | 2 | 3 | 9 | 0.75 | 124 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM - 6:30 PM | | 0 | 11 | 12 | 23 | 0.72 | 0 | 0 | 0 | 0 | 0.00 | 15 | 71 | 2 | 88 | 0.79 | 4 | 3 | 2 | 9 | 0.75 | 111 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM - 6:45 PM | | 0 | 9 | 10 | 19 | 0.79 | 0 | 0 | 0 | 0 | 0.00 | 19 | 77 | 1 | 97 | 0.87 | 2 | 3 | 2 | 7 | 0.58 | 116 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 PM - 7:00 PM | | 0 | 6 | 11 | 17 | 0.71 | 0 | 0 | 0 | 0 | 0.00 | 22 | 74 | 1 | 97 | 0.87 | 2 | 2 | 3 | 7 | 0.58 | 114 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Bicycles

| Time Period | | Southbound Pleasant Avenue | | | | Westbound Church Street | | | | Northbound Pleasant Avenue | | | | Eastbound Church Street | | | | North & South | East & West | Total |
|-----------------------------|--|----------------------------|------|------|-------|-------------------------|------|------|-------|----------------------------|------|------|-------|-------------------------|------|------|-------|---------------|-------------|-------|
| | | Right | Thru | Left | Total | Right | Thru | Left | Total | Right | Thru | Left | Total | Right | Thru | Left | Total | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:15 AM - 6:30 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:30 AM - 6:45 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:45 AM - 7:00 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 7:00 AM - 7:15 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 7:15 AM - 7:30 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 7:30 AM - 7:45 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 7:45 AM - 8:00 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 8:00 AM - 8:15 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 8:15 AM - 8:30 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 8:30 AM - 8:45 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 8:45 AM - 9:00 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| Total | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AM One Hour Volumes | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15 AM - 7:15 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:30 AM - 7:30 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:45 AM - 7:45 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:00 AM - 8:00 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM - 8:15 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM - 8:30 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM - 8:45 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM - 9:00 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 4:15 PM - 4:30 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 4:30 PM - 4:45 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 4:45 PM - 5:00 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 5:00 PM - 5:15 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 5:15 PM - 5:30 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 5:30 PM - 5:45 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 5:45 PM - 6:00 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:00 PM - 6:15 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:15 PM - 6:30 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:30 PM - 6:45 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:45 PM - 7:00 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| Total | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM One Hour Volumes | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM - 5:15 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM - 5:30 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM - 5:45 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM - 6:00 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM - 6:15 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM - 6:30 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM - 6:45 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:00 PM - 7:00 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Wells + Associates, Inc.

McLean, Virginia

Pedestrian Volume Survey

| | |
|--|--|
| <p>PROJECT: Maple Avenue Consolidation W+A JOB NO: 6740 INTERSECTION: Lawyers Road & Maple Avenue LOCATION: Vienna, VA DATE: 2/17/2016 DAY: Wednesday WEATHER: Cloudy COUNTED BY: 0 INPUTED BY: JAS</p> | |
|--|--|

| Time Period | Movement | | | | | | | | 1 + 2 | 3 + 4 | 5 + 6 | 7 + 8 | Total |
|-----------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | | | | | | | | | | | | |
| 6:15 AM - 6:30 AM | | | | | | | | | | | | | |
| 6:30 AM - 6:45 AM | | | | | | | | | | | | | |
| 6:45 AM - 7:00 AM | | | | | | | | | | | | | |
| 7:00 AM - 7:15 AM | | | | | | | | | | | | | |
| 7:15 AM - 7:30 AM | | | | | | | | | | | | | |
| 7:30 AM - 7:45 AM | | | | | | | | | | | | | |
| 7:45 AM - 8:00 AM | | | | | | | | | | | | | |
| 8:00 AM - 8:15 AM | | | | | | | | | | | | | |
| 8:15 AM - 8:30 AM | | | | | | | | | | | | | |
| 8:30 AM - 8:45 AM | | | | | | | | | | | | | |
| 8:45 AM - 9:00 AM | | | | | | | | | | | | | |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AM One Hour Volumes | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15 AM - 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:30 AM - 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:45 AM - 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:00 AM - 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM - 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM - 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM - 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM - 9:00 AM | 0 |
| PM 15 Minute Volumes | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | | | | | | | | | | | | | |
| 4:15 PM - 4:30 PM | | | | | | | | | | | | | |
| 4:30 PM - 4:45 PM | | | | | | | | | | | | | |
| 4:45 PM - 5:00 PM | | | | | | | | | | | | | |
| 5:00 PM - 5:15 PM | | | | | | | | | | | | | |
| 5:15 PM - 5:30 PM | | | | | | | | | | | | | |
| 5:30 PM - 5:45 PM | | | | | | | | | | | | | |
| 5:45 PM - 6:00 PM | | | | | | | | | | | | | |
| 6:00 PM - 6:15 PM | | | | | | | | | | | | | |
| 6:15 PM - 6:30 PM | | | | | | | | | | | | | |
| 6:30 PM - 6:45 PM | | | | | | | | | | | | | |
| 6:45 PM - 7:00 PM | | | | | | | | | | | | | |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM One Hour Volumes | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM - 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM - 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM - 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM - 6:00 PM | 0 |
| 5:15 PM - 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM - 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM - 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:00 PM - 7:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - All Vehicles

| Time Period | | Southbound Lawyers Road | | | | | Westbound Church Street | | | | | Northbound Lawyers Road | | | | | Eastbound Church Street | | | | | North & South | East & West | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|----------------------------|-------------|------------|-------------|-------------|----------------------------|-----------|------------|-------------|-------------|----------------------------|-------------|-----------|-------------|-------------|----------------------------|-----------|-----------|------------|-------------|---------------------------------|-------------------|-------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROJECT: Maple Avenue Consolidation | | | | | | | | | | | | | | | | | | | | | | DATE: 2/17/2016 | | | | | | | | | | | | | | | | | | | | | | SOUTHBOUND ROAD: Lawyers Road | | | | | | | | | | | | | | | | | | | | | |
| W+A JOB NO: 6740 | | | | | | | | | | | | | | | | | | | | | | DAY: Wednesday | | | | | | | | | | | | | | | | | | | | | | NORTHBOUND ROAD: Lawyers Road | | | | | | | | | | | | | | | | | | | | | |
| INTERSECTION: Lawyers Road & Maple Avenue | | | | | | | | | | | | | | | | | | | | | | WEATHER: Cloudy | | | | | | | | | | | | | | | | | | | | | | WESTBOUND ROAD: Church Street | | | | | | | | | | | | | | | | | | | | | |
| LOCATION: Vienna, VA | | | | | | | | | | | | | | | | | | | | | | COUNTED BY: Jose & Salih | | | | | | | | | | | | | | | | | | | | | | EASTBOUND ROAD: Church Street | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | INPUT BY: JAS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | 3 | 25 | 11 | 39 | | 2 | 1 | 0 | 3 | | 5 | 8 | 2 | 15 | | 4 | 0 | 0 | 4 | | 54 | 7 | 61 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:15 AM - 6:30 AM | | 0 | 28 | 16 | 44 | | 1 | 0 | 1 | 2 | | 1 | 13 | 0 | 14 | | 1 | 2 | 0 | 3 | | 58 | 5 | 63 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:30 AM - 6:45 AM | | 4 | 63 | 24 | 91 | | 6 | 0 | 4 | 10 | | 5 | 28 | 0 | 33 | | 2 | 1 | 3 | 6 | | 124 | 16 | 140 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:45 AM - 7:00 AM | | 3 | 60 | 53 | 116 | | 7 | 0 | 6 | 13 | | 6 | 29 | 2 | 37 | | 3 | 3 | 1 | 7 | | 153 | 20 | 173 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:00 AM - 7:15 AM | | 2 | 84 | 50 | 136 | | 10 | 0 | 1 | 11 | | 5 | 35 | 2 | 42 | | 7 | 0 | 1 | 8 | | 178 | 19 | 197 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM - 7:30 AM | | 3 | 82 | 46 | 131 | | 14 | 0 | 6 | 20 | | 14 | 46 | 2 | 62 | | 2 | 2 | 0 | 4 | | 193 | 24 | 217 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM - 7:45 AM | | 2 | 99 | 57 | 158 | | 36 | 0 | 7 | 43 | | 10 | 75 | 3 | 88 | | 6 | 3 | 2 | 11 | | 246 | 54 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM - 8:00 AM | | 1 | 89 | 62 | 152 | | 34 | 0 | 8 | 42 | | 10 | 69 | 3 | 82 | | 1 | 4 | 2 | 7 | | 234 | 49 | 283 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM - 8:15 AM | | 2 | 100 | 88 | 190 | | 22 | 0 | 1 | 23 | | 14 | 74 | 3 | 91 | | 4 | 5 | 2 | 11 | | 281 | 34 | 315 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM - 8:30 AM | | 1 | 101 | 72 | 174 | | 18 | 0 | 7 | 25 | | 17 | 69 | 0 | 86 | | 7 | 7 | 4 | 18 | | 260 | 43 | 303 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM - 8:45 AM | | 2 | 101 | 67 | 170 | | 22 | 1 | 7 | 30 | | 16 | 69 | 2 | 87 | | 4 | 5 | 1 | 10 | | 257 | 40 | 297 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM - 9:00 AM | | 2 | 96 | 58 | 156 | | 11 | 0 | 9 | 20 | | 19 | 76 | 1 | 96 | | 6 | 4 | 4 | 14 | | 252 | 34 | 286 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | 25 | 928 | 604 | 1557 | | 183 | 2 | 57 | 242 | | 122 | 591 | 20 | 733 | | 47 | 36 | 20 | 103 | | 2290 | 345 | 2635 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | | 10 | 176 | 104 | 290 | 0.63 | 16 | 1 | 11 | 28 | 0.54 | 17 | 78 | 4 | 99 | 0.67 | 10 | 6 | 4 | 20 | 0.71 | 389 | 48 | 437 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:15 AM - 7:15 AM | | 9 | 235 | 143 | 387 | 0.71 | 24 | 0 | 12 | 36 | 0.69 | 17 | 105 | 4 | 126 | 0.75 | 13 | 6 | 5 | 24 | 0.75 | 513 | 60 | 573 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:30 AM - 7:30 AM | | 12 | 289 | 173 | 474 | 0.87 | 37 | 0 | 17 | 54 | 0.68 | 30 | 138 | 6 | 174 | 0.70 | 14 | 6 | 5 | 25 | 0.78 | 648 | 79 | 727 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:45 AM - 7:45 AM | | 10 | 325 | 206 | 541 | 0.86 | 67 | 0 | 20 | 87 | 0.51 | 35 | 185 | 9 | 229 | 0.65 | 18 | 8 | 4 | 30 | 0.68 | 770 | 117 | 887 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:00 AM - 8:00 AM | | 8 | 354 | 215 | 577 | 0.91 | 94 | 0 | 22 | 116 | 0.67 | 39 | 225 | 10 | 274 | 0.78 | 16 | 9 | 5 | 30 | 0.68 | 851 | 146 | 997 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM - 8:15 AM | | 8 | 370 | 253 | 631 | 0.83 | 106 | 0 | 22 | 128 | 0.74 | 48 | 264 | 11 | 323 | 0.89 | 13 | 14 | 6 | 33 | 0.75 | 954 | 161 | 1115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM - 8:30 AM | | 6 | 389 | 279 | 674 | 0.89 | 110 | 0 | 23 | 133 | 0.77 | 51 | 287 | 9 | 347 | 0.95 | 18 | 19 | 10 | 47 | 0.65 | 1021 | 180 | 1201 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM - 8:45 AM | | 6 | 391 | 289 | 686 | 0.90 | 96 | 1 | 23 | 120 | 0.71 | 57 | 281 | 8 | 346 | 0.95 | 16 | 21 | 9 | 46 | 0.64 | 1032 | 166 | 1198 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM - 9:00 AM | | 7 | 398 | 285 | 690 | 0.91 | 73 | 1 | 24 | 98 | 0.82 | 66 | 288 | 6 | 360 | 0.94 | 21 | 21 | 11 | 53 | 0.74 | 1050 | 151 | 1201 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | | 1 | 79 | 46 | 126 | | 47 | 5 | 21 | 73 | | 18 | 66 | 1 | 85 | | 19 | 3 | 4 | 26 | | 211 | 99 | 310 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM - 4:30 PM | | 1 | 65 | 39 | 105 | | 67 | 5 | 24 | 96 | | 23 | 73 | 6 | 102 | | 15 | 2 | 4 | 21 | | 207 | 117 | 324 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM - 4:45 PM | | 2 | 70 | 33 | 105 | | 52 | 5 | 9 | 66 | | 21 | 94 | 4 | 119 | | 13 | 4 | 10 | 27 | | 224 | 93 | 317 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM - 5:00 PM | | 4 | 64 | 26 | 94 | | 58 | 6 | 15 | 79 | | 17 | 86 | 3 | 106 | | 13 | 4 | 9 | 26 | | 200 | 105 | 305 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM - 5:15 PM | | 7 | 93 | 43 | 143 | | 68 | 5 | 22 | 95 | | 24 | 101 | 2 | 127 | | 16 | 4 | 3 | 23 | | 270 | 118 | 388 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM - 5:30 PM | | 2 | 95 | 33 | 130 | | 58 | 1 | 21 | 80 | | 17 | 97 | 2 | 116 | | 12 | 1 | 4 | 17 | | 246 | 97 | 343 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM - 5:45 PM | | 1 | 90 | 32 | 123 | | 57 | 0 | 36 | 93 | | 17 | 89 | 2 | 108 | | 7 | 1 | 2 | 10 | | 231 | 103 | 334 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM - 6:00 PM | | 2 | 90 | 29 | 121 | | 57 | 2 | 43 | 102 | | 16 | 81 | 1 | 98 | | 8 | 3 | 2 | 13 | | 219 | 115 | 334 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 PM - 6:15 PM | | 0 | 98 | 42 | 140 | | 75 | 1 | 30 | 106 | | 15 | 89 | 0 | 104 | | 8 | 1 | 1 | 10 | | 244 | 116 | 360 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:15 PM - 6:30 PM | | 0 | 103 | 33 | 136 | | 56 | 0 | 32 | 88 | | 13 | 85 | 1 | 99 | | 11 | 8 | 1 | 20 | | 235 | 108 | 343 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:30 PM - 6:45 PM | | 0 | 78 | 20 | 98 | | 61 | 0 | 50 | 111 | | 19 | 70 | 3 | 92 | | 7 | 3 | 2 | 12 | | 190 | 123 | 313 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:45 PM - 7:00 PM | | 0 | 86 | 26 | 112 | | 52 | 0 | 23 | 75 | | 24 | 86 | 0 | 110 | | 9 | 4 | 4 | 17 | | 222 | 92 | 314 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | 20 | 1011 | 402 | 1433 | | 708 | 30 | 326 | 1064 | | 224 | 1017 | 25 | 1266 | | 138 | 38 | 46 | 222 | | 2699 | 1286 | 3985 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | | 8 | 278 | 144 | 430 | 0.85 | 224 | 21 | 69 | 314 | 0.82 | 79 | 319 | 14 | 412 | 0.87 | 60 | 13 | 27 | 100 | 0.93 | 842 | 414 | 1256 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM - 5:15 PM | | 14 | 292 | 141 | 447 | 0.78 | 245 | 21 | 70 | 336 | 0.88 | 85 | 354 | 15 | 454 | 0.89 | 57 | 14 | 26 | 97 | 0.90 | 901 | 433 | 1334 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM - 5:30 PM | | 15 | 322 | 135 | 472 | 0.83 | 236 | 17 | 67 | 320 | 0.84 | 79 | 378 | 11 | 468 | 0.92 | 54 | 13 | 26 | 93 | 0.86 | 940 | 413 | 1353 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM - 5:45 PM | | 14 | 342 | 134 | 490 | 0.86 | 241 | 12 | 94 | 347 | 0.91 | 75 | 373 | 9 | 457 | 0.90 | 48 | 10 | 18 | 76 | 0.73 | 947 | 423 | 1370 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM - 6:00 PM | | 12 | 368 | 137 | 517 | 0.90 | 240 | 8 | 122 | 370 | 0.91 | 74 | 368 | 7 | 449 | 0.88 | 43 | 9 | 11 | 63 | 0.68 | 966 | 433 | 1399 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM - 6:15 PM | | 5 | 373 | 136 | 514 | 0.92 | 247 | 4 | 130 | 381 | 0.90 | 65 | 356 | 5 | 426 | 0.92 | 35 | 6 | 9 | 50 | 0.74 | 940 | 431 | 1371 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM - 6:30 PM | | 3 | 381 | 136 | 520 | 0.93 | 245 | 3 | 141 | 389 | 0.92 | 61 | 344 | 4 | 409 | 0.95 | 34 | 13 | 6 | 53 | 0.66 | 929 | 442 | 1371 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM - 6:45 PM | | 2 | 369 | 124 | 495 | 0.88 | 249 | 3 | 155 | 407 | 0.92 | 63 | 325 | 5 | 393 | 0.94 | 34 | 15 | 6 | 55 | 0.69 | 888 | 462 | 1350 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 PM - 7:00 PM | | 0 | 365 | 121 | 486 | 0.87 | 244 | 1 | 135 | 380 | 0.86 | 71 | 330 | 4 | 405 | 0.92 | 35 | 16 | 8 | 59 | 0.74 | 891 | 439 | 1330 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Bicycles

| Time Period | | Southbound Lawyers Road | | | | Westbound Church Street | | | | Northbound Lawyers Road | | | | Eastbound Church Street | | | | North & South | East & West | Total |
|-----------------------------|--|----------------------------|------|------|-------|----------------------------|------|------|-------|----------------------------|------|------|-------|----------------------------|------|------|-------|---------------------|-------------------|-------|
| | | Right | Thru | Left | Total | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:15 AM - 6:30 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:30 AM - 6:45 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:45 AM - 7:00 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 7:00 AM - 7:15 AM | | | | | 0 | | | | 0 | | 1 | | 1 | | | | 0 | 1 | 0 | 1 |
| 7:15 AM - 7:30 AM | | | | | 0 | | 1 | 1 | 2 | | 2 | | 2 | | | | 0 | 2 | 2 | 4 |
| 7:30 AM - 7:45 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 7:45 AM - 8:00 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 8:00 AM - 8:15 AM | | | | | 0 | | | 1 | 1 | | | | 0 | | | | 0 | 0 | 0 | 1 |
| 8:15 AM - 8:30 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 8:30 AM - 8:45 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 8:45 AM - 9:00 AM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| Total | | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 6 |
| AM One Hour Volumes | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15 AM - 7:15 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 6:30 AM - 7:30 AM | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 2 | 5 |
| 6:45 AM - 7:45 AM | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 2 | 5 |
| 7:00 AM - 8:00 AM | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 2 | 5 |
| 7:15 AM - 8:15 AM | | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 3 | 5 |
| 7:30 AM - 8:30 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 7:45 AM - 8:45 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 8:00 AM - 9:00 AM | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| PM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | | | | | 0 | | 1 | | 1 | | | | 0 | | 1 | | 1 | 0 | 2 | 2 |
| 4:15 PM - 4:30 PM | | | 1 | | 1 | | 1 | | 1 | | | | 0 | | | | 0 | 1 | 1 | 2 |
| 4:30 PM - 4:45 PM | | | 1 | | 1 | | | | 0 | | | | 0 | | | | 0 | 1 | 0 | 1 |
| 4:45 PM - 5:00 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 5:00 PM - 5:15 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 5:15 PM - 5:30 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 5:30 PM - 5:45 PM | | | | | 0 | | | | 0 | | | | 0 | | 1 | | 1 | 0 | 1 | 1 |
| 5:45 PM - 6:00 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:00 PM - 6:15 PM | | | | | 0 | | | | 0 | | 1 | | 1 | | | | 0 | 1 | 0 | 1 |
| 6:15 PM - 6:30 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| 6:30 PM - 6:45 PM | | | | | 0 | | | | 0 | | 1 | | 1 | | | | 0 | 1 | 0 | 1 |
| 6:45 PM - 7:00 PM | | | | | 0 | | | | 0 | | | | 0 | | | | 0 | 0 | 0 | 0 |
| Total | | 0 | 2 | 0 | 2 | 1 | 1 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 2 | 4 | 4 | 8 |
| PM One Hour Volumes | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | | 0 | 2 | 0 | 2 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 3 | 5 |
| 4:15 PM - 5:15 PM | | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 3 |
| 4:30 PM - 5:30 PM | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 4:45 PM - 5:45 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 5:00 PM - 6:00 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 5:15 PM - 6:15 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 2 |
| 5:30 PM - 6:30 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 2 |
| 5:45 PM - 6:45 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| 6:00 PM - 7:00 PM | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |

Wells + Associates, Inc.

McLean, Virginia

Pedestrian Volume Survey

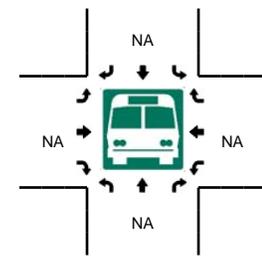
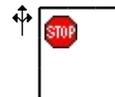
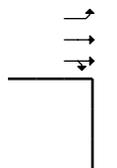
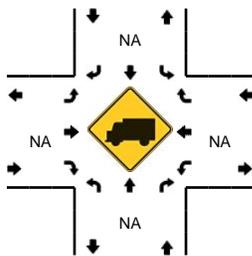
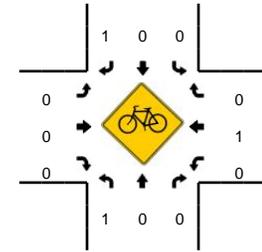
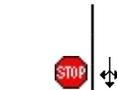
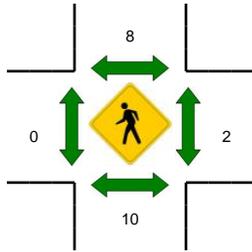
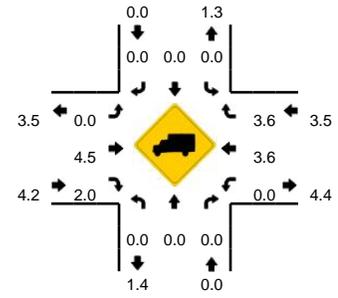
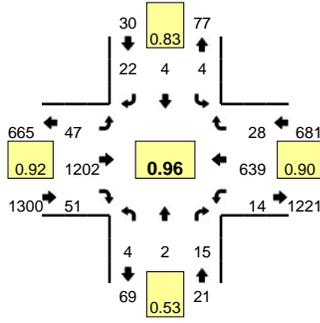
| | |
|--|--|
| <p>PROJECT: Maple Avenue Consolidation W+A JOB NO: 6740 INTERSECTION: Lawyers Road & Maple Avenue LOCATION: Vienna, VA DATE: 2/17/2016 DAY: Wednesday WEATHER: Cloudy COUNTED BY: Salih INPUTED BY: JAS</p> | |
|--|--|

| Time Period | Movement | | | | | | | | 1+2 | 3+4 | 5+6 | 7+8 | Total |
|-----------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | | | | | | | | | | | | |
| 6:15 AM - 6:30 AM | | | | | | | | | | | | | |
| 6:30 AM - 6:45 AM | | | | | | | | | | | | | |
| 6:45 AM - 7:00 AM | | | | | | | | | | | | | |
| 7:00 AM - 7:15 AM | | | | | | | | | | | | | |
| 7:15 AM - 7:30 AM | | | | | | | | | | | | | |
| 7:30 AM - 7:45 AM | | | | | | | | | | | | | |
| 7:45 AM - 8:00 AM | | | | | | | | | | | | | |
| 8:00 AM - 8:15 AM | | | | | | | | 1 | | | | | |
| 8:15 AM - 8:30 AM | | | | | | | | | | | | | |
| 8:30 AM - 8:45 AM | 1 | | | | | | | | | | | | |
| 8:45 AM - 9:00 AM | | | | | | | | | | | | | |
| Total | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | | | | |
| AM One Hour Volumes | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15 AM - 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:30 AM - 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:45 AM - 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:00 AM - 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM - 8:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 7:30 AM - 8:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 7:45 AM - 8:45 AM | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| 8:00 AM - 9:00 AM | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| PM 15 Minute Volumes | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | 1 | 3 | | 1 | 4 | | | | | | | | |
| 4:15 PM - 4:30 PM | 2 | 1 | | | | | | | | | | | |
| 4:30 PM - 4:45 PM | | | | | | | | | | | | | |
| 4:45 PM - 5:00 PM | | | | | | | | | | | | | |
| 5:00 PM - 5:15 PM | 1 | 1 | | | | | | | | | | | |
| 5:15 PM - 5:30 PM | | 2 | 1 | | | | | | | | | | |
| 5:30 PM - 5:45 PM | | 2 | 1 | | | | | | | | | | |
| 5:45 PM - 6:00 PM | | | | | | | | | | | | | |
| 6:00 PM - 6:15 PM | | | | 2 | | | | | | | | | |
| 6:15 PM - 6:30 PM | | 2 | | | | | | | | | | | |
| 6:30 PM - 6:45 PM | | | | | | | | | | | | | |
| 6:45 PM - 7:00 PM | | | | | | | | | | | | | |
| Total | 4 | 11 | 2 | 3 | 4 | 0 |
| PM One Hour Volumes | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | 3 | 4 | 0 | 1 | 4 | 0 | 0 | 0 | 7 | 1 | 4 | 0 | 12 |
| 4:15 PM - 5:15 PM | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 |
| 4:30 PM - 5:30 PM | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 5 |
| 4:45 PM - 5:45 PM | 1 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 0 | 0 | 8 |
| 5:00 PM - 6:00 PM | 1 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 0 | 0 | 8 |
| 5:15 PM - 6:15 PM | 0 | 4 | 2 | 2 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 8 |
| 5:30 PM - 6:30 PM | 0 | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 4 | 3 | 0 | 0 | 7 |
| 5:45 PM - 6:45 PM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 4 |
| 6:00 PM - 7:00 PM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 4 |

LOCATION: Pleasant St NW -- Route 123
CITY/STATE: Vienna, VA

QC JOB #: 12465707
DATE: Thu, May 08 2014

Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM



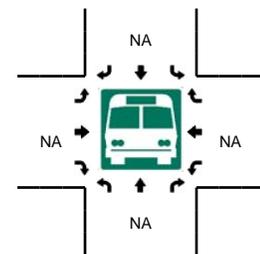
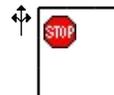
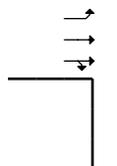
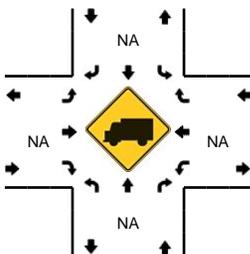
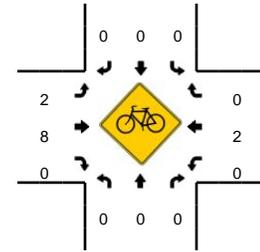
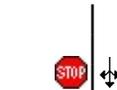
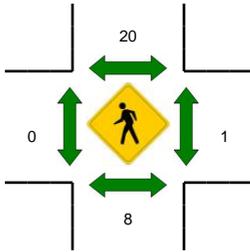
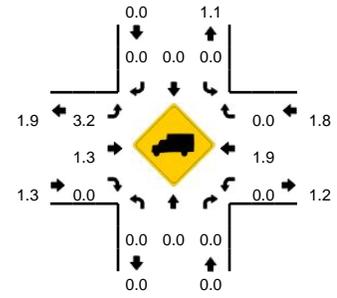
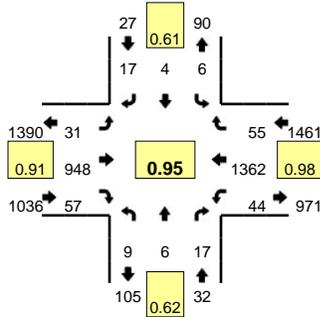
| 15-Min Count Period Beginning At | Pleasant St NW (Northbound) | | | | Pleasant St NW (Southbound) | | | | Route 123 (Eastbound) | | | | Route 123 (Westbound) | | | | Total | Hourly Totals |
|----------------------------------|-----------------------------|------|-------|---|-----------------------------|------|-------|---|-----------------------|------|-------|---|-----------------------|------|-------|---|-------|---------------|
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| 8:00 AM | 3 | 0 | 7 | 0 | 3 | 2 | 4 | 0 | 3 | 286 | 9 | 0 | 2 | 150 | 6 | 0 | 475 | |
| 8:15 AM | 0 | 1 | 4 | 0 | 0 | 1 | 5 | 0 | 13 | 323 | 16 | 0 | 5 | 155 | 6 | 0 | 529 | |
| 8:30 AM | 0 | 0 | 2 | 0 | 1 | 1 | 5 | 0 | 15 | 290 | 16 | 0 | 3 | 156 | 9 | 0 | 498 | |
| 8:45 AM | 1 | 1 | 2 | 0 | 0 | 0 | 8 | 0 | 16 | 303 | 10 | 0 | 4 | 178 | 7 | 0 | 530 | 2032 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1557 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1028 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 530 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak 15-Min Flowrates | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total | |
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| All Vehicles | 4 | 4 | 8 | 0 | 0 | 0 | 32 | 0 | 64 | 1212 | 40 | 0 | 16 | 712 | 28 | 0 | 2120 | |
| Heavy Trucks | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 64 | 0 | | 0 | 40 | 0 | | 104 | |
| Pedestrians | | 0 | | | | 8 | | | | 0 | | | | 0 | | | 8 | |
| Bicycles | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | |
| Railroad | | | | | | | | | | | | | | | | | 0 | |
| Stopped Buses | | | | | | | | | | | | | | | | | | |

Comments:

LOCATION: Pleasant St NW -- Route 123
CITY/STATE: Vienna, VA

QC JOB #: 12465708
DATE: Thu, May 08 2014

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM



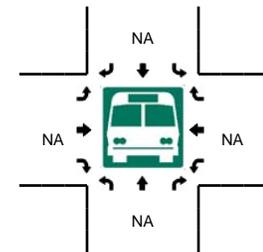
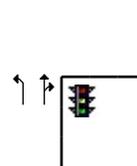
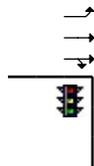
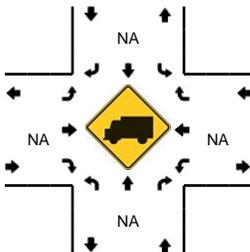
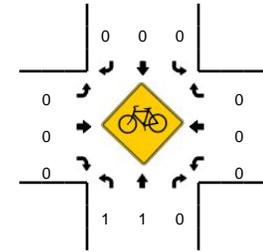
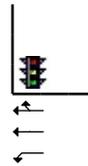
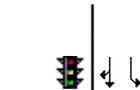
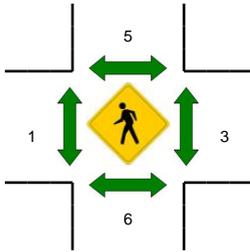
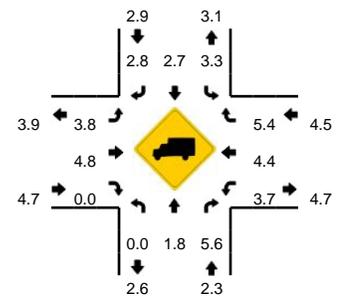
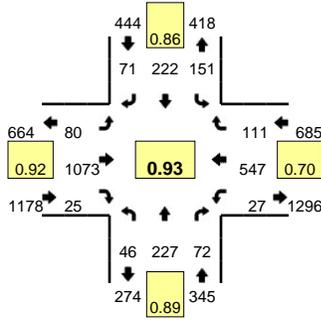
| 15-Min Count Period Beginning At | Pleasant St NW (Northbound) | | | | Pleasant St NW (Southbound) | | | | Route 123 (Eastbound) | | | | Route 123 (Westbound) | | | | Total | Hourly Totals |
|----------------------------------|-----------------------------|------|-------|---|-----------------------------|------|-------|---|-----------------------|------|-------|---|-----------------------|------|-------|---|-------|---------------|
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| 5:00 PM | 1 | 2 | 3 | 0 | 4 | 2 | 5 | 0 | 3 | 272 | 9 | 1 | 10 | 355 | 7 | 0 | 674 | |
| 5:15 PM | 2 | 1 | 3 | 0 | 2 | 1 | 4 | 0 | 9 | 211 | 14 | 1 | 11 | 346 | 12 | 0 | 617 | |
| 5:30 PM | 3 | 1 | 3 | 0 | 0 | 1 | 7 | 0 | 7 | 218 | 14 | 0 | 12 | 316 | 18 | 0 | 600 | |
| 5:45 PM | 3 | 2 | 8 | 0 | 0 | 0 | 1 | 0 | 10 | 247 | 20 | 0 | 11 | 345 | 18 | 0 | 665 | 2556 |
| 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1882 |
| 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1265 |
| 6:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 665 |
| 6:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peak 15-Min Flowrates | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total | |
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| All Vehicles | 4 | 8 | 12 | 0 | 16 | 8 | 20 | 0 | 12 | 1088 | 36 | 4 | 40 | 1420 | 28 | 0 | 2696 | |
| Heavy Trucks | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 24 | 0 | | 0 | 40 | 0 | | 64 | |
| Pedestrians | | 12 | | | | 8 | | | | 0 | | | | 0 | | | 20 | |
| Bicycles | 0 | 0 | 0 | | 0 | 0 | 0 | | 1 | 6 | 0 | | 0 | 0 | 0 | | 7 | |
| Railroad | | | | | | | | | | | | | | | | | | |
| Stopped Buses | | | | | | | | | | | | | | | | | | |

Comments:

LOCATION: Lawyers Rd NW -- Route 123
CITY/STATE: Vienna, VA

QC JOB #: 12465528
DATE: Thu, May 08 2014

Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

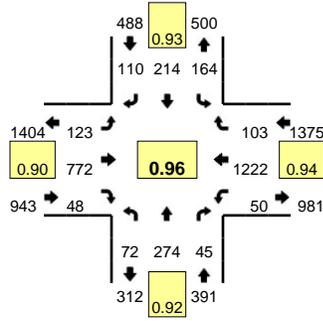


| 15-Min Count Period Beginning At | Lawyers Rd NW (Northbound) | | | | Lawyers Rd NW (Southbound) | | | | Route 123 (Eastbound) | | | | Route 123 (Westbound) | | | | Total | Hourly Totals |
|----------------------------------|----------------------------|------|-------|---|----------------------------|------|-------|---|-----------------------|------|-------|---|-----------------------|------|-------|---|-------|---------------|
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| 6:00 AM | 3 | 4 | 5 | 0 | 16 | 17 | 5 | 0 | 2 | 153 | 4 | 0 | 2 | 52 | 4 | 0 | 267 | |
| 6:15 AM | 1 | 9 | 7 | 0 | 17 | 19 | 8 | 0 | 2 | 211 | 2 | 0 | 1 | 52 | 4 | 0 | 333 | |
| 6:30 AM | 4 | 20 | 10 | 0 | 28 | 24 | 18 | 0 | 7 | 209 | 2 | 0 | 0 | 72 | 10 | 0 | 404 | |
| 6:45 AM | 11 | 32 | 8 | 0 | 28 | 43 | 17 | 0 | 10 | 270 | 2 | 0 | 3 | 137 | 7 | 0 | 568 | 1572 |
| 7:00 AM | 16 | 28 | 16 | 0 | 36 | 57 | 9 | 0 | 8 | 275 | 2 | 0 | 3 | 226 | 20 | 0 | 696 | 2001 |
| 7:15 AM | 5 | 38 | 20 | 0 | 33 | 56 | 17 | 0 | 9 | 316 | 6 | 0 | 6 | 133 | 14 | 0 | 653 | 2321 |
| 7:30 AM | 8 | 53 | 19 | 0 | 45 | 59 | 15 | 0 | 17 | 293 | 5 | 0 | 7 | 120 | 20 | 0 | 661 | 2578 |
| 7:45 AM | 5 | 42 | 23 | 0 | 19 | 69 | 15 | 0 | 19 | 203 | 3 | 0 | 10 | 118 | 20 | 0 | 546 | 2556 |
| 8:00 AM | 11 | 52 | 11 | 0 | 36 | 43 | 12 | 0 | 19 | 273 | 7 | 0 | 5 | 132 | 34 | 0 | 635 | 2495 |
| 8:15 AM | 6 | 56 | 22 | 0 | 32 | 61 | 23 | 0 | 19 | 298 | 8 | 0 | 11 | 142 | 33 | 0 | 711 | 2553 |
| 8:30 AM | 15 | 69 | 13 | 0 | 48 | 65 | 16 | 0 | 24 | 242 | 5 | 0 | 5 | 134 | 25 | 0 | 661 | 2553 |
| 8:45 AM | 14 | 50 | 26 | 0 | 35 | 53 | 20 | 0 | 18 | 260 | 5 | 0 | 6 | 139 | 19 | 0 | 645 | 2652 |
| | | | | | | | | | | | | | | | | | | |
| Peak 15-Min Flowrates | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total | |
| All Vehicles | 24 | 224 | 88 | 0 | 128 | 244 | 92 | 0 | 76 | 1192 | 32 | 0 | 44 | 568 | 132 | 0 | 2844 | |
| Heavy Trucks | 0 | 12 | 0 | | 4 | 8 | 0 | | 4 | 60 | 0 | | 4 | 20 | 4 | | 116 | |
| Pedestrians | | 4 | | | | 8 | | | | 4 | | | | 0 | | | 16 | |
| Bicycles | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | |
| Railroad | | | | | | | | | | | | | | | | | | |
| Stopped Buses | | | | | | | | | | | | | | | | | | |

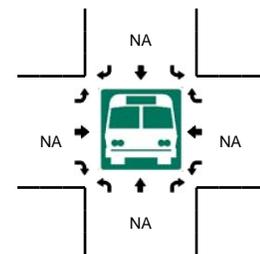
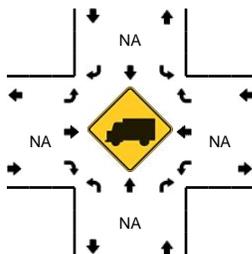
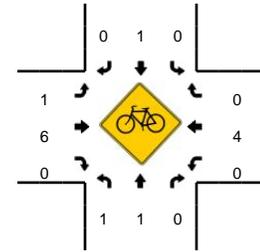
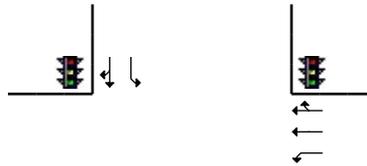
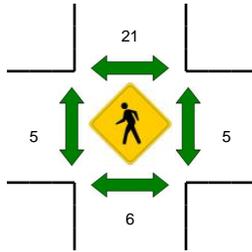
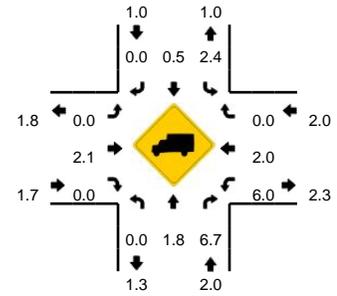
Comments:

LOCATION: Lawyers Rd NW -- Route 123
CITY/STATE: Vienna, VA

QC JOB #: 12465529
DATE: Thu, May 08 2014



Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM



| 15-Min Count Period Beginning At | Lawyers Rd NW (Northbound) | | | | Lawyers Rd NW (Southbound) | | | | Route 123 (Eastbound) | | | | Route 123 (Westbound) | | | | Total | Hourly Totals |
|----------------------------------|----------------------------|------|-------|---|----------------------------|------|-------|---|-----------------------|------|-------|---|-----------------------|------|-------|---|-------|---------------|
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| 4:00 PM | 17 | 50 | 8 | 0 | 34 | 35 | 34 | 0 | 25 | 190 | 13 | 0 | 7 | 324 | 33 | 0 | 770 | |
| 4:15 PM | 15 | 60 | 9 | 0 | 38 | 49 | 29 | 0 | 32 | 202 | 5 | 0 | 10 | 296 | 29 | 0 | 774 | |
| 4:30 PM | 24 | 69 | 11 | 0 | 34 | 48 | 33 | 0 | 26 | 196 | 5 | 0 | 9 | 276 | 22 | 0 | 753 | |
| 4:45 PM | 15 | 63 | 14 | 0 | 39 | 59 | 33 | 0 | 31 | 183 | 5 | 0 | 15 | 288 | 26 | 0 | 771 | 3068 |
| 5:00 PM | 26 | 61 | 8 | 0 | 41 | 51 | 22 | 0 | 31 | 218 | 13 | 0 | 12 | 323 | 29 | 0 | 835 | 3133 |
| 5:15 PM | 10 | 67 | 14 | 0 | 29 | 49 | 40 | 0 | 32 | 188 | 17 | 0 | 12 | 309 | 31 | 0 | 798 | 3157 |
| 5:30 PM | 15 | 76 | 8 | 0 | 49 | 60 | 25 | 0 | 34 | 177 | 9 | 0 | 13 | 283 | 21 | 0 | 770 | 3174 |
| 5:45 PM | 21 | 70 | 15 | 0 | 45 | 54 | 23 | 0 | 26 | 189 | 9 | 0 | 13 | 307 | 22 | 0 | 794 | 3197 |
| 6:00 PM | 14 | 49 | 18 | 0 | 33 | 62 | 26 | 0 | 31 | 191 | 13 | 0 | 16 | 300 | 38 | 0 | 791 | 3153 |
| 6:15 PM | 19 | 64 | 15 | 0 | 39 | 61 | 22 | 0 | 33 | 195 | 9 | 0 | 11 | 295 | 32 | 0 | 795 | 3150 |
| 6:30 PM | 24 | 64 | 18 | 0 | 33 | 54 | 24 | 0 | 29 | 158 | 5 | 0 | 9 | 277 | 22 | 0 | 717 | 3097 |
| 6:45 PM | 18 | 58 | 17 | 0 | 34 | 31 | 36 | 0 | 27 | 186 | 7 | 0 | 10 | 295 | 33 | 0 | 752 | 3055 |
| Peak 15-Min Flowrates | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total | |
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| All Vehicles | 104 | 244 | 32 | 0 | 164 | 204 | 88 | 0 | 124 | 872 | 52 | 0 | 48 | 1292 | 116 | 0 | 3340 | |
| Heavy Trucks | 0 | 4 | 4 | | 0 | 4 | 0 | | 0 | 28 | 0 | | 4 | 36 | 0 | | 80 | |
| Pedestrians | | 4 | | | | 28 | | | | 0 | | | | 4 | | | 36 | |
| Bicycles | 1 | 0 | 0 | | 0 | 0 | 0 | | 0 | 5 | 0 | | 0 | 0 | 0 | | 6 | |
| Railroad | | | | | | | | | | | | | | | | | | |
| Stopped Buses | | | | | | | | | | | | | | | | | | |

Comments:

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - All Vehicles

| Time Period | | Southbound Site Driveway | | | | | Westbound Maple Avenue | | | | | Northbound 0 | | | | | Eastbound Maple Avenue | | | | | North & South | East & West | Total |
|-----------------------------|--|-----------------------------|------|------|-------|------|---------------------------|------|------|-------|------|-----------------|------|------|-------|------|---------------------------|------|------|-------|------|---------------------|-------------------|-------|
| | | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | 0 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 1 | 1 | 2 |
| 6:15 AM - 6:30 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 6:30 AM - 6:45 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:45 AM - 7:00 AM | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 1 | 1 | 2 |
| 7:00 AM - 7:15 AM | | 0 | 1 | 0 | 1 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 1 | 2 | 3 |
| 7:15 AM - 7:30 AM | | 0 | 2 | 0 | 2 | | 0 | 0 | 1 | 1 | | 0 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | | 3 | 1 | 4 |
| 7:30 AM - 7:45 AM | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 1 | 2 |
| 7:45 AM - 8:00 AM | | 1 | 2 | 0 | 3 | | 0 | 0 | 0 | 0 | | 0 | 3 | 1 | 4 | | 0 | 0 | 0 | 0 | | 7 | 0 | 7 |
| 8:00 AM - 8:15 AM | | 0 | 2 | 0 | 2 | | 0 | 0 | 0 | 0 | | 1 | 2 | 0 | 3 | | 0 | 0 | 1 | 1 | | 5 | 1 | 6 |
| 8:15 AM - 8:30 AM | | 0 | 0 | 1 | 1 | | 1 | 0 | 0 | 1 | | 0 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | | 2 | 1 | 3 |
| 8:30 AM - 8:45 AM | | 0 | 1 | 3 | 4 | | 1 | 0 | 1 | 2 | | 0 | 2 | 0 | 2 | | 1 | 1 | 1 | 3 | | 6 | 5 | 11 |
| 8:45 AM - 9:00 AM | | 0 | 2 | 0 | 2 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 2 | 1 | 3 |
| Total | | 1 | 11 | 5 | 17 | | 5 | 0 | 2 | 7 | | 1 | 11 | 1 | 13 | | 3 | 1 | 3 | 7 | | 30 | 14 | 44 |
| AM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | | 0 | 1 | 1 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 0 | 1 | 0 | 1 | 0.25 | 1 | 0 | 1 | 2 | 0.50 | 3 | 2 | 5 |
| 6:15 AM - 7:15 AM | | 0 | 1 | 1 | 2 | 0.50 | 1 | 0 | 0 | 1 | 0.25 | 0 | 1 | 0 | 1 | 0.25 | 1 | 0 | 1 | 2 | 0.50 | 3 | 3 | 6 |
| 6:30 AM - 7:30 AM | | 0 | 3 | 1 | 4 | 0.50 | 1 | 0 | 1 | 2 | 0.50 | 0 | 1 | 0 | 1 | 0.25 | 1 | 0 | 1 | 2 | 0.50 | 5 | 4 | 9 |
| 6:45 AM - 7:45 AM | | 0 | 3 | 1 | 4 | 0.50 | 2 | 0 | 1 | 3 | 0.75 | 0 | 2 | 0 | 2 | 0.50 | 1 | 0 | 1 | 2 | 0.50 | 6 | 5 | 11 |
| 7:00 AM - 8:00 AM | | 1 | 5 | 0 | 6 | 0.50 | 2 | 0 | 1 | 3 | 0.75 | 0 | 5 | 1 | 6 | 0.38 | 1 | 0 | 0 | 1 | 0.25 | 12 | 4 | 16 |
| 7:15 AM - 8:15 AM | | 1 | 6 | 0 | 7 | 0.58 | 1 | 0 | 1 | 2 | 0.50 | 1 | 7 | 1 | 9 | 0.56 | 0 | 0 | 1 | 1 | 0.25 | 16 | 3 | 19 |
| 7:30 AM - 8:30 AM | | 1 | 4 | 1 | 6 | 0.50 | 2 | 0 | 0 | 2 | 0.50 | 1 | 7 | 1 | 9 | 0.56 | 0 | 0 | 1 | 1 | 0.25 | 15 | 3 | 18 |
| 7:45 AM - 8:45 AM | | 1 | 5 | 4 | 10 | 0.63 | 2 | 0 | 1 | 3 | 0.38 | 1 | 8 | 1 | 10 | 0.63 | 1 | 1 | 2 | 4 | 0.33 | 20 | 7 | 27 |
| 8:00 AM - 9:00 AM | | 0 | 5 | 4 | 9 | 0.56 | 3 | 0 | 1 | 4 | 0.50 | 1 | 5 | 0 | 6 | 0.50 | 1 | 1 | 2 | 4 | 0.33 | 15 | 8 | 23 |
| PM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | | 1 | 0 | 0 | 1 | | 3 | 0 | 0 | 3 | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 1 | 4 | 5 |
| 4:15 PM - 4:30 PM | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 1 | 1 |
| 4:30 PM - 4:45 PM | | 1 | 0 | 0 | 1 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 1 | 2 | 3 |
| 4:45 PM - 5:00 PM | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 0 | 2 | 2 |
| 5:00 PM - 5:15 PM | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 1 | 1 | 2 |
| 5:15 PM - 5:30 PM | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 5:30 PM - 5:45 PM | | 2 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 2 | 0 | 2 |
| 5:45 PM - 6:00 PM | | 1 | 0 | 0 | 1 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 1 | 2 |
| 6:00 PM - 6:15 PM | | 0 | 0 | 0 | 0 | | 3 | 0 | 0 | 3 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 3 | 3 |
| 6:15 PM - 6:30 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:30 PM - 6:45 PM | | 2 | 0 | 0 | 2 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 2 | 1 | 3 |
| 6:45 PM - 7:00 PM | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| Total | | 10 | 0 | 0 | 10 | | 11 | 0 | 0 | 11 | | 0 | 0 | 0 | 0 | | 0 | 0 | 4 | 4 | | 10 | 15 | 25 |
| PM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | | 2 | 0 | 0 | 2 | 0.50 | 6 | 0 | 0 | 6 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 3 | 3 | 0.75 | 2 | 9 | 11 |
| 4:15 PM - 5:15 PM | | 2 | 0 | 0 | 2 | 0.50 | 3 | 0 | 0 | 3 | 0.75 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 3 | 3 | 0.75 | 2 | 6 | 8 |
| 4:30 PM - 5:30 PM | | 3 | 0 | 0 | 3 | 0.75 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 3 | 3 | 0.75 | 3 | 5 | 8 |
| 4:45 PM - 5:45 PM | | 4 | 0 | 0 | 4 | 0.50 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 2 | 2 | 0.50 | 4 | 3 | 7 |
| 5:00 PM - 6:00 PM | | 5 | 0 | 0 | 5 | 0.63 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 1 | 1 | 0.25 | 5 | 2 | 7 |
| 5:15 PM - 6:15 PM | | 4 | 0 | 0 | 4 | 0.50 | 4 | 0 | 0 | 4 | 0.33 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 4 | 4 | 8 |
| 5:30 PM - 6:30 PM | | 3 | 0 | 0 | 3 | 0.38 | 4 | 0 | 0 | 4 | 0.33 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 3 | 4 | 7 |
| 5:45 PM - 6:45 PM | | 3 | 0 | 0 | 3 | 0.38 | 5 | 0 | 0 | 5 | 0.42 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 3 | 5 | 8 |
| 6:00 PM - 7:00 PM | | 3 | 0 | 0 | 3 | 0.38 | 4 | 0 | 0 | 4 | 0.33 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 3 | 4 | 7 |

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - All Vehicles

| Time Period | | Southbound Pleasant Street | | | | | Westbound Driveway South | | | | | Northbound Pleasant Street | | | | | Eastbound 0 | | | | | North & South | East & West | Total |
|-----------------------------|--|----------------------------|------|------|-------|------|--------------------------|------|------|-------|------|----------------------------|------|------|-------|------|-------------|------|------|-------|------|---------------|-------------|-------|
| | | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:15 AM - 6:30 AM | | 0 | 0 | 2 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 2 | 0 | 2 |
| 6:30 AM - 6:45 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:45 AM - 7:00 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 7:00 AM - 7:15 AM | | 0 | 0 | 2 | 2 | | 1 | 0 | 0 | 1 | | 2 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 4 | 1 | 5 |
| 7:15 AM - 7:30 AM | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 7:30 AM - 7:45 AM | | 0 | 0 | 2 | 2 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 2 | 1 | 3 |
| 7:45 AM - 8:00 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 8:00 AM - 8:15 AM | | 0 | 0 | 2 | 2 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 3 | 0 | 3 |
| 8:15 AM - 8:30 AM | | 0 | 0 | 1 | 1 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 1 | 2 |
| 8:30 AM - 8:45 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 8:45 AM - 9:00 AM | | 0 | 0 | 2 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 2 | 0 | 2 |
| Total | | 0 | 0 | 12 | 12 | | 3 | 0 | 0 | 3 | | 5 | 0 | 0 | 5 | | 0 | 0 | 0 | 0 | | 17 | 3 | 20 |
| AM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | | 0 | 0 | 2 | 2 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 |
| 6:15 AM - 7:15 AM | | 0 | 0 | 4 | 4 | 0.50 | 1 | 0 | 0 | 1 | 0.25 | 2 | 0 | 0 | 2 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 6 | 1 | 7 |
| 6:30 AM - 7:30 AM | | 0 | 0 | 3 | 3 | 0.38 | 1 | 0 | 0 | 1 | 0.25 | 2 | 0 | 0 | 2 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 5 | 1 | 6 |
| 6:45 AM - 7:45 AM | | 0 | 0 | 5 | 5 | 0.63 | 2 | 0 | 0 | 2 | 0.50 | 2 | 0 | 0 | 2 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 7 | 2 | 9 |
| 7:00 AM - 8:00 AM | | 0 | 0 | 5 | 5 | 0.63 | 2 | 0 | 0 | 2 | 0.50 | 3 | 0 | 0 | 3 | 0.38 | 0 | 0 | 0 | 0 | 0.00 | 8 | 2 | 10 |
| 7:15 AM - 8:15 AM | | 0 | 0 | 5 | 5 | 0.63 | 1 | 0 | 0 | 1 | 0.25 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 7 | 1 | 8 |
| 7:30 AM - 8:30 AM | | 0 | 0 | 5 | 5 | 0.63 | 2 | 0 | 0 | 2 | 0.50 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 7 | 2 | 9 |
| 7:45 AM - 8:45 AM | | 0 | 0 | 3 | 3 | 0.38 | 1 | 0 | 0 | 1 | 0.25 | 3 | 0 | 0 | 3 | 0.75 | 0 | 0 | 0 | 0 | 0.00 | 6 | 1 | 7 |
| 8:00 AM - 9:00 AM | | 0 | 0 | 5 | 5 | 0.63 | 1 | 0 | 0 | 1 | 0.25 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 7 | 1 | 8 |
| PM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | | 0 | 0 | 0 | 0 | | 2 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 2 | 2 |
| 4:15 PM - 4:30 PM | | 0 | 0 | 1 | 1 | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 1 | 2 |
| 4:30 PM - 4:45 PM | | 0 | 0 | 1 | 1 | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 1 | 2 |
| 4:45 PM - 5:00 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 5:00 PM - 5:15 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 1 | 1 |
| 5:15 PM - 5:30 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 5:30 PM - 5:45 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 5:45 PM - 6:00 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:00 PM - 6:15 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:15 PM - 6:30 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:30 PM - 6:45 PM | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 6:45 PM - 7:00 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| Total | | 0 | 0 | 3 | 3 | | 2 | 0 | 3 | 5 | | 2 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 5 | 5 | 10 |
| PM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | | 0 | 0 | 2 | 2 | 0.50 | 2 | 0 | 2 | 4 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 4 | 6 |
| 4:15 PM - 5:15 PM | | 0 | 0 | 2 | 2 | 0.50 | 0 | 0 | 3 | 3 | 0.75 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 3 | 5 |
| 4:30 PM - 5:30 PM | | 0 | 0 | 1 | 1 | 0.25 | 0 | 0 | 2 | 2 | 0.50 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 2 | 2 | 4 |
| 4:45 PM - 5:45 PM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 1 | 1 | 0.25 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 2 | 1 | 3 |
| 5:00 PM - 6:00 PM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 1 | 1 | 0.25 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 2 | 1 | 3 |
| 5:15 PM - 6:15 PM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 |
| 5:30 PM - 6:30 PM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 1 | 0 | 1 |
| 5:45 PM - 6:45 PM | | 0 | 0 | 1 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 1 | 0 | 1 |
| 6:00 PM - 7:00 PM | | 0 | 0 | 1 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 1 | 0 | 1 |

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - All Vehicles

| Time Period | | Southbound Pleasant Street | | | | | Westbound North Driveway | | | | | Northbound Pleasant Street | | | | | Eastbound N/A | | | | | North & South | East & West | Total |
|-----------------------------|--|----------------------------|------|------|-------|------|--------------------------|------|------|-------|------|----------------------------|------|------|-------|------|---------------|------|------|-------|------|---------------|-------------|-------|
| | | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | Right | Thru | Left | Total | PHF | | | |
| AM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 6:15 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:15 AM - 6:30 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:30 AM - 6:45 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:45 AM - 7:00 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 7:00 AM - 7:15 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 2 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 2 | 0 | 2 |
| 7:15 AM - 7:30 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 7:30 AM - 7:45 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 7:45 AM - 8:00 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 8:00 AM - 8:15 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 8:15 AM - 8:30 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 8:30 AM - 8:45 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 |
| 8:45 AM - 9:00 AM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| Total | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 5 | 0 | 0 | 5 | | 0 | 0 | 0 | 0 | | 5 | 0 | 5 |
| AM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 6:00 AM - 7:00 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 |
| 6:15 AM - 7:15 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 0 | 2 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 |
| 6:30 AM - 7:30 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 0 | 2 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 |
| 6:45 AM - 7:45 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 0 | 2 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 |
| 7:00 AM - 8:00 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 3 | 0 | 0 | 3 | 0.38 | 0 | 0 | 0 | 0 | 0.00 | 3 | 0 | 3 |
| 7:15 AM - 8:15 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 |
| 7:30 AM - 8:30 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 |
| 7:45 AM - 8:45 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 3 | 0 | 0 | 3 | 0.75 | 0 | 0 | 0 | 0 | 0.00 | 3 | 0 | 3 |
| 8:00 AM - 9:00 AM | | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 0 | 2 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 |
| PM 15 Minute Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 4:15 PM | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 1 | 1 |
| 4:15 PM - 4:30 PM | | 0 | 0 | 1 | 1 | | 1 | 0 | 2 | 3 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 1 | 3 | 4 |
| 4:30 PM - 4:45 PM | | 0 | 0 | 0 | 0 | | 1 | 0 | 1 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 2 | 2 |
| 4:45 PM - 5:00 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 2 | 2 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 1 | 2 | 3 |
| 5:00 PM - 5:15 PM | | 0 | 0 | 0 | 0 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 1 | 1 |
| 5:15 PM - 5:30 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 1 | 1 |
| 5:30 PM - 5:45 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 5:45 PM - 6:00 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 1 | 1 |
| 6:00 PM - 6:15 PM | | 0 | 0 | 0 | 0 | | 2 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 2 | 2 |
| 6:15 PM - 6:30 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:30 PM - 6:45 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 1 | 1 |
| 6:45 PM - 7:00 PM | | 0 | 0 | 0 | 0 | | 0 | 0 | 2 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 2 | 2 |
| Total | | 0 | 0 | 1 | 1 | | 6 | 0 | 10 | 16 | | 1 | 0 | 0 | 1 | | 0 | 0 | 0 | 0 | | 2 | 16 | 18 |
| PM One Hour Volumes | | | | | | | | | | | | | | | | | | | | | | | | |
| 4:00 PM - 5:00 PM | | 0 | 0 | 1 | 1 | 0.25 | 3 | 0 | 5 | 8 | 0.67 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 2 | 8 | 10 |
| 4:15 PM - 5:15 PM | | 0 | 0 | 1 | 1 | 0.25 | 3 | 0 | 5 | 8 | 0.67 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 2 | 8 | 10 |
| 4:30 PM - 5:30 PM | | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 4 | 6 | 0.75 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 1 | 6 | 7 |
| 4:45 PM - 5:45 PM | | 0 | 0 | 0 | 0 | 0.00 | 1 | 0 | 3 | 4 | 0.50 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0 | 0 | 0.00 | 1 | 4 | 5 |
| 5:00 PM - 6:00 PM | | 0 | 0 | 0 | 0 | 0.00 | 1 | 0 | 2 | 3 | 0.75 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 3 | 3 |
| 5:15 PM - 6:15 PM | | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 | 4 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 4 | 4 |
| 5:30 PM - 6:30 PM | | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 1 | 3 | 0.38 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 3 | 3 |
| 5:45 PM - 6:45 PM | | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 2 | 4 | 0.50 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 4 | 4 |
| 6:00 PM - 7:00 PM | | 0 | 0 | 0 | 0 | 0.00 | 2 | 0 | 3 | 5 | 0.63 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 5 | 5 |

APPENDIX C

Appendix C - Existing Capacity Analysis



HCM Unsignalized Intersection Capacity Analysis 1. Pleasant St & Parking Lot/Church Street

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Lane Configurations | | 4 | | | | | | 4 | | | | 4 |
| Traffic Volume (veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 26 | 47 | 8 | 47 | 1 |
| Future Volume (Veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 26 | 47 | 8 | 47 | 1 |
| Sign Control | Stop | 0% | Stop | 0% | 0% | Stop | Free | 2% | Free | Free | Free | -2% |
| Grade | 0% | | 0% | | | 0% | | | | | | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 1.00 | 0.92 |
| Hourly flow rate (vph) | 1 | 0 | 1 | 0 | 0 | 0 | 5 | 31 | 55 | 9 | 47 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | | | | | | | | | | | | |
| VC, conflicting volume | 134 | 162 | 48 | 135 | 134 | 58 | 48 | | | | | 86 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 134 | 162 | 48 | 135 | 134 | 58 | 48 | | | | | 86 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | 99 |
| CM capacity (veh/h) | 832 | 724 | 1022 | 830 | 749 | 1007 | 1559 | | | | | 1510 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volumes Total | 2 | 91 | 57 | | | | | | | | | |
| Volume Left | 1 | 5 | 9 | | | | | | | | | |
| Volume Right | 1 | 55 | 1 | | | | | | | | | |
| cSH | 917 | 1559 | 1510 | | | | | | | | | |
| Volumes to Capacity | 0.00 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | | | | | | | | | |
| Control Delay (s) | 8.9 | 0.4 | 1.2 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.9 | 0.4 | 1.2 | | | | | | | | | |
| Approach LOS | A | | | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | | | | | | | | | 0.8 |
| Intersection Capacity Utilization | | | | | | | | | | | | 15.4% |
| ICU Level of Service | | | | | | | | | | | | A |
| Analysis Period (min) | | | | | | | | | | | | 15 |

HCM Unsignalized Intersection Capacity Analysis 2. Lawyers Rd & Church Street

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Lane Configurations | | 4 | | | | | | 4 | | | | 4 |
| Traffic Volume (veh/h) | 11 | 21 | 21 | 24 | 1 | 73 | 8 | 335 | 75 | 295 | 398 | 7 |
| Future Volume (Veh/h) | 11 | 21 | 21 | 24 | 1 | 73 | 8 | 335 | 75 | 295 | 398 | 7 |
| Sign Control | Stop | 0% | Stop | 0% | 0% | Stop | Free | 0% | Free | Free | Free | 0% |
| Grade | 0% | | 0% | | | 0% | | | | | | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 13 | 25 | 25 | 28 | 1 | 86 | 9 | 364 | 82 | 321 | 433 | 8 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | | | | | | | | | | | | |
| VC, conflicting volume | 1546 | 1543 | 438 | 1512 | 1506 | 406 | 441 | | | | | 0.84 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 1555 | 1551 | 438 | 1514 | 1507 | 200 | 441 | | | | | 247 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 75 | 62 | 96 | 36 | 99 | 88 | 99 | | | | | 71 |
| CM capacity (veh/h) | 52 | 66 | 612 | 44 | 72 | 705 | 1119 | | | | | 1109 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 | | | | | | | |
| Volumes Total | 63 | 115 | 455 | 321 | 441 | | | | | | | |
| Volume Left | 13 | 28 | 9 | 321 | 0 | | | | | | | |
| Volume Right | 25 | 86 | 82 | 0 | 8 | | | | | | | |
| cSH | 102 | 176 | 1119 | 1109 | 1700 | | | | | | | |
| Volumes to Capacity | 0.62 | 0.65 | 0.01 | 0.29 | 0.26 | | | | | | | |
| Queue Length 95th (ft) | 75 | 94 | 1 | 30 | 0 | | | | | | | |
| Control Delay (s) | 84.0 | 53.6 | 0.3 | 9.6 | 0.0 | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | |
| Approach Delay (s) | 84.0 | 53.6 | 0.3 | 4.0 | | | | | | | | |
| Approach LOS | F | F | | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | | | | | | | | | 10.5 |
| Intersection Capacity Utilization | | | | | | | | | | | | 62.5% |
| ICU Level of Service | | | | | | | | | | | | B |
| Analysis Period (min) | | | | | | | | | | | | 15 |

3. Pleasant St & Rt 123/Maple Avenue

Existing AM Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 15 | 7 | 7 | 7 | 34 |
| Traffic Volume (veh/h) | 47 | 1202 | 51 | 14 | 639 | 28 | 4 | 2 | 15 | 7 | 7 | 34 |
| Future Volume (Veh/h) | 47 | 1202 | 51 | 14 | 639 | 28 | 4 | 2 | 15 | 7 | 7 | 34 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| Grade | -2% | -2% | -2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Hourly flow rate (vph) | 51 | 1307 | 55 | 16 | 710 | 31 | 5 | 2 | 18 | 8 | 8 | 40 |
| Pedestrians | | | | 2 | | | 10 | | | | | 8 |
| Lane Width (ft) | | | | 9.7 | | | 16.0 | | | | | 15.0 |
| Walking Speed (ft/s) | | | | 4.0 | | | 4.0 | | | | | 4.0 |
| Percent Blockage | | | | 0 | | | 1 | | | | | 1 |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | TWLT | TL | TL | TWLT | TL | TL | | | | | | |
| Median storage (veh) | 2 | | | 2 | | | | | | | | |
| Upstream signal (ft) | 254 | | | 747 | | | | | | | | |
| pX platoon unblocked | 0.86 | | | | | | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 |
| VC conflicting volume | 749 | | | 1372 | | | 1878 | 2228 | 693 | 1542 | 2240 | 378 |
| VC1 stage 1 conf vol | | | | | | | 1446 | 1446 | | 766 | 766 | |
| VC2 stage 2 conf vol | | | | | | | 431 | 781 | | 776 | 1474 | |
| VCu unblocked vol | 387 | | | 1372 | | | 1697 | 2103 | 693 | 1307 | 2117 | 0 |
| IC single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| IC 2 stage (s) | | | | | | | 6.5 | 5.5 | 3.3 | 3.5 | 4.0 | 3.3 |
| IF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 95 | | | 97 | | | 96 | 99 | 95 | 97 | 95 | 96 |
| CM capacity (veh/h) | 998 | | | 491 | | | 125 | 166 | 381 | 262 | 151 | 926 |
| Direction Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
| Volumes Total | 51 | 871 | 491 | 16 | 473 | 268 | 25 | 56 | | | | |
| Volume Left | 51 | 0 | 0 | 16 | 0 | 0 | 5 | 8 | | | | |
| Volume Right | 0 | 0 | 55 | 0 | 0 | 31 | 18 | 40 | | | | |
| cSH | 998 | 1700 | 1700 | 491 | 1700 | 1700 | 252 | 442 | | | | |
| Volumes to Capacity | 0.05 | 0.51 | 0.29 | 0.03 | 0.28 | 0.16 | 0.10 | 0.13 | | | | |
| Queue Length 95th (ft) | 4 | 0 | 0 | 3 | 0 | 0 | 8 | 11 | | | | |
| Control Delay (s) | 8.8 | 0.0 | 0.0 | 12.6 | 0.0 | 0.0 | 20.9 | 14.3 | | | | |
| Lane LOS | A | B | B | C | B | C | C | B | | | | |
| Approach Delay (s) | 0.3 | | | 0.3 | | | 20.9 | 14.3 | | | | |
| Approach LOS | C | | | C | | | C | B | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 0.9 | | | | | | | | | | | |
| Intersection Capacity Utilization | 49.7% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |

4. Courthouse Rd/Lawyers Rd & Maple Avenue

Existing AM Conditions

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | |
|---|------|------|------|------|------|------|------|------|-----|-----|-----|--|
| Lane Group Flow (vph) | 87 | 1193 | 32 | 775 | 52 | 336 | 176 | 341 | | | | |
| v/c Ratio | 0.61 | 0.78 | 0.29 | 0.60 | 0.49 | 0.91 | 0.85 | 0.66 | | | | |
| Control Delay | 77.9 | 36.7 | 68.9 | 34.4 | 78.3 | 81.5 | 91.8 | 49.2 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Total Delay | 77.9 | 36.7 | 68.9 | 34.4 | 78.3 | 81.5 | 91.8 | 49.2 | | | | |
| Queue Length 50th (ft) | 77 | 527 | 28 | 290 | 46 | 289 | 157 | 265 | | | | |
| Queue Length 95th (ft) | 136 | #640 | 60 | 341 | 91 | #447 | #257 | 355 | | | | |
| Internal Link Dist (ft) | | 667 | | 792 | | 621 | | 287 | | | | |
| Turn Bay Length (ft) | 160 | | 145 | | 230 | | 245 | | | | | |
| Base Capacity (vph) | 167 | 1530 | 110 | 1298 | 122 | 390 | 222 | 522 | | | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Reduced v/c Ratio | 0.52 | 0.78 | 0.29 | 0.60 | 0.43 | 0.86 | 0.79 | 0.65 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | | | |
| Queue shown is maximum after two cycles. | | | | | | | | | | | | |

4. Courthouse Rd/Lawyers Rd & Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|-------|------|------|------|-------|------|-------|-------|------|-------|------|
| Lane Configurations | 80 | 1073 | 25 | 27 | 547 | 111 | 46 | 227 | 72 | 151 | 222 | 71 |
| Traffic Volume (vph) | 80 | 1073 | 25 | 27 | 547 | 111 | 46 | 227 | 72 | 151 | 222 | 71 |
| Future Volume (vph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Ideal Flow (vphpl) | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 |
| Lane Width | 0% | 0% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Grade (%) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Total Lost Time (s) | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. 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 |
| Fllb. ped/bikes | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.96 | 1.00 | 0.96 | 1.00 | 0.96 | 1.00 | 0.96 |
| Fll Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Sat'd. Flow (prot) | 1562 | 3197 | 1546 | 3101 | 1711 | 1728 | 1711 | 1728 | 1636 | 1771 | 1636 | 1771 |
| Fll Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Sat'd. Flow (perm) | 1562 | 3197 | 1546 | 3101 | 1711 | 1728 | 1711 | 1728 | 1636 | 1771 | 1636 | 1771 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.85 | 0.85 | 0.85 | 0.89 | 0.89 | 0.89 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 87 | 1166 | 27 | 32 | 644 | 131 | 52 | 255 | 81 | 176 | 258 | 83 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 8 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 87 | 1192 | 0 | 32 | 763 | 0 | 52 | 328 | 0 | 176 | 332 | 0 |
| Confl. Peds. (#/hr) | 6 | 6 | 2% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Heavy Vehicles (%) | 4% | 5% | 2% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Turn Type | Prot | MA | Prot | NA | Prot | NA | Prot | NA | Prot | MA | Prot | MA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 12.8 | 63.9 | 6.0 | 57.1 | 7.6 | 30.3 | 7.6 | 30.3 | 17.8 | 40.5 | 17.8 | 40.5 |
| Effective Green, g (s) | 12.8 | 63.9 | 6.0 | 57.1 | 7.6 | 30.3 | 7.6 | 30.3 | 17.8 | 40.5 | 17.8 | 40.5 |
| Actuated g/C Ratio | 0.09 | 0.46 | 0.04 | 0.41 | 0.05 | 0.22 | 0.05 | 0.22 | 0.13 | 0.29 | 0.13 | 0.29 |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 142 | 1459 | 66 | 1264 | 92 | 373 | 92 | 373 | 208 | 512 | 208 | 512 |
| v/s Ratio Prot | c0.06 | c0.37 | 0.02 | 0.25 | 0.03 | c0.19 | 0.03 | c0.19 | c0.11 | 0.19 | c0.11 | 0.19 |
| v/s Ratio Perm | 0.61 | 0.82 | 0.48 | 0.60 | 0.57 | 0.88 | 0.57 | 0.88 | 0.85 | 0.65 | 0.85 | 0.65 |
| Uniform Delay, d1 | 61.2 | 33.0 | 65.5 | 32.6 | 64.6 | 53.1 | 64.6 | 53.1 | 59.8 | 43.5 | 59.8 | 43.5 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 7.1 | 4.9 | 5.5 | 2.1 | 7.7 | 20.3 | 7.7 | 20.3 | 25.8 | 2.8 | 25.8 | 2.8 |
| Delay (s) | 68.4 | 37.8 | 71.0 | 34.7 | 72.3 | 73.4 | 72.3 | 73.4 | 85.6 | 46.4 | 85.6 | 46.4 |
| Level of Service | E | D | E | C | E | E | E | E | F | D | F | D |
| Approach Delay (s) | 39.9 | | 36.1 | | 73.3 | | 73.3 | | 59.7 | | 59.7 | |
| Approach LOS | D | | D | | E | | E | | E | | E | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 46.6 HCM 2000 Level of Service D | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.84 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 1400 Sum of lost Time (s) 22.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 82.0% ICU Level of Service E | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

9. Nutley Street & Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Lane Group Flow (vph) | 14 | 1374 | 191 | 553 | 177 | 183 | 319 | 78 | 326 | | | |
| v/c Ratio | 0.03 | 0.88 | 0.87 | 0.30 | 0.73 | 0.73 | 0.56 | 0.22 | 0.89 | | | |
| Control Delay | 21.1 | 55.2 | 90.3 | 26.9 | 94.5 | 93.6 | 16.7 | 64.8 | 99.0 | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Total Delay | 21.1 | 55.2 | 90.3 | 26.9 | 94.5 | 93.6 | 16.7 | 64.8 | 99.0 | | | |
| Queue Length 50th (ft) | 8 | 836 | 188 | 212 | 226 | 234 | 72 | 82 | 395 | | | |
| Queue Length 95th (ft) | 21 | #971 | #346 | 287 | 289 | 297 | 138 | 137 | #556 | | | |
| Internal Link Dist (ft) | 206 | | | 1528 | | | 575 | | 583 | | | |
| Turn Bay Length (ft) | 60 | | 285 | | 215 | | | | | | | |
| Base Capacity (vph) | 556 | 1568 | 225 | 1869 | 327 | 340 | 575 | 372 | 389 | | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Reduced v/c Ratio | 0.03 | 0.88 | 0.85 | 0.30 | 0.54 | 0.54 | 0.55 | 0.21 | 0.84 | | | |
| Intersection Summary | | | | | | | | | | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | | | |
| Queue shown is maximum after two cycles. | | | | | | | | | | | | |

9. Nutley Street & Maple Avenue

HCM Signalized Intersection Capacity Analysis

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|-------|-------|-------|-------|------|-------|-------|------|-------|------|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Traffic Volume (vph) | 12 | 1059 | 109 | 176 | 472 | 37 | 188 | 118 | 188 | 72 | 283 | 17 |
| Future Volume (vph) | 12 | 1059 | 109 | 176 | 472 | 37 | 188 | 118 | 188 | 72 | 283 | 17 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fpb. ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 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 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.85 | 1.00 | 0.99 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.99 |
| Satd. Flow (prot) | 1762 | 3479 | 1770 | 3490 | 1681 | 1749 | 1568 | 1770 | 1846 | 1568 | 1770 | 1846 |
| Flt Permitted | 0.45 | 1.00 | 0.04 | 1.00 | 0.04 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.99 |
| Satd. Flow (perm) | 825 | 3479 | 82 | 3490 | 82 | 3490 | 1681 | 1749 | 1568 | 1770 | 1846 | 1846 |
| Peak-hour factor, PHF | 0.85 | 0.85 | 0.85 | 0.92 | 0.92 | 0.92 | 0.85 | 0.85 | 0.85 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 14 | 1246 | 128 | 191 | 513 | 40 | 221 | 139 | 319 | 78 | 308 | 18 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 185 | 0 | 1 |
| Lane Group Flow (vph) | 14 | 1370 | 0 | 191 | 551 | 0 | 177 | 183 | 134 | 78 | 325 | 0 |
| Confl. Peds. (#/hr) | 6 | 3 | 3 | 3 | 3 | 6 | 1 | 2 | 2 | 2 | 2 | 1 |
| Turn Type | pm+pl | NA | pm+pl | NA | NA | Split | NA | pm+ov | Split | NA | NA | NA |
| Permitted Phases | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 1 | 4 | 4 | 4 | 4 |
| Prohibited Phases | 2 | 6 | 6 | 6 | 6 | 6 | 6 | 8 | 8 | 8 | 8 | 8 |
| Actuated Green, G (s) | 87.5 | 83.5 | 107.9 | 96.9 | 25.4 | 42.8 | 25.4 | 42.8 | 35.7 | 35.7 | 35.7 | 35.7 |
| Effective Green, g (s) | 91.5 | 85.5 | 109.9 | 98.9 | 27.4 | 46.8 | 27.4 | 46.8 | 37.7 | 37.7 | 37.7 | 37.7 |
| Actuated q/C Ratio | 0.48 | 0.45 | 0.58 | 0.52 | 0.14 | 0.14 | 0.14 | 0.25 | 0.20 | 0.20 | 0.20 | 0.20 |
| Clearance Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 426 | 1565 | 219 | 1816 | 242 | 252 | 427 | 351 | 366 | 366 | 366 | 366 |
| v/s Ratio Prot | 0.00 | 0.39 | 0.09 | 0.16 | c0.11 | 0.10 | 0.03 | 0.04 | c0.18 | 0.04 | c0.18 | 0.18 |
| v/s Ratio Perm | 0.01 | c0.41 | c0.41 | c0.41 | c0.41 | c0.41 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| v/c Ratio | 0.03 | 0.88 | 0.87 | 0.30 | 0.73 | 0.73 | 0.31 | 0.22 | 0.89 | 0.22 | 0.89 | 0.89 |
| Uniform Delay, d1 | 25.7 | 47.4 | 63.6 | 25.9 | 77.8 | 77.7 | 58.5 | 63.9 | 74.1 | 63.9 | 74.1 | 74.1 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.0 | 7.2 | 29.4 | 0.4 | 10.8 | 10.0 | 0.4 | 0.3 | 22.0 | 0.3 | 22.0 | 22.0 |
| Delay (s) | 25.8 | 54.6 | 92.9 | 26.4 | 88.6 | 87.7 | 58.9 | 64.2 | 96.1 | 64.2 | 96.1 | 96.1 |
| Level of Service | C | D | F | C | F | F | E | E | E | E | F | F |
| Approach Delay (s) | 54.3 | 54.3 | 54.3 | 43.5 | 43.5 | 43.5 | 74.4 | 74.4 | 74.4 | 74.4 | 90.0 | 90.0 |
| Approach LOS | D | D | D | D | D | D | E | E | E | E | F | F |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 60.5 | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.86 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 190.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 84.2% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | E | | | | | | | | | | | |

1. Pleasant St & Parking Lot/Church Street

HCM Unsignalized Intersection Capacity Analysis

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 |
| Traffic Volume (veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 |
| Future Volume (Veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 2% | 2% | 2% | 2% | 2% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 75 | 17 | 12 | 17 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pK, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 135 | 144 | 18 | 140 | 136 | 84 | 18 | 92 | 92 | 92 | 92 | 92 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 135 | 144 | 18 | 140 | 136 | 84 | 18 | 92 | 92 | 92 | 92 | 92 |
| iC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| iC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| dM capacity (veh/h) | 829 | 739 | 1061 | 820 | 747 | 976 | 1599 | 1503 | 1503 | 1503 | 1503 | 1503 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volume Total | 7 | 97 | 30 | | | | | | | | | |
| Volume Left | 2 | 5 | 12 | | | | | | | | | |
| Volume Right | 4 | 17 | 1 | | | | | | | | | |
| cSH | 929 | 1599 | 1503 | | | | | | | | | |
| Volume to Capacity | 0.01 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 1 | 0 | 1 | | | | | | | | | |
| Control Delay (s) | 8.9 | 0.4 | 3.0 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.9 | 0.4 | 3.0 | | | | | | | | | |
| Approach LOS | A | A | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 1.4 | | | | | | | | | | | |
| Intersection Capacity Utilization | 15.4% | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

2. Lawlors Rd & Church Street

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|-------|------|------|------|------|------|-----|-----|-----|-----|-----|------|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 42 | 15 | 50 | 124 | 8 | 245 | 7 | 375 | 75 | 140 | 392 | 12 | |
| Future Volume (Veh/h) | 42 | 15 | 50 | 124 | 8 | 245 | 7 | 375 | 75 | 140 | 392 | 12 | |
| Sign Control | Stop | | | | | | | | | | | | |
| Grade | 0% | | | | | | | | | | | | |
| Peak Hour Factor | 0.92 | | | | | | | | | | | | |
| Hourly flow rate (vph) | 46 | 16 | 54 | 135 | 9 | 266 | 8 | 408 | 82 | 152 | 426 | 13 | |
| Pedestrians | 2 | | | | | | | | | | | | |
| Lane Width (ft) | 12.0 | | | | | | | | | | | | |
| Walking Speed (ft/s) | 4.0 | | | | | | | | | | | | |
| Percent Blockage | 0 | | | | | | | | | | | | |
| Right turn flare (veh) | 3 | | | | | | | | | | | | |
| Median type | None | | | | | | | | | | | | |
| Median storage (veh) | None | | | | | | | | | | | | |
| Upstream signal (ft) | 367 | | | | | | | | | | | | |
| pX platoon unblocked | 0.82 | | | | | | | | | | | | |
| VC, conflicting volume | 1345 | 1244 | 432 | 1205 | 1210 | 457 | 439 | | | | | | 492 |
| VC1, stage 1 conf vol | | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | | |
| VCu, unblocked vol | 1311 | 1189 | 432 | 1141 | 1147 | 229 | 439 | | | | | | 272 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | | 2.2 |
| p0 queue free % | 17 | 88 | 91 | 0 | 94 | 60 | 99 | | | | | | 86 |
| CM capacity (veh/h) | 56 | 131 | 623 | 107 | 139 | 660 | 1121 | | | | | | 1058 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | EB 2 | WB 2 | SB 2 | | | | | | |
| Volume Total | 116 | 410 | 498 | 152 | 439 | | | | | | | | |
| Volume Left | 46 | 135 | 8 | 152 | 0 | | | | | | | | |
| Volume Right | 54 | 266 | 82 | 0 | 13 | | | | | | | | |
| cSH | 133 | 249 | 1121 | 1058 | 1700 | | | | | | | | |
| Volumes to Capacity | 0.87 | 1.65 | 0.01 | 0.14 | 0.26 | | | | | | | | |
| Queue Length 95th (ft) | 140 | 650 | 1 | 13 | 0 | | | | | | | | |
| Control Delay (s) | 109.5 | 343.0 | 0.2 | 9.0 | 0.0 | | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | | |
| Approach Delay (s) | 109.5 | 343.0 | 0.2 | 2.3 | | | | | | | | | |
| Approach LOS | F | F | C | C | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | | |
| Average Delay | 95.9 | | | | | | | | | | | | |
| Intersection Capacity Utilization | 70.0% | | | | | | | | | | | | |
| ICU Level of Service | C | | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

3. Pleasant St & Rt 123/Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 43 | 1002 | 58 | 45 | 1408 | 56 | 9 | 6 | 17 | 6 | 14 | 37 |
| Future Volume (Veh/h) | 43 | 1002 | 58 | 45 | 1408 | 56 | 9 | 6 | 17 | 6 | 14 | 37 |
| Sign Control | Free | | | | | | | | | | | |
| Grade | -2% | | | | | | | | | | | |
| Peak Hour Factor | 0.92 | | | | | | | | | | | |
| Hourly flow rate (vph) | 47 | 1089 | 63 | 49 | 1530 | 61 | 10 | 7 | 18 | 7 | 15 | 40 |
| Pedestrians | 2 | | | | | | | | | | | |
| Lane Width (ft) | 9.7 | | | | | | | | | | | |
| Walking Speed (ft/s) | 4.0 | | | | | | | | | | | |
| Percent Blockage | 0 | | | | | | | | | | | |
| Right turn flare (veh) | 0 | | | | | | | | | | | |
| Median type | TWLTL | | | | | | | | | | | |
| Median storage (veh) | 2 | | | | | | | | | | | |
| Upstream signal (ft) | 254 | | | | | | | | | | | |
| pX platoon unblocked | 0.59 | | | | | | | | | | | |
| VC, conflicting volume | 1599 | 1162 | | 2135 | | 2922 | 588 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 617 | 1162 | | 1529 | | 2866 | 588 | 1858 | 2868 | 0 | 6.9 | 6.9 |
| IC, single (s) | 4.1 | 4.1 | | 7.5 | | 6.5 | 6.9 | 7.5 | 6.5 | 6.5 | 5.5 | 5.5 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 2.2 | 2.2 | | 3.5 | | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 4.0 | 3.3 |
| p0 queue free % | 92 | 92 | | 94 | | 95 | 96 | 96 | 96 | 89 | 94 | 94 |
| CM capacity (veh/h) | 567 | 602 | | 159 | | 129 | 451 | 165 | 131 | 636 | | |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 1 | SB 1 | | | |
| Volume Total | 47 | 726 | 426 | 49 | 1020 | 571 | 35 | 62 | | | | |
| Volume Left | 47 | 0 | 0 | 49 | 0 | 0 | 10 | 7 | | | | |
| Volume Right | 0 | 63 | 0 | 0 | 61 | 18 | 40 | | | | | |
| cSH | 567 | 1700 | 1700 | 602 | 1700 | 1700 | 223 | 282 | | | | |
| Volumes to Capacity | 0.08 | 0.43 | 0.25 | 0.08 | 0.60 | 0.34 | 0.16 | 0.22 | | | | |
| Queue Length 95th (ft) | 7 | 0 | 0 | 7 | 0 | 0 | 14 | 21 | | | | |
| Control Delay (s) | 11.9 | 0.0 | 0.0 | 11.5 | 0.0 | 0.0 | 24.1 | 21.4 | | | | |
| Lane LOS | B | F | A | B | C | C | C | C | | | | |
| Approach Delay (s) | 0.5 | 0.3 | | 24.1 | | 21.4 | | | | | | |
| Approach LOS | C | C | | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 1.1 | | | | | | | | | | | |
| Intersection Capacity Utilization | 51.9% | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

Queues
4: Courthouse Rd/Lawyers Rd & Maple Avenue

Existing PM Conditions

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-------------------------|-------|------|-------|-------|-------|------|-------|------|
| Lane Group | 136 | 942 | 55 | 1513 | 92 | 354 | 188 | 377 |
| Lane Group Flow (vph) | 0.93 | 0.62 | 0.52 | 1.10 | 0.75 | 0.94 | 0.93 | 0.80 |
| v/c Ratio | 137.2 | 21.3 | 103.0 | 96.5 | 106.8 | 94.2 | 115.6 | 66.1 |
| Control Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 137.2 | 21.3 | 103.0 | 96.5 | 106.8 | 94.2 | 115.6 | 66.1 |
| Total Delay | #300 | 283 | 111 | #1088 | #186 | #554 | #355 | 486 |
| Queue Length 50th (ft) | 148 | 222 | 56 | -951 | 96 | 361 | 198 | 353 |
| Queue Length 95th (ft) | 667 | 792 | 792 | 792 | 621 | 621 | 287 | 287 |
| Internal Link Dist (ft) | 160 | 145 | 230 | 230 | 230 | 230 | 245 | 245 |
| Turn Bay Length (ft) | 146 | 1517 | 115 | 1371 | 128 | 388 | 204 | 478 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.93 | 0.62 | 0.48 | 1.10 | 0.72 | 0.91 | 0.92 | 0.79 |

Intersection Summary

- Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

Existing PM Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|------|-------|-------|------|-------|-------|------|------|------|------|------|
| Lane Configurations | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← |
| Traffic Volume (vph) | 125 | 808 | 59 | 51 | 1287 | 105 | 85 | 280 | 46 | 173 | 218 | 129 |
| Future Volume (vph) | 125 | 808 | 59 | 51 | 1287 | 105 | 85 | 280 | 46 | 173 | 218 | 129 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 |
| Grade (%) | 0% | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Total Lost time (s) | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 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 | 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flt | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.98 | 1.00 | 0.98 | 1.00 | 0.94 | 1.00 | 0.94 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1562 | 3177 | 1546 | 3159 | 1711 | 1758 | 1711 | 1758 | 1636 | 1733 | 1733 | 1733 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1562 | 3177 | 1546 | 3159 | 1711 | 1758 | 1711 | 1758 | 1636 | 1733 | 1733 | 1733 |
| 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) | 136 | 878 | 64 | 55 | 1399 | 114 | 92 | 304 | 50 | 188 | 237 | 140 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 136 | 939 | 0 | 55 | 1509 | 0 | 92 | 350 | 0 | 188 | 364 | 0 |
| Confl. Peds (#/hr) | 4% | 5% | 0% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Heavy Vehicles (%) | 4% | 5% | 0% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Turn Type | Prot | NA | Prot | NA | Prot | NA | Prot | NA | Prot | NA | Prot | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 15.1 | 75.3 | 9.0 | 69.2 | 11.4 | 33.9 | 11.4 | 33.9 | 19.8 | 42.3 | 42.3 | 42.3 |
| Effective Green, g (s) | 15.1 | 75.3 | 9.0 | 69.2 | 11.4 | 33.9 | 11.4 | 33.9 | 19.8 | 42.3 | 42.3 | 42.3 |
| Actuated g/C Ratio | 0.09 | 0.47 | 0.06 | 0.43 | 0.07 | 0.21 | 0.07 | 0.21 | 0.12 | 0.26 | 0.26 | 0.26 |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 147 | 1495 | 86 | 1366 | 121 | 372 | 202 | 458 | | | | |
| v/s Ratio Prot | c0.09 | 0.30 | 0.04 | c0.48 | 0.05 | c0.20 | c0.11 | 0.21 | | | | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.93 | 0.63 | 0.64 | 1.10 | 0.76 | 0.94 | 0.93 | 0.79 | | | | |
| Uniform Delay, d1 | 71.9 | 31.8 | 73.9 | 45.4 | 73.0 | 62.1 | 69.4 | 54.8 | | | | |
| Progression Factor | 1.20 | 0.60 | 1.19 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Incremental Delay, d2 | 49.8 | 1.9 | 14.5 | 58.3 | 24.1 | 31.8 | 44.0 | 9.2 | | | | |
| Delay (s) | 135.8 | 21.0 | 102.5 | 99.4 | 97.0 | 93.8 | 113.5 | 64.0 | | | | |
| Level of Service | F | C | F | F | F | F | F | E | | | | |
| Approach Delay (s) | | | | 99.5 | | 94.5 | | 80.5 | | | | |
| Approach LOS | | | | F | | F | | F | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 77.1 HCM 2000 Level of Service E | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 1.02 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 160.0 Sum of lost time (s) 22.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 92.8% ICU Level of Service F | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Queues
9. Nutley Street & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT | Existing PM Conditions |
|-----------------------------|---|------|------|------|------|------|------|------|------|------------------------|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT | Existing PM Conditions |
| Lane Group Flow (vph) | 45 | 830 | 272 | 1230 | 286 | 298 | 403 | 76 | 336 | Existing PM Conditions |
| v/c Ratio | 0.38 | 0.76 | 0.87 | 0.83 | 0.91 | 0.91 | 0.54 | 0.22 | 0.94 | Existing PM Conditions |
| Control Delay | 33.6 | 53.7 | 63.8 | 36.7 | 94.3 | 93.8 | 13.1 | 56.2 | 97.1 | Existing PM Conditions |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | Existing PM Conditions |
| Total Delay | 33.6 | 53.7 | 63.8 | 36.7 | 94.3 | 93.8 | 13.1 | 56.2 | 97.1 | Existing PM Conditions |
| Queue Length 50th (ft) | 25 | 409 | 168 | 593 | 309 | 323 | 82 | 68 | 348 | Existing PM Conditions |
| Queue Length 95th (ft) | 49 | 493 | #335 | 737 | #486 | #503 | 187 | 120 | #546 | Existing PM Conditions |
| Internal Link Dist (ft) | 206 | | | 1528 | | 575 | | | 583 | Existing PM Conditions |
| Turn Bay Length (ft) | 60 | 285 | | | 215 | | | | | Existing PM Conditions |
| Base Capacity (vph) | 120 | 1094 | 320 | 1492 | 325 | 338 | 757 | 347 | 361 | Existing PM Conditions |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Existing PM Conditions |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Existing PM Conditions |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Existing PM Conditions |
| Reduced v/c Ratio | 0.38 | 0.76 | 0.85 | 0.82 | 0.88 | 0.88 | 0.53 | 0.22 | 0.93 | Existing PM Conditions |
| Intersection Summary | | | | | | | | | | |
| # | 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | |
| | Queue shown is maximum after two cycles. | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
9. Nutley Street & Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|---------------------|------|------|-------|-------|-------|------|-------|------|-------|---------------------------|------|------|
| Lane Configurations | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | |
| Traffic Volume (vph) | 41 | 593 | 170 | 250 | 1092 | 40 | 333 | 204 | 371 | 70 | 271 | 38 | |
| Future Volume (vph) | 41 | 593 | 170 | 250 | 1092 | 40 | 333 | 204 | 371 | 70 | 271 | 38 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Total Lost time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frb. ped/bikes | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Fllb. 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 | 0.97 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1770 | 3374 | 1770 | 3512 | 1681 | 1747 | 1681 | 1747 | 1583 | 1770 | 1822 | 1822 | |
| Flt Permitted | 0.09 | 1.00 | 0.13 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 170 | 3374 | 250 | 3512 | 1681 | 1747 | 1681 | 1747 | 1583 | 1770 | 1822 | 1822 | |
| 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) | 45 | 645 | 185 | 272 | 1187 | 43 | 362 | 222 | 403 | 76 | 295 | 41 | |
| RTOR Reduction (vph) | 0 | 16 | 0 | 0 | 2 | 0 | 0 | 0 | 188 | 0 | 3 | 0 | |
| Lane Group Flow (vph) | 45 | 814 | 0 | 272 | 1228 | 0 | 286 | 298 | 215 | 76 | 333 | 0 | |
| Confl. Peds. (#/hr) | 17 | 11 | 11 | 11 | 11 | 17 | 8 | 4 | 4 | 4 | 4 | 8 | |
| Turn Type | pm+pt | NA | NA | pm+pt | NA | Split | NA | Split | NA | Split | NA | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | 1 | 8 | 1 | 4 | |
| Permitted Phases | 2 | | | 6 | | | | | | | | 4 | |
| Actuated Green, G (s) | 55.7 | 50.9 | 77.9 | 66.1 | 66.1 | 30.1 | 30.1 | 30.1 | 57.1 | 31.0 | 31.0 | 31.0 | |
| Effective Green, g (s) | 55.7 | 50.9 | 77.9 | 66.1 | 66.1 | 30.1 | 30.1 | 30.1 | 57.1 | 31.0 | 31.0 | 31.0 | |
| Actuated g/C Ratio | 0.35 | 0.32 | 0.49 | 0.41 | 0.41 | 0.19 | 0.19 | 0.19 | 0.36 | 0.19 | 0.19 | 0.19 | |
| Clearance Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 107 | 1073 | 311 | 1450 | 316 | 328 | 564 | 342 | 353 | 0.18 | 0.18 | 0.18 | |
| v/s Ratio Prot | 0.01 | 0.24 | | c0.11 | c0.35 | | 0.17 | c0.17 | 0.14 | 0.04 | c0.18 | | |
| v/s Ratio Perm | 0.13 | | | c0.32 | | | | | | | | | |
| v/c Ratio | 0.42 | 0.76 | 0.87 | 0.85 | 0.85 | 0.91 | 0.91 | 0.91 | 0.38 | 0.22 | 0.94 | 0.94 | |
| Uniform Delay, d1 | 38.1 | 49.0 | 34.4 | 42.4 | 42.4 | 63.6 | 63.6 | 63.6 | 38.3 | 54.3 | 63.6 | 63.6 | |
| Progression Factor | 1.00 | 1.00 | 1.17 | 0.73 | 0.73 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.7 | 5.0 | 22.7 | 6.3 | 6.3 | 27.7 | 27.5 | 27.5 | 0.4 | 0.3 | 33.2 | 33.2 | |
| Delay (s) | 40.8 | 54.1 | 63.0 | 37.3 | 37.3 | 91.2 | 91.1 | 91.1 | 38.7 | 54.7 | 96.8 | 96.8 | |
| Level of Service | D | D | E | D | D | F | F | F | D | D | F | F | |
| Approach Delay (s) | 53.4 | | | 41.9 | | 69.7 | | | | | 89.0 | | |
| Approach LOS | D | | | D | | E | | | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | 57.0 | | | | | | | | | | HCM 2000 Level of Service | | E |
| HCM 2000 Volume to Capacity ratio | 0.92 | | | | | | | | | | | | |
| Actuated Cycle Length (s) | 160.0 | | | | | | | | | | Sum of lost time (s) | | 28.0 |
| Intersection Capacity Utilization | 92.2% | | | | | | | | | | ICU Level of Service | | F |
| Analysis Period (min) | 15 | | | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | |

APPENDIX D

Appendix D - Background Capacity Analysis



HCM Unsignalized Intersection Capacity Analysis
1. Pleasant St & Parking Lot/Church Street

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|-------|------|------|----------------------|------|------|------|------|------|------|
| Lane Configurations | | ↔ | | | | | | ↔ | | | | ↔ |
| Traffic Volume (veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 27 | 48 | 8 | 48 | 1 |
| Future Volume (Veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 27 | 48 | 8 | 48 | 1 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 2% | 2% | 2% | 2% | 2% | -2% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 29 | 52 | 9 | 52 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | | | | | | | | | | | | |
| VC, conflicting volume | 134 | 160 | 52 | 134 | 134 | 55 | 53 | | | | | 81 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | 134 | 160 | 52 | 134 | 134 | 55 | 53 | | | | | 81 |
| VCu, unblocked vol | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, single (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| IC, 2 stage (s) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | 99 |
| p0 queue free % | 833 | 726 | 1015 | 831 | 750 | 1012 | 1553 | | | | | 1517 |
| CM capacity (veh/h) | | | | | | | | | | | | |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volumes Total | 2 | 85 | 62 | | | | | | | | | |
| Volume Left | 1 | 4 | 9 | | | | | | | | | |
| Volume Right | 1 | 52 | 1 | | | | | | | | | |
| cSH | 915 | 1553 | 1517 | | | | | | | | | |
| Volumes to Capacity | 0.00 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | | | | | | | | | |
| Control Delay (s) | 8.9 | 0.4 | 1.1 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.9 | 0.4 | 1.1 | | | | | | | | | |
| Approach LOS | A | A | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.8 | | | | | | | | | |
| Intersection Capacity Utilization | | | 15.5% | | | ICU Level of Service | | | | | | A |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
2. Lawyers Rd & Church Street

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|-------|------|------|----------------------|------|------|------|------|------|------|
| Lane Configurations | | ↔ | | | | | | ↔ | | | | ↔ |
| Traffic Volume (veh/h) | 17 | 22 | 22 | 24 | 24 | 1 | 74 | 8 | 342 | 77 | 301 | 411 |
| Future Volume (Veh/h) | 17 | 22 | 22 | 24 | 24 | 1 | 74 | 8 | 342 | 77 | 301 | 411 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 18 | 24 | 24 | 26 | 26 | 1 | 80 | 9 | 372 | 84 | 327 | 447 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | | | | | 0.84 |
| VC, conflicting volume | 1578 | 1579 | 452 | 1546 | 1541 | 415 | 455 | | | | | 456 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | 1594 | 1594 | 452 | 1555 | 1549 | 207 | 455 | | | | | 256 |
| VCu, unblocked vol | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, single (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| IC, 2 stage (s) | 63 | 61 | 96 | 35 | 98 | 89 | 99 | | | | | 70 |
| p0 queue free % | 49 | 62 | 601 | 40 | 67 | 696 | 1106 | | | | | 1098 |
| CM capacity (veh/h) | | | | | | | | | | | | |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 | | | | | | | |
| Volumes Total | 66 | 107 | 465 | 327 | 455 | | | | | | | |
| Volume Left | 18 | 26 | 9 | 327 | 0 | | | | | | | |
| Volume Right | 24 | 80 | 84 | 0 | 8 | | | | | | | |
| cSH | 88 | 162 | 1106 | 1098 | 1700 | | | | | | | |
| Volumes to Capacity | 0.75 | 0.66 | 0.01 | 0.30 | 0.27 | | | | | | | |
| Queue Length 95th (ft) | 95 | 95 | 1 | 31 | 0 | | | | | | | |
| Control Delay (s) | 112.9 | 57.7 | 0.3 | 9.7 | 0.0 | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | |
| Approach Delay (s) | 112.9 | 57.7 | 0.3 | 4.0 | | | | | | | | |
| Approach LOS | F | F | F | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 11.9 | | | | | | | | | |
| Intersection Capacity Utilization | | | 64.1% | | | ICU Level of Service | | | | | | C |
| Analysis Period (min) | | | 15 | | | | | | | | | |

3. Pleasant St & Rt 123/Maple Avenue

Background AM Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------------------------|------|------|--------|------|------|------|------|------|------|------|------|
| Lane Configurations | 51 | 1236 | 52 | 14 | 656 | 29 | 4 | 2 | 15 | 7 | 9 | 39 |
| Traffic Volume (veh/h) | 51 | 1236 | 52 | 14 | 656 | 29 | 4 | 2 | 15 | 7 | 9 | 39 |
| Future Volume (Veh/h) | Free | Free | Free | 4% | 4% | 4% | Stop | 4% | Stop | Stop | Stop | Stop |
| Sign Control | -2% | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Grade | 55 | 1343 | 57 | 15 | 713 | 32 | 4 | 2 | 16 | 8 | 10 | 42 |
| Hourly flow rate (vph) | | | | | | | | | | | | |
| Pedestrians | | | | 2 | | | 10 | | | | | 8 |
| Lane Width (ft) | | | | 9.7 | | | 16.0 | | | | | 15.0 |
| Walking Speed (ft/s) | | | | 4.0 | | | 4.0 | | | | | 4.0 |
| Percent Blockage | | | | 0 | | | 1 | | | | | 1 |
| Right turn flare (veh) | | | | TWLT/L | | | | | | | | |
| Median type | | | | TWLT/L | | | | | | | | |
| Median storage (veh) | | | | 2 | | | | | | | | |
| Walking speed (ft/s) | | | | 7.47 | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | 0.87 | | | 1410 | | | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| VC, conflicting volume | 753 | | | | | | 1925 | 2274 | 712 | 1568 | 2287 | 380 |
| VC1, stage 1 conf vol | | | | | | | 1492 | 1492 | | 767 | 767 | |
| VC2, stage 2 conf vol | | | | | | | 434 | 783 | | 800 | 1520 | |
| VCu, unblocked vol | 407 | | | 1410 | | | 1759 | 2163 | 712 | 1347 | 2177 | 0 |
| IC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| IC, 2 stage (s) | | | | | | | 6.5 | 5.5 | 3.3 | 3.5 | 4.0 | 3.3 |
| IF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 94 | | | 97 | | | 97 | 99 | 96 | 97 | 93 | 95 |
| CM capacity (veh/h) | 987 | | | 474 | | | 116 | 157 | 370 | 254 | 143 | 932 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
| Volumes Total | 55 | 895 | 505 | 15 | 475 | 270 | 22 | 60 | | | | |
| Volume Left | 55 | 0 | 0 | 15 | 0 | 0 | 4 | 8 | | | | |
| Volume Right | 0 | 0 | 57 | 0 | 0 | 32 | 16 | 42 | | | | |
| cSH | 987 | 1700 | 1700 | 474 | 1700 | 1700 | 244 | 410 | | | | |
| Volumes to Capacity | 0.06 | 0.53 | 0.30 | 0.03 | 0.28 | 0.16 | 0.09 | 0.15 | | | | |
| Queue Length 95th (ft) | 4 | 0 | 0 | 2 | 0 | 0 | 7 | 13 | | | | |
| Control Delay (s) | 8.9 | 0.0 | 0.0 | 12.8 | 0.0 | 0.0 | 21.2 | 15.3 | | | | |
| Lane LOS | A | B | B | C | C | C | C | C | | | | |
| Approach Delay (s) | 0.3 | | | 0.3 | | | 21.2 | 15.3 | | | | |
| Approach LOS | C | | | C | | | C | C | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 0.9 | | | | | | | | | | | |
| Intersection Capacity Utilization | 53.0% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| | ICU Level of Service A | | | | | | | | | | | |

4. Courthouse Rd/Lawyers Rd & Maple Avenue

Background AM Conditions

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | |
|---|-------|------|------|------|------|------|------|------|-----|-----|-----|--|
| Lane Group Flow (vph) | 89 | 1225 | 30 | 741 | 55 | 331 | 168 | 330 | | | | |
| v/c Ratio | 0.62 | 0.79 | 0.27 | 0.57 | 0.51 | 0.91 | 0.82 | 0.65 | | | | |
| Control Delay | 102.7 | 18.3 | 68.3 | 33.4 | 79.4 | 80.7 | 89.2 | 49.1 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Total Delay | 102.7 | 18.3 | 68.3 | 33.4 | 79.4 | 80.7 | 89.2 | 49.1 | | | | |
| Queue Length 50th (ft) | 85 | 293 | 26 | 274 | 49 | 284 | 150 | 255 | | | | |
| Queue Length 95th (ft) | 145 | #696 | 61 | 350 | 96 | #447 | #259 | 365 | | | | |
| Internal Link Dist (ft) | 667 | | | 792 | | 621 | | 287 | | | | |
| Turn Bay Length (ft) | 160 | | 145 | | 230 | | 245 | | | | | |
| Base Capacity (vph) | 167 | 1541 | 110 | 1309 | 122 | 390 | 222 | 517 | | | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Reduced v/c Ratio | 0.53 | 0.79 | 0.27 | 0.57 | 0.45 | 0.85 | 0.76 | 0.64 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | | | |
| Queue shown is maximum after two cycles. | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background AM Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|-------|------|------|------|-------|------|-------|-------|------|-------|---------------------------|------|
| Lane Configurations | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | |
| Traffic Volume (vph) | 82 | 1099 | 28 | 28 | 569 | 113 | 51 | 232 | 73 | 155 | 226 | 77 | |
| Future Volume (vph) | 82 | 1099 | 28 | 28 | 569 | 113 | 51 | 232 | 73 | 155 | 226 | 77 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 | |
| Grade (%) | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | |
| Total Lost Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.99 | 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 | 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flt | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | 0.96 | 1.00 | 0.96 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | |
| Sat'd. Flow (prot) | 1562 | 3196 | 1546 | 3103 | 1711 | 1729 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | |
| Sat'd. Flow (perm) | 1562 | 3196 | 1546 | 3103 | 1711 | 1729 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 | |
| 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) | 89 | 1195 | 30 | 30 | 618 | 123 | 55 | 252 | 79 | 168 | 246 | 84 | |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 11 | 0 | 0 | 8 | 0 | 0 | 9 | 0 | |
| Lane Group Flow (vph) | 89 | 1224 | 0 | 30 | 730 | 0 | 55 | 323 | 0 | 168 | 321 | 0 | |
| Confl. Peds. (#/hr) | 6 | 6 | 6 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | |
| Heavy Vehicles (%) | 4% | 5% | 2% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% | |
| Turn Type | Prot | MA | Prot | NA | Prot | NA | Prot | NA | Prot | MA | Prot | MA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | | |
| Permitted Phases | | | | | | | | | | | | | |
| Actuated Green, G (s) | 12.9 | 64.5 | 6.0 | 57.6 | 7.7 | 30.0 | 7.7 | 30.0 | 17.5 | 39.8 | 17.5 | 39.8 | |
| Effective Green, g (s) | 12.9 | 64.5 | 6.0 | 57.6 | 7.7 | 30.0 | 7.7 | 30.0 | 17.5 | 39.8 | 17.5 | 39.8 | |
| Actuated g/C Ratio | 0.09 | 0.46 | 0.04 | 0.41 | 0.06 | 0.21 | 0.06 | 0.21 | 0.12 | 0.28 | 0.12 | 0.28 | |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 143 | 1472 | 66 | 1276 | 94 | 370 | 94 | 370 | 204 | 502 | 204 | 502 | |
| v/s Ratio Prot | c0.06 | c0.38 | 0.02 | 0.24 | 0.03 | c0.19 | 0.03 | c0.19 | c0.10 | 0.18 | c0.10 | 0.18 | |
| v/s Ratio Perm | 0.62 | 0.83 | 0.45 | 0.57 | 0.59 | 0.87 | 0.59 | 0.87 | 0.82 | 0.64 | 0.82 | 0.64 | |
| Uniform Delay, d1 | 61.2 | 33.0 | 65.4 | 31.7 | 64.6 | 53.2 | 64.6 | 53.2 | 59.7 | 43.8 | 59.7 | 43.8 | |
| Progression Factor | 1.39 | 0.41 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.7 | 5.3 | 4.9 | 1.9 | 9.0 | 19.7 | 9.0 | 19.7 | 22.8 | 2.8 | 22.8 | 2.8 | |
| Delay (s) | 93.1 | 18.8 | 70.3 | 33.6 | 73.6 | 72.9 | 73.6 | 72.9 | 82.5 | 46.6 | 82.5 | 46.6 | |
| Level of Service | F | B | E | C | E | C | E | C | F | D | F | D | |
| Approach Delay (s) | 23.8 | | 35.0 | | 73.0 | | 73.0 | | 58.7 | | 58.7 | | |
| Approach LOS | C | | D | | E | | E | | E | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | 39.0 | | | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.84 | | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 | | | | | | | | | | | Sum of lost Time (s) | 22.0 |
| Intersection Capacity Utilization | 83.3% | | | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | 15 | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

Queues
 9: Nutley Street & Maple Avenue

Background AM Conditions

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|-------------------------|---|------|------|------|------|------|------|------|-------|-----|-----|
| Lane Group Flow (vph) | 13 | 1309 | 196 | 573 | 167 | 172 | 300 | 79 | 332 | | |
| v/c Ratio | 0.03 | 0.95 | 0.88 | 0.33 | 0.74 | 0.73 | 0.58 | 0.25 | 1.02 | | |
| Control Delay | 16.9 | 56.8 | 90.7 | 11.6 | 77.1 | 75.9 | 18.7 | 52.8 | 111.0 | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Total Delay | 16.9 | 56.8 | 90.7 | 11.6 | 77.1 | 75.9 | 18.7 | 52.8 | 111.0 | | |
| Queue Length 50th (ft) | 5 | 608 | 147 | 72 | 153 | 157 | 72 | 63 | 326 | | |
| Queue Length 95th (ft) | 17 | #770 | #299 | 92 | 237 | 242 | 164 | 114 | #525 | | |
| Internal Link Dist (ft) | | 206 | | 1528 | | | 575 | | | | |
| Turn Bay Length (ft) | 60 | | 285 | | 215 | | | | | | |
| Base Capacity (vph) | 392 | 1372 | 224 | 1758 | 264 | 274 | 539 | 310 | 325 | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Reduced v/c Ratio | 0.03 | 0.95 | 0.88 | 0.33 | 0.63 | 0.63 | 0.56 | 0.25 | 1.02 | | |
| Intersection Summary | | | | | | | | | | | |
| - | Volume exceeds capacity, queue is theoretically infinite. | | | | | | | | | | |
| - | Queue shown is maximum after two cycles. | | | | | | | | | | |
| # | 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | |
| - | Queue shown is maximum after two cycles. | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
9. Nutley Street & Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|-------|------|-------|-------|------|------|-------|-------|-------|-------|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Traffic Volume (veh/h) | 12 | 1093 | 111 | 180 | 489 | 38 | 192 | 120 | 276 | 73 | 289 | 17 |
| Future Volume (veh/h) | 12 | 1093 | 111 | 180 | 489 | 38 | 192 | 120 | 276 | 73 | 289 | 17 |
| Ideal Flow (vehph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frbp_psd/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fllb_psd/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 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | 1.00 | 0.99 |
| Fll Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.99 |
| Satd. Flow (prot) | 1764 | 3481 | 1770 | 3492 | 1681 | 1748 | 1569 | 1770 | 1846 | 1770 | 1846 | 1770 |
| Fll Permitted | 0.44 | 1.00 | 0.06 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 |
| Satd. Flow (perm) | 811 | 3481 | 120 | 3492 | 1681 | 1748 | 1569 | 1770 | 1846 | 1770 | 1846 | 1770 |
| 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) | 13 | 1188 | 121 | 196 | 532 | 41 | 209 | 130 | 300 | 79 | 314 | 18 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 0 | 151 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 13 | 1304 | 0 | 196 | 569 | 0 | 167 | 172 | 149 | 79 | 330 | 0 |
| Confl. Peds. (#/hr) | 6 | 3 | 3 | 3 | 3 | 6 | 1 | 2 | 2 | 2 | 2 | 1 |
| Turn Type | pm+pl | NA | pm+pl | NA | NA | Split | NA | NA | pm+ov | Split | NA | NA |
| Permitted Phases | 5 | 2 | 1 | 6 | 6 | 8 | 8 | 1 | 4 | 4 | 4 | 4 |
| Prohibited Phases | 2 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Actuated Green, G (s) | 57.3 | 54.9 | 75.5 | 66.1 | 18.9 | 18.9 | 18.9 | 32.5 | 24.6 | 24.6 | 24.6 | 24.6 |
| Effective Green, g (s) | 57.3 | 54.9 | 75.5 | 66.1 | 18.9 | 18.9 | 18.9 | 32.5 | 24.6 | 24.6 | 24.6 | 24.6 |
| Actuated q/C Ratio | 0.41 | 0.39 | 0.54 | 0.47 | 0.13 | 0.13 | 0.13 | 0.23 | 0.18 | 0.18 | 0.18 | 0.18 |
| Clearance Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 348 | 1365 | 225 | 1648 | 226 | 235 | 442 | 311 | 324 | 324 | 324 | 324 |
| v/s Ratio Prot | 0.00 | c0.37 | c0.08 | 0.16 | c0.10 | 0.10 | 0.03 | 0.04 | c0.18 | 0.04 | c0.18 | c0.18 |
| v/s Ratio Perm | 0.01 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 |
| v/c Ratio | 0.04 | 0.95 | 0.87 | 0.35 | 0.74 | 0.73 | 0.34 | 0.25 | 1.02 | 0.25 | 1.02 | 1.02 |
| Uniform Delay, d1 | 24.6 | 41.3 | 41.8 | 23.3 | 58.2 | 58.1 | 44.8 | 49.8 | 57.7 | 49.8 | 57.7 | 57.7 |
| Progression Factor | 1.00 | 1.00 | 1.75 | 0.50 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.0 | 15.7 | 28.4 | 0.6 | 11.9 | 11.1 | 0.5 | 0.4 | 55.1 | 0.4 | 55.1 | 55.1 |
| Delay (s) | C | E | F | F | B | E | E | D | D | D | F | F |
| Level of Service | C | E | F | F | B | E | E | D | D | D | F | F |
| Approach Delay (s) | 56.8 | 56.8 | 56.8 | 35.0 | 35.0 | 58.2 | 58.2 | 58.2 | 58.2 | 58.2 | 58.2 | 58.2 |
| Approach LOS | E | E | E | D | D | E | E | D | D | D | F | F |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 57.5 | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.92 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 92.5% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | E | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
1. Pleasant St & Parking Lot/Church Street

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 |
| Traffic Volume (veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 |
| Future Volume (Veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 2% | 2% | 2% | 2% | 2% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 75 | 17 | 12 | 17 |
| Pedestrians | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 5 | 75 | 17 | 12 | 17 |
| Lane Width (ft) | None | | | | | | | | | | | |
| Walking Speed (ft/s) | None | | | | | | | | | | | |
| Percent Blockage | None | | | | | | | | | | | |
| Right turn flare (veh) | None | | | | | | | | | | | |
| Median type | None | | | | | | | | | | | |
| Median storage (veh) | None | | | | | | | | | | | |
| Upstream signal (ft) | None | | | | | | | | | | | |
| pX platoon unblocked | None | | | | | | | | | | | |
| vC, conflicting volume | 135 | 144 | 18 | 140 | 136 | 84 | 18 | 92 | 92 | 92 | 92 | 92 |
| vC1, stage 1 conf vol | None | | | | | | | | | | | |
| vC2, stage 2 conf vol | None | | | | | | | | | | | |
| vCu, unblocked vol | 135 | 144 | 18 | 140 | 136 | 84 | 18 | 92 | 92 | 92 | 92 | 92 |
| iC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| iC, 2 stage (s) | None | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| dM capacity (veh/h) | 829 | 739 | 1061 | 820 | 747 | 976 | 1599 | 1503 | 1503 | 1503 | 1503 | 1503 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volume Total | 7 | 97 | 30 | | | | | | | | | |
| Volume Left | 2 | 5 | 12 | | | | | | | | | |
| Volume Right | 4 | 17 | 1 | | | | | | | | | |
| cSH | 929 | 1599 | 1503 | | | | | | | | | |
| Volume to Capacity | 0.01 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 1 | 0 | 1 | | | | | | | | | |
| Control Delay (s) | 8.9 | 0.4 | 3.0 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.9 | 0.4 | 3.0 | | | | | | | | | |
| Approach LOS | A | A | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 1.4 | | | | | | | | | | | |
| Intersection Capacity Utilization | 15.4% | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

2. Lawyers Rd & Church Street

Background PM Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|-------|------|------|------|------|------|-----|-----|-----|-----|-----|------|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 42 | 15 | 50 | 124 | 8 | 245 | 7 | 375 | 75 | 140 | 392 | 12 | |
| Future Volume (Veh/h) | 42 | 15 | 50 | 124 | 8 | 245 | 7 | 375 | 75 | 140 | 392 | 12 | |
| Sign Control | Stop | | | | | | | | | | | | |
| Grade | 0% | | | | | | | | | | | | |
| Peak Hour Factor | 0.92 | | | | | | | | | | | | |
| Hourly flow rate (vph) | 46 | 16 | 54 | 135 | 9 | 266 | 8 | 408 | 82 | 152 | 426 | 13 | |
| Pedestrians | 2 | | | | | | | | | | | | |
| Lane Width (ft) | 12.0 | | | | | | | | | | | | |
| Walking Speed (ft/s) | 4.0 | | | | | | | | | | | | |
| Percent Blockage | 0 | | | | | | | | | | | | |
| Right turn flare (veh) | 3 | | | | | | | | | | | | |
| Median type | None | | | | | | | | | | | | |
| Median storage (veh) | None | | | | | | | | | | | | |
| Upstream signal (ft) | 367 | | | | | | | | | | | | |
| pX platoon unblocked | 0.82 | | | | | | | | | | | | |
| VC, conflicting volume | 1345 | 1244 | 432 | 1205 | 1210 | 457 | 439 | | | | | | 492 |
| VC1, stage 1 conf vol | | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | | |
| VCu, unblocked vol | 1311 | 1189 | 432 | 1141 | 1147 | 229 | 439 | | | | | | 272 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | | 2.2 |
| IF (s) | 17 | 88 | 91 | 0 | 94 | 60 | 99 | | | | | | 86 |
| p0 capacity (veh/h) | 56 | 131 | 623 | 107 | 139 | 660 | 1121 | | | | | | 1058 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | EB 2 | WB 2 | SB 2 | | | | | | |
| Volume Total | 116 | 410 | 498 | 152 | 439 | | | | | | | | |
| Volume Left | 46 | 135 | 8 | 152 | 0 | | | | | | | | |
| Volume Right | 54 | 266 | 82 | 0 | 13 | | | | | | | | |
| cSH | 133 | 249 | 1121 | 1058 | 1700 | | | | | | | | |
| Volumes to Capacity | 0.87 | 1.65 | 0.01 | 0.14 | 0.26 | | | | | | | | |
| Queue Length 95th (ft) | 140 | 650 | 1 | 13 | 0 | | | | | | | | |
| Control Delay (s) | 109.5 | 343.0 | 0.2 | 9.0 | 0.0 | | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | | |
| Approach Delay (s) | 109.5 | 343.0 | 0.2 | 2.3 | | | | | | | | | |
| Approach LOS | F | F | C | C | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | | |
| Average Delay | 95.9 | | | | | | | | | | | | |
| Intersection Capacity Utilization | 70.0% | | | | | | | | | | | | |
| ICU Level of Service | C | | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

3. Pleasant St & Rt 123/Maple Avenue

Background PM Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 43 | 1002 | 58 | 45 | 1408 | 56 | 9 | 6 | 17 | 6 | 14 | 37 |
| Future Volume (Veh/h) | 43 | 1002 | 58 | 45 | 1408 | 56 | 9 | 6 | 17 | 6 | 14 | 37 |
| Sign Control | Free | | | | | | | | | | | |
| Grade | -2% | | | | | | | | | | | |
| Peak Hour Factor | 0.92 | | | | | | | | | | | |
| Hourly flow rate (vph) | 47 | 1089 | 63 | 49 | 1530 | 61 | 10 | 7 | 18 | 7 | 15 | 40 |
| Pedestrians | 2 | | | | | | | | | | | |
| Lane Width (ft) | 9.7 | | | | | | | | | | | |
| Walking Speed (ft/s) | 4.0 | | | | | | | | | | | |
| Percent Blockage | 0 | | | | | | | | | | | |
| Right turn flare (veh) | 0 | | | | | | | | | | | |
| Median type | TWLTL | | | | | | | | | | | |
| Median storage (veh) | 2 | | | | | | | | | | | |
| Upstream signal (ft) | 254 | | | | | | | | | | | |
| pX platoon unblocked | 0.59 | | | | | | | | | | | |
| VC, conflicting volume | 1599 | | | | | | | | | | | |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 617 | | | | | | | | | | | |
| IC, single (s) | 4.1 | | | | | | | | | | | |
| IC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 2.2 | | | | | | | | | | | |
| IF (s) | 92 | | | | | | | | | | | |
| p0 capacity (veh/h) | 567 | | | | | | | | | | | |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
| Volume Total | 47 | 726 | 426 | 49 | 1020 | 571 | 35 | 62 | | | | |
| Volume Left | 47 | 0 | 0 | 49 | 0 | 0 | 10 | 7 | | | | |
| Volume Right | 0 | 63 | 0 | 0 | 61 | 18 | 40 | | | | | |
| cSH | 567 | 1700 | 1700 | 602 | 1700 | 1700 | 223 | 282 | | | | |
| Volumes to Capacity | 0.08 | 0.43 | 0.25 | 0.08 | 0.60 | 0.34 | 0.16 | 0.22 | | | | |
| Queue Length 95th (ft) | 7 | 0 | 0 | 7 | 0 | 0 | 14 | 21 | | | | |
| Control Delay (s) | 11.9 | 0.0 | 0.0 | 11.5 | 0.0 | 0.0 | 24.1 | 21.4 | | | | |
| Lane LOS | B | F | A | B | B | C | C | C | | | | |
| Approach Delay (s) | 0.5 | | | | | | | | | | | |
| Approach LOS | C | | | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 1.1 | | | | | | | | | | | |
| Intersection Capacity Utilization | 51.9% | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

Queues
4: Courthouse Rd/Lawyers Rd & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-------------------------|-------|------|-------|-------|-------|------|-------|------|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
| Lane Group Flow (vph) | 136 | 942 | 55 | 1513 | 92 | 354 | 188 | 377 |
| v/c Ratio | 0.93 | 0.62 | 0.52 | 1.10 | 0.75 | 0.94 | 0.93 | 0.80 |
| Control Delay | 137.2 | 21.3 | 103.0 | 96.5 | 106.8 | 94.2 | 115.6 | 66.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 137.2 | 21.3 | 103.0 | 96.5 | 106.8 | 94.2 | 115.6 | 66.1 |
| Queue Length 50th (ft) | 148 | 222 | 56 | -951 | 96 | 361 | 198 | 353 |
| Queue Length 95th (ft) | #300 | 283 | 111 | #1088 | #186 | #554 | #355 | 486 |
| Internal Link Dist (ft) | 667 | | 792 | | 621 | | 287 | |
| Turn Bay Length (ft) | 160 | 145 | | 230 | | 245 | | |
| Base Capacity (vph) | 146 | 1517 | 115 | 1371 | 128 | 388 | 204 | 478 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.93 | 0.62 | 0.48 | 1.10 | 0.72 | 0.91 | 0.92 | 0.79 |

Intersection Summary
 - Volume exceeds capacity, queue is theoretically infinite.
 - Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 - Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-----------------------------------|----------------------------------|------|-------|-------|------|-------|-------|------|
| Movement | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
| Lane Configurations | ← | ← | ← | ← | ← | ← | ← | ← |
| Traffic Volume (vph) | 125 | 808 | 59 | 51 | 1287 | 105 | 85 | 280 |
| Future Volume (vph) | 125 | 808 | 59 | 51 | 1287 | 105 | 85 | 280 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 12 |
| Grade (%) | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% |
| Total Lost time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 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 |
| Flpb. ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1562 | 3177 | 1546 | 3159 | 1711 | 1758 | 1636 | 1733 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1562 | 3177 | 1546 | 3159 | 1711 | 1758 | 1636 | 1733 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 136 | 878 | 64 | 55 | 1399 | 114 | 92 | 304 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 13 |
| Lane Group Flow (vph) | 136 | 939 | 0 | 55 | 1509 | 0 | 92 | 350 |
| Confl. Peds (#/hr) | | 6 | | 5 | | 3 | | 3 |
| Heavy Vehicles (%) | 4% | 5% | 0% | 4% | 4% | 5% | 2% | 2% |
| Turn Type | Prot | NA | Prot | NA | Prot | NA | Prot | NA |
| Protected Phases | 5 | 2 | 1 | 6 | 3 | 8 | 7 | 4 |
| Permitted Phases | | | | | | | | |
| Actuated Green, G (s) | 15.1 | 75.3 | 9.0 | 69.2 | 11.4 | 33.9 | 19.8 | 42.3 |
| Effective Green, g (s) | 15.1 | 75.3 | 9.0 | 69.2 | 11.4 | 33.9 | 19.8 | 42.3 |
| Actuated g/C Ratio | 0.09 | 0.47 | 0.06 | 0.43 | 0.07 | 0.21 | 0.12 | 0.26 |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 147 | 1495 | 86 | 1366 | 121 | 372 | 202 | 458 |
| v/s Ratio Prot | c0.09 | 0.30 | 0.04 | c0.48 | 0.05 | c0.20 | c0.11 | 0.21 |
| v/s Ratio Perm | | | | | | | | |
| v/c Ratio | 0.93 | 0.63 | 0.64 | 1.10 | 0.76 | 0.94 | 0.93 | 0.79 |
| Uniform Delay, d1 | 71.9 | 31.8 | 73.9 | 45.4 | 73.0 | 62.1 | 69.4 | 54.8 |
| Progression Factor | 1.20 | 0.60 | 1.19 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 49.8 | 1.9 | 14.5 | 58.3 | 24.1 | 31.8 | 44.0 | 9.2 |
| Delay (s) | 135.8 | 21.0 | 102.5 | 99.4 | 97.0 | 93.8 | 113.5 | 64.0 |
| Level of Service | F | C | F | F | F | F | F | E |
| Approach Delay (s) | | 35.5 | | 99.5 | | 94.5 | | 80.5 |
| Approach LOS | | D | | F | | F | | F |
| Intersection Summary | | | | | | | | |
| HCM 2000 Control Delay | 77.1 HCM 2000 Level of Service E | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 1.02 | | | | | | | |
| Actuated Cycle Length (s) | 160.0 Sum of lost time (s) 22.0 | | | | | | | |
| Intersection Capacity Utilization | 92.8% ICU Level of Service F | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | |
| c Critical Lane Group | | | | | | | | |

Marco Polo Site, 3/14/2016 Background PM Conditions
 Wells + Associates
 Synchro 9 Report
 Page 5

Queues
9. Nutley Street & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|-------------------------|------|------|------|------|------|------|------|------|------|
| Lane Group | 45 | 830 | 272 | 1230 | 286 | 298 | 403 | 76 | 336 |
| Lane Group Flow (vph) | 0.38 | 0.76 | 0.87 | 0.83 | 0.91 | 0.91 | 0.54 | 0.22 | 0.94 |
| v/c Ratio | 33.6 | 53.7 | 63.8 | 36.7 | 94.3 | 93.8 | 13.1 | 56.2 | 97.1 |
| Control Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 33.6 | 53.7 | 63.8 | 36.7 | 94.3 | 93.8 | 13.1 | 56.2 | 97.1 |
| Total Delay | 25 | 409 | 168 | 593 | 309 | 323 | 82 | 68 | 348 |
| Queue Length 50th (ft) | 49 | 493 | #335 | 737 | #486 | #503 | 187 | 120 | #546 |
| Queue Length 95th (ft) | 206 | | | 1528 | | 575 | | | 583 |
| Internal Link Dist (ft) | 60 | 285 | | 215 | | | | | |
| Turn Bay Length (ft) | 120 | 1094 | 320 | 1492 | 325 | 338 | 757 | 347 | 361 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.38 | 0.76 | 0.85 | 0.82 | 0.88 | 0.88 | 0.53 | 0.22 | 0.93 |

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
9. Nutley Street & Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
| Lane Configurations | 41 | 593 | 170 | 250 | 1092 | 40 | 333 | 204 | 371 | 70 | 271 | 38 |
| Traffic Volume (vph) | 41 | 593 | 170 | 250 | 1092 | 40 | 333 | 204 | 371 | 70 | 271 | 38 |
| Future Volume (vph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Ideal Flow (vphpl) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Total Lost time (s) | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lane Util. Factor | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. 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 |
| Fllb. ped/bikes | 1.00 | 0.97 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | 1.00 |
| Frt | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.98 |
| Flt Protected | 1770 | 3374 | 1770 | 3512 | 1681 | 1747 | 1583 | 1770 | 1822 | 1770 | 1822 | 1770 |
| Sald. Flow (prot) | 0.09 | 1.00 | 0.13 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.98 |
| Flt Permitted | 170 | 3374 | 250 | 3512 | 1681 | 1747 | 1583 | 1770 | 1822 | 1770 | 1822 | 1770 |
| Sald. Flow (perm) | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak-Hour factor, PHF | 45 | 645 | 185 | 272 | 1187 | 43 | 362 | 222 | 403 | 76 | 295 | 41 |
| Adj. Flow (vph) | 0 | 16 | 0 | 0 | 2 | 0 | 0 | 0 | 188 | 0 | 3 | 0 |
| RTOR Reduction (vph) | 45 | 814 | 0 | 272 | 1228 | 0 | 286 | 298 | 215 | 76 | 333 | 0 |
| Lane Group Flow (vph) | 17 | 11 | 11 | 11 | 17 | 8 | 4 | 4 | 4 | 4 | 4 | 8 |
| Confl. Peds. (#/hr) | pm+pt | NA | pm+pt | NA | pm+pt | NA | Split | NA | Split | NA | Split | NA |
| Turn Type | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 8 | 8 | 1 | 4 | 4 |
| Protected Phases | 2 | | | | | | | | | | | |
| Permitted Phases | 55.7 | 50.9 | 77.9 | 66.1 | 30.1 | 30.1 | 57.1 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 |
| Actuated Green, G (s) | 55.7 | 50.9 | 77.9 | 66.1 | 30.1 | 30.1 | 57.1 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 |
| Effective Green, g (s) | 0.35 | 0.32 | 0.49 | 0.41 | 0.19 | 0.19 | 0.36 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 |
| Actuated g/C Ratio | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Clearance Time (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 107 | 1073 | 311 | 1450 | 316 | 328 | 564 | 342 | 353 | 316 | 328 | 564 |
| Lane Grp Cap (vph) | 0.01 | 0.24 | 0.13 | 0.32 | 0.17 | 0.35 | 0.17 | 0.17 | 0.14 | 0.04 | 0.18 | 0.18 |
| v/s Ratio Prot | 0.42 | 0.76 | 0.87 | 0.85 | 0.91 | 0.91 | 0.91 | 0.91 | 0.38 | 0.22 | 0.94 | 0.94 |
| v/s Ratio Perm | 38.1 | 49.0 | 34.4 | 42.4 | 63.6 | 63.6 | 38.3 | 54.3 | 63.6 | 63.6 | 63.6 | 63.6 |
| Uniform Delay, d1 | 1.00 | 1.00 | 1.17 | 0.73 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Progression Factor | 2.7 | 5.0 | 22.7 | 6.3 | 27.7 | 27.7 | 27.5 | 0.4 | 0.3 | 33.2 | 33.2 | 33.2 |
| Incremental Delay, d2 | 40.8 | 54.1 | 63.0 | 37.3 | 91.2 | 91.1 | 38.7 | 54.7 | 96.8 | 96.8 | 96.8 | 96.8 |
| Delay (s) | D | D | E | D | F | F | D | D | D | D | D | F |
| Level of Service | 53.4 | D | 41.9 | D | 69.7 | E | 89.0 | F | F | F | F | F |
| Approach Delay (s) | D | D | D | D | D | D | D | D | D | D | D | D |
| Approach LOS | D | D | D | D | D | D | D | D | D | D | D | D |

| Intersection Summary | |
|-----------------------------------|-------|
| HCM 2000 Control Delay | 57.0 |
| HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.92 |
| Actuated Cycle Length (s) | 160.0 |
| Sum of lost time (s) | 28.0 |
| Intersection Capacity Utilization | 92.2% |
| ICU Level of Service | F |
| Analysis Period (min) | 15 |
| c Critical Lane Group | |

1. Pleasant St & Parking Lot/Church Street

Background AM Conditions Improvement #1

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Lane Configurations | | 4 | | | | | | 4 | | | 4 | |
| Traffic Volume (veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 27 | 48 | 8 | 48 | 1 |
| Future Volume (Veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 27 | 48 | 8 | 48 | 1 |
| Sign Control | Stop | 0% | Stop | 0% | 0% | 0% | Free | 2% | Free | Free | Free | -2% |
| Grade | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak Hour Factor | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 29 | 52 | 9 | 52 | 1 |
| Hourly flow rate (vph) | | | | | | | | | | | | |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | | | | | | | | | | | | |
| VC, conflicting volume | 134 | 160 | 52 | 134 | 134 | 55 | 53 | | | | | 81 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 134 | 160 | 52 | 134 | 134 | 55 | 53 | | | | | 81 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| IF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | 99 |
| CM capacity (veh/h) | 833 | 726 | 1015 | 831 | 750 | 1012 | 1553 | | | | | 1517 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volumes Total | 2 | 85 | 62 | | | | | | | | | |
| Volume Left | 1 | 4 | 9 | | | | | | | | | |
| Volume Right | 1 | 52 | 1 | | | | | | | | | |
| cSH | 915 | 1553 | 1517 | | | | | | | | | |
| Volumes to Capacity | 0.00 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | | | | | | | | | |
| Control Delay (s) | 8.9 | 0.4 | 1.1 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.9 | 0.4 | 1.1 | | | | | | | | | |
| Approach LOS | A | | | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | | | | | | | | | 0.8 |
| Intersection Capacity Utilization | | | | | | | | | | | | 15.5% |
| ICU Level of Service | | | | | | | | | | | | A |
| Analysis Period (min) | | | | | | | | | | | | 15 |

2. Lawyers Rd & Church Street

Background AM Conditions Improvement #1

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|-------|
| Lane Configurations | | 4 | | | | | | 4 | | | 4 | |
| Traffic Volume (veh/h) | 17 | 22 | 22 | 24 | 24 | 1 | 74 | 8 | 342 | 77 | 301 | 411 |
| Future Volume (Veh/h) | 17 | 22 | 22 | 24 | 24 | 1 | 74 | 8 | 342 | 77 | 301 | 411 |
| Sign Control | Stop | 0% | Stop | 0% | 0% | 0% | Free | 0% | Free | Free | Free | 0% |
| Grade | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak Hour Factor | 18 | 24 | 24 | 26 | 26 | 1 | 80 | 9 | 372 | 84 | 327 | 447 |
| Hourly flow rate (vph) | | | | | | | | | | | | |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | | | | | | | | | | | | |
| VC, conflicting volume | 1578 | 1579 | 452 | 1546 | 1541 | 415 | 455 | | | | | 456 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 1595 | 1596 | 452 | 1556 | 1550 | 188 | 455 | | | | | 238 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| IF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 62 | 60 | 96 | 33 | 98 | 89 | 99 | | | | | 70 |
| CM capacity (veh/h) | 48 | 61 | 601 | 39 | 66 | 703 | 1106 | | | | | 1099 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 | | | | | | | |
| Volumes Total | 66 | 107 | 465 | 327 | 455 | | | | | | | |
| Volume Left | 18 | 26 | 9 | 327 | 0 | | | | | | | |
| Volume Right | 24 | 80 | 84 | 0 | 8 | | | | | | | |
| cSH | 87 | 150 | 1106 | 1099 | 1700 | | | | | | | |
| Volumes to Capacity | 0.76 | 0.71 | 0.01 | 0.30 | 0.27 | | | | | | | |
| Queue Length 95th (ft) | 96 | 105 | 1 | 31 | 0 | | | | | | | |
| Control Delay (s) | 116.1 | 73.4 | 0.3 | 9.7 | 0.0 | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | |
| Approach Delay (s) | 116.1 | 73.4 | 0.3 | 4.0 | | | | | | | | |
| Approach LOS | F | F | | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | | | | | | | | | 13.2 |
| Intersection Capacity Utilization | | | | | | | | | | | | 64.1% |
| ICU Level of Service | | | | | | | | | | | | C |
| Analysis Period (min) | | | | | | | | | | | | 15 |

3: Pleasant St & Rt 123/Maple Avenue

Background AM Conditions Improvement #1

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | 51 | 1236 | 52 | 14 | 656 | 29 | 4 | 2 | 15 | 7 | 9 | 39 |
| Traffic Volume (veh/h) | 51 | 1236 | 52 | 14 | 656 | 29 | 4 | 2 | 15 | 7 | 9 | 39 |
| Future Volume (Veh/h) | 51 | 1236 | 52 | 14 | 656 | 29 | 4 | 2 | 15 | 7 | 9 | 39 |
| Sign Control | Free | Free | Free | Free | Free | Free | Free | Free | Free | Free | Free | Free |
| Grade | -2% | -2% | -2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 55 | 1343 | 57 | 15 | 713 | 32 | 4 | 2 | 16 | 8 | 10 | 42 |
| Pedestrians | | | | 2 | | | | 10 | | | | 8 |
| Lane Width (ft) | | | | 9.7 | | | | 16.0 | | | | 15.0 |
| Walking Speed (ft/s) | | | | 4.0 | | | | 4.0 | | | | 4.0 |
| Percent Blockage | | | | 0 | | | | 1 | | | | 1 |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | TWLT | TL | TL | TWLT | TL |
| Median storage (veh) | 2 | | | 2 | | | | | | | | |
| Walking speed (ft/s) | 254 | | | 747 | | | | | | | | |
| Upstream signal (ft) | 0.88 | | | | | | | 0.88 | | | | 0.88 |
| pX platoon unblocked | 753 | | | 1410 | | | | 1925 | | | | 2274 |
| VC, conflicting volume | | | | | | | | 1492 | | | | 712 |
| VC1, stage 1 conf vol | | | | | | | | 434 | | | | 767 |
| VC2, stage 2 conf vol | | | | | | | | 1771 | | | | 2171 |
| VCu, unblocked vol | 432 | | | 1410 | | | | 1771 | | | | 2171 |
| IC, single (s) | 4.1 | | | 4.1 | | | | 7.5 | | | | 6.5 |
| IC, 2 stage (s) | 2.2 | | | 2.2 | | | | 6.5 | | | | 5.5 |
| p0 queue free % | 94 | | | 97 | | | | 3.5 | | | | 4.0 |
| ICM capacity (veh/h) | 975 | | | 474 | | | | 97 | | | | 99 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
| Volumes Total | 55 | 895 | 505 | 15 | 475 | 270 | 22 | 60 | | | | |
| Volume Left | 55 | 0 | 0 | 15 | 0 | 0 | 4 | 8 | | | | |
| Volume Right | 0 | 0 | 57 | 0 | 0 | 32 | 16 | 42 | | | | |
| cSH | 975 | 1700 | 1700 | 474 | 1700 | 1700 | 243 | 409 | | | | |
| Volumes to Capacity | 0.06 | 0.53 | 0.30 | 0.03 | 0.28 | 0.16 | 0.09 | 0.15 | | | | |
| Queue Length 95th (ft) | 4 | 0 | 0 | 2 | 0 | 0 | 7 | 13 | | | | |
| Control Delay (s) | 8.9 | 0.0 | 0.0 | 12.8 | 0.0 | 0.0 | 21.3 | 15.3 | | | | |
| Lane LOS | A | B | B | C | C | C | C | C | | | | |
| Approach Delay (s) | 0.3 | | | 0.3 | | | 21.3 | 15.3 | | | | |
| Approach LOS | C | | | C | | | C | C | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 0.9 | | | | | | | | | | | |
| Intersection Capacity Utilization | 53.0% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| | ICU Level of Service A | | | | | | | | | | | |

4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background AM Conditions Improvement #1

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | |
|-----------------------------|---|------|------|------|------|------|------|------|-----|-----|-----|--|
| Lane Group Flow (vph) | 89 | 1225 | 30 | 741 | 55 | 331 | 168 | 330 | | | | |
| v/c Ratio | 0.29 | 0.79 | 0.16 | 0.53 | 0.51 | 0.92 | 0.84 | 0.66 | | | | |
| Control Delay | 8.8 | 19.2 | 16.9 | 29.6 | 79.4 | 83.0 | 93.3 | 50.6 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Total Delay | 8.8 | 19.2 | 16.9 | 29.6 | 79.4 | 83.0 | 93.3 | 50.6 | | | | |
| Queue Length 50th (ft) | 13 | 454 | 12 | 255 | 49 | 286 | 151 | 260 | | | | |
| Queue Length 95th (ft) | 27 | 687 | 29 | 318 | 96 | 459 | 270 | 372 | | | | |
| Internal Link Dist (ft) | 667 | | | 792 | | | 621 | 287 | | | | |
| Turn Bay Length (ft) | 160 | | | 145 | | | 230 | 245 | | | | |
| Base Capacity (vph) | 309 | 1560 | 192 | 1392 | 122 | 378 | 210 | 501 | | | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Reduced v/c Ratio | 0.29 | 0.79 | 0.16 | 0.53 | 0.45 | 0.88 | 0.80 | 0.66 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| # | 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | | |
| | Queue shown is maximum after two cycles. | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background AM Conditions Improvement #1

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|-------|-------|------|------|-------|------|-------|-------|------|-------|------|
| Lane Configurations | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ |
| Traffic Volume (vph) | 82 | 1099 | 28 | 28 | 569 | 113 | 51 | 232 | 73 | 155 | 226 | 77 |
| Future Volume (vph) | 82 | 1099 | 28 | 28 | 569 | 113 | 51 | 232 | 73 | 155 | 226 | 77 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 |
| Grade (%) | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Total Lost Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frpb, 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 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flt | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 3196 | 1546 | 3103 | 1711 | 1729 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 |
| Flt/Permitted | 0.26 | 1.00 | 0.11 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 424 | 3196 | 180 | 3103 | 1711 | 1729 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 |
| 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) | 89 | 1195 | 30 | 30 | 618 | 123 | 55 | 252 | 79 | 168 | 246 | 84 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 8 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 89 | 1224 | 0 | 30 | 729 | 0 | 55 | 323 | 0 | 168 | 321 | 0 |
| Confl. Peds. (#/hr) | 6 | 6 | 6 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 1 |
| Heavy Vehicles (%) | 4% | 5% | 2% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Turn Type | pm+pl | MA | pm+pl | NA | Prot | NA | Prot | NA | Prot | MA | Prot | MA |
| Protected Phases | 5 | 2 | 1 | 6 | 3 | 8 | 7 | 4 | 7 | 4 | 7 | 4 |
| Permitted Phases | 2 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Actuated Green, G (s) | 75.3 | 65.3 | 67.3 | 61.3 | 7.7 | 29.6 | 7.7 | 29.6 | 17.1 | 39.0 | 17.1 | 39.0 |
| Effective Green, g (s) | 75.3 | 65.3 | 67.3 | 61.3 | 7.7 | 29.6 | 7.7 | 29.6 | 17.1 | 39.0 | 17.1 | 39.0 |
| Actuated g/C Ratio | 0.54 | 0.47 | 0.48 | 0.44 | 0.06 | 0.21 | 0.06 | 0.21 | 0.12 | 0.28 | 0.12 | 0.28 |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 309 | 1490 | 145 | 1358 | 94 | 365 | 94 | 365 | 199 | 492 | 199 | 492 |
| v/s Ratio Prot | c0.02 | c0.38 | 0.01 | 0.24 | 0.03 | c0.19 | 0.03 | c0.19 | c0.10 | 0.18 | c0.10 | 0.18 |
| v/s Ratio Perm | 0.13 | 0.09 | 0.09 | 0.09 | 0.59 | 0.89 | 0.59 | 0.89 | 0.84 | 0.65 | 0.84 | 0.65 |
| v/c Ratio | 0.29 | 0.82 | 0.21 | 0.54 | 0.21 | 0.54 | 0.21 | 0.54 | 0.21 | 0.54 | 0.21 | 0.54 |
| Uniform Delay, d1 | 17.5 | 32.3 | 23.1 | 28.9 | 64.6 | 53.6 | 60.1 | 53.6 | 60.1 | 44.5 | 60.1 | 44.5 |
| Progression Factor | 0.43 | 0.47 | 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 | 4.9 | 0.7 | 1.5 | 9.0 | 21.7 | 26.5 | 21.7 | 26.5 | 3.1 | 26.5 | 3.1 |
| Delay (s) | 8.0 | 20.0 | 23.9 | 30.4 | 73.6 | 75.2 | 86.6 | 75.2 | 86.6 | 47.6 | 86.6 | 47.6 |
| Level of Service | A | B | C | C | E | E | F | E | F | D | F | D |
| Approach Delay (s) | 19.2 | 30.2 | 30.2 | 30.2 | 75.0 | 75.0 | 60.8 | 75.0 | 60.8 | 60.8 | 60.8 | 60.8 |
| Approach LOS | B | B | C | C | E | E | F | E | F | D | F | D |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 36.3 HCM 2000 Level of Service D | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.82 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 Sum of lost Time (s) 22.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 83.3% ICU Level of Service E | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Queues
9: Nutley Street & Maple Avenue

Background AM Conditions Improvement #1

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|------|------|------|------|------|------|------|------|-------|------|------|-------|
| Lane Group Flow (vph) | 13 | 1309 | 196 | 573 | 167 | 172 | 300 | 79 | 332 | 300 | 79 | 332 |
| v/c Ratio | 0.03 | 0.95 | 0.88 | 0.33 | 0.74 | 0.73 | 0.58 | 0.25 | 1.02 | 0.58 | 0.25 | 1.02 |
| Control Delay | 16.9 | 56.8 | 90.9 | 12.5 | 77.1 | 75.9 | 18.7 | 52.8 | 111.0 | 18.7 | 52.8 | 111.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 16.9 | 56.8 | 90.9 | 12.5 | 77.1 | 75.9 | 18.7 | 52.8 | 111.0 | 18.7 | 52.8 | 111.0 |
| Queue Length 50th (ft) | 5 | 608 | 148 | 82 | 153 | 157 | 72 | 63 | 326 | 72 | 63 | 326 |
| Queue Length 95th (ft) | 17 | #770 | #299 | 106 | 237 | 242 | 164 | 114 | #525 | 164 | 114 | #525 |
| Internal Link Dist (ft) | 60 | 206 | 285 | 1528 | 215 | 215 | 575 | 575 | 215 | 215 | 575 | 575 |
| Turn Bay Length (ft) | 60 | 206 | 285 | 1528 | 215 | 215 | 575 | 575 | 215 | 215 | 575 | 575 |
| Base Capacity (vph) | 392 | 1372 | 224 | 1758 | 264 | 274 | 539 | 310 | 325 | 539 | 310 | 325 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.03 | 0.95 | 0.88 | 0.33 | 0.63 | 0.63 | 0.56 | 0.25 | 1.02 | 0.56 | 0.25 | 1.02 |
| Intersection Summary | | | | | | | | | | | | |
| - Volume exceeds capacity, queue is theoretically infinite. | | | | | | | | | | | | |
| - Queue shown is maximum after two cycles. | | | | | | | | | | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | | | |
| - Queue shown is maximum after two cycles. | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
9. Nutley Street & Maple Avenue

Background AM Conditions Improvement #1

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|-------|------|-------|-------|------|------|-------|-------|-------|-------|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Traffic Volume (vph) | 12 | 1093 | 111 | 180 | 489 | 38 | 192 | 120 | 276 | 73 | 289 | 17 |
| Future Volume (vph) | 12 | 1093 | 111 | 180 | 489 | 38 | 192 | 120 | 276 | 73 | 289 | 17 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Frb. ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fllb. 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 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | 1.00 | 0.99 |
| Fll Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.99 |
| Satd. Flow (prot) | 1764 | 3481 | 1770 | 3492 | 1681 | 1748 | 1569 | 1770 | 1846 | 1770 | 1846 | 1770 |
| Fll Permitted | 0.44 | 1.00 | 0.06 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 |
| Satd. Flow (perm) | 811 | 3481 | 120 | 3492 | 1681 | 1748 | 1569 | 1770 | 1846 | 1770 | 1846 | 1770 |
| 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) | 13 | 1188 | 121 | 196 | 532 | 41 | 209 | 130 | 300 | 79 | 314 | 18 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 0 | 151 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 13 | 1304 | 0 | 196 | 569 | 0 | 167 | 172 | 149 | 79 | 330 | 0 |
| Conf. Ped. (#/hr) | 6 | 3 | 3 | 3 | 3 | 6 | 1 | 2 | 2 | 2 | 2 | 1 |
| Turn Type | pm+pl | NA | pm+pl | NA | NA | Split | NA | NA | pm+ov | Split | NA | NA |
| Permitted Phases | 5 | 2 | NA | 1 | 6 | NA | 8 | 8 | 1 | 4 | 4 | 4 |
| Prohibited Phases | 2 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Actuated Green, G (s) | 57.3 | 54.9 | 75.5 | 66.1 | 18.9 | 18.9 | 18.9 | 32.5 | 24.6 | 24.6 | 24.6 | 24.6 |
| Effective Green, g (s) | 57.3 | 54.9 | 75.5 | 66.1 | 18.9 | 18.9 | 18.9 | 32.5 | 24.6 | 24.6 | 24.6 | 24.6 |
| Actuated q/C Ratio | 0.41 | 0.39 | 0.54 | 0.47 | 0.13 | 0.13 | 0.13 | 0.23 | 0.18 | 0.18 | 0.18 | 0.18 |
| Clearance Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 348 | 1365 | 225 | 1648 | 226 | 235 | 442 | 311 | 324 | 324 | 324 | 324 |
| v/s Ratio Prot | 0.00 | c0.37 | c0.08 | 0.16 | c0.10 | 0.10 | 0.03 | 0.04 | c0.18 | 0.04 | c0.18 | c0.18 |
| v/s Ratio Perm | 0.01 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 |
| v/c Ratio | 0.04 | 0.95 | 0.87 | 0.35 | 0.74 | 0.73 | 0.34 | 0.25 | 1.02 | 0.25 | 1.02 | 1.02 |
| Uniform Delay, d1 | 24.6 | 41.3 | 41.8 | 23.3 | 58.2 | 58.1 | 44.8 | 49.8 | 57.7 | 49.8 | 57.7 | 57.7 |
| Progression Factor | 1.00 | 1.00 | 1.76 | 0.55 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.0 | 15.7 | 28.4 | 0.6 | 11.9 | 11.1 | 0.5 | 0.4 | 55.1 | 0.4 | 55.1 | 55.1 |
| Delay (s) | C | E | F | F | B | E | E | D | D | D | F | F |
| Level of Service | C | E | F | F | B | E | E | D | D | D | F | F |
| Approach Delay (s) | 56.8 | 35.8 | 35.8 | 35.8 | 35.8 | 35.8 | 58.2 | 58.2 | 58.2 | 58.2 | 58.2 | 58.2 |
| Approach LOS | E | E | E | E | D | D | E | E | E | E | F | F |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 57.7 | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.92 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 92.5% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
1. Pleasant St & Parking Lot/Church Street

Background PM Conditions Improvement #1

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 | 1 |
| Traffic Volume (veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 | 1 |
| Future Volume (Veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 | 1 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 2% | 2% | 2% | 2% | 2% | 2% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 75 | 17 | 12 | 17 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pK, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 135 | 144 | 18 | 140 | 136 | 84 | 18 | | | | | 92 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCU, unblocked vol | 135 | 144 | 18 | 140 | 136 | 84 | 18 | | | | | 92 |
| iC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| iC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | 99 |
| dM capacity (veh/h) | 829 | 739 | 1061 | 820 | 747 | 976 | 1599 | | | | | 1503 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volume Total | 7 | 97 | 30 | | | | | | | | | |
| Volume Left | 2 | 5 | 12 | | | | | | | | | |
| Volume Right | 4 | 17 | 1 | | | | | | | | | |
| cSH | 929 | 1599 | 1503 | | | | | | | | | |
| Volume to Capacity | 0.01 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 1 | 0 | 1 | | | | | | | | | |
| Control Delay (s) | 8.9 | 0.4 | 3.0 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.9 | 0.4 | 3.0 | | | | | | | | | |
| Approach LOS | A | A | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 1.4 | | | | | | | | | | | |
| Intersection Capacity Utilization | 15.4% | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

2. Lawyers Rd & Church Street

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 42 | 15 | 50 | 124 | 8 | 245 | 7 | 375 | 75 | 140 | 392 | 12 |
| Future Volume (Veh/h) | 42 | 15 | 50 | 124 | 8 | 245 | 7 | 375 | 75 | 140 | 392 | 12 |
| Sign Control | Stop | 0% | 0% | Stop | 0% | 0% | Free | 0% | Free | 0% | Free | 0% |
| Grade | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak Hour Factor | 46 | 16 | 54 | 135 | 9 | 266 | 8 | 408 | 82 | 152 | 426 | 13 |
| Hourly flow rate (vph) | | | | | | | | | | | | |
| Pedestrians | | | | 2 | | | | | | | | 6 |
| Lane Width (ft) | | | | 120 | | | | | | | | 120 |
| Walking Speed (ft/s) | | | | 4.0 | | | | | | | | 4.0 |
| Percent Blockage | | | | 0 | | | | | | | | 1 |
| Right turn flare (veh) | | 3 | | | 2 | | | | | | | None |
| Median type | | | | | | | | | | | | None |
| Median storage (veh) | | | | | | | | | | | | 367 |
| Upstream signal (ft) | | | | | | | | | | | | 0.80 |
| pX platoon unblocked | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | | | | | | 492 |
| VC, conflicting volume | 1345 | 1244 | 432 | 1205 | 1210 | 457 | 439 | | | | | |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 1306 | 1180 | 432 | 1130 | 1136 | 192 | 439 | | | | | 236 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| IF (s) | 17 | 88 | 91 | 0 | 93 | 60 | 99 | | | | | 86 |
| p0 capacity (veh/h) | 55 | 129 | 623 | 105 | 137 | 673 | 1121 | | | | | 1060 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | EB 2 | WB 2 | NB 2 | SB 2 | | | | |
| Volume Total | 116 | 410 | 498 | 152 | 439 | | | | | | | |
| Volume Left | 46 | 135 | 8 | 152 | 0 | | | | | | | |
| Volume Right | 54 | 266 | 82 | 0 | 13 | | | | | | | |
| cSH | 132 | 247 | 1121 | 1060 | 1700 | | | | | | | |
| Volume to Capacity | 0.88 | 1.66 | 0.01 | 0.14 | 0.26 | | | | | | | |
| Queue Length 95th (ft) | 142 | 655 | 1 | 13 | 0 | | | | | | | |
| Control Delay (s) | 112.4 | 348.8 | 0.2 | 9.0 | 0.0 | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | |
| Approach Delay (s) | 112.4 | 348.8 | 0.2 | 2.3 | | | | | | | | |
| Approach LOS | F | F | C | C | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 97.5 | | | | | | | | | | | |
| Intersection Capacity Utilization | 70.0% | | | | | | | | | | | |
| ICU Level of Service | C | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

3. Pleasant St & Rt 123/Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|--------|------|------|------|------|------|------|------|--------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 43 | 1002 | 58 | 45 | 1408 | 56 | 9 | 6 | 17 | 6 | 14 | 37 |
| Future Volume (Veh/h) | 43 | 1002 | 58 | 45 | 1408 | 56 | 9 | 6 | 17 | 6 | 14 | 37 |
| Sign Control | Free | -2% | Free | Free | 4% | Free | 4% | 4% | Stop | Stop | Stop | -2% |
| Grade | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak Hour Factor | 47 | 1089 | 63 | 49 | 1530 | 61 | 10 | 7 | 18 | 7 | 15 | 40 |
| Hourly flow rate (vph) | | | | | | | | | | | | |
| Pedestrians | | | | 2 | | | | | | | | 8 |
| Lane Width (ft) | | | | 9.7 | | | | | | | | 15.0 |
| Walking Speed (ft/s) | | | | 4.0 | | | | | | | | 4.0 |
| Percent Blockage | | | | 0 | | | | | | | | 1 |
| Right turn flare (veh) | | | | | | | | | | | | 1 |
| Median type | | | | TW/LTL | | | | | | | | TW/LTL |
| Median storage (veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 254 | | | 747 | | | | | | | |
| pX platoon unblocked | 0.55 | | | 1162 | | | | | 0.55 | 0.55 | 0.55 | 0.55 |
| VC, conflicting volume | 1599 | | | | | | | | 2135 | 2922 | 588 | 2328 |
| VC1, stage 1 conf vol | | | | | | | | | 1224 | 1224 | 1666 | 1666 |
| VC2, stage 2 conf vol | | | | | | | | | 910 | 1697 | 662 | 1256 |
| VCu, unblocked vol | 465 | | | 1162 | | | | | 1435 | 2858 | 588 | 1785 |
| IC, single (s) | 4.1 | | | 4.1 | | | | | 7.5 | 6.5 | 6.9 | 7.5 |
| IC, 2 stage (s) | | | | | | | | | 6.5 | 5.5 | 6.5 | 5.5 |
| p0 queue free % | 2.2 | | | 2.2 | | | | | 3.5 | 4.0 | 3.3 | 3.5 |
| IF (s) | 92 | | | 92 | | | | | 94 | 95 | 96 | 89 |
| p0 capacity (veh/h) | 607 | | | 602 | | | | | 159 | 138 | 451 | 181 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 2 | SB 1 | | | |
| Volume Total | 47 | 726 | 426 | 49 | 1020 | 571 | 35 | 62 | | | | |
| Volume Left | 47 | 0 | 0 | 49 | 0 | 0 | 10 | 7 | | | | |
| Volume Right | 0 | 63 | 0 | 0 | 61 | 18 | 40 | | | | | |
| cSH | 607 | 1700 | 1700 | 602 | 1700 | 1700 | 228 | 286 | | | | |
| Volume to Capacity | 0.08 | 0.43 | 0.25 | 0.08 | 0.60 | 0.34 | 0.15 | 0.22 | | | | |
| Queue Length 95th (ft) | 6 | 0 | 0 | 7 | 0 | 0 | 13 | 20 | | | | |
| Control Delay (s) | 11.4 | 0.0 | 0.0 | 11.5 | 0.0 | 0.0 | 23.6 | 21.0 | | | | |
| Lane LOS | B | F | F | B | C | C | C | C | | | | |
| Approach Delay (s) | 0.4 | | | 0.3 | | | 23.6 | 21.0 | | | | |
| Approach LOS | C | | | C | | | C | C | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 1.1 | | | | | | | | | | | |
| Intersection Capacity Utilization | 51.9% | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

Queues
4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background PM Conditions Improvement #1

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-------------------------|-------|------|------|------|-------|-------|-------|------|
| Lane Group | 136 | 942 | 55 | 1513 | 92 | 354 | 188 | 377 |
| Lane Group Flow (vph) | 0.93 | 0.58 | 0.20 | 0.99 | 0.87 | 1.03 | 0.97 | 0.85 |
| v/c Ratio | 105.3 | 16.5 | 12.5 | 59.5 | 129.5 | 116.6 | 125.5 | 72.1 |
| Control Delay | 0.0 | 0.0 | 0.0 | 10.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 105.3 | 16.5 | 12.5 | 70.1 | 129.5 | 116.6 | 125.5 | 72.1 |
| Total Delay | 103 | 183 | 15 | 831 | 97 | 390 | 199 | 362 |
| Queue Length 50th (ft) | #242 | 233 | 32 | #996 | #209 | #602 | #366 | #534 |
| Queue Length 95th (ft) | 667 | 667 | 792 | 792 | 621 | 621 | 287 | 287 |
| Internal Link Dist (ft) | 160 | 145 | 230 | 230 | 230 | 230 | 245 | 245 |
| Turn Bay Length (ft) | 147 | 1611 | 270 | 1524 | 106 | 344 | 194 | 446 |
| Base Capacity (vph) | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.93 | 0.58 | 0.20 | 1.03 | 0.87 | 1.03 | 0.97 | 0.85 |

Intersection Summary
 - Volume exceeds capacity, queue is theoretically infinite.
 - Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 - Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background PM Conditions Improvement #1

| Movement | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|------|-------|-------|-------|-------|-------|------|------|
| Lane Configurations | ← | ← | ← | ← | ← | ← | ← | ← | ← |
| Traffic Volume (vph) | 125 | 808 | 59 | 51 | 1287 | 105 | 85 | 280 | 46 |
| Future Volume (vph) | 125 | 808 | 59 | 51 | 1287 | 105 | 85 | 280 | 46 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 10 | 9 | 12 | 11 | 11 | 12 | 10 |
| Grade (%) | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% |
| Total Lost time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. ped/bikes | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.98 | 1.00 | 0.94 | 1.00 |
| Frb. Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 3177 | 1546 | 3159 | 1711 | 1758 | 1636 | 1733 | 1733 |
| Frb. Permitted | 0.05 | 1.00 | 0.22 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 82 | 3177 | 357 | 3159 | 1711 | 1758 | 1636 | 1733 | 1733 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 136 | 878 | 64 | 55 | 1399 | 114 | 92 | 304 | 50 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 136 | 939 | 0 | 55 | 1509 | 0 | 92 | 350 | 0 |
| Confl. Peds. (#/hr) | 6 | 6 | 6 | 6 | 5 | 5 | 3 | 3 | 1 |
| Heavy Vehicles (%) | 4% | 5% | 0% | 4% | 2% | 2% | 2% | 3% | 3% |
| Turn Type | pm+pl | NA | pm+pl | NA | Prot | NA | Prot | NA | NA |
| Protected Phases | 5 | 2 | 1 | 6 | 3 | 8 | 7 | 4 | 4 |
| Permitted Phases | 2 | 6 | 6 | 6 | 3 | 8 | 7 | 4 | 4 |
| Actuated Green, G (s) | 91.0 | 80.0 | 85.0 | 77.0 | 10.0 | 31.0 | 19.0 | 40.0 | 40.0 |
| Effective Green, g (s) | 91.0 | 80.0 | 85.0 | 77.0 | 10.0 | 31.0 | 19.0 | 40.0 | 40.0 |
| Actuated g/C Ratio | 0.57 | 0.50 | 0.53 | 0.48 | 0.06 | 0.19 | 0.12 | 0.25 | 0.25 |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 148 | 1588 | 249 | 1520 | 106 | 340 | 194 | 433 | 433 |
| v/s Ratio Prot | c0.06 | 0.30 | 0.01 | c0.48 | 0.05 | c0.20 | c0.11 | 0.21 | 0.21 |
| v/s Ratio Perm | 0.46 | 0.11 | 0.11 | 0.11 | 0.05 | 0.20 | 0.11 | 0.21 | 0.21 |
| v/c Ratio | 0.92 | 0.59 | 0.22 | 0.99 | 0.87 | 1.03 | 0.97 | 0.84 | 0.84 |
| Uniform Delay, d1 | 49.0 | 28.4 | 19.8 | 41.2 | 74.3 | 64.5 | 70.2 | 57.0 | 57.0 |
| Progression Factor | 1.34 | 0.53 | 0.75 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 47.8 | 1.5 | 0.4 | 21.4 | 47.9 | 56.6 | 55.0 | 13.4 | 13.4 |
| Delay (s) | 113.3 | 16.5 | 15.4 | 60.1 | 122.3 | 121.1 | 125.2 | 70.3 | 70.3 |
| Level of Service | F | B | B | E | F | F | F | E | E |
| Approach Delay (s) | 28.7 | 58.5 | 58.5 | 121.3 | 121.3 | 121.3 | 88.6 | 88.6 | 88.6 |
| Approach LOS | C | C | E | E | F | F | F | F | F |
| Intersection Summary | | | | | | | | | |
| HCM 2000 Control Delay | 62.0 HCM 2000 Level of Service E | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.99 | | | | | | | | |
| Actuated Cycle Length (s) | 160.0 Sum of lost time (s) | | | | | | | | |
| Intersection Capacity Utilization | 92.8% ICU Level of Service F | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | |
| c Critical Lane Group | | | | | | | | | |

Queues
9. Nutley Street & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|-------------------------|------|------|------|------|------|------|------|------|------|
| Lane Group | 45 | 830 | 272 | 1230 | 286 | 298 | 403 | 76 | 336 |
| Lane Group Flow (vph) | 0.38 | 0.76 | 0.87 | 0.83 | 0.91 | 0.91 | 0.54 | 0.22 | 0.94 |
| v/c Ratio | 33.6 | 53.7 | 63.8 | 36.3 | 94.3 | 93.8 | 13.1 | 56.2 | 97.1 |
| Control Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 33.6 | 53.7 | 63.8 | 36.3 | 94.3 | 93.8 | 13.1 | 56.2 | 97.1 |
| Total Delay | 25 | 409 | 171 | 564 | 309 | 323 | 82 | 68 | 348 |
| Queue Length 50th (ft) | 49 | 493 | #336 | 682 | #486 | #503 | 187 | 120 | #546 |
| Queue Length 95th (ft) | 206 | | | 1528 | | 575 | | | 583 |
| Internal Link Dist (ft) | 60 | 285 | | | 215 | | | | |
| Turn Bay Length (ft) | 120 | 1094 | 320 | 1492 | 325 | 338 | 757 | 347 | 361 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.38 | 0.76 | 0.85 | 0.82 | 0.88 | 0.88 | 0.53 | 0.22 | 0.93 |

Intersection Summary
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 9. Nutley Street & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| Movement | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
| Lane Configurations | 41 | 593 | 170 | 250 | 1092 | 40 | 333 | 204 | 371 |
| Traffic Volume (vph) | 41 | 593 | 170 | 250 | 1092 | 40 | 333 | 204 | 371 |
| Future Volume (vph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Ideal Flow (vphpb) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Total Lost time (s) | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Lane Util. Factor | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. ped/bikes | 1.00 | 0.97 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.85 | 1.00 | 0.98 |
| Flt Protected | 1770 | 3374 | 1770 | 3512 | 1681 | 1747 | 1583 | 1770 | 1822 |
| Satd. Flow (prot) | 0.09 | 1.00 | 0.13 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 |
| Flt Permitted | 170 | 3374 | 250 | 3512 | 1681 | 1747 | 1583 | 1770 | 1822 |
| Satd. Flow (perm) | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak-Hour factor, PHF | 45 | 645 | 185 | 272 | 1187 | 43 | 362 | 222 | 403 |
| Adj. Flow (vph) | 0 | 16 | 0 | 0 | 2 | 0 | 0 | 188 | 0 |
| RTOR Reduction (vph) | 45 | 814 | 0 | 272 | 1228 | 0 | 286 | 215 | 76 |
| Lane Group Flow (vph) | 17 | 11 | 11 | 11 | 8 | 8 | 4 | 4 | 8 |
| Confl. Peds. (#/hr) | pm+pt | NA | pm+pl | NA | Split | NA | pl+ov | Split | NA |
| Turn Type | 5 | 2 | 1 | 6 | 8 | 8 | 1 | 8 | 4 |
| Protected Phases | 2 | | 6 | | | | | | |
| Permitted Phases | 55.7 | 50.9 | 77.9 | 66.1 | 30.1 | 30.1 | 57.1 | 31.0 | 31.0 |
| Actuated Green, G (s) | 55.7 | 50.9 | 77.9 | 66.1 | 30.1 | 30.1 | 57.1 | 31.0 | 31.0 |
| Effective Green, g (s) | 0.35 | 0.32 | 0.49 | 0.41 | 0.19 | 0.19 | 0.36 | 0.19 | 0.19 |
| Actuated g/C Ratio | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Clearance Time (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 107 | 1073 | 311 | 1450 | 316 | 328 | 564 | 342 | 353 |
| Lane Grp Cap (vph) | 0.01 | 0.24 | c0.11 | c0.35 | 0.17 | c0.17 | 0.14 | 0.04 | c0.18 |
| v/s Ratio Prot | 0.13 | | c0.32 | | | | | | |
| v/s Ratio Perm | 0.42 | 0.76 | 0.87 | 0.85 | 0.91 | 0.91 | 0.38 | 0.22 | 0.94 |
| v/c Ratio | 38.1 | 49.0 | 34.4 | 42.4 | 63.6 | 63.6 | 38.3 | 54.3 | 63.6 |
| Uniform Delay, d1 | 1.00 | 1.00 | 1.17 | 0.72 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Progression Factor | 2.7 | 5.0 | 22.7 | 6.3 | 27.7 | 27.5 | 0.4 | 0.3 | 33.2 |
| Incremental Delay, d2 | 40.8 | 54.1 | 63.0 | 36.9 | 91.2 | 91.1 | 38.7 | 54.7 | 96.8 |
| Delay (s) | D | D | E | D | F | F | D | D | F |
| Level of Service | D | D | E | D | F | F | D | D | F |
| Approach Delay (s) | 53.4 | | 41.6 | | 69.7 | | | | 89.0 |
| Approach LOS | D | | D | | E | | | | F |

| Intersection Summary | |
|-----------------------------------|-------|
| HCM 2000 Control Delay | 56.9 |
| HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.92 |
| Actuated Cycle Length (s) | 160.0 |
| Sum of lost time (s) | 28.0 |
| Intersection Capacity Utilization | 92.2% |
| ICU Level of Service | F |
| Analysis Period (min) | 15 |
| c Critical Lane Group | |

HCM Unsignalized Intersection Capacity Analysis
1. Pleasant St & Parking Lot/Church Street

Background AM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|-------|------|------|----------------------|------|------|------|------|------|------|
| Lane Configurations | | ↔ | ↔ | | | | | ↔ | ↔ | | ↔ | ↔ |
| Traffic Volume (veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 27 | 48 | 8 | 48 | 1 |
| Future Volume (Veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 27 | 48 | 8 | 48 | 1 |
| Sign Control | Stop | 0% | Stop | 0% | 0% | 0% | Free | 2% | Free | Free | Free | -2% |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 29 | 52 | 9 | 52 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | | | | | | | | | | | | |
| VC, conflicting volume | 134 | 160 | 52 | 134 | 134 | 55 | 53 | | | | | 81 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 134 | 160 | 52 | 134 | 134 | 55 | 53 | | | | | 81 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | 99 |
| CM capacity (veh/h) | 833 | 726 | 1015 | 831 | 750 | 1012 | 1553 | | | | | 1517 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volumes Total | 2 | 85 | 62 | | | | | | | | | |
| Volume Left | 1 | 4 | 9 | | | | | | | | | |
| Volume Right | 1 | 52 | 1 | | | | | | | | | |
| cSH | 915 | 1553 | 1517 | | | | | | | | | |
| Volumes to Capacity | 0.00 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | | | | | | | | | |
| Control Delay (s) | 8.9 | 0.4 | 1.1 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.9 | 0.4 | 1.1 | | | | | | | | | |
| Approach LOS | A | A | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.8 | | | | | | | | | |
| Intersection Capacity Utilization | | | 15.5% | | | ICU Level of Service | | | | | | A |
| Analysis Period (min) | | | 15 | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
2. Lawyers Rd & Church Street

Background AM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|-------|------|------|----------------------|------|------|------|------|------|------|
| Lane Configurations | | ↔ | ↔ | | | | | ↔ | ↔ | | ↔ | ↔ |
| Traffic Volume (veh/h) | 17 | 22 | 22 | 24 | 24 | 1 | 74 | 8 | 342 | 77 | 301 | 411 |
| Future Volume (Veh/h) | 17 | 22 | 22 | 24 | 24 | 1 | 74 | 8 | 342 | 77 | 301 | 411 |
| Sign Control | Stop | 0% | Stop | 0% | 0% | 0% | Free | 0% | Free | Free | Free | 0% |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 18 | 24 | 24 | 26 | 26 | 1 | 80 | 9 | 372 | 84 | 327 | 447 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | | | | | 0.83 |
| VC, conflicting volume | 1578 | 1579 | 452 | 1546 | 1541 | 415 | 455 | | | | | 456 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 1595 | 1595 | 452 | 1555 | 1549 | 193 | 455 | | | | | 242 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 62 | 61 | 96 | 33 | 98 | 89 | 99 | | | | | 70 |
| CM capacity (veh/h) | 48 | 61 | 601 | 39 | 66 | 702 | 1106 | | | | | 1099 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 | | | | | | | |
| Volumes Total | 66 | 107 | 465 | 327 | 455 | | | | | | | |
| Volume Left | 18 | 26 | 9 | 327 | 0 | | | | | | | |
| Volume Right | 24 | 80 | 84 | 0 | 8 | | | | | | | |
| cSH | 87 | 151 | 1106 | 1099 | 1700 | | | | | | | |
| Volumes to Capacity | 0.76 | 0.71 | 0.01 | 0.30 | 0.27 | | | | | | | |
| Queue Length 95th (ft) | 96 | 104 | 1 | 31 | 0 | | | | | | | |
| Control Delay (s) | 115.3 | 72.6 | 0.3 | 9.7 | 0.0 | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | |
| Approach Delay (s) | 115.3 | 72.6 | 0.3 | 4.0 | | | | | | | | |
| Approach LOS | F | F | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 13.1 | | | | | | | | | |
| Intersection Capacity Utilization | | | 64.1% | | | ICU Level of Service | | | | | | C |
| Analysis Period (min) | | | 15 | | | | | | | | | |

3: Pleasant St & Rt 123/Maple Avenue

Background AM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | 51 | 1236 | 52 | 14 | 656 | 29 | 4 | 2 | 15 | 7 | 9 | 39 |
| Traffic Volume (veh/h) | 51 | 1236 | 52 | 14 | 656 | 29 | 4 | 2 | 15 | 7 | 9 | 39 |
| Future Volume (Veh/h) | 51 | 1236 | 52 | 14 | 656 | 29 | 4 | 2 | 15 | 7 | 9 | 39 |
| Sign Control | Free | Free | Free | Free | Free | Free | Free | Free | Free | Free | Free | Free |
| Grade | -2% | -2% | -2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 55 | 1343 | 57 | 15 | 713 | 32 | 4 | 2 | 16 | 8 | 10 | 42 |
| Pedestrians | | | | 2 | | | | 10 | | | | 8 |
| Lane Width (ft) | | | | 9.7 | | | | 16.0 | | | | 15.0 |
| Walking Speed (ft/s) | | | | 4.0 | | | | 4.0 | | | | 4.0 |
| Percent Blockage | | | | 0 | | | | 1 | | | | 1 |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | TWLT | TL | TL | TWLT | TL |
| Median storage (veh) | 2 | | | 2 | | | | | | | | |
| Upstream signal (ft) | 254 | | | 747 | | | | | | | | |
| pX platoon unblocked | 0.88 | | | | | | | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| VC, conflicting volume | 753 | | | 1410 | | | | 1925 | 2274 | 712 | 1568 | 2287 |
| VC1, stage 1 conf vol | | | | | | | | 1492 | 1492 | | 767 | 767 |
| VC2, stage 2 conf vol | | | | | | | | 434 | 783 | | 800 | 1520 |
| VCu, unblocked vol | 450 | | | 1410 | | | | 1780 | 2177 | 712 | 1374 | 2191 |
| IC, single (s) | 4.1 | | | 4.1 | | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 |
| IC, 2 stage (s) | | | | | | | | 6.5 | 5.5 | 6.5 | 6.5 | 5.5 |
| p0 queue free % | 2.2 | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 |
| IF (s) | 94 | | | 97 | | | | 97 | 99 | 96 | 97 | 93 |
| CM capacity (veh/h) | 967 | | | 474 | | | | 116 | 156 | 370 | 251 | 143 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 1 | SB 1 | | | |
| Volumes Total | 55 | 895 | 505 | 15 | 475 | 270 | 22 | 60 | | | | |
| Volume Left | 55 | 0 | 0 | 15 | 0 | 0 | 4 | 8 | | | | |
| Volume Right | 0 | 0 | 57 | 0 | 0 | 32 | 16 | 42 | | | | |
| cSH | 967 | 1700 | 1700 | 474 | 1700 | 1700 | 243 | 405 | | | | |
| Volumes to Capacity | 0.06 | 0.53 | 0.30 | 0.03 | 0.28 | 0.16 | 0.09 | 0.15 | | | | |
| Queue Length 95th (ft) | 5 | 0 | 0 | 2 | 0 | 0 | 7 | 13 | | | | |
| Control Delay (s) | 8.9 | 0.0 | 0.0 | 12.8 | 0.0 | 0.0 | 21.3 | 15.4 | | | | |
| Lane LOS | A | A | B | B | C | C | C | C | | | | |
| Approach Delay (s) | 0.3 | | | 0.3 | | | 21.3 | 15.4 | | | | |
| Approach LOS | C | | | C | | | C | C | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 0.9 | | | | | | | | | | | |
| Intersection Capacity Utilization | 53.0% | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background AM Conditions Improvement #2

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | |
|---|------|------|------|------|------|------|------|------|-----|-----|-----|--|
| Lane Group Flow (vph) | 89 | 1225 | 30 | 741 | 55 | 331 | 168 | 330 | | | | |
| v/c Ratio | 0.27 | 0.76 | 0.15 | 0.51 | 0.23 | 0.89 | 0.70 | 0.66 | | | | |
| Control Delay | 7.8 | 17.3 | 15.5 | 27.6 | 33.0 | 77.9 | 49.3 | 49.9 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Total Delay | 7.8 | 17.3 | 15.5 | 27.6 | 33.0 | 77.9 | 49.3 | 49.9 | | | | |
| Queue Length 50th (ft) | 13 | 432 | 12 | 252 | 32 | 281 | 105 | 255 | | | | |
| Queue Length 95th (ft) | 25 | 675 | 27 | 305 | 65 | #435 | #179 | 365 | | | | |
| Internal Link Dist (ft) | 667 | | | 792 | | | 621 | 287 | | | | |
| Turn Bay Length (ft) | 160 | | | 145 | | | 230 | 245 | | | | |
| Base Capacity (vph) | 324 | 1630 | 203 | 1461 | 237 | 402 | 241 | 513 | | | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Reduced v/c Ratio | 0.27 | 0.75 | 0.15 | 0.51 | 0.23 | 0.82 | 0.70 | 0.64 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | | | |
| Queue shown is maximum after two cycles. | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background AM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|
| Lane Configurations | EB | EB | EB | WB | WB | WB | NB | NB | NB | SB | SB | SB |
| Traffic Volume (vph) | 82 | 1099 | 28 | 28 | 569 | 113 | 51 | 232 | 73 | 155 | 226 | 77 |
| Future Volume (vph) | 82 | 1099 | 28 | 28 | 569 | 113 | 51 | 232 | 73 | 155 | 226 | 77 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 |
| Grade (%) | 0% | 0% | 2% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Total Lost Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. 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 |
| Frb. 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 |
| Frb. protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1562 | 3196 | 1546 | 3103 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 | 1636 | 1768 |
| Flt Permitted | 0.27 | 1.00 | 0.12 | 1.00 | 0.41 | 1.00 | 0.19 | 1.00 | 0.41 | 1.00 | 0.19 | 1.00 |
| Satd. Flow (perm) | 438 | 3196 | 197 | 3103 | 746 | 1729 | 319 | 1768 | 746 | 1729 | 319 | 1768 |
| 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) | 89 | 1195 | 30 | 30 | 618 | 123 | 55 | 252 | 79 | 168 | 246 | 84 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 8 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 89 | 1224 | 0 | 30 | 729 | 0 | 55 | 323 | 0 | 168 | 321 | 0 |
| Confl. Peds. (#/hr) | 6 | 6 | 6 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 1 |
| Heavy Vehicles (%) | 4% | 5% | 2% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Turn Type | pm+pl | MA | pm+pl | NA | pm+pl | NA | pm+pl | NA | pm+pl | MA | pm+pl | MA |
| Protected Phases | 5 | 2 | 1 | 6 | 3 | 8 | 7 | 4 | 3 | 7 | 4 | 4 |
| Permitted Phases | 2 | 6 | 6 | 8 | 8 | 8 | 4 | 4 | 8 | 4 | 4 | 4 |
| Actuated Green, G (s) | 78.0 | 68.0 | 70.0 | 64.0 | 35.3 | 30.4 | 49.0 | 39.1 | 35.3 | 49.0 | 39.1 | 39.1 |
| Effective Green, g (s) | 78.0 | 68.0 | 70.0 | 64.0 | 35.3 | 30.4 | 49.0 | 39.1 | 35.3 | 49.0 | 39.1 | 39.1 |
| Actuated g/C Ratio | 0.56 | 0.49 | 0.50 | 0.46 | 0.25 | 0.22 | 0.35 | 0.28 | 0.25 | 0.35 | 0.28 | 0.28 |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 324 | 1552 | 156 | 1418 | 221 | 375 | 239 | 493 | 221 | 375 | 239 | 493 |
| v/s Ratio Prot | c0.02 | c0.38 | 0.01 | 0.23 | 0.01 | c0.19 | c0.07 | 0.18 | 0.01 | c0.19 | c0.07 | 0.18 |
| v/s Ratio Perm | 0.13 | 0.09 | 0.09 | 0.51 | 0.05 | 0.86 | 0.18 | 0.18 | 0.05 | 0.86 | 0.18 | 0.18 |
| v/c Ratio | 0.27 | 0.79 | 0.19 | 0.51 | 0.25 | 0.86 | 0.70 | 0.65 | 0.25 | 0.86 | 0.70 | 0.65 |
| Uniform Delay, d1 | 16.1 | 30.0 | 21.4 | 27.0 | 40.7 | 52.8 | 35.4 | 44.5 | 40.7 | 52.8 | 35.4 | 44.5 |
| Progression Factor | 0.41 | 0.47 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.4 | 3.9 | 0.6 | 1.3 | 0.6 | 1.8 | 0.9 | 3.1 | 0.6 | 1.8 | 0.9 | 3.1 |
| Delay (s) | 7.0 | 17.9 | 22.0 | 28.3 | 41.3 | 70.8 | 44.4 | 47.5 | 41.3 | 70.8 | 44.4 | 47.5 |
| Level of Service | A | B | C | C | D | E | D | D | D | E | D | D |
| Approach Delay (s) | 17.2 | 17.2 | 28.1 | 28.1 | 66.6 | 66.6 | 46.5 | 46.5 | 66.6 | 66.6 | 46.5 | 46.5 |
| Approach LOS | B | B | C | C | E | E | D | D | E | E | D | D |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 31.3 HCM 2000 Level of Service C | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.78 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 Sum of lost time (s) 22.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 83.3% ICU Level of Service E | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Queues
9: Nutley Street & Maple Avenue

Background AM Conditions Improvement #2

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | |
|---|------|------|------|------|------|------|------|------|-------|------|------|--|
| Lane Group Flow (vph) | 13 | 1309 | 196 | 573 | 167 | 172 | 300 | 79 | 332 | 300 | 79 | |
| v/c Ratio | 0.03 | 0.95 | 0.88 | 0.33 | 0.74 | 0.73 | 0.58 | 0.25 | 1.02 | 0.58 | 0.25 | |
| Control Delay | 16.9 | 56.8 | 86.5 | 13.0 | 77.1 | 75.9 | 18.7 | 52.8 | 111.0 | 18.7 | 52.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 16.9 | 56.8 | 86.5 | 13.0 | 77.1 | 75.9 | 18.7 | 52.8 | 111.0 | 18.7 | 52.8 | |
| Queue Length 50th (ft) | 5 | 608 | 148 | 82 | 153 | 157 | 72 | 63 | 326 | 72 | 63 | |
| Queue Length 95th (ft) | 17 | #770 | #299 | 112 | 237 | 242 | 164 | 114 | #525 | 164 | 114 | |
| Internal Link Dist (ft) | 60 | 206 | 285 | 1528 | 215 | 215 | 575 | 575 | 215 | 215 | 583 | |
| Turn Bay Length (ft) | 392 | 1372 | 224 | 1758 | 264 | 274 | 539 | 310 | 325 | 539 | 310 | |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.03 | 0.95 | 0.88 | 0.33 | 0.63 | 0.63 | 0.56 | 0.25 | 1.02 | 0.56 | 0.25 | |
| Intersection Summary | | | | | | | | | | | | |
| - Volume exceeds capacity, queue is theoretically infinite. | | | | | | | | | | | | |
| - Queue shown is maximum after two cycles. | | | | | | | | | | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | | | |
| - Queue shown is maximum after two cycles. | | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
9. Nutley Street & Maple Avenue

Background AM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|-------|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Traffic Volume (veh/h) | 12 | 1093 | 111 | 180 | 489 | 38 | 192 | 120 | 276 | 73 | 289 | 17 |
| Future Volume (veh/h) | 12 | 1093 | 111 | 180 | 489 | 38 | 192 | 120 | 276 | 73 | 289 | 17 |
| Ideal Flow (vehph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Frbp_psd/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 |
| Fllb_psd/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 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | 1.00 |
| Fll Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1764 | 3481 | 1770 | 3492 | 1681 | 1748 | 1569 | 1770 | 1846 | 1770 | 1846 | 1846 |
| Fll Permitted | 0.44 | 1.00 | 0.06 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 811 | 3481 | 120 | 3492 | 1681 | 1748 | 1569 | 1770 | 1846 | 1770 | 1846 | 1846 |
| 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) | 13 | 1188 | 121 | 196 | 532 | 41 | 209 | 130 | 300 | 79 | 314 | 18 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 0 | 151 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 13 | 1304 | 0 | 196 | 569 | 0 | 167 | 172 | 149 | 79 | 330 | 0 |
| Confl. Peds. (#/hr) | 6 | 3 | 3 | 6 | 6 | 1 | 2 | 2 | 2 | 2 | 2 | 1 |
| Turn Type | pm+pl | NA | pm+pl | NA | NA | pm+ov | Split | NA | pm+ov | Split | NA | NA |
| Permitted Phases | 5 | 2 | NA | 1 | 6 | NA | 8 | 8 | 1 | 4 | 4 | 4 |
| Prohibited Phases | 2 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Actuated Green, G (s) | 57.3 | 54.9 | 75.5 | 66.1 | 18.9 | 18.9 | 18.9 | 32.5 | 24.6 | 24.6 | 24.6 | 24.6 |
| Effective Green, g (s) | 57.3 | 54.9 | 75.5 | 66.1 | 18.9 | 18.9 | 18.9 | 32.5 | 24.6 | 24.6 | 24.6 | 24.6 |
| Actuated q/C Ratio | 0.41 | 0.39 | 0.54 | 0.47 | 0.13 | 0.13 | 0.13 | 0.23 | 0.18 | 0.18 | 0.18 | 0.18 |
| Clearance Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 348 | 1365 | 225 | 1648 | 226 | 235 | 442 | 311 | 324 | 324 | 324 | 324 |
| v/s Ratio Prot | 0.00 | c0.37 | c0.08 | 0.16 | c0.10 | 0.10 | 0.03 | 0.04 | c0.18 | c0.18 | c0.18 | c0.18 |
| v/s Ratio Perm | 0.01 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 |
| v/c Ratio | 0.04 | 0.95 | 0.87 | 0.35 | 0.74 | 0.73 | 0.34 | 0.25 | 1.02 | 1.02 | 1.02 | 1.02 |
| Uniform Delay, d1 | 24.6 | 41.3 | 41.8 | 23.3 | 58.2 | 58.1 | 44.8 | 49.8 | 57.7 | 57.7 | 57.7 | 57.7 |
| Progression Factor | 1.00 | 1.00 | 1.60 | 0.57 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.0 | 15.7 | 28.4 | 0.6 | 11.9 | 11.1 | 0.5 | 0.4 | 55.1 | 55.1 | 55.1 | 55.1 |
| Delay (s) | C | E | F | F | B | E | E | D | D | D | F | F |
| Level of Service | C | E | F | F | B | E | E | D | D | D | F | F |
| Approach Delay (s) | 56.8 | 34.6 | 34.6 | 34.6 | 34.6 | 34.6 | 58.2 | 58.2 | 58.2 | 58.2 | 100.8 | 100.8 |
| Approach LOS | E | E | C | C | C | C | E | E | E | E | F | F |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 57.4 | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.92 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 92.5% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
1. Pleasant St & Parking Lot/Church Street

Background PM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 | 1 |
| Traffic Volume (veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 | 1 |
| Future Volume (Veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 16 | 11 | 16 | 1 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 2% | 2% | 2% | 2% | 2% | 2% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 75 | 17 | 12 | 17 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 135 | 144 | 18 | 140 | 136 | 84 | 18 | 92 | 92 | 92 | 92 | 92 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 135 | 144 | 18 | 140 | 136 | 84 | 18 | 92 | 92 | 92 | 92 | 92 |
| iC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| iC, 2 stage (s) | | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| dM capacity (veh/h) | 829 | 739 | 1061 | 820 | 747 | 976 | 1599 | 1503 | 1503 | 1503 | 1503 | 1503 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volume Total | 7 | 97 | 30 | | | | | | | | | |
| Volume Left | 2 | 5 | 12 | | | | | | | | | |
| Volume Right | 4 | 17 | 1 | | | | | | | | | |
| cSH | 929 | 1599 | 1503 | | | | | | | | | |
| Volume to Capacity | 0.01 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 1 | 0 | 1 | | | | | | | | | |
| Control Delay (s) | 8.9 | 0.4 | 3.0 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.9 | 0.4 | 3.0 | | | | | | | | | |
| Approach LOS | A | A | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 1.4 | | | | | | | | | | | |
| Intersection Capacity Utilization | 15.4% | | | | | | | | | | | |
| ICU Level of Service | A | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

2. Lawyers Rd & Church Street

Background PM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|------|------|-------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 42 | 15 | 50 | 124 | 8 | 245 | 7 | 375 | 75 | 140 | 392 | 12 |
| Future Volume (Veh/h) | 42 | 15 | 50 | 124 | 8 | 245 | 7 | 375 | 75 | 140 | 392 | 12 |
| Sign Control | Stop | 0% | 0% | Stop | 0% | 0% | Free | 0% | Free | 0% | 0% | 0% |
| Grade | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak Hour Factor | 46 | 16 | 54 | 135 | 9 | 266 | 8 | 408 | 82 | 152 | 426 | 13 |
| Hourly flow rate (vph) | | | | | | | | | | | | |
| Pedestrians | | | | 2 | | | | | | | | 6 |
| Lane Width (ft) | | | | 120 | | | | | | | | 120 |
| Walking Speed (ft/s) | | | | 4.0 | | | | | | | | 4.0 |
| Percent Blockage | | | | 0 | | | | | | | | 1 |
| Right turn flare (veh) | | 3 | | | | 2 | | | | | | None |
| Median type | | | | | | | | | | | | None |
| Median storage (veh) | | | | | | | | | | | | 367 |
| Upstream signal (ft) | | | | | | | | | | | | 0.79 |
| pX platoon unblocked | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 |
| VC, conflicting volume | 1345 | 1244 | 432 | 1205 | 1210 | 457 | 439 | | | | | 492 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 1305 | 1178 | 432 | 1128 | 1135 | 186 | 439 | | | | | 230 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| IF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 17 | 88 | 91 | 0 | 93 | 61 | 99 | | | | | 86 |
| p0 capacity (veh/h) | 55 | 129 | 623 | 105 | 136 | 675 | 1121 | | | | | 1060 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | EB 2 | WB 2 | NB 2 | SB 2 | | | | |
| Volume Total | 116 | 410 | 498 | 152 | 439 | | | | | | | |
| Volume Left | 46 | 135 | 8 | 152 | 0 | | | | | | | |
| Volume Right | 54 | 266 | 82 | 0 | 13 | | | | | | | |
| cSH | 132 | 247 | 1121 | 1060 | 1700 | | | | | | | |
| Volume to Capacity | 0.88 | 1.66 | 0.01 | 0.14 | 0.26 | | | | | | | |
| Queue Length 95th (ft) | 142 | 656 | 1 | 12 | 0 | | | | | | | |
| Control Delay (s) | 112.9 | 349.8 | 0.2 | 9.0 | 0.0 | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | |
| Approach Delay (s) | 112.9 | 349.8 | 0.2 | 2.3 | | | | | | | | |
| Approach LOS | F | F | C | C | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | | 97.8 | | | | | | | |
| Intersection Capacity Utilization | | | | | 70.0% | | | | | | | C |
| Analysis Period (min) | | | | | 15 | | | | | | | |
| ICU Level of Service | | | | | | | | | | | | A |

HCM Unsignalized Intersection Capacity Analysis

3. Pleasant St & Rt 123/Maple Avenue

Background PM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|------|------|-------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 43 | 1002 | 58 | 45 | 1408 | 56 | 9 | 6 | 17 | 6 | 14 | 37 |
| Future Volume (Veh/h) | 43 | 1002 | 58 | 45 | 1408 | 56 | 9 | 6 | 17 | 6 | 14 | 37 |
| Sign Control | Free | -2% | Free | Free | 4% | Free | 4% | 4% | Stop | Stop | Stop | -2% |
| Grade | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak Hour Factor | 47 | 1089 | 63 | 49 | 1530 | 61 | 10 | 7 | 18 | 7 | 15 | 40 |
| Hourly flow rate (vph) | | | | | | | | | | | | |
| Pedestrians | | | | 2 | | | | | | | | 8 |
| Lane Width (ft) | | | | 9.7 | | | | | | | | 15.0 |
| Walking Speed (ft/s) | | | | 4.0 | | | | | | | | 4.0 |
| Percent Blockage | | | | 0 | | | | | | | | 1 |
| Right turn flare (veh) | | | | | | | | | | | | 1 |
| Median type | | | | | | | | | | | | 1 |
| Median storage (veh) | | 2 | | | | | | | | | | |
| Upstream signal (ft) | | 254 | | | | 747 | | | | | | |
| pX platoon unblocked | 0.55 | | | | | | | | | | | 0.55 |
| VC, conflicting volume | 1599 | | | 1162 | | | | | 0.55 | 0.55 | | 0.55 |
| VC1, stage 1 conf vol | | | | | | | | | 2135 | 2922 | | 588 |
| VC2, stage 2 conf vol | | | | | | | | | 1224 | 1224 | | 1666 |
| VCu, unblocked vol | 459 | | | 1162 | | | | | 1431 | 2858 | | 588 |
| IC, single (s) | 4.1 | | | 4.1 | | | | | 7.5 | 6.5 | | 6.9 |
| IC, 2 stage (s) | | | | | | | | | 6.5 | 5.5 | | 5.5 |
| IF (s) | 2.2 | | | 2.2 | | | | | 3.5 | 4.0 | | 3.3 |
| p0 queue free % | 92 | | | 92 | | | | | 94 | 95 | | 96 |
| p0 capacity (veh/h) | 608 | | | 602 | | | | | 159 | 138 | | 451 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
| Volume Total | 47 | 726 | 426 | 49 | 1020 | 571 | 35 | 62 | | | | |
| Volume Left | 47 | 0 | 0 | 49 | 0 | 0 | 10 | 7 | | | | |
| Volume Right | 0 | 63 | 0 | 0 | 61 | 18 | 40 | | | | | |
| cSH | 608 | 1700 | 1700 | 602 | 1700 | 1700 | 228 | 287 | | | | |
| Volume to Capacity | 0.08 | 0.43 | 0.25 | 0.08 | 0.60 | 0.34 | 0.15 | 0.22 | | | | |
| Queue Length 95th (ft) | 6 | 0 | 0 | 7 | 0 | 0 | 13 | 20 | | | | |
| Control Delay (s) | 11.4 | 0.0 | 0.0 | 11.5 | 0.0 | 0.0 | 23.6 | 21.0 | | | | |
| Lane LOS | B | F | F | B | C | C | C | C | | | | |
| Approach Delay (s) | 0.4 | | | 0.3 | | | 23.6 | 21.0 | | | | |
| Approach LOS | | | | C | | | C | C | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | | 1.1 | | | | | | | |
| Intersection Capacity Utilization | | | | | 51.9% | | | | | | | A |
| Analysis Period (min) | | | | | 15 | | | | | | | |
| ICU Level of Service | | | | | | | | | | | | A |

Queues
4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background PM Conditions Improvement #2

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-------------------------|-------|------|------|------|------|-------|------|------|
| Lane Group | 136 | 942 | 55 | 1513 | 92 | 354 | 188 | 377 |
| Lane Group Flow (vph) | 0.91 | 0.57 | 0.20 | 0.98 | 0.53 | 0.97 | 0.91 | 0.80 |
| v/c Ratio | 101.9 | 15.5 | 11.8 | 55.1 | 52.5 | 101.1 | 85.0 | 66.5 |
| Control Delay | 0.0 | 0.0 | 0.0 | 9.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 101.9 | 15.5 | 11.8 | 64.3 | 52.5 | 101.1 | 85.0 | 66.5 |
| Total Delay | 102 | 179 | 15 | 812 | 68 | 367 | 148 | 356 |
| Queue Length 50th (ft) | #241 | 223 | 31 | #974 | 114 | #578 | #308 | #510 |
| Queue Length 95th (ft) | 667 | 667 | 792 | 792 | 621 | 621 | 245 | 287 |
| Internal Link Dist (ft) | 160 | 145 | 230 | 230 | 230 | 230 | 245 | 245 |
| Turn Bay Length (ft) | 150 | 1641 | 277 | 1563 | 173 | 366 | 206 | 469 |
| Base Capacity (vph) | 0 | 0 | 0 | 70 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.91 | 0.57 | 0.20 | 1.01 | 0.53 | 0.97 | 0.91 | 0.80 |

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

Background PM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|------|------|-------|------|-------|-------|-------|------|-------|-------|---------------------------|------|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Traffic Volume (vph) | 125 | 808 | 59 | 51 | 1287 | 105 | 85 | 280 | 46 | 173 | 218 | 129 | |
| Future Volume (vph) | 125 | 808 | 59 | 51 | 1287 | 105 | 85 | 280 | 46 | 173 | 218 | 129 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 | |
| Grade (%) | 0% | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | |
| Total Lost time (s) | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 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 | 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flt | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.98 | 1.00 | 0.98 | 1.00 | 0.94 | 1.00 | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | |
| Satd. Flow (prot) | 1562 | 3177 | 1546 | 3159 | 1711 | 1758 | 1636 | 1733 | 1636 | 1733 | 1636 | 1733 | |
| Flt Permitted | 0.05 | 1.00 | 0.22 | 1.00 | 0.28 | 1.00 | 0.11 | 1.00 | 0.11 | 1.00 | 0.11 | 1.00 | |
| Satd. Flow (perm) | 81 | 3177 | 364 | 3159 | 500 | 1758 | 194 | 1733 | 194 | 1733 | 194 | 1733 | |
| 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) | 136 | 878 | 64 | 55 | 1399 | 114 | 92 | 304 | 50 | 188 | 237 | 140 | |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 13 | 0 | |
| Lane Group Flow (vph) | 136 | 939 | 0 | 55 | 1509 | 0 | 92 | 350 | 0 | 188 | 364 | 0 | |
| Confl. Peds (#/hr) | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | |
| Heavy Vehicles (%) | 4% | 5% | 0% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% | |
| Turn Type | pm+pl | NA | NA | pm+pl | NA | pm+pl | NA | pm+pl | NA | pm+pl | NA | NA | |
| Protected Phases | 5 | 2 | 1 | 6 | 3 | 8 | 7 | 4 | 8 | 7 | 4 | 4 | |
| Permitted Phases | 2 | 6 | 6 | 6 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | |
| Actuated Green, G (s) | 92.7 | 81.5 | 86.3 | 78.3 | 39.2 | 32.9 | 53.5 | 42.2 | 39.2 | 32.9 | 53.5 | 42.2 | |
| Effective Green, g (s) | 92.7 | 81.5 | 86.3 | 78.3 | 39.2 | 32.9 | 53.5 | 42.2 | 39.2 | 32.9 | 53.5 | 42.2 | |
| Actuated g/C Ratio | 0.58 | 0.51 | 0.54 | 0.49 | 0.25 | 0.21 | 0.33 | 0.26 | 0.25 | 0.21 | 0.33 | 0.26 | |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 150 | 1618 | 255 | 1545 | 170 | 361 | 205 | 457 | 170 | 361 | 205 | 457 | |
| v/s Ratio Prot | c0.06 | 0.30 | 0.01 | c0.48 | 0.02 | 0.20 | c0.09 | 0.21 | 0.02 | 0.20 | c0.09 | 0.21 | |
| v/s Ratio Perm | 0.46 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | |
| v/c Ratio | 0.91 | 0.58 | 0.22 | 0.98 | 0.54 | 0.97 | 0.92 | 0.80 | 0.54 | 0.97 | 0.92 | 0.80 | |
| Uniform Delay, d1 | 48.9 | 27.3 | 19.1 | 40.0 | 50.2 | 63.1 | 43.6 | 54.9 | 50.2 | 63.1 | 43.6 | 54.9 | |
| Progression Factor | 1.34 | 0.52 | 0.75 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 44.5 | 1.4 | 0.4 | 18.0 | 3.5 | 38.8 | 40.1 | 9.3 | 3.5 | 38.8 | 40.1 | 9.3 | |
| Delay (s) | 110.1 | 15.6 | 14.8 | 55.6 | 53.7 | 101.9 | 83.7 | 64.2 | 53.7 | 101.9 | 83.7 | 64.2 | |
| Level of Service | F | B | B | E | D | F | F | E | D | F | F | E | |
| Approach Delay (s) | 27.5 | 27.5 | 54.2 | 91.9 | 91.9 | 70.7 | 70.7 | 70.7 | 91.9 | 91.9 | 70.7 | 70.7 | |
| Approach LOS | C | C | D | D | D | F | F | E | D | F | F | E | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | 53.5 | | | | | | | | | | | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.97 | | | | | | | | | | | | |
| Actuated Cycle Length (s) | 160.0 | | | | | | | | | | | Sum of lost time (s) | 22.0 |
| Intersection Capacity Utilization | 92.8% | | | | | | | | | | | ICU Level of Service | F |
| Analysis Period (min) | 15 | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

Queues
9. Nutley Street & Maple Avenue

Background PM Conditions Improvement #2

| | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|-------------------------|------|------|------|------|------|------|------|------|------|
| Lane Group | 45 | 830 | 272 | 1230 | 286 | 298 | 403 | 76 | 336 |
| Lane Group Flow (vph) | 0.38 | 0.76 | 0.87 | 0.83 | 0.91 | 0.91 | 0.54 | 0.22 | 0.94 |
| v/c Ratio | 33.6 | 53.7 | 63.6 | 36.2 | 94.3 | 93.8 | 13.1 | 56.2 | 97.1 |
| Control Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 33.6 | 53.7 | 63.6 | 36.2 | 94.3 | 93.8 | 13.1 | 56.2 | 97.1 |
| Total Delay | 25 | 409 | 171 | 564 | 309 | 323 | 82 | 68 | 348 |
| Queue Length 50th (ft) | 49 | 493 | #336 | 675 | #486 | #503 | 187 | 120 | #546 |
| Queue Length 95th (ft) | 206 | | | 1528 | | 575 | | | 583 |
| Internal Link Dist (ft) | 60 | 285 | | | 215 | | | | |
| Turn Bay Length (ft) | 120 | 1094 | 320 | 1492 | 325 | 338 | 757 | 347 | 361 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.38 | 0.76 | 0.85 | 0.82 | 0.88 | 0.88 | 0.53 | 0.22 | 0.93 |

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
9. Nutley Street & Maple Avenue

Background PM Conditions Improvement #2

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|------|-------|------|
| Lane Configurations | 41 | 593 | 170 | 250 | 1092 | 40 | 333 | 204 | 371 | 70 | 271 | 38 |
| Traffic Volume (vph) | 41 | 593 | 170 | 250 | 1092 | 40 | 333 | 204 | 371 | 70 | 271 | 38 |
| Future Volume (vph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Ideal Flow (vphpl) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Total Lost time (s) | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lane Util. Factor | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. 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 |
| Fllb. ped/bikes | 1.00 | 0.97 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | 1.00 |
| Frt | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.98 |
| Flt Protected | 1770 | 3374 | 1770 | 3512 | 1770 | 3512 | 1681 | 1747 | 1583 | 1770 | 1822 | 1770 |
| Sald. Flow (prot) | 0.09 | 1.00 | 0.13 | 1.00 | 0.13 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.95 |
| Flt Permitted | 170 | 3374 | 250 | 3512 | 1681 | 1747 | 1583 | 1770 | 1822 | 1770 | 1822 | 1770 |
| Sald. Flow (perm) | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Peak-Hour factor, PHF | 45 | 645 | 185 | 272 | 1187 | 43 | 362 | 222 | 403 | 76 | 295 | 41 |
| Adj. Flow (vph) | 0 | 16 | 0 | 0 | 2 | 0 | 0 | 0 | 188 | 0 | 3 | 0 |
| RTOR Reduction (vph) | 45 | 814 | 0 | 272 | 1228 | 0 | 286 | 298 | 215 | 76 | 333 | 0 |
| Lane Group Flow (vph) | 17 | 11 | 11 | 11 | 17 | 8 | 8 | 4 | 4 | 4 | 4 | 8 |
| Confl. Peds. (#/hr) | pm+pt | NA | pm+pl | NA | Split | NA | Split | NA | Split | NA | Split | NA |
| Turn Type | 5 | 2 | 2 | 1 | 6 | 6 | 8 | 8 | 1 | 8 | 1 | 4 |
| Protected Phases | 2 | | | | | | | | | | | |
| Permitted Phases | 55.7 | 50.9 | 77.9 | 66.1 | 30.1 | 30.1 | 57.1 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 |
| Actuated Green, G (s) | 0.35 | 0.32 | 0.49 | 0.41 | 0.19 | 0.19 | 0.36 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 |
| Effective Green, g (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Actuated g/C Ratio | 107 | 1073 | 311 | 1450 | 316 | 328 | 564 | 342 | 353 | 342 | 353 | 353 |
| Clearance Time (s) | 0.01 | 0.24 | 0.13 | c0.32 | 0.17 | c0.35 | 0.17 | c0.17 | 0.14 | 0.04 | c0.18 | 0.18 |
| Vehicle Extension (s) | 0.13 | | | | | | | | | | | |
| Lane Grp Cap (vph) | 0.42 | 0.76 | 0.87 | 0.85 | 0.91 | 0.91 | 0.91 | 0.91 | 0.38 | 0.22 | 0.94 | 0.94 |
| v/s Ratio Prot | 38.1 | 49.0 | 34.4 | 42.4 | 63.6 | 63.6 | 38.3 | 54.3 | 63.6 | 63.6 | 63.6 | 63.6 |
| v/c Ratio | 1.00 | 1.00 | 1.16 | 0.72 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay, d1 | 2.7 | 5.0 | 22.7 | 6.3 | 27.7 | 27.5 | 0.4 | 0.3 | 33.2 | 33.2 | 33.2 | 33.2 |
| Progression Factor | 40.8 | 54.1 | 62.7 | 36.7 | 91.2 | 91.1 | 38.7 | 54.7 | 96.8 | 96.8 | 96.8 | 96.8 |
| Incremental Delay, d2 | D | D | E | D | F | F | D | D | D | D | D | F |
| Delay (s) | 53.4 | | 41.4 | | 69.7 | | | | 89.0 | | | |
| Level of Service | D | | D | | E | | | | F | | | F |
| Approach Delay (s) | D | | D | | D | | | | E | | | F |
| Approach LOS | D | | D | | D | | | | E | | | F |

| Intersection Summary | |
|-----------------------------------|-------|
| HCM 2000 Control Delay | 56.8 |
| HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.92 |
| Actuated Cycle Length (s) | 160.0 |
| Sum of lost time (s) | 28.0 |
| Intersection Capacity Utilization | 92.2% |
| ICU Level of Service | F |
| Analysis Period (min) | 15 |
| c Critical Lane Group | |

APPENDIX E

Appendix E - Total Future Capacity Analysis



HCM Unsignalized Intersection Capacity Analysis
1: Pleasant St & Parking Lot/Church Street

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|------|-------|------|------|------|------|------|------|------|------|
| Lane Configurations | | 4 | 4 | | | | | 4 | 4 | | 4 | 4 |
| Traffic Volume (veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 27 | 25 | 9 | 21 | 1 |
| Future Volume (Veh/h) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 27 | 25 | 9 | 21 | 1 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | 2% | Free | Free | Free | Free |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 2% | 2% | 0% | 0% | 0% | -2% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 29 | 27 | 10 | 23 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | | | | | | | | | | | | |
| VC, conflicting volume | 94 | 108 | 24 | 95 | 94 | 42 | 24 | | | | | 56 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 94 | 108 | 24 | 95 | 94 | 42 | 24 | | | | | 56 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| IF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | 99 |
| CM capacity (veh/h) | 883 | 776 | 1063 | 881 | 788 | 1028 | 1591 | | | | | 1549 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volumes Total | 2 | 60 | 34 | | | | | | | | | |
| Volume Left | 1 | 4 | 10 | | | | | | | | | |
| Volume Right | 1 | 27 | 1 | | | | | | | | | |
| cSH | 961 | 1591 | 1549 | | | | | | | | | |
| Volumes to Capacity | 0.00 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 0 | 0 | 0 | | | | | | | | | |
| Control Delay (s) | 8.8 | 0.5 | 2.2 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 8.8 | 0.5 | 2.2 | | | | | | | | | |
| Approach LOS | A | A | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | 1.3 | | | | | | | | |
| Intersection Capacity Utilization | | | | 14.2% | | | | | | | | A |
| Analysis Period (min) | | | | 15 | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
2: Lawyers Rd & Church Street

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|------|-------|------|------|------|------|------|------|------|------|
| Lane Configurations | | 4 | 4 | | | | | 4 | 4 | | 4 | 4 |
| Traffic Volume (veh/h) | 16 | 23 | 35 | 24 | 1 | 74 | 8 | 343 | 77 | 301 | 407 | 7 |
| Future Volume (Veh/h) | 16 | 23 | 35 | 24 | 1 | 74 | 8 | 343 | 77 | 301 | 407 | 7 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 25 | 38 | 26 | 1 | 80 | 9 | 373 | 84 | 327 | 442 | 8 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | 2 | | | | | |
| Median type | | | | | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX platoon unblocked | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | | | | | | 0.84 |
| VC, conflicting volume | 1574 | 1575 | 447 | 1542 | 1537 | 416 | 450 | | | | | 457 |
| VC1, stage 1 conf vol | | | | | | | | | | | | |
| VC2, stage 2 conf vol | | | | | | | | | | | | |
| VCu, unblocked vol | 1589 | 1589 | 447 | 1551 | 1544 | 209 | 450 | | | | | 258 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | | | | | | | | | | | | |
| IF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 65 | 60 | 94 | 32 | 99 | 88 | 99 | | | | | 70 |
| CM capacity (veh/h) | 49 | 62 | 605 | 38 | 67 | 695 | 1110 | | | | | 1097 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 | | | | | | | |
| Volumes Total | 80 | 107 | 466 | 327 | 450 | | | | | | | |
| Volume Left | 17 | 26 | 9 | 327 | 0 | | | | | | | |
| Volume Right | 38 | 80 | 84 | 0 | 8 | | | | | | | |
| cSH | 108 | 149 | 1110 | 1097 | 1700 | | | | | | | |
| Volumes to Capacity | 0.74 | 0.72 | 0.01 | 0.30 | 0.26 | | | | | | | |
| Queue Length 95th (ft) | 100 | 106 | 1 | 31 | 0 | | | | | | | |
| Control Delay (s) | 93.2 | 74.7 | 0.2 | 9.7 | 0.0 | | | | | | | |
| Lane LOS | F | F | A | A | A | | | | | | | |
| Approach Delay (s) | 93.2 | 74.7 | 0.2 | 4.1 | | | | | | | | |
| Approach LOS | F | F | F | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | | 13.1 | | | | | | | | |
| Intersection Capacity Utilization | | | | 63.9% | | | | | | | | B |
| Analysis Period (min) | | | | 15 | | | | | | | | |

3. Pleasant St & Rt 123/Maple Avenue

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBR |
|-----------------------------------|------------------------|------|------|--------|------|------|--------|------|------|------|--------|
| Lane Configurations | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ |
| Traffic Volume (veh/h) | 22 | 1225 | 52 | 15 | 658 | 32 | 4 | 2 | 15 | 7 | 35 |
| Future Volume (Veh/h) | 22 | 1225 | 52 | 15 | 658 | 32 | 4 | 2 | 15 | 7 | 35 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop |
| Grade | -2% | -2% | -2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | -2% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 24 | 1332 | 57 | 16 | 715 | 35 | 4 | 2 | 16 | 8 | 38 |
| Pedestrians | | | | 2 | | | 10 | | | | 8 |
| Lane Width (ft) | | | | 9.7 | | | 16.0 | | | | 15.0 |
| Walking Speed (ft/s) | | | | 4.0 | | | 4.0 | | | | 4.0 |
| Percent Blockage | | | | 0 | | | 1 | | | | 1 |
| Right turn flare (veh) | | | | TWLT/L | | | TWLT/L | | | | TWLT/L |
| Median type | | | | 2 | | | 2 | | | | 2 |
| Median storage (veh) | | | | 254 | | | 747 | | | | 747 |
| Upstream signal (ft) | | | | 0.89 | | | 0.89 | | | | 0.89 |
| pX platoon unblocked | | | | 758 | | | 1399 | | | | 1399 |
| VC, conflicting volume | | | | 1418 | | | 1418 | | | | 1418 |
| VC1, stage 1 conf vol | | | | 432 | | | 790 | | | | 733 |
| VC2, stage 2 conf vol | | | | 1701 | | | 2106 | | | | 2119 |
| VCU, unblocked vol | | | | 4.1 | | | 7.5 | | | | 6.9 |
| IC, single (s) | | | | 2.2 | | | 3.5 | | | | 4.0 |
| IC, 2 stage (s) | | | | 97 | | | 97 | | | | 96 |
| p0 queue free % | | | | 479 | | | 133 | | | | 174 |
| CM capacity (veh/h) | | | | 501 | | | 16 | | | | 54 |
| Direction Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
| Volumes Total | 24 | 888 | 501 | 16 | 477 | 273 | 22 | 54 | | | |
| Volume Left | 24 | 0 | 0 | 16 | 0 | 0 | 4 | 8 | | | |
| Volume Right | 0 | 0 | 57 | 0 | 0 | 35 | 16 | 38 | | | |
| cSH | 957 | 1700 | 1700 | 479 | 1700 | 1700 | 261 | 443 | | | |
| Volumes to Capacity | 0.03 | 0.52 | 0.29 | 0.03 | 0.28 | 0.16 | 0.08 | 0.12 | | | |
| Queue Length 95th (ft) | 2 | 0 | 0 | 3 | 0 | 0 | 7 | 10 | | | |
| Control Delay (s) | 8.9 | 0.0 | 0.0 | 12.8 | 0.0 | 0.0 | 20.1 | 14.3 | | | |
| Lane LOS | A | B | B | C | C | C | B | B | | | |
| Approach Delay (s) | 0.2 | | 0.3 | | | | 20.1 | 14.3 | | | |
| Approach LOS | C | | C | | | | C | B | | | |
| Intersection Summary | | | | | | | | | | | |
| Average Delay | 0.7 | | | | | | | | | | |
| Intersection Capacity Utilization | 46.2% | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | |
| | ICU Level of Service A | | | | | | | | | | |

4. Courthouse Rd/Lawyers Rd & Maple Avenue

12/8/2017

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|-------|------|------|------|------|------|------|------|
| Lane Group Flow (vph) | 90 | 1220 | 30 | 702 | 52 | 331 | 173 | 334 |
| v/c Ratio | 0.62 | 0.79 | 0.27 | 0.54 | 0.49 | 0.91 | 0.84 | 0.65 |
| Control Delay | 102.2 | 17.4 | 69.7 | 32.8 | 78.3 | 80.7 | 90.9 | 49.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 102.2 | 17.4 | 69.7 | 32.8 | 78.3 | 80.7 | 90.9 | 49.1 |
| Queue Length 50th (ft) | 86 | 203 | 28 | 170 | 46 | 284 | 155 | 258 |
| Queue Length 95th (ft) | 146 | #533 | 65 | 274 | 92 | #447 | #272 | 368 |
| Internal Link Dist (ft) | | 387 | | 792 | | 621 | | 287 |
| Turn Bay Length (ft) | 160 | 1537 | 110 | 1303 | 122 | 390 | 222 | 518 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.54 | 0.79 | 0.27 | 0.54 | 0.43 | 0.85 | 0.78 | 0.64 |
| Intersection Summary | | | | | | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | |
| Queue shown is maximum after two cycles. | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 4: Courthouse Rd/Lawyers Rd & Maple Avenue

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|-------|------|------|------|-------|------|-------|-------|------|-------|------|
| Lane Configurations | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← | ← |
| Traffic Volume (veh/h) | 83 | 1096 | 27 | 28 | 533 | 113 | 48 | 232 | 73 | 159 | 229 | 78 |
| Future Volume (Veh/h) | 83 | 1096 | 27 | 28 | 533 | 113 | 48 | 232 | 73 | 159 | 229 | 78 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 |
| Grade (%) | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Total Lost Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. 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 |
| Frb. protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 3196 | 1546 | 3097 | 1711 | 1729 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1562 | 3196 | 1546 | 3097 | 1711 | 1729 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 |
| 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) | 90 | 1191 | 29 | 30 | 579 | 123 | 52 | 252 | 79 | 173 | 249 | 85 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 8 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 90 | 1219 | 0 | 30 | 690 | 0 | 52 | 323 | 0 | 173 | 325 | 0 |
| Confl. Peds. (#/hr) | 4% | 5% | 2% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Heavy Vehicles (%) | Prot | MA | Prot | NA | Prot | NA | Prot | NA | Prot | MA | Prot | MA |
| Turn Type | 5 | 2 | 1 | 6 | 3 | 8 | 7 | 4 | 7 | 4 | 7 | 4 |
| Protected Phases | 12.9 | 64.3 | 6.0 | 57.4 | 7.6 | 30.0 | 7.6 | 30.0 | 17.7 | 40.1 | 17.7 | 40.1 |
| Permitted Phases | 12.9 | 64.3 | 6.0 | 57.4 | 7.6 | 30.0 | 7.6 | 30.0 | 17.7 | 40.1 | 17.7 | 40.1 |
| Actuated Green, G (s) | 0.09 | 0.46 | 0.04 | 0.41 | 0.05 | 0.21 | 0.05 | 0.21 | 0.13 | 0.29 | 0.13 | 0.29 |
| Actuated g/C Ratio | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Clearance Time (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Vehicle Extension (s) | 143 | 1467 | 66 | 1269 | 92 | 370 | 92 | 370 | 206 | 506 | 206 | 506 |
| Lane Grp Cap (vph) | c0.06 | c0.38 | 0.02 | 0.22 | 0.03 | c0.19 | 0.03 | c0.19 | c0.11 | 0.18 | c0.11 | 0.18 |
| v/s Ratio Prot | 0.63 | 0.83 | 0.45 | 0.54 | 0.57 | 0.87 | 0.57 | 0.87 | 0.84 | 0.64 | 0.84 | 0.64 |
| v/s Ratio Perm | 61.2 | 33.1 | 65.4 | 31.4 | 64.6 | 53.2 | 64.6 | 53.2 | 59.8 | 43.7 | 59.8 | 43.7 |
| v/c Ratio | 1.38 | 0.38 | 1.03 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay, d1 | 7.9 | 5.3 | 4.6 | 1.6 | 7.7 | 19.7 | 7.7 | 19.7 | 24.8 | 2.8 | 24.8 | 2.8 |
| Progression Factor | 92.5 | 17.9 | 71.9 | 33.2 | 72.3 | 72.9 | 72.3 | 72.9 | 84.6 | 46.5 | 84.6 | 46.5 |
| Incremental Delay, d2 | F | B | E | C | E | E | E | E | F | D | F | D |
| Level of Service | 23.0 | C | 34.8 | C | 72.8 | E | 72.8 | E | 59.5 | E | 59.5 | E |
| Approach Delay (s) | C | C | C | C | C | C | C | C | E | E | E | E |
| Approach LOS | Intersection Summary | | | | | | | | | | | |
| HCM 2000 Control Delay | 38.8 HCM 2000 Level of Service D | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.64 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 Sum of lost time (s) 22.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 83.4% ICU Level of Service E | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
 5: Residential Site Driveway & Church Street

12/8/2017

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|-------|------|------|------|------|------|
| Lane Configurations | ← | ← | ← | ← | ← | ← |
| Traffic Volume (veh/h) | 58 | 3 | 0 | 0 | 0 | 8 |
| Future Volume (Veh/h) | 58 | 3 | 0 | 0 | 0 | 8 |
| Sign Control | Free | Free | Stop | Stop | Stop | Stop |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 63 | 3 | 0 | 0 | 0 | 9 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | None | None | None | None | None | None |
| Median type | | | | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX platoon unblocked | | | | | | |
| vC, conflicting volume | | 66 | | | 64 | 64 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | 66 | | | 64 | 64 |
| iC, single (s) | | 4.1 | | | 6.4 | 6.2 |
| iC, 2 stage (s) | | | | | | |
| IF (s) | | 2.2 | | | 3.5 | 3.3 |
| p0 queue free % | | 100 | | | 100 | 99 |
| dM capacity (veh/h) | | 1536 | | | 941 | 1000 |
| Direction, Lane # | EB 1 | NB 1 | | | | |
| Volume Total | 66 | 9 | | | | |
| Volume Left | 0 | 0 | | | | |
| Volume Right | 3 | 9 | | | | |
| cSH | 1700 | 1000 | | | | |
| Volume to Capacity | 0.04 | 0.01 | | | | |
| Queue Length 95th (ft) | 0 | 1 | | | | |
| Control Delay (s) | 0.0 | 8.6 | | | | |
| Lane LOS | A | A | | | | |
| Approach Delay (s) | 0.0 | 8.6 | | | | |
| Approach LOS | A | A | | | | |
| Intersection Summary | | | | | | |
| Average Delay | 1.0 | | | | | |
| Intersection Capacity Utilization | 13.3% | | | | | |
| ICU Level of Service | A | | | | | |
| Analysis Period (min) | 15 | | | | | |

6: Retail Site Driveway & Church Street

12/8/2017

7: Maple Avenue & Retail Site Driveway

12/8/2017

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------|-------|------|------|----------------------|------|
| Lane Configurations | ↔ | ↔ | | | ↔ | ↔ |
| Traffic Volume (veh/h) | 64 | 2 | 0 | 0 | 0 | 13 |
| Future Volume (Veh/h) | 64 | 2 | 0 | 0 | 0 | 13 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 70 | 2 | 0 | 0 | 0 | 14 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX platoon unblocked | | 72 | | | 71 | 71 |
| VC conflicting volume | | | | | | |
| VC1 stage 1 conf vol | | | | | | |
| VC2 stage 2 conf vol | | | | | | |
| VCu unblocked vol | | 72 | | | 71 | 71 |
| IC single (s) | | 4.1 | | | 6.4 | 6.2 |
| IC 2 stage (s) | | 2.2 | | | 3.5 | 3.3 |
| p0 queue free % | | 100 | | | 100 | 99 |
| CM capacity (veh/h) | | 1528 | | | 933 | 991 |
| Direction_Lane # | EB 1 | NB 1 | | | | |
| Volumes Total | 72 | 14 | | | | |
| Volume Left | 0 | 0 | | | | |
| Volume Right | 2 | 14 | | | | |
| cSH | 1700 | 991 | | | | |
| Volumes to Capacity | 0.04 | 0.01 | | | | |
| Queue Length 95th (ft) | 0 | 1 | | | | |
| Control Delay (s) | 0.0 | 8.7 | | | | |
| Lane LOS | A | A | | | | |
| Approach Delay (s) | 0.0 | 8.7 | | | | |
| Approach LOS | A | A | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | 1.4 | | | | |
| Intersection Capacity Utilization | | 13.5% | | | ICU Level of Service | A |
| Analysis Period (min) | | 15 | | | | |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR | |
|-----------------------------------|------|--------|--------|-------|------|----------------------|---|
| Lane Configurations | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | |
| Traffic Volume (veh/h) | 8 | 1244 | 678 | 12 | 6 | 7 | |
| Future Volume (Veh/h) | 8 | 1244 | 678 | 12 | 6 | 7 | |
| Sign Control | Free | Free | Free | Free | Stop | Stop | |
| Grade | 0% | 4% | 0% | 0% | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | |
| Hourly flow rate (vph) | 9 | 1352 | 737 | 13 | 7 | 8 | |
| Pedestrians | | | | | | | |
| Lane Width (ft) | | | | | | | |
| Walking Speed (ft/s) | | | | | | | |
| Percent Blockage | | | | | | | |
| Right turn flare (veh) | | | | | | | |
| Median type | | TWLT/L | TWLT/L | | | | |
| Median storage (veh) | | 2 | 2 | | | | |
| Upstream signal (ft) | | 534 | 467 | | | | |
| pX platoon unblocked | 0.86 | | | | 0.86 | 0.86 | |
| VC conflicting volume | 750 | | | | 1438 | 375 | |
| VC1 stage 1 conf vol | | | | | 744 | 694 | |
| VC2 stage 2 conf vol | | | | | | | |
| VCu unblocked vol | 382 | | | | 1182 | 0 | |
| IC single (s) | 4.1 | | | | 6.8 | 6.9 | |
| IC 2 stage (s) | 2.2 | | | | 5.8 | 3.3 | |
| p0 queue free % | 99 | | | | 98 | 99 | |
| CM capacity (veh/h) | 1008 | | | | 376 | 932 | |
| Direction_Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | SB 1 | |
| Volumes Total | 9 | 676 | 676 | 491 | 259 | 15 | |
| Volume Left | 9 | 0 | 0 | 0 | 0 | 7 | |
| Volume Right | 0 | 0 | 0 | 0 | 13 | 8 | |
| cSH | 1008 | 1700 | 1700 | 1700 | 1700 | 551 | |
| Volumes to Capacity | 0.01 | 0.40 | 0.40 | 0.29 | 0.15 | 0.03 | |
| Queue Length 95th (ft) | 1 | 0 | 0 | 0 | 0 | 2 | |
| Control Delay (s) | 8.6 | 0.0 | 0.0 | 0.0 | 0.0 | 11.7 | |
| Lane LOS | A | A | A | B | B | B | |
| Approach Delay (s) | 0.1 | | | 0.0 | | 11.7 | |
| Approach LOS | B | | | B | | B | |
| Intersection Summary | | | | | | | |
| Average Delay | | | | 0.1 | | | |
| Intersection Capacity Utilization | | | | 44.4% | | ICU Level of Service | A |
| Analysis Period (min) | | | | 15 | | | |

Queues
8: Nutley Street & Maple Avenue

12/8/2017

| | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|-------------------------|------|------|------|------|------|------|------|------|-------|
| Lane Group | 13 | 1298 | 196 | 282 | 167 | 172 | 300 | 79 | 332 |
| Lane Group Flow (vph) | 0.03 | 0.95 | 0.88 | 0.16 | 0.74 | 0.73 | 0.51 | 0.25 | 1.01 |
| v/c Ratio | 16.8 | 56.1 | 87.0 | 16.6 | 77.1 | 75.9 | 16.9 | 52.6 | 107.8 |
| Control Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 16.8 | 56.1 | 87.0 | 16.6 | 77.1 | 75.9 | 16.9 | 52.6 | 107.8 |
| Total Delay | 5 | 600 | 147 | 52 | 153 | 157 | 71 | 63 | 325 |
| Queue Length 50th (ft) | 17 | #757 | #300 | 68 | 237 | 242 | 164 | 114 | #525 |
| Queue Length 95th (ft) | | | | | | | | | |
| Internal Link Dist (ft) | 60 | 158 | 285 | 1576 | 215 | 459 | | 619 | |
| Turn Bay Length (ft) | 497 | 1368 | 224 | 1740 | 264 | 274 | 572 | 314 | 329 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.03 | 0.95 | 0.88 | 0.16 | 0.63 | 0.63 | 0.52 | 0.25 | 1.01 |

Intersection Summary
 - Volume exceeds capacity, queue is theoretically infinite.
 - Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 - Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Nutley Street & Maple Avenue

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|-------|-------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | 12 | 1083 | 111 | 180 | 222 | 38 | 192 | 120 | 276 | 73 | 289 | 17 |
| Traffic Volume (vph) | 12 | 1083 | 111 | 180 | 222 | 38 | 192 | 120 | 276 | 73 | 289 | 17 |
| Future Volume (vph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Ideal Flow (vphpl) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Total Lost time (s) | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flt Util. Factor | 1.00 | 0.99 | 1.00 | 0.98 | 1.00 | 0.98 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 3490 | 1770 | 3462 | 1681 | 1748 | 1681 | 1748 | 1583 | 1770 | 1848 | 1848 |
| Flt Permitted | 0.58 | 1.00 | 0.06 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1078 | 3490 | 121 | 3462 | 1681 | 1748 | 1681 | 1748 | 1583 | 1770 | 1848 | 1848 |
| 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) | 13 | 1177 | 121 | 196 | 241 | 41 | 209 | 130 | 300 | 79 | 314 | 18 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 9 | 0 | 0 | 0 | 152 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 13 | 1293 | 0 | 196 | 273 | 0 | 167 | 172 | 148 | 79 | 330 | 0 |
| Turn Type | pm+pt | NA | pm+pt | NA | Split | NA | pm+ov | Split | NA | Split | NA | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 1 | 4 | | 4 | |
| Permitted Phases | 2 | | 6 | | | | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 57.0 | 54.6 | 75.2 | 65.8 | 18.9 | 18.9 | 18.9 | 32.5 | 24.9 | 24.9 | 24.9 | 24.9 |
| Effective Green, g (s) | 57.0 | 54.6 | 75.2 | 65.8 | 18.9 | 18.9 | 18.9 | 32.5 | 24.9 | 24.9 | 24.9 | 24.9 |
| Actuated g/C Ratio | 0.41 | 0.39 | 0.54 | 0.47 | 0.13 | 0.13 | 0.13 | 0.23 | 0.18 | 0.18 | 0.18 | 0.18 |
| Clearance Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 450 | 1361 | 225 | 1627 | 226 | 235 | 446 | 314 | 328 | 314 | 328 | 328 |
| v/s Ratio Prot | 0.00 | c0.37 | c0.08 | 0.08 | c0.10 | 0.10 | 0.03 | 0.04 | c0.18 | 0.04 | c0.18 | c0.18 |
| v/s Ratio Perm | 0.01 | | 0.38 | | | | 0.06 | | | | | |
| v/c Ratio | 0.03 | 0.95 | 0.87 | 0.17 | 0.74 | 0.73 | 0.33 | 0.25 | 1.01 | 0.25 | 1.01 | 1.01 |
| Uniform Delay, d1 | 24.8 | 41.4 | 41.7 | 21.3 | 58.2 | 58.1 | 44.7 | 49.5 | 57.5 | 49.5 | 57.5 | 57.5 |
| Progression Factor | 1.00 | 1.00 | 1.61 | 0.85 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.0 | 15.0 | 28.4 | 0.2 | 11.9 | 11.1 | 0.4 | 0.4 | 51.5 | 0.4 | 51.5 | 51.5 |
| Delay (s) | 24.8 | 56.4 | 95.6 | 18.4 | 70.1 | 69.3 | 45.2 | 50.0 | 109.1 | 45.2 | 109.1 | 109.1 |
| Level of Service | C | E | F | B | E | D | E | D | D | D | F | F |
| Approach Delay (s) | 56.1 | | | 50.0 | | | 58.2 | | | | 97.7 | |
| Approach LOS | E | | | D | | | E | | | | F | |

| Intersection Summary | |
|-----------------------------------|-------|
| HCM 2000 Control Delay | 61.5 |
| HCM 2000 Volume to Capacity ratio | 0.92 |
| Actuated Cycle Length (s) | 140.0 |
| Sum of lost time (s) | 28.0 |
| Intersection Capacity Utilization | 91.5% |
| ICU Level of Service | F |
| Analysis Period (min) | 15 |
| Critical Lane Group | |

12/8/2017
Queues
4: Courthouse Rd/Lawyers Rd & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-------------------------|------|------|------|------|------|------|------|------|
| Lane Group | 90 | 1220 | 30 | 702 | 52 | 331 | 173 | 334 |
| Lane Group Flow (vph) | 0.28 | 0.79 | 0.16 | 0.51 | 0.49 | 0.92 | 0.84 | 0.65 |
| v/c Ratio | 9.2 | 19.4 | 20.0 | 23.5 | 78.3 | 83.0 | 90.9 | 49.8 |
| Control Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 9.2 | 19.4 | 20.0 | 23.5 | 78.3 | 83.0 | 90.9 | 49.8 |
| Total Delay | 15 | 434 | 9 | 137 | 46 | 286 | 155 | 261 |
| Queue Length 50th (ft) | 28 | #699 | 33 | 211 | 92 | #459 | #272 | 372 |
| Queue Length 95th (ft) | 387 | | 792 | | 621 | | 287 | |
| Internal Link Dist (ft) | 160 | 145 | | 230 | | 245 | | 287 |
| Turn Bay Length (ft) | 320 | 1545 | 190 | 1377 | 122 | 378 | 222 | 510 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.28 | 0.79 | 0.16 | 0.51 | 0.43 | 0.88 | 0.78 | 0.65 |

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

12/8/2017
HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|-------|-------|------|------|-------|------|-------|-------|------|-------|------|
| Lane Configurations | 83 | 1096 | 27 | 28 | 533 | 113 | 48 | 232 | 73 | 159 | 229 | 78 |
| Traffic Volume (vph) | 83 | 1096 | 27 | 28 | 533 | 113 | 48 | 232 | 73 | 159 | 229 | 78 |
| Future Volume (vph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Ideal Flow (vphpl) | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 |
| Lane Width | 0% | 0% | 0% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Grade (%) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Total Lost time (s) | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. 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 |
| 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 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1562 | 3196 | 1546 | 3097 | 1711 | 1729 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 |
| Flt Permitted | 0.27 | 1.00 | 0.11 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 452 | 3196 | 179 | 3097 | 1711 | 1729 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 |
| 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) | 90 | 1191 | 29 | 30 | 579 | 123 | 52 | 252 | 79 | 173 | 249 | 85 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 8 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 90 | 1219 | 0 | 30 | 690 | 0 | 52 | 323 | 0 | 173 | 325 | 0 |
| Confl. Peds (#/hr) | 4% | 5% | 2% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Heavy Vehicles (%) | pm+pl | MA | pm+pl | NA | NA | NA | Prot | NA | NA | Prot | NA | NA |
| Turn Type | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Protected Phases | 2 | | | 6 | | | | | | | | |
| Permitted Phases | 74.7 | 64.7 | 66.7 | 60.7 | 7.6 | 29.6 | 7.6 | 29.6 | 17.7 | 39.7 | 17.7 | 39.7 |
| Actuated Green, G (s) | 74.7 | 64.7 | 66.7 | 60.7 | 0.48 | 0.43 | 0.05 | 0.21 | 0.13 | 0.28 | 0.13 | 0.28 |
| Effective Green, g (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Actuated q/C Ratio | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Clearance Time (s) | 320 | 1477 | 143 | 1342 | 92 | 365 | 92 | 365 | 206 | 501 | 206 | 501 |
| Vehicle Extension (s) | c0.02 | c0.38 | 0.01 | 0.22 | 0.03 | c0.19 | 0.03 | c0.19 | c0.11 | 0.18 | c0.11 | 0.18 |
| Lane Grp Cap (vph) | 0.13 | | 0.09 | | | | | | | | | |
| v/s Ratio Prot | 0.28 | 0.83 | 0.21 | 0.51 | 0.57 | 0.89 | 0.57 | 0.89 | 0.84 | 0.65 | 0.84 | 0.65 |
| v/s Ratio Perm | 17.6 | 32.7 | 23.5 | 28.9 | 64.6 | 53.6 | 64.6 | 53.6 | 59.8 | 44.0 | 59.8 | 44.0 |
| Uniform Delay, d1 | 0.45 | 0.46 | 1.17 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Progression Factor | 0.5 | 5.1 | 0.7 | 1.3 | 7.7 | 21.7 | 7.7 | 21.7 | 24.8 | 2.9 | 24.8 | 2.9 |
| Incremental Delay, d2 | 8.4 | 20.0 | 28.3 | 24.2 | 72.3 | 75.2 | 72.3 | 75.2 | 84.6 | 46.9 | 84.6 | 46.9 |
| Delay (s) | A | C | C | C | E | E | E | E | F | D | F | D |
| Level of Service | 19.2 | | 24.3 | | 74.8 | | 74.8 | | 59.8 | | 59.8 | |
| Approach Delay (s) | B | | C | | E | | E | | E | | E | |
| Approach LOS | | | | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 34.8 HCM 2000 Level of Service C | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.82 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 Sum of lost time (s) 22.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 83.4% ICU Level of Service E | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

12/8/2017
Queues
4: Courthouse Rd/Lawyers Rd & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-------------------------|------|------|------|------|------|------|------|------|
| Lane Group | 90 | 1220 | 30 | 702 | 52 | 331 | 173 | 334 |
| Lane Group Flow (vph) | 0.27 | 0.76 | 0.15 | 0.49 | 0.22 | 0.89 | 0.71 | 0.66 |
| v/c Ratio | 8.0 | 17.3 | 14.9 | 19.6 | 32.6 | 77.9 | 50.2 | 50.0 |
| Control Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 8.0 | 17.3 | 14.9 | 19.6 | 32.6 | 77.9 | 50.2 | 50.0 |
| Total Delay | 14 | 408 | 9 | 134 | 30 | 281 | 108 | 259 |
| Queue Length 50th (ft) | 25 | 642 | 24 | 170 | 62 | #435 | #192 | 368 |
| Queue Length 95th (ft) | 387 | | | 792 | | 621 | | 287 |
| Internal Link Dist (ft) | 160 | 145 | | 230 | | 245 | | 245 |
| Turn Bay Length (ft) | 337 | 1626 | 203 | 1455 | 235 | 402 | 243 | 514 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.27 | 0.75 | 0.15 | 0.48 | 0.22 | 0.82 | 0.71 | 0.65 |

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

12/8/2017
HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|---------------------------|------|
| Lane Configurations | 83 | 1096 | 27 | 28 | 533 | 113 | 48 | 232 | 73 | 159 | 229 | 78 | |
| Traffic Volume (vph) | 83 | 1096 | 27 | 28 | 533 | 113 | 48 | 232 | 73 | 159 | 229 | 78 | |
| Future Volume (vph) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Ideal Flow (vphpl) | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 | |
| Lane Width | 0% | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | |
| Grade (%) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | |
| Total Lost time (s) | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frb. 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 | |
| Frb. ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.96 | 1.00 | 0.96 | 1.00 | 0.96 | 1.00 | |
| Frb. Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1562 | 3196 | 1546 | 3097 | 1711 | 1729 | 1636 | 1768 | 1636 | 1768 | 1636 | 1768 | |
| Flt Permitted | 0.28 | 1.00 | 0.12 | 1.00 | 0.41 | 1.00 | 0.19 | 1.00 | 0.41 | 1.00 | 0.19 | 1.00 | |
| Satd. Flow (perm) | 468 | 3196 | 198 | 3097 | 741 | 1729 | 319 | 1768 | 741 | 1729 | 319 | 1768 | |
| 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) | 90 | 1191 | 29 | 30 | 579 | 123 | 52 | 252 | 79 | 173 | 249 | 85 | |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 8 | 0 | 0 | 9 | 0 | |
| Lane Group Flow (vph) | 90 | 1219 | 0 | 30 | 689 | 0 | 52 | 323 | 0 | 173 | 325 | 0 | |
| Confl. Peds (#/hr) | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | |
| Heavy Vehicles (%) | 4% | 5% | 2% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% | |
| Turn Type | pm+pl | NA | pm+pl | NA | pm+pl | NA | pm+pl | NA | pm+pl | NA | pm+pl | NA | |
| Protected Phases | 5 | 2 | 1 | 6 | 3 | 8 | 7 | 4 | 3 | 8 | 7 | 4 | |
| Permitted Phases | 2 | 6 | 6 | 6 | 8 | 8 | 4 | 4 | 8 | 4 | 4 | 4 | |
| Actuated Green, G (s) | 77.8 | 67.8 | 69.8 | 63.8 | 35.3 | 30.4 | 49.2 | 39.3 | 35.3 | 30.4 | 49.2 | 39.3 | |
| Effective Green, g (s) | 77.8 | 67.8 | 69.8 | 63.8 | 35.3 | 30.4 | 49.2 | 39.3 | 35.3 | 30.4 | 49.2 | 39.3 | |
| Actuated g/C Ratio | 0.56 | 0.48 | 0.50 | 0.46 | 0.25 | 0.22 | 0.35 | 0.28 | 0.25 | 0.22 | 0.35 | 0.28 | |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 338 | 1547 | 156 | 1411 | 220 | 375 | 241 | 496 | 220 | 375 | 241 | 496 | |
| v/s Ratio Prot | c0.02 | c0.38 | 0.01 | 0.22 | 0.01 | c0.19 | c0.07 | 0.18 | 0.01 | c0.19 | c0.07 | 0.18 | |
| v/s Ratio Perm | 0.13 | 0.09 | 0.09 | 0.09 | 0.05 | 0.05 | 0.18 | 0.18 | 0.05 | 0.05 | 0.18 | 0.18 | |
| v/c Ratio | 0.27 | 0.79 | 0.19 | 0.49 | 0.24 | 0.86 | 0.72 | 0.66 | 0.24 | 0.86 | 0.72 | 0.66 | |
| Uniform Delay, d1 | 16.0 | 30.1 | 21.5 | 26.7 | 40.6 | 52.8 | 35.4 | 44.4 | 40.6 | 52.8 | 35.4 | 44.4 | |
| Progression Factor | 0.43 | 0.47 | 0.96 | 0.71 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.4 | 3.9 | 0.6 | 1.1 | 0.6 | 1.0 | 0.8 | 3.1 | 0.6 | 1.0 | 0.8 | 3.1 | |
| Delay (s) | 7.3 | 17.9 | 21.3 | 20.2 | 41.2 | 70.8 | 45.1 | 47.5 | 41.2 | 70.8 | 45.1 | 47.5 | |
| Level of Service | A | B | C | C | D | E | D | D | D | E | D | D | |
| Approach Delay (s) | 17.2 | 17.2 | 20.2 | 20.2 | 66.8 | 66.8 | 46.7 | 46.7 | 66.8 | 66.8 | 46.7 | 46.7 | |
| Approach LOS | B | B | C | C | E | E | D | D | E | E | D | D | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | 29.5 | | | | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.78 | | | | | | | | | | | | |
| Actuated Cycle Length (s) | 140.0 | | | | | | | | | | | Sum of lost time (s) | 22.0 |
| Intersection Capacity Utilization | 83.4% | | | | | | | | | | | ICU Level of Service | E |
| Analysis Period (min) | 15 | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
1: Pleasant St & Parking Lot/Church Street

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|------|----------------------|
| Lane Configurations | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 32 | 14 | 16 | 1 |
| Traffic Volume (veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 32 | 14 | 16 | 1 |
| Future Volume (Veh/h) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 69 | 32 | 14 | 16 | 1 |
| Sign Control | Stop | | | | | | | | | | | |
| Grade | 0% | | | | | | | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 2 | 1 | 4 | 0 | 0 | 0 | 5 | 75 | 35 | 15 | 17 | 1 |
| Pedestrians | - | | | | | | | | | | | |
| Lane Width (ft) | 12.0 | | | | | | | | | | | |
| Walking Speed (ft/s) | 4.0 | | | | | | | | | | | |
| Percent Blockage | 0 | | | | | | | | | | | |
| Right turn flare (veh) | None | | | | | | | | | | | |
| Median type | None | | | | | | | | | | | |
| Median storage (veh) | - | | | | | | | | | | | |
| Upstream signal (ft) | - | | | | | | | | | | | |
| pX platoon unblocked | - | | | | | | | | | | | |
| VC, conflicting volume | 150 | 168 | 18 | 154 | 150 | 92 | 18 | | | | | 110 |
| VC1, stage 1 conf vol | - | | | | | | | | | | | |
| VC2, stage 2 conf vol | - | | | | | | | | | | | |
| VCu, unblocked vol | 150 | 168 | 18 | 154 | 150 | 92 | 18 | | | | | 110 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | - | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | 99 |
| CM capacity (veh/h) | 809 | 716 | 1061 | 800 | 731 | 965 | 1599 | | | | | 1480 |
| Direction, Lane # | EB 1 | NB 1 | SB 1 | | | | | | | | | |
| Volumes Total | 7 | 115 | 33 | | | | | | | | | |
| Volume Left | 2 | 5 | 15 | | | | | | | | | |
| Volume Right | 4 | 35 | 1 | | | | | | | | | |
| cSH | 917 | 1599 | 1480 | | | | | | | | | |
| Volumes to Capacity | 0.01 | 0.00 | 0.01 | | | | | | | | | |
| Queue Length 95th (ft) | 1 | 0 | 1 | | | | | | | | | |
| Control Delay (s) | 9.0 | 0.3 | 3.4 | | | | | | | | | |
| Lane LOS | A | A | A | | | | | | | | | |
| Approach Delay (s) | 9.0 | 0.3 | 3.4 | | | | | | | | | |
| Approach LOS | A | A | A | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 1.4 | | | | | | | | | | | A |
| Intersection Capacity Utilization | 17.3% | | | | | | | | | | | ICU Level of Service |
| Analysis Period (min) | 15 | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
2: Lawyers Rd & Church Street

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|-------|-------|------|------|------|------|------|------|------|------|------|----------------------|
| Lane Configurations | 13 | 10 | 50 | 124 | 8 | 245 | 7 | 377 | 75 | 140 | 379 | 12 |
| Traffic Volume (veh/h) | 13 | 10 | 50 | 124 | 8 | 245 | 7 | 377 | 75 | 140 | 379 | 12 |
| Future Volume (Veh/h) | 13 | 10 | 50 | 124 | 8 | 245 | 7 | 377 | 75 | 140 | 379 | 12 |
| Sign Control | Stop | | | | | | | | | | | |
| Grade | 0% | | | | | | | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 14 | 11 | 54 | 135 | 9 | 266 | 8 | 410 | 82 | 152 | 412 | 13 |
| Pedestrians | 2 | | | | | | | | | | | |
| Lane Width (ft) | 12.0 | | | | | | | | | | | |
| Walking Speed (ft/s) | 4.0 | | | | | | | | | | | |
| Percent Blockage | 0 | | | | | | | | | | | |
| Right turn flare (veh) | 3 | | | | | | | | | | | |
| Median type | None | | | | | | | | | | | |
| Median storage (veh) | - | | | | | | | | | | | |
| Upstream signal (ft) | - | | | | | | | | | | | |
| pX platoon unblocked | - | | | | | | | | | | | |
| VC, conflicting volume | 1333 | 1232 | 418 | 1190 | 1198 | 459 | 425 | | | | | 494 |
| VC1, stage 1 conf vol | - | | | | | | | | | | | |
| VC2, stage 2 conf vol | - | | | | | | | | | | | |
| VCu, unblocked vol | 1297 | 1174 | 418 | 1123 | 1132 | 232 | 425 | | | | | 274 |
| IC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | | | 4.1 |
| IC, 2 stage (s) | - | | | | | | | | | | | |
| p0 queue free % | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | | | 2.2 |
| p0 queue free % | 75 | 92 | 91 | 0 | 94 | 60 | 99 | | | | | 86 |
| CM capacity (veh/h) | 57 | 134 | 635 | 114 | 141 | 658 | 1134 | | | | | 1056 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 | | | | | | | |
| Volumes Total | 79 | 410 | 500 | 152 | 425 | | | | | | | |
| Volume Left | 14 | 135 | 8 | 152 | 0 | | | | | | | |
| Volume Right | 54 | 266 | 82 | 0 | 13 | | | | | | | |
| cSH | 286 | 264 | 1134 | 1056 | 1700 | | | | | | | |
| Volumes to Capacity | 0.28 | 1.55 | 0.01 | 0.14 | 0.25 | | | | | | | |
| Queue Length 95th (ft) | 27 | 613 | 1 | 13 | 0 | | | | | | | |
| Control Delay (s) | 26.4 | 301.2 | 0.2 | 9.0 | 0.0 | | | | | | | |
| Lane LOS | D | F | A | A | A | | | | | | | |
| Approach Delay (s) | 26.4 | 301.2 | 0.2 | 2.4 | | | | | | | | |
| Approach LOS | D | F | F | | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 81.1 | | | | | | | | | | | |
| Intersection Capacity Utilization | 69.5% | | | | | | | | | | | ICU Level of Service |
| Analysis Period (min) | 15 | | | | | | | | | | | C |

3. Pleasant St & Rt 123/Maple Avenue

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | 3 | 4 | 4 | 1 | 1 | 1 | 4 | 4 | 4 | 4 | 4 | 4 |
| Traffic Volume (veh/h) | 37 | 971 | 58 | 47 | 1395 | 66 | 9 | 7 | 20 | 6 | 4 | 17 |
| Future Volume (Veh/h) | 37 | 971 | 58 | 47 | 1395 | 66 | 9 | 7 | 20 | 6 | 4 | 17 |
| Sign Control | Free | Free | Free | Free | Free | Free | Slop | Slop | Slop | Slop | Slop | Slop |
| Grade | -2% | -2% | -2% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 40 | 1055 | 63 | 51 | 1516 | 72 | 10 | 8 | 22 | 7 | 4 | 18 |
| Pedestrians | | | | 2 | | | 10 | | | | | 8 |
| Lane Width (ft) | | | | 9.7 | | | 16.0 | | | | | 15.0 |
| Walking Speed (ft/s) | | | | 4.0 | | | 4.0 | | | | | 4.0 |
| Percent Blockage | | | | 0 | | | 1 | | | | | 1 |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | TWLT | TL | TL | TWLT | TL | TL | | | | | | |
| Median storage (veh) | 2 | | | 2 | | | | | | | | |
| Walking speed (ft/s) | 254 | | | 747 | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| VC, conflicting volume | 0.59 | | | 1128 | | | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 |
| VC1, stage 1 conf vol | 15% | | | | | | 2056 | 2874 | 571 | 2298 | 2870 | 802 |
| VC2, stage 2 conf vol | | | | | | | 1176 | 1176 | | 1662 | 1662 | |
| VCu, unblocked vol | 632 | | | 1128 | | | 880 | 1698 | | 636 | 1208 | |
| IC, single (s) | 4.1 | | | 4.1 | | | 1408 | 2788 | 571 | 1815 | 2781 | 0 |
| IC, 2 stage (s) | | | | | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| IF (s) | 2.2 | | | 2.2 | | | 6.5 | 5.5 | 5.5 | 6.5 | 5.5 | 5.5 |
| p0 queue free % | 93 | | | 92 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| CM capacity (veh/h) | 565 | | | 620 | | | 94 | 94 | 95 | 96 | 97 | 97 |
| Direction Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | NB 1 | SB 1 | SB 1 | SB 1 | SB 1 |
| Volumes Total | 40 | 703 | 415 | 51 | 1011 | 577 | 40 | 29 | | | | |
| Volume Left | 40 | 0 | 0 | 51 | 0 | 0 | 10 | 7 | | | | |
| Volume Right | 0 | 0 | 63 | 0 | 0 | 72 | 22 | 18 | | | | |
| cSH | 565 | 1700 | 1700 | 620 | 1700 | 1700 | 244 | 292 | | | | |
| Volumes to Capacity | 0.07 | 0.41 | 0.24 | 0.08 | 0.59 | 0.34 | 0.16 | 0.10 | | | | |
| Queue Length 95th (ft) | 6 | 0 | 0 | 7 | 0 | 0 | 14 | 8 | | | | |
| Control Delay (s) | 11.9 | 0.0 | 0.0 | 11.3 | 0.0 | 0.0 | 22.7 | 18.7 | | | | |
| Lane LOS | B | C | C | B | C | C | C | C | | | | |
| Approach Delay (s) | 0.4 | | | 0.4 | | | 22.7 | 18.7 | | | | |
| Approach LOS | C | | | C | | | C | C | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 0.9 | | | | | | | | | | | |
| Intersection Capacity Utilization | 51.3% | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| | ICU Level of Service A | | | | | | | | | | | |

4. Courthouse Rd/Lawyers Rd & Maple Avenue

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------|---|------|-------|-------|-------|------|-------|------|-----|-----|-----|-----|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Group Flow (vph) | 138 | 917 | 55 | 1484 | 84 | 354 | 184 | 366 | | | | |
| v/c Ratio | 0.93 | 0.60 | 0.52 | 1.08 | 0.71 | 0.94 | 0.92 | 0.77 | | | | |
| Control Delay | 136.3 | 21.1 | 103.1 | 89.3 | 102.3 | 94.2 | 113.6 | 64.0 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Total Delay | 136.3 | 21.1 | 103.1 | 89.3 | 102.3 | 94.2 | 113.6 | 64.0 | | | | |
| Queue Length 50th (ft) | -152 | 216 | 56 | -918 | 87 | 361 | 193 | 340 | | | | |
| Queue Length 95th (ft) | #305 | 262 | 109 | #1056 | #164 | #344 | 469 | | | | | |
| Internal Link Dist (ft) | | 387 | | 792 | | 621 | 287 | | | | | |
| Turn Bay Length (ft) | 160 | | 145 | | 230 | | 245 | | | | | |
| Base Capacity (vph) | 149 | 1522 | 115 | 1369 | 128 | 388 | 204 | 481 | | | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Reduced v/c Ratio | 0.93 | 0.60 | 0.48 | 1.08 | 0.66 | 0.91 | 0.90 | 0.76 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| - | Volume exceeds capacity, queue is theoretically infinite. | | | | | | | | | | | |
| - | Queue shown is maximum after two cycles. | | | | | | | | | | | |
| # | 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | | | | |
| - | Queue shown is maximum after two cycles. | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 4: Courthouse Rd/Lawyers Rd & Maple Avenue

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|------|-------|-------|------|-------|------|-------|-------|------|-------|------|
| Lane Configurations | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Traffic Volume (veh/h) | 127 | 794 | 50 | 51 | 1260 | 105 | 77 | 280 | 46 | 169 | 219 | 118 |
| Future Volume (Veh/h) | 127 | 794 | 50 | 51 | 1260 | 105 | 77 | 280 | 46 | 169 | 219 | 118 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 |
| Grade (%) | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Total Lost Time (s) | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frb. 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 |
| Frb. 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 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 0.98 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1562 | 3181 | 1546 | 3158 | 1711 | 1758 | 1711 | 1758 | 1636 | 1739 | 1636 | 1739 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1562 | 3181 | 1546 | 3158 | 1711 | 1758 | 1711 | 1758 | 1636 | 1739 | 1636 | 1739 |
| 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) | 138 | 863 | 54 | 55 | 1370 | 114 | 84 | 304 | 50 | 184 | 238 | 128 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 12 | 0 |
| Lane Group Flow (vph) | 138 | 914 | 0 | 55 | 1480 | 0 | 84 | 350 | 0 | 184 | 354 | 0 |
| Confl. Peds. (#/hr) | 4 | 5 | 0 | 4 | 5 | 5 | 2 | 2 | 2 | 3 | 3 | 1 |
| Heavy Vehicles (%) | 4% | 5% | 0% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Turn Type | Prot | MA | Prot | NA | Prot | NA | Prot | NA | Prot | MA | Prot | MA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | | 4 |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 15.3 | 75.4 | 9.0 | 69.1 | 11.2 | 34.0 | 11.2 | 34.0 | 19.6 | 42.4 | 19.6 | 42.4 |
| Effective Green, g (s) | 15.3 | 75.4 | 9.0 | 69.1 | 11.2 | 34.0 | 11.2 | 34.0 | 19.6 | 42.4 | 19.6 | 42.4 |
| Actuated g/C Ratio | 0.10 | 0.47 | 0.06 | 0.43 | 0.07 | 0.21 | 0.07 | 0.21 | 0.12 | 0.26 | 0.12 | 0.26 |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 149 | 1499 | 86 | 1363 | 119 | 373 | 119 | 373 | 200 | 460 | 200 | 460 |
| v/s Ratio Prot | c0.09 | 0.29 | 0.04 | c0.47 | 0.05 | c0.20 | 0.05 | c0.20 | c0.11 | 0.20 | c0.11 | 0.20 |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.93 | 0.61 | 0.64 | 1.09 | 0.71 | 0.94 | 0.71 | 0.94 | 0.92 | 0.77 | 0.92 | 0.77 |
| Uniform Delay, d1 | 71.8 | 31.4 | 73.9 | 45.5 | 72.8 | 62.0 | 72.8 | 62.0 | 69.4 | 54.3 | 69.4 | 54.3 |
| Progression Factor | 1.19 | 0.61 | 1.19 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 49.8 | 1.8 | 14.5 | 51.2 | 17.3 | 30.9 | 17.3 | 30.9 | 41.8 | 7.6 | 41.8 | 7.6 |
| Delay (s) | 135.2 | 20.8 | 102.5 | 92.2 | 90.1 | 92.9 | 90.1 | 92.9 | 111.2 | 61.8 | 111.2 | 61.8 |
| Level of Service | F | C | F | F | F | F | F | F | F | F | F | E |
| Approach Delay (s) | | 35.8 | | 92.6 | | 92.3 | | 92.3 | | 78.3 | | 78.3 |
| Approach LOS | | D | | F | | F | | F | | F | | E |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 73.6 HCM 2000 Level of Service E | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 1.01 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 160.0 Sum of lost Time (s) 22.0 | | | | | | | | | | | |
| Intersection Capacity Utilization | 91.8% ICU Level of Service F | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
 5: Residential Site Driveway & Church Street

12/8/2017

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------------------------------|------|------|------|------|------|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 |
| Traffic Volume (veh/h) | 37 | 11 | 0 | 0 | 0 | 4 |
| Future Volume (Veh/h) | 37 | 11 | 0 | 0 | 0 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 40 | 12 | 0 | 0 | 0 | 4 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pK platoon unblocked | | 52 | | | 46 | 46 |
| vC, conflicting volume | | | | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | 52 | | | 46 | 46 |
| IC, single (s) | | 4.1 | | | 6.4 | 6.2 |
| IC, 2 stage (s) | | | | | | |
| p0 queue free % | | 2.2 | | | 3.5 | 3.3 |
| IF (s) | | 100 | | | 100 | 100 |
| dM capacity (veh/h) | | 1554 | | | 964 | 1023 |
| Direction, Lane # | EB 1 | NB 1 | | | | |
| Volume Total | 52 | 4 | | | | |
| Volume Left | 0 | 0 | | | | |
| Volume Right | 12 | 4 | | | | |
| cSH | 1700 | 1023 | | | | |
| Volume to Capacity | 0.03 | 0.00 | | | | |
| Queue Length 95th (ft) | 0 | 0 | | | | |
| Control Delay (s) | 0.0 | 8.5 | | | | |
| Lane LOS | A | A | | | | |
| Approach Delay (s) | 0.0 | 8.5 | | | | |
| Approach LOS | A | A | | | | |
| Intersection Summary | | | | | | |
| Average Delay | 0.6 | | | | | |
| Intersection Capacity Utilization | 13.3% ICU Level of Service A | | | | | |
| Analysis Period (min) | 15 | | | | | |

6: Retail Site Driveway & Church Street

12/8/2017

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|------|-------|------|------|----------------------|------|
| Lane Configurations | 33 | 8 | 0 | 0 | 0 | 5 |
| Traffic Volume (veh/h) | 33 | 8 | 0 | 0 | 0 | 5 |
| Future Volume (Veh/h) | 33 | 8 | 0 | 0 | 0 | 5 |
| Sign Control | Free | Free | Free | Stop | Stop | Stop |
| Grade | 0% | 0% | 0% | 0% | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 36 | 9 | 0 | 0 | 0 | 5 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX platoon unblocked | | | | | | |
| VC conflicting volume | | 45 | | | 40 | 40 |
| VC1 stage 1 conf vol | | | | | | |
| VC2 stage 2 conf vol | | | | | | |
| VCu unblocked vol | | 45 | | | 40 | 40 |
| IC single (s) | | 4.1 | | | 6.4 | 6.2 |
| IC 2 stage (s) | | 2.2 | | | 3.5 | 3.3 |
| p0 queue free % | | 100 | | | 100 | 100 |
| CM capacity (veh/h) | | 1563 | | | 971 | 1031 |
| Direction_Lane # | EB 1 | NB 1 | | | | |
| Volumes Total | 45 | 5 | | | | |
| Volume Left | 0 | 0 | | | | |
| Volume Right | 9 | 5 | | | | |
| cSH | 1700 | 1031 | | | | |
| Volumes to Capacity | 0.03 | 0.00 | | | | |
| Queue Length 95th (ft) | 0 | 0 | | | | |
| Control Delay (s) | 0.0 | 8.5 | | | | |
| Lane LOS | A | A | | | | |
| Approach Delay (s) | 0.0 | 8.5 | | | | |
| Approach LOS | A | A | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | 0.9 | | | | |
| Intersection Capacity Utilization | | 13.3% | | | ICU Level of Service | A |
| Analysis Period (min) | | 15 | | | | |

7: Maple Avenue & Retail Site Driveway

12/8/2017

| Movement | EBL | EBT | WBT | WBR | SBL | SBR | |
|-----------------------------------|--------|------|------|-------|------|----------------------|---|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 | |
| Traffic Volume (veh/h) | 21 | 978 | 1425 | 32 | 26 | 30 | |
| Future Volume (Veh/h) | 21 | 978 | 1425 | 32 | 26 | 30 | |
| Sign Control | Free | Free | Free | Free | Stop | Stop | |
| Grade | 0% | 0% | 4% | 0% | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | |
| Hourly flow rate (vph) | 23 | 1063 | 1549 | 35 | 28 | 33 | |
| Pedestrians | | | | | | | |
| Lane Width (ft) | | | | | | | |
| Walking Speed (ft/s) | | | | | | | |
| Percent Blockage | | | | | | | |
| Right turn flare (veh) | | | | | | | |
| Median type | TWLT/L | None | | | | | |
| Median storage (veh) | | 2 | | | | | |
| Upstream signal (ft) | | 534 | 467 | | | | |
| pX platoon unblocked | | 0.58 | | 0.58 | 0.58 | 0.58 | |
| VC conflicting volume | | 1584 | | 2144 | 792 | | |
| VC1 stage 1 conf vol | | | | 1566 | | | |
| VC2 stage 2 conf vol | | | | 578 | | | |
| VCu unblocked vol | | 563 | | 1527 | 0 | | |
| IC single (s) | | 4.1 | | 6.8 | 6.9 | | |
| IC 2 stage (s) | | 2.2 | | 3.5 | 3.3 | | |
| p0 queue free % | | 96 | | 90 | 95 | | |
| CM capacity (veh/h) | | 584 | | 268 | 630 | | |
| Direction_Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | SB 1 | |
| Volumes Total | 23 | 532 | 532 | 1033 | 551 | 61 | |
| Volume Left | 23 | 0 | 0 | 0 | 0 | 28 | |
| Volume Right | 0 | 0 | 0 | 0 | 35 | 33 | |
| cSH | 584 | 1700 | 1700 | 1700 | 389 | | |
| Volumes to Capacity | 0.04 | 0.31 | 0.31 | 0.61 | 0.32 | 0.16 | |
| Queue Length 95th (ft) | 3 | 0 | 0 | 0 | 0 | 14 | |
| Control Delay (s) | 11.4 | 0.0 | 0.0 | 0.0 | 0.0 | 16.0 | |
| Lane LOS | B | C | C | C | C | C | |
| Approach Delay (s) | 0.2 | | | 0.0 | | 16.0 | |
| Approach LOS | C | | | C | | C | |
| Intersection Summary | | | | | | | |
| Average Delay | | | | 0.5 | | | |
| Intersection Capacity Utilization | | | | 50.4% | | ICU Level of Service | A |
| Analysis Period (min) | | | | 15 | | | |

Queues
8: Nutley Street & Maple Avenue

12/8/2017

| | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|-------------------------|------|------|------|------|------|------|------|------|------|
| Lane Group | 45 | 840 | 272 | 1239 | 286 | 298 | 403 | 76 | 336 |
| Lane Group Flow (vph) | 0.38 | 0.76 | 0.88 | 0.83 | 0.91 | 0.91 | 0.53 | 0.22 | 0.94 |
| v/c Ratio | 34.1 | 53.8 | 66.1 | 37.0 | 94.3 | 93.8 | 12.9 | 56.3 | 97.1 |
| Control Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 34.1 | 53.8 | 66.1 | 37.0 | 94.3 | 93.8 | 12.9 | 56.3 | 97.1 |
| Total Delay | 25 | 415 | 174 | 598 | 309 | 323 | 80 | 68 | 347 |
| Queue Length 50th (ft) | 49 | 498 | #343 | 738 | #486 | #503 | 185 | 120 | #545 |
| Queue Length 95th (ft) | 165 | | | 1570 | | 422 | | | 912 |
| Internal Link Dist (ft) | 60 | 285 | | | 215 | | | | |
| Turn Bay Length (ft) | 118 | 1107 | 317 | 1497 | 325 | 338 | 758 | 347 | 362 |
| Base Capacity (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stavation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.38 | 0.76 | 0.86 | 0.83 | 0.88 | 0.88 | 0.53 | 0.22 | 0.93 |

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Nutley Street & Maple Avenue

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------|------|
| Lane Configurations | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| Traffic Volume (vph) | 41 | 603 | 170 | 250 | 1100 | 40 | 333 | 204 | 371 | 70 | 271 | 38 | |
| Future Volume (vph) | 41 | 603 | 170 | 250 | 1100 | 40 | 333 | 204 | 371 | 70 | 271 | 38 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Total Lost time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flt | 1.00 | 0.97 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (prot) | 1770 | 3422 | 1770 | 3521 | 1770 | 3521 | 1681 | 1747 | 1583 | 1770 | 1829 | 1829 | |
| Flt Permitted | 0.09 | 1.00 | 0.13 | 1.00 | 0.09 | 1.00 | 0.95 | 0.99 | 1.00 | 0.95 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 165 | 3422 | 241 | 3521 | 165 | 3422 | 1681 | 1747 | 1583 | 1770 | 1829 | 1829 | |
| 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) | 45 | 655 | 185 | 272 | 1196 | 43 | 362 | 222 | 403 | 76 | 295 | 41 | |
| RTOR Reduction (vph) | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 189 | 0 | 3 | |
| Lane Group Flow (vph) | 45 | 824 | 0 | 272 | 1237 | 0 | 286 | 298 | 214 | 76 | 333 | 0 | |
| Turn Type | pm+pt | NA | pm+pt | NA | pm+pt | NA | Split | NA | ph+ov | Split | NA | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | 8 | 8 | 4 | 4 | |
| Permitted Phases | 2 | | | 6 | | | | | | | | | |
| Actuated Green, G (s) | 55.6 | 50.8 | 78.0 | 66.2 | 78.0 | 66.2 | 30.1 | 30.1 | 57.3 | 30.9 | 30.9 | 30.9 | |
| Effective Green, g (s) | 55.6 | 50.8 | 78.0 | 66.2 | 78.0 | 66.2 | 30.1 | 30.1 | 57.3 | 30.9 | 30.9 | 30.9 | |
| Actuated g/C Ratio | 0.35 | 0.32 | 0.49 | 0.41 | 0.49 | 0.41 | 0.19 | 0.19 | 0.36 | 0.19 | 0.19 | 0.19 | |
| Clearance Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 105 | 1086 | 310 | 1456 | 310 | 1456 | 316 | 328 | 566 | 341 | 353 | 353 | |
| v/s Ratio Prot | 0.01 | 0.24 | | c0.35 | | c0.32 | 0.17 | c0.17 | 0.14 | 0.04 | c0.18 | | |
| v/s Ratio Perm | 0.14 | | | | | | | | | | | | |
| v/c Ratio | 0.43 | 0.76 | 0.88 | 0.85 | 0.88 | 0.85 | 0.91 | 0.91 | 0.38 | 0.22 | 0.94 | 0.94 | |
| Uniform Delay, d1 | 38.3 | 49.1 | 35.8 | 42.4 | 35.8 | 42.4 | 63.6 | 63.6 | 38.1 | 54.4 | 63.7 | 63.7 | |
| Progression Factor | 1.00 | 1.00 | 1.19 | 0.73 | 1.19 | 0.73 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.8 | 5.0 | 23.1 | 6.4 | 27.7 | 27.5 | 0.4 | 0.3 | 33.2 | | | | |
| Delay (s) | 41.1 | 54.1 | 65.7 | 37.5 | 65.7 | 37.5 | 91.2 | 91.1 | 38.6 | 54.8 | 96.8 | 96.8 | |
| Level of Service | D | D | E | D | E | D | F | F | D | D | F | F | |
| Approach Delay (s) | | 53.4 | | 42.6 | | 69.7 | | | | | 89.1 | | |
| Approach LOS | | D | | D | | E | | | | | F | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | 57.2 | | | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.93 | | | | | | | | | | | | |
| Actuated Cycle Length (s) | 160.0 | | | | | | | | | | | Sum of lost time (s) | 28.0 |
| Intersection Capacity Utilization | 91.2% | | | | | | | | | | | ICU Level of Service | F |
| Analysis Period (min) | 15 | | | | | | | | | | | | |
| c. Critical Lane Group | | | | | | | | | | | | | |

Queues
4: Courthouse Rd/Lawyers Rd & Maple Avenue

12/8/2017

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|-------|------|------|------|-------|-------|-------|------|
| Lane Group | 138 | 917 | 55 | 1484 | 84 | 354 | 184 | 366 |
| Lane Group Flow (vph) | 0.94 | 0.57 | 0.20 | 0.98 | 0.86 | 1.03 | 0.94 | 0.80 |
| v/c Ratio | 108.2 | 16.6 | 12.4 | 55.9 | 131.2 | 115.9 | 119.6 | 67.4 |
| Control Delay | 0.0 | 0.0 | 0.0 | 7.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 108.2 | 16.6 | 12.4 | 63.7 | 131.2 | 115.9 | 119.6 | 67.4 |
| Total Delay | 105 | 180 | 15 | 804 | 89 | -390 | 194 | 347 |
| Queue Length 50th (ft) | #248 | 233 | 32 | #964 | #199 | #602 | #355 | #488 |
| Queue Length 95th (ft) | 387 | 792 | 230 | 621 | 245 | 287 | | |
| Internal Link Dist (ft) | 160 | 145 | 230 | 230 | 245 | 287 | | |
| Turn Bay Length (ft) | 147 | 1609 | 278 | 1522 | 98 | 345 | 195 | 457 |
| Base Capacity (vph) | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.94 | 0.57 | 0.20 | 1.01 | 0.86 | 1.03 | 0.94 | 0.80 |
| Intersection Summary | | | | | | | | |
| - Volume exceeds capacity, queue is theoretically infinite. | | | | | | | | |
| - Queue shown is maximum after two cycles. | | | | | | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | | | | | | |
| - Queue shown is maximum after two cycles. | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

12/8/2017

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|------|------|---------------------------|------|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Traffic Volume (vph) | 127 | 794 | 50 | 51 | 1260 | 105 | 77 | 280 | 46 | 169 | 219 | 118 | |
| Future Volume (vph) | 127 | 794 | 50 | 51 | 1260 | 105 | 77 | 280 | 46 | 169 | 219 | 118 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 | |
| Grade (%) | 0% | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | |
| Total Lost time (s) | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 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 | |
| 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 | |
| Flt | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.98 | 1.00 | 0.95 | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | |
| Satd. Flow (prot) | 1562 | 3181 | 1546 | 3158 | 1711 | 1758 | 1711 | 1758 | 1636 | 1739 | 1739 | 1739 | |
| Flt Permitted | 0.05 | 1.00 | 0.23 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | |
| Satd. Flow (perm) | 82 | 3181 | 372 | 3158 | 1711 | 1758 | 1711 | 1758 | 1636 | 1739 | 1739 | 1739 | |
| 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) | 138 | 863 | 54 | 55 | 1370 | 114 | 84 | 304 | 50 | 184 | 238 | 128 | |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | |
| Lane Group Flow (vph) | 138 | 914 | 0 | 55 | 1480 | 0 | 84 | 350 | 0 | 184 | 354 | 0 | |
| Confl. Peds (#/hr) | | | 6 | | | 5 | | | 3 | | | 1 | |
| Heavy Vehicles (%) | 4% | 5% | 0% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% | |
| Turn Type | pm+pl | NA | pm+pl | NA | NA | Prot | NA | NA | Prot | NA | NA | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | | |
| Permitted Phases | 2 | | | 6 | | | | | | | | | |
| Actuated Green, G (s) | 90.8 | 79.8 | 84.8 | 76.8 | 92 | 31.1 | 9.2 | 31.1 | 19.1 | 41.0 | 41.0 | 41.0 | |
| Effective Green, g (s) | 90.8 | 79.8 | 84.8 | 76.8 | 92 | 31.1 | 9.2 | 31.1 | 19.1 | 41.0 | 41.0 | 41.0 | |
| Actuated g/C Ratio | 0.57 | 0.50 | 0.53 | 0.48 | 0.06 | 0.19 | 0.06 | 0.19 | 0.12 | 0.26 | 0.26 | 0.26 | |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 148 | 1586 | 255 | 1515 | 98 | 341 | 98 | 341 | 195 | 445 | 445 | 445 | |
| v/s Ratio Prot | c0.06 | 0.29 | 0.01 | c0.47 | 0.05 | c0.20 | 0.05 | c0.20 | c0.11 | 0.20 | 0.20 | 0.20 | |
| v/s Ratio Perm | 0.46 | | 0.10 | | | | | | | | | | |
| v/c Ratio | 0.93 | 0.58 | 0.22 | 0.98 | 0.86 | 1.03 | 0.86 | 1.03 | 0.94 | 0.80 | 0.80 | 0.80 | |
| Uniform Delay, d1 | 49.0 | 28.2 | 19.8 | 40.7 | 74.7 | 64.5 | 69.9 | 55.6 | 69.9 | 55.6 | 55.6 | 55.6 | |
| Progression Factor | 1.32 | 0.54 | 0.75 | 0.93 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 51.9 | 1.4 | 0.4 | 18.2 | 48.0 | 55.6 | 48.2 | 9.5 | 48.2 | 9.5 | 9.5 | 9.5 | |
| Delay (s) | 116.8 | 16.7 | 15.3 | 56.2 | 122.7 | 120.1 | 118.1 | 65.1 | 118.1 | 65.1 | 65.1 | 65.1 | |
| Level of Service | F | B | B | E | F | F | F | F | F | F | F | F | |
| Approach Delay (s) | | 29.8 | | 54.8 | | 120.6 | | 82.8 | | 82.8 | | 82.8 | |
| Approach LOS | | C | | D | | F | | F | | F | | F | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | 59.8 | | | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.98 | | | | | | | | | | | | |
| Actuated Cycle Length (s) | 160.0 | | | | | | | | | | | Sum of lost time (s) | 22.0 |
| Intersection Capacity Utilization | 91.8% | | | | | | | | | | | ICU Level of Service | F |
| Analysis Period (min) | 15 | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

12/8/2017
Queues
4: Courthouse Rd/Lawyers Rd & Maple Avenue

| | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-------------------------|-------|------|------|------|------|-------|------|------|
| Lane Group | 138 | 917 | 55 | 1484 | 84 | 354 | 184 | 366 |
| Lane Group Flow (vph) | 0.92 | 0.56 | 0.19 | 0.96 | 0.47 | 0.97 | 0.90 | 0.78 |
| v/c Ratio | 104.7 | 15.3 | 11.6 | 50.8 | 49.0 | 101.1 | 82.2 | 65.1 |
| Control Delay | 0.0 | 0.0 | 0.0 | 6.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Queue Delay | 104.7 | 15.3 | 11.6 | 57.2 | 49.0 | 101.1 | 82.2 | 65.1 |
| Total Delay | #247 | 223 | 30 | #941 | 106 | #578 | #296 | 474 |
| Queue Length 50th (ft) | 104 | 175 | 14 | 784 | 61 | 367 | 144 | 344 |
| Queue Length 95th (ft) | #247 | 223 | 30 | #941 | 106 | #578 | #296 | 474 |
| Internal Link Dist (ft) | 387 | | 145 | 792 | 230 | 621 | 245 | 287 |
| Turn Bay Length (ft) | 160 | | 145 | | 230 | | 245 | |
| Base Capacity (vph) | 150 | 1646 | 286 | 1562 | 179 | 366 | 205 | 469 |
| Starvation Cap Reductn | 0 | 0 | 0 | 71 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.92 | 0.56 | 0.19 | 1.00 | 0.47 | 0.97 | 0.90 | 0.78 |

Intersection Summary
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

12/8/2017
HCM Signalized Intersection Capacity Analysis
4: Courthouse Rd/Lawyers Rd & Maple Avenue

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|----------------------------------|------|------|-------|------|-------|-------|-------|------|-------|------|------|
| Lane Configurations | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Traffic Volume (vph) | 127 | 794 | 50 | 51 | 1260 | 105 | 77 | 280 | 46 | 169 | 219 | 118 |
| Future Volume (vph) | 127 | 794 | 50 | 51 | 1260 | 105 | 77 | 280 | 46 | 169 | 219 | 118 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 9 | 10 | 10 | 9 | 10 | 12 | 11 | 11 | 12 | 10 | 12 | 12 |
| Grade (%) | 0% | 0% | 0% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Total Lost time (s) | 5.0 | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Frpb, 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 |
| 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 |
| Flt | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 0.98 | 1.00 | 0.95 | 1.00 | 0.95 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1562 | 3181 | 1546 | 3158 | 1711 | 1758 | 1636 | 1739 | | | | |
| Flt Permitted | 0.05 | 1.00 | 0.23 | 1.00 | 0.30 | 1.00 | 0.11 | 1.00 | | | | |
| Satd. Flow (perm) | 81 | 3181 | 380 | 3158 | 534 | 1758 | 197 | 1739 | | | | |
| 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) | 138 | 863 | 54 | 55 | 1370 | 114 | 84 | 304 | 50 | 184 | 238 | 128 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 12 | 0 |
| Lane Group Flow (vph) | 138 | 914 | 0 | 55 | 1480 | 0 | 84 | 350 | 0 | 184 | 354 | 0 |
| Confl. Peds (#/hr) | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Heavy Vehicles (%) | 4% | 5% | 0% | 4% | 4% | 5% | 2% | 2% | 2% | 3% | 3% | 3% |
| Turn Type | pm+pl | NA | NA | pm+pl | NA | pm+pl | NA | pm+pl | NA | pm+pl | NA | NA |
| Protected Phases | 5 | 2 | 1 | 6 | 3 | 8 | 7 | 4 | | | | |
| Permitted Phases | 2 | 6 | 6 | 8 | 8 | 8 | 8 | 8 | 4 | | | |
| Actuated Green, G (s) | 92.8 | 81.6 | 86.4 | 78.4 | 39.3 | 33.0 | 53.4 | 42.1 | | | | |
| Effective Green, g (s) | 92.8 | 81.6 | 86.4 | 78.4 | 39.3 | 33.0 | 53.4 | 42.1 | | | | |
| Actuated q/C Ratio | 0.58 | 0.51 | 0.54 | 0.49 | 0.25 | 0.21 | 0.33 | 0.26 | | | | |
| Clearance Time (s) | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | 5.0 | 6.0 | | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | | |
| Lane Grp Cap (vph) | 150 | 1622 | 263 | 1547 | 177 | 362 | 204 | 457 | | | | |
| v/s Ratio Prot | c0.06 | 0.29 | 0.01 | c0.47 | 0.02 | 0.20 | c0.09 | 0.20 | | | | |
| v/s Ratio Perm | 0.47 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.21 | 0.21 | | | | |
| v/c Ratio | 0.92 | 0.56 | 0.21 | 0.96 | 0.47 | 0.97 | 0.90 | 0.78 | | | | |
| Uniform Delay, d1 | 49.0 | 27.0 | 18.9 | 39.2 | 48.6 | 63.0 | 43.5 | 54.6 | | | | |
| Progression Factor | 1.36 | 0.52 | 0.74 | 0.93 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Incremental Delay, d2 | 48.3 | 1.3 | 0.4 | 14.6 | 2.0 | 38.2 | 37.1 | 8.0 | | | | |
| Delay (s) | 114.9 | 15.4 | 14.5 | 51.0 | 50.6 | 101.1 | 80.6 | 62.6 | | | | |
| Level of Service | F | B | B | D | D | F | F | E | | | | |
| Approach Delay (s) | 28.4 | 28.4 | 49.7 | 91.5 | 68.6 | | | | | | | |
| Approach LOS | C | C | D | D | F | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | 51.4 HCM 2000 Level of Service D | | | | | | | | | | | |
| HCM 2000 Volume to Capacity ratio | 0.95 | | | | | | | | | | | |
| Actuated Cycle Length (s) | 160.0 Sum of lost time (s) | | | | | | | | | | | |
| Intersection Capacity Utilization | 91.8% ICU Level of Service F | | | | | | | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |