

TECHNICAL MEMORANDUM



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TO: Erin Yancy and Jakob zumFelde
The City of Harrisonburg, VA

SUBJECT: Harrisonburg Street Connectivity Evaluation and Road Diet Multimodal Evaluation, Task 3
Technical Memorandum – **Revised**
Feasibility of Road Reconfiguration on Three Corridors – Road Diet Multimodal Evaluation

DATE: Original July 6, 2022/**Revised and Resubmitted August 17, 2022**

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Introduction

The purpose of this memo is to summarize the traffic operational analysis and design approach for the following potential roadway reconfiguration corridors in Harrisonburg, VA, shown on Figure 1:

- 1.46-mile segment of Garbers Church Road between Erickson Avenue and W Market Street (US 33)
- 1.50-mile segment of W Market Street (US 33) between Garbers Church Road and High Street (VA 42)
- 0.85-mile segment of E Market Street (US 33) between Mason Street and Vine Street

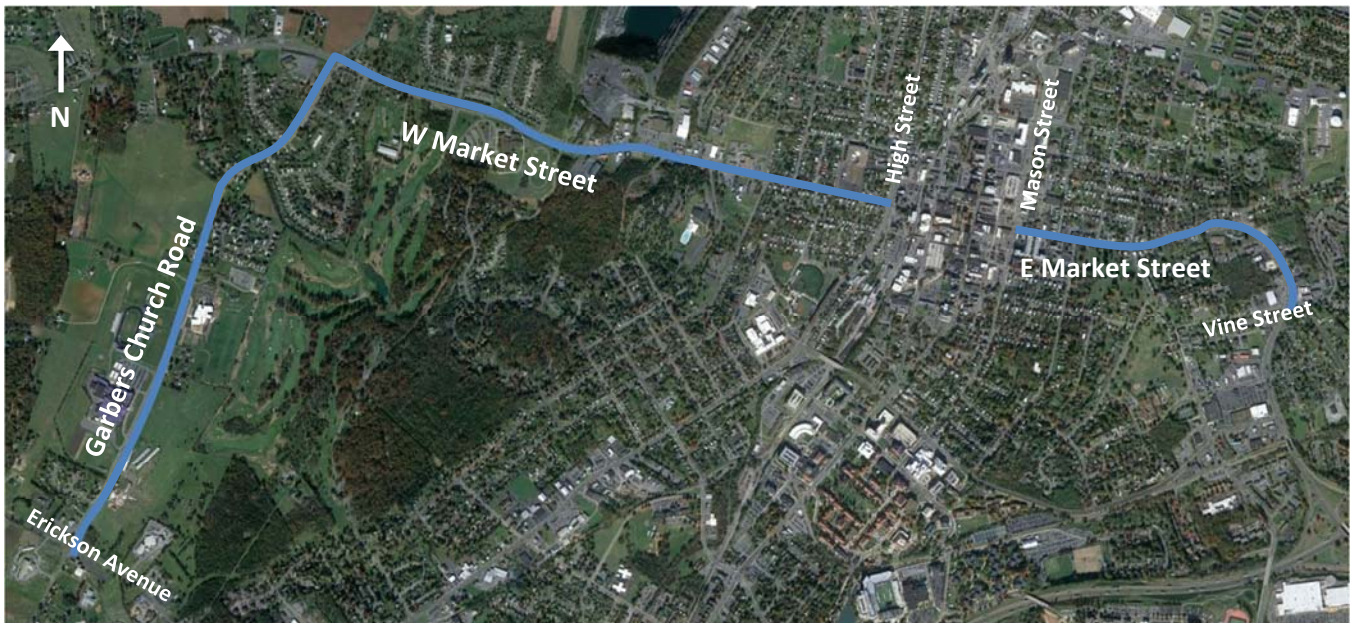


Figure 1: Study Corridors

This memo includes a summary of opportunities and constraints for roadway reconfiguration on the three corridors, a crash summary provided by the City, three alternative cross sections that were presented to the City, tradeoffs between each alternative, feasibility of roadway reallocation, and the selection of a preferred alternative.

A preliminary assessment of the average daily traffic volumes (ADT), compared to thresholds from the FHWA Road Diet Informational Guide, revealed that the study corridors are good candidates for road diets. According to the Guide, agencies should conduct intersection analyses and consider signal retiming in conjunction with implementation and conduct a corridor analysis, described in this memo.

The traffic operational analysis was conducted at 26 intersections across the three corridors using Synchro analysis and Highway Capacity Manual (HCM) methodologies to report vehicular delay, vehicular Level of Service (LOS), volume-to-capacity ratio (v/c), and 50th and 95th percentile queues, are presented for the AM and PM peak hours under future 2040 no build conditions and the preferred alternative with predicted 2040 traffic volumes (see page 22 for the definitions of these terms). This memo also includes a discussion of design details to advance the reconfiguration concepts into further design phases.

Opportunities and Constraints

Garbers Church Road, W Market Street, and E Market Street all consist of two travel lanes in each direction with turn lanes at several intersections along the corridors. The space encompassed by these travel lanes provide the opportunity to reconfigure one travel lane in each direction to serve other modes such as bicyclists, while maintaining at least one lane for motor vehicles.

Details on the geometry of the existing cross sections and traffic information including the average daily traffic (ADT) volume collected in April 2022, projected future 2040 volume based on a regional growth factor of 1% per year as provided by the City, and speed limits for each corridor are described in the tables and figures below. The specific ADT data collection locations are shown in Figure 2. Note: dimensions shown in the figures in this section are approximate and have been refined in the concept design based on GIS and aerial images.

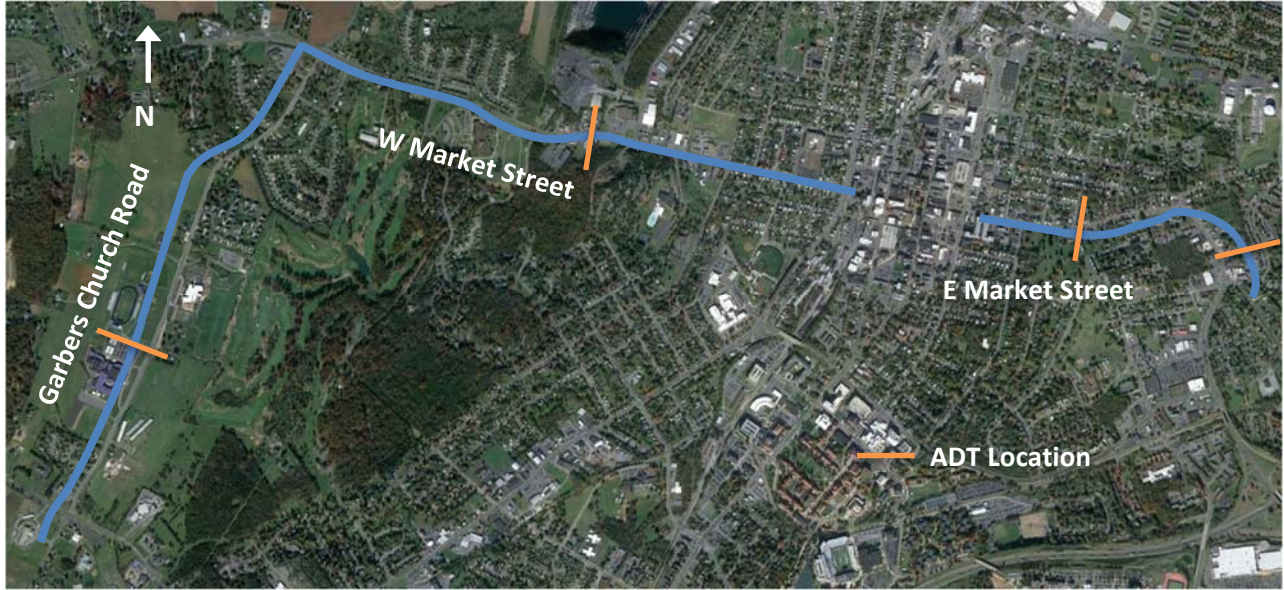


Figure 2: 2022 ADT Data Collection Locations

Garbers Church Road

Table 1: Garbers Church Road Corridor Details

Detail	Garbers Church Road
Width	<ul style="list-style-type: none"> Approximately 48' curb to curb, up to 60' at intersections
Turn lanes	<ul style="list-style-type: none"> Turn lanes in the vicinity of High School
Median	<ul style="list-style-type: none"> No median
Sidewalks	<ul style="list-style-type: none"> No sidewalks on either side south of Springside Drive No sidewalk on east side between Springside Drive and High School north entrance
ADT	<ul style="list-style-type: none"> 2022: 6,455 vpd between Harrisonburg High School and Bluestone Elementary Projected 2040: 7,720 vpd
Speeds	<ul style="list-style-type: none"> Speed Limit – 35 mph 85th Percentile Speed – 40 mph at curve

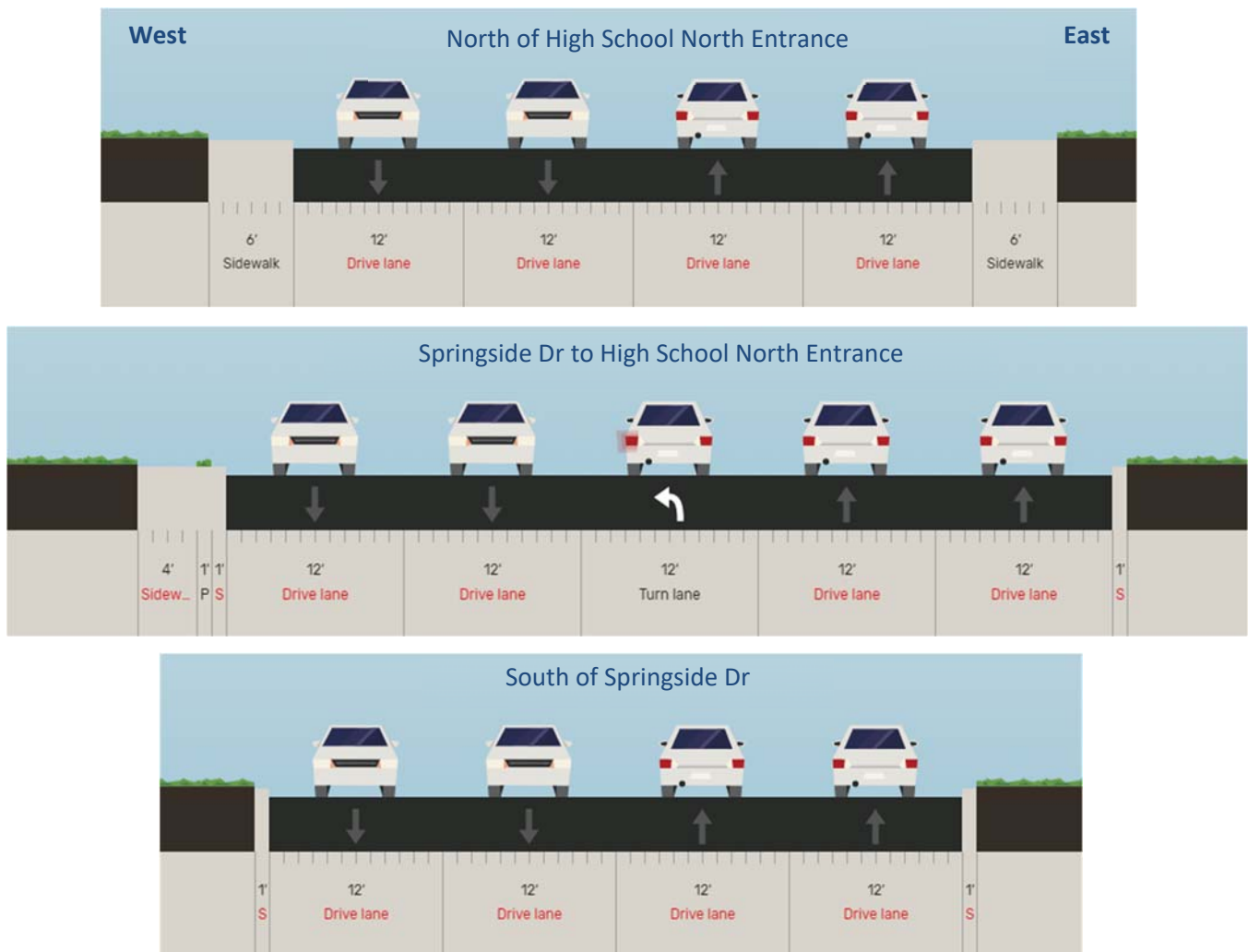


Figure 3: Garbers Church Road Cross Sections

W Market Street

Table 2: W Market Street Corridor Details

Detail	W Market Street
Width	<ul style="list-style-type: none"> Approximately 66' curb to curb, up to 80' at intersections
Turn lanes and Median	<ul style="list-style-type: none"> West of car wash: Turn lanes at intersections, grass median Car wash to Dogwood Dr: Two-way center left-turn lane (TWLTL) East of Dogwood Dr: No turn lanes, no median
Sidewalks	<ul style="list-style-type: none"> No sidewalk north side of street, west of car wash
ADT	<ul style="list-style-type: none"> 2022: 12,050 vpd east of 7-Eleven Projected 2040: 14,415 vpd
Speed Limit	<ul style="list-style-type: none"> 35 mph

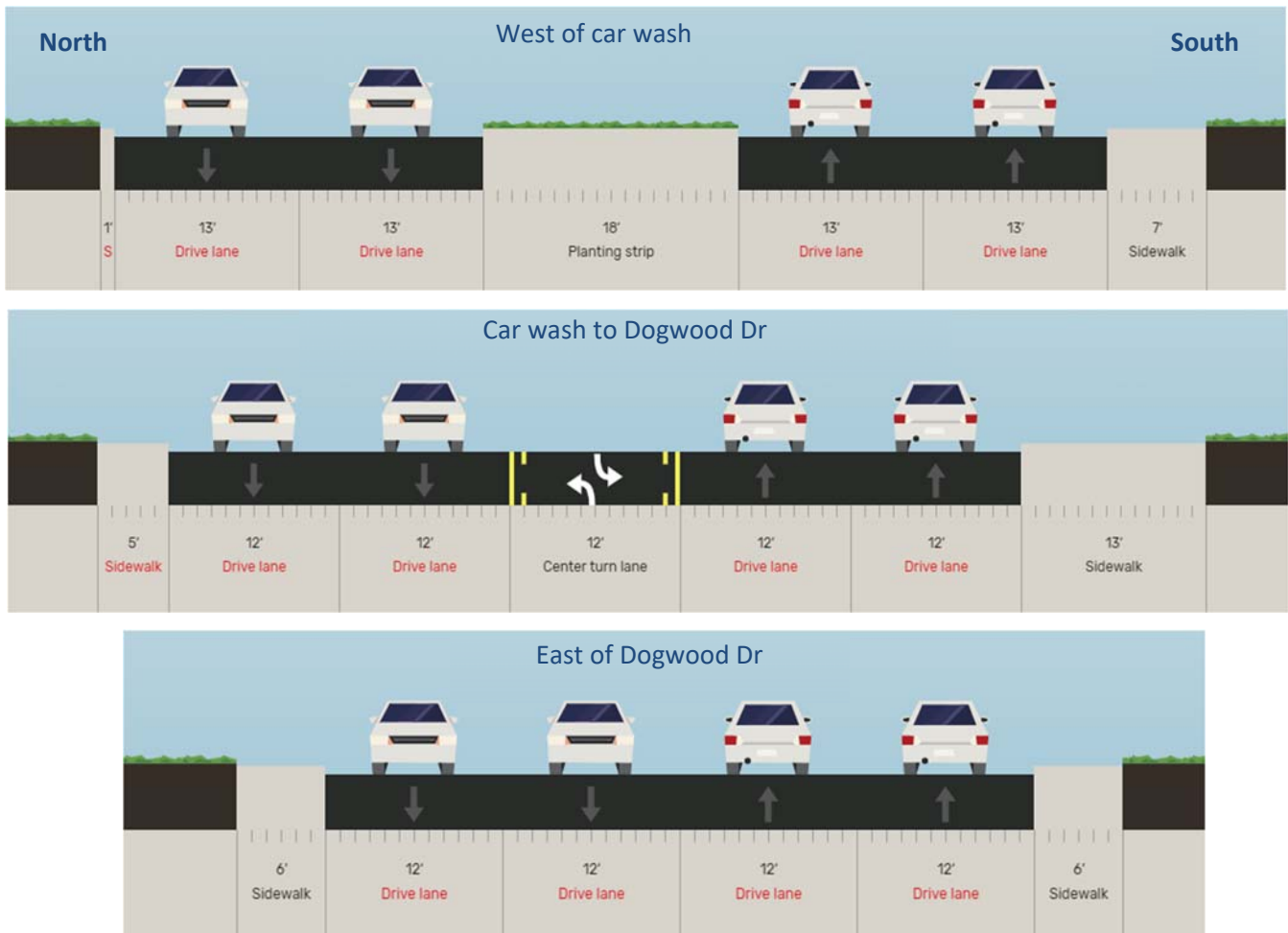


Figure 4: W Market Street Existing Cross Sections

E Market Street

Table 3: E Market Street Corridor Details

Detail	E Market Street
Width	<ul style="list-style-type: none"> • Approximately 48' curb to curb
Turn lanes	<ul style="list-style-type: none"> • Turn lanes at Old Furnace Rd and Hawkins St/Vine St
Median	<ul style="list-style-type: none"> • No median
Sidewalks	<ul style="list-style-type: none"> • Continuous sidewalks
ADT	<ul style="list-style-type: none"> • 2022: 16,516 vpd between Ott Street and Myrtle Street • 2022: 12,516 vpd between Old Furnace Road and Vine Street • Projected 2040: 19,755 vpd between Ott Street and Myrtle Street • Projected 2040: 14,970 vpd between Old Furnace Road and Vine Street
Speed Limit	<ul style="list-style-type: none"> • 35 mph



Figure 5: E Market Street Existing Cross Section

Crash Summary

The following crash summary was provided by city staff for inclusion in this memorandum. The data provided indicates that in the six years of data provided between 2016 and 2021, 13 crashes were recorded on the study segment of Garber’s Church Road, 67 crashes were recorded on the study segment of W. Market Street and 110 crashes occurred on the study segment of E. Market Street. Rear end and angle collisions were the most frequent crash type on all three corridors. There were no fatalities recorded, and property damage only crashes were the most frequent severity with 67% of Garbers Church Road crashes, 72% of W. Market Crashes and 80% of E. Market Crashes. There was one pedestrian crash recorded each on E. Market Street and W. Market Street.

Garbers Church Road

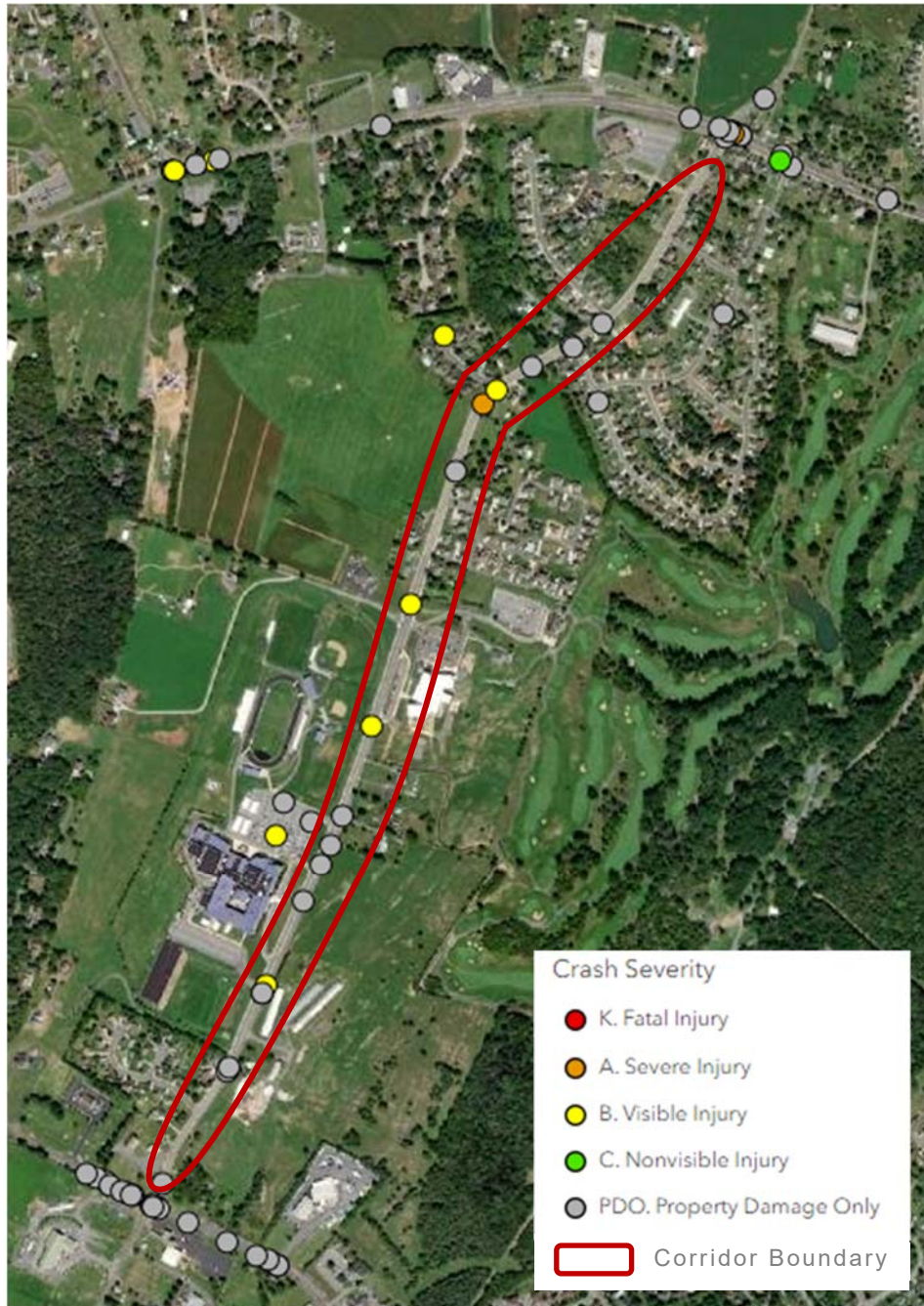


Figure 6: Garbers Church Road Crash Map

Table 4: Garbers Church Road Crash Summary – Collision Type

Year	Collision Type									Total
	Rear End	Angle	Head On	Side-swipe	Fixed Object in Road	Non-Collision	Fixed Object Off Road	Animal	Other	
2016	1	3								4
2017	1							1		2
2018		1						1	1	3
2019	1					1				2
2020										0
2021					1				1	2
Total	3	4	0	0	1	1	0	2	2	13
%	23%	31%	0%	0%	8%	8%	0%	15%	15%	

Table 5: Garbers Church Road Crash Summary – Crash Severity

Year	Crash Severity ¹					Total
	K	A	B	C	PDO	
2016			1		3	4
2017					2	2
2018			1		2	3
2019			1		1	2
2020						0
2021			1		1	2
Total	0	0	4	0	9	13
%	0%	0%	31%	0%	69%	

¹Crash Severity definitions:

K = Fatal Injury, A = Severe Injury, B = Visible Injury, C = Nonvisible Injury, PDO = Property Damage Only

W Market Street



Figure 7: W Market Street Existing Crash Map

Table 6: W Market Street Crash Summary – Collision Type

Year	Collision Type									Total
	Rear End	Angle	Head On	Side-swipe	Fixed Object in Road	Non-Collision	Fixed Object Off Road	Animal	Other	
2016	6	5	1	1						13
2017	3	3		1				2		9
2018	7	7		2						16
2019	2	4	1	3					1*	11
2020	5	3		2					1	11
2021	1	5	1							7
Total	24	27	3	9	0	0	0	2	2	67
%	36%	40%	4%	13%	0%	0%	0%	3%	3%	

* = Pedestrian Crash

Table 7: W Market Street Crash Summary – Crash Severity

Year	Crash Severity ¹					Total
	K	A	B	C	PDO	
2016		1	4		8	13
2017			2		7	9
2018		1	4		11	16
2019		1	1	1	8	11
2020		1		1	9	11
2021		1		1	5	7
Total	0	5	11	3	48	67
%	0%	7%	16%	4%	72%	

¹Crash Severity definitions:

K = Fatal Injury, A = Severe Injury, B = Visible Injury, C = Nonvisible Injury, PDO = Property Damage Only

E Market Street



Figure 8: E Market Street Existing Crash Map

Table 8: E Market Street Crash Summary – Collision Type

Year	Collision Type									Total
	Rear End	Angle	Head On	Side-swipe	Fixed Object in Road	Non-Collision	Fixed Object Off Road	Animal	Other	
2016	7	11					3		1*	22
2017	9	10	1	2			3			25
2018	7	14	1	1			2		1	26
2019	4	7					3			14
2020	3	2				2	3			10
2021	1	7	1		1		3			13
Total	31	51	3	3	1	2	17	0	2	110
%	28%	46%	3%	3%	1%	2%	15%	0%	2%	

* = Pedestrian Crash

Table 9: E Market Street Crash Summary – Crash Severity

Year	Crash Severity ¹					Total
	K	A	B	C	PDO	
2016		2		2	18	22
2017			5		20	25
2018			2		24	26
2019			4		10	14
2020			1	1	8	10
2021			2	2	9	13
Total	0	2	14	5	89	110
%	0%	2%	13%	5%	81%	

¹Crash Severity definitions:

K = Fatal Injury, A = Severe Injury, B = Visible Injury, C = Nonvisible Injury, PDO = Property Damage Only

Roadway Reconfiguration Feasibility

FHWA Road Diet Informational Guide

ADT guidelines from the *FHWA Road Diet Informational Guide*¹ to determine the feasibility of a road diet are listed below:

- Less than 10,000 ADT: A great candidate for Road Diets in most instances. Capacity will most likely not be affected.
- 10,000-15,000 ADT: A good candidate for Road Diets in many instances. Agencies should conduct intersection analyses and consider signal retiming in conjunction with implementation.
- 15,000-20,000 ADT: A good candidate for Road Diets in some instances; however, capacity may be affected depending on conditions. Agencies should conduct a corridor analysis.
- Greater than 20,000 ADT: Agencies should complete a feasibility study to determine whether the location is a good candidate. Some agencies have had success with Road Diets at higher traffic volumes.

An assessment of the 2022 and projected 2040 ADT reveals that the study corridors are good or great candidates for road diets. According to the Guide, agencies should conduct intersection analyses and consider signal retiming in conjunction with implementation and should conduct a corridor analysis, which is described further in this memo.

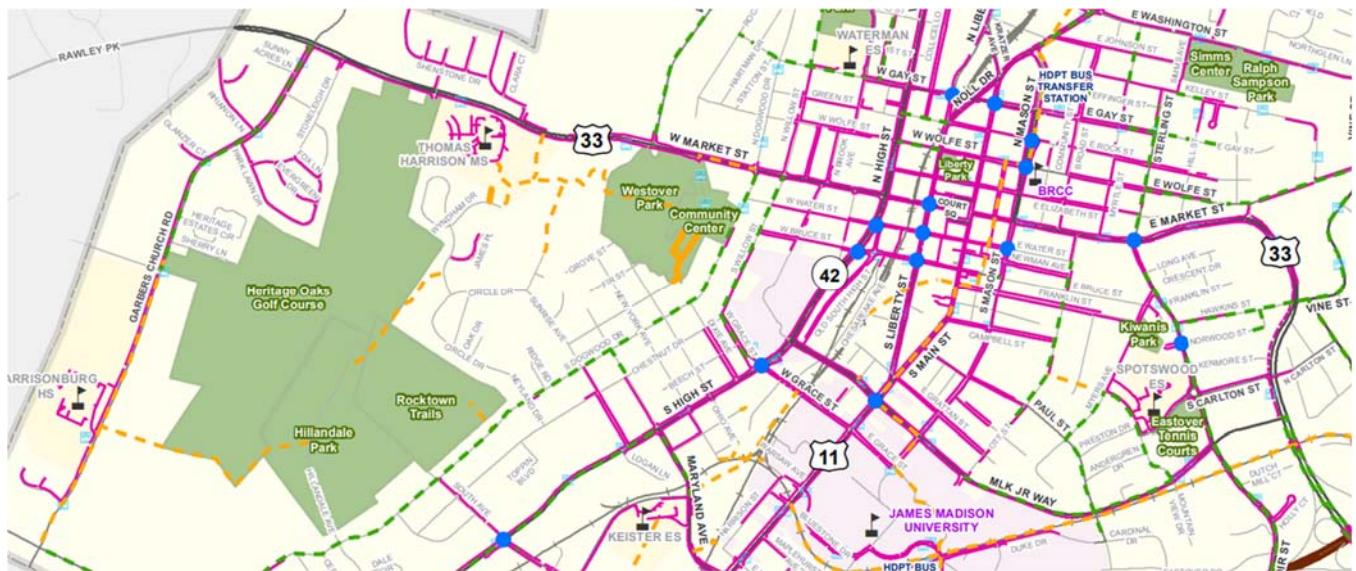
¹ Knapp, Keith, et al. *Road diet informational guide*. No. FHWA-SA-14-028. United States. Federal Highway Administration. Office of Safety, 2014.

Roadway Reconfiguration Alternatives

As part of the corridor analyses, the project team developed three roadway reconfiguration alternatives for repurposing the available curb-to-curb space.

Garbers Church Road, W Market Street, and E Market Street are included in Harrisonburg's Bicycle & Pedestrian Plan as proposed pedestrian improvement segments, proposed shared use path, or proposed bike segments. The maps from this plan are shown in the figures below.

Based on these plans, the alternatives include bike facilities on each corridor.



Facility Type

- | | |
|--|--|
|  Proposed Pedestrian Improvement Segment |  Existing Sidewalk |
|  Proposed Shared Use Path |  Existing Shared Use Path |
|  Proposed Intersection Improvements |  School |
|  Existing Traffic Signal with Crosswalk Signal |  Transit Bus Stop |
|  Existing Traffic Signal without Crosswalk Signal | |

Figure 9: Proposed Pedestrian Facilities from the Harrisonburg Bicycle & Pedestrian Plan



Growth & Accessibility Planning

TECHNICAL ASSISTANCE PROGRAM



Facility Type

- Proposed Bike Segments
- Proposed Shared Use Path
- Existing Shared Use Path
- Existing Bicycle Lanes
- Existing Shared Lane Markings
- School
- Transit Bus Stop

Figure 10: Proposed Bicycle Facilities from the Harrisonburg Bicycle & Pedestrian Plan

The FHWA Bikeway Selection Guide ², published in February 2019 was referenced to determine the preferred bikeway type based on speed and volume of the roadway. A figure from this guide for Urban, Urban Core, Suburban and Rural Town contexts is shown in the figure below.

Based on the speed and 2022 volumes on the study corridors, a separated bike lane or shared use path is the preferred bikeway type for all three segments.

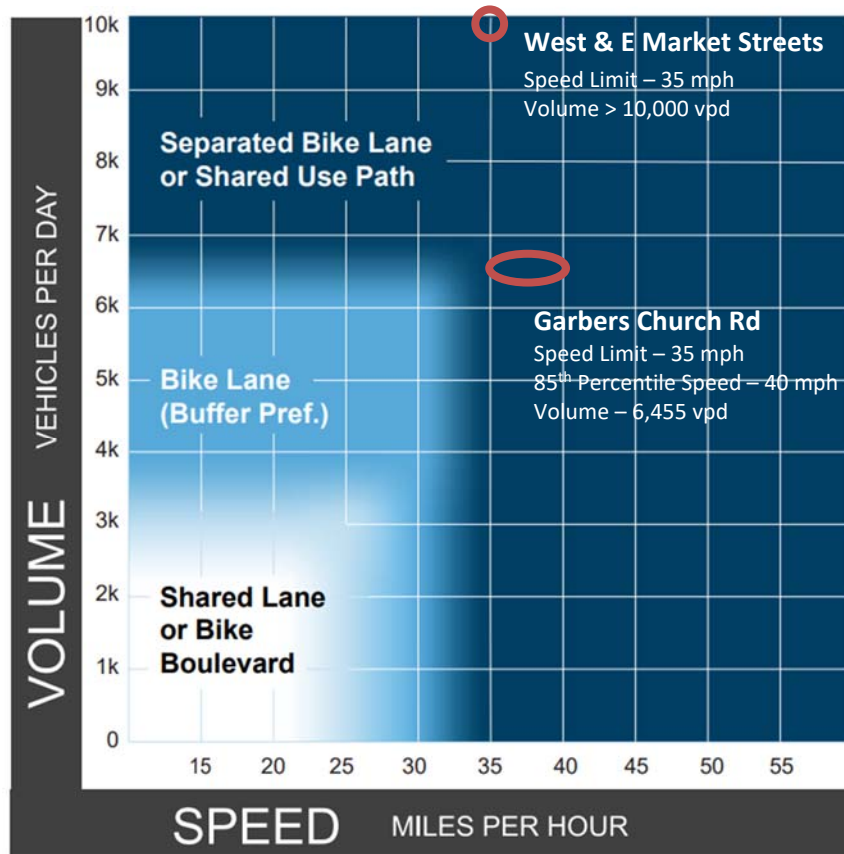


Figure 11: Preferred Bikeway Type for Urban, Urban Core, Suburban and Rural Town Contexts²

- Note: 1. Chart assumes operating speeds are similar to posted speed.
2. Advisory bike lanes may be an option where traffic volume is <3K ADT.

² Schultheiss, Bill, et al. *Bikeway selection guide*. No. FHWA-SA-18-077. United States. Federal Highway Administration. Office of Safety, 2019.

Based on the preferred bikeway type from the FHWA Guide, the following three bike facility alternatives were developed. Dimensions and buffer materials presented in the figures in this section are illustrative and have been refined for the preferred alternative.

One-way separated bike lanes

- Separation can be curb or paint and bollards
- Median can be curb, painted, and/or provide turn lanes at intersections, or space can be allocated to bikeway and buffer depending on alignment and turn lane needs. Minimum pavement widths will be a consideration when choosing median type and width

Pros:

- Can maintain curbs, existing medians/turn lane locations
- Intuitive for users at intersections and driveways since cyclists would be traveling “with traffic”
- Cyclists in both directions can see both pedestrian and vehicular signal heads

Cons:

- Harder to transition to existing shared use paths
- More space must be dedicated to buffer on both sides of the roadway
- Requires careful design of buffer elements to provide a lower stress experience to cyclists

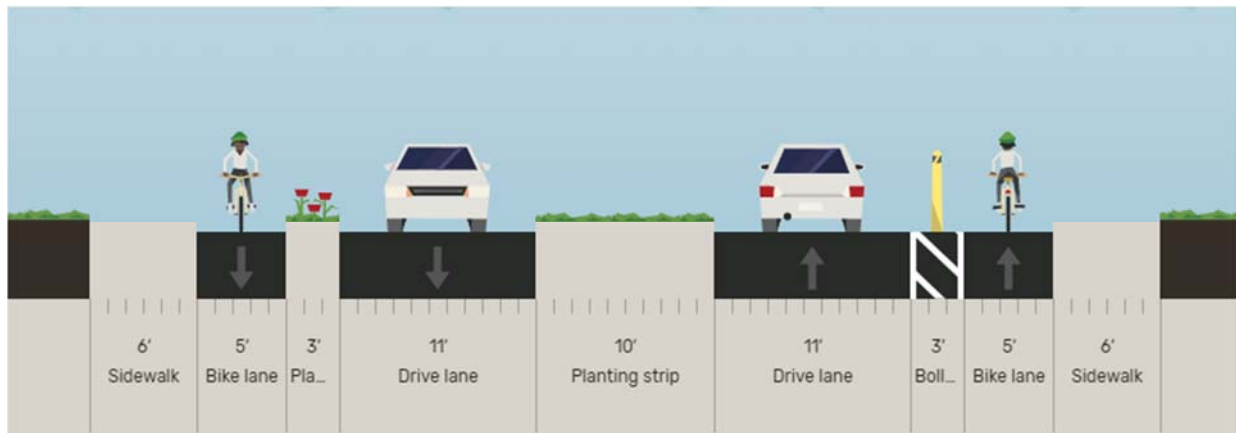


Figure 12: One-way Separated Bike Lanes Cross Section Example (Note: In most cases, the separation type would be the same on both sides of the street. This graphic shows a curbed planter strip on the left side and a paint-and-bollard design on the right side just to illustrate different options.)

Two-way separated bike lanes

- Separation can be curb or paint and bollards
- Median can be curb, painted, and/or provide turn lanes at intersections, minimum pavement widths will be a consideration when choosing median type and width

Pros:

- Can maintain curbs, existing medians/turn lane locations
- Easy transitions to existing shared use paths (Garber’s Church) or potential future paths

Cons:

- Less intuitive conflicts at intersections and driveways with cyclists traveling “against” traffic.
- Requires visibility of crossing signals for counterflow cyclists (can use ped signal)
- More efficient use of buffer space
- Requires careful design of buffer elements to provide a lower stress experience to cyclists

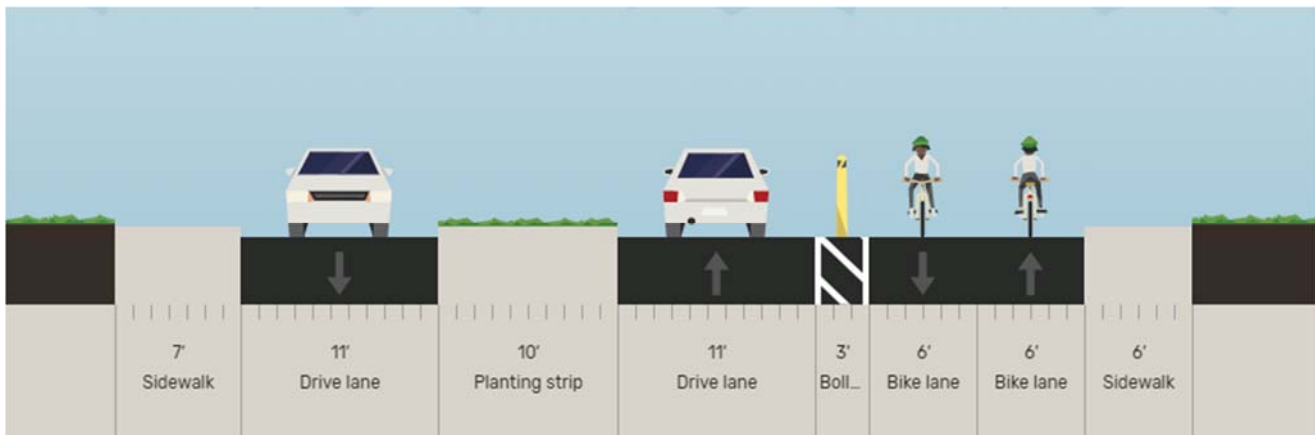


Figure 13: Two-way Separated Bike Lane Cross Section Example

Shared-use path on one side

- Sidewalk level shared-use path (SUP)
- Median can be curb, painted, and/or provide turn lanes at intersections, minimum pavement widths will be a consideration when choosing median type and width

Pros:

- Easy transitions to existing shared use paths (Garber's Church) or potential future paths
- Most protected facility provides a very low stress experience to cyclists of all ages and abilities

Cons:

- Must relocate at least one side of curb and shift median, which increases implementation cost
- Requires visibility of crossing signals for counterflow cyclists (can use ped signal)
- More efficient use of buffer space
- Pedestrians and bicyclists use a shared space, which could create conflicts in the future if the volumes of people walking or biking grow significantly. Given present-day volumes of people walking and biking, it is unlikely that this is a concern.



Figure 14: Shared-use Path Cross Section Example

Selection of Preferred Alternative

According to the City, the primary goal of the preferred alternative is to identify low-cost changes that can be completed with repaving of the roads. The repaving schedule is listed below. This will include primarily pavement marking, sign, and signal changes with the potential for addition of delineator posts (or similar) for protected bike lanes or intersection-specific physical changes such as installation of a pedestrian refuge island.

The estimated paving years for the corridors are:

- Garbers Church Road: 2023 for the segment between W Market St and the Bluestone Elementary School/Heritage Oaks Golf Course entrance; ~2027 for the remainder
- W Market Street: 2027-2030 for the whole corridor
- E Market Street: 2023

Based on the priority to maintain existing curb lines and limit impacts to signals, the preferred alternative for all three corridors under a road diet is one-way separated bike lanes that maintain the curbs. Concept designs have been developed for two alternative approaches. Each concept maintains one travel lane in each direction. Concept A includes turn lanes only where warranted as described later in this memorandum and reallocates that roadway space to provide a wider bike lane and buffer to maximize cyclist comfort and safety. Concept B maintains existing turn lanes at signalized intersections and provides a two-way center left-turn lane (TWLTL) through the majority of the corridor for turns at driveways and unsignalized intersections, which results in a minimum width of bike lane and buffer. In trade-off, Concept B allows for additional pedestrian crossing refuges at three-way intersections such as Broad Street or Ott Street at E. Market Street.

Traffic Operational Analysis

Traffic operational analysis was conducted at 26 intersections across the three corridors using Synchro analysis and HCM methodologies to determine the feasibility of removing a travel lane for roadway reconfiguration to accommodate the preferred alternative of one-way separated bike lanes that maintain the curbs. Traffic operational results, including vehicular delay, LOS, v/c, and 50th and 95th percentile queues, are presented for the AM and PM peak hours under future 2040 no build conditions and the preferred alternative with predicted 2040 traffic volumes. Details on the traffic operational analysis are provided below.

Study Intersections and Data Collection

The following intersections are included in the traffic operational analysis.

1. Garbers Church Rd and Erickson Ave (signalized) – via Gridsmart
2. Garbers Church Rd and HHS south entrance (signalized)
3. Garbers Church Rd and HHS inbound unsignalized loop entrance
4. Garbers Church Rd and HHS north entrance (signalized)
5. Garbers Church Rd and Bluestone ES inbound entrance
6. Garbers Church Rd and Heritage Center Way/Elementary School/Golf course
7. Garbers Church Rd and Heritage Estates
8. Garbers Church Rd and Park Lawn Dr
9. Garbers Church Rd and Rhianon Ln
10. Garbers Church Rd and Lendale Ln
11. Garbers Church Rd and W Market St (signalized)
12. W Market St and Stoneleigh Dr
13. W Market St and THMS/Westfield Ct (signalized)
14. W Market St and Brickstone Ct
15. W Market St and Waterman Dr (signalized)
16. W Market St and Dogwood Dr (signalized)
17. W Market St and Willow St
18. W Market St and High St (signalized) – via Gridsmart
19. E Market St and Mason St (signalized) – via Gridsmart
20. E Market St and Broad St
21. E Market St and Ott St
22. E Market St and Myrtle St
23. E Market St and Reservoir/Sterling (signalized)
24. E Market St and Hill St
25. E Market St and Old Furnace Rd
26. E Market St and Vine/Hawkins (signalized) – via Gridsmart

Peak period turning movement counts were collected in April 2022 from 7AM-9AM and 2PM-6PM or were provided by the City via the GridSmart system using the same day as the data collection for all study intersections. Based on the data collected, one AM and one PM peak hour was selected per corridor and the peak hour per corridor was used for analysis purposes. These peak hours are listed in the table below. Traffic count data is provided in Attachment A.

Table 10: Corridor Peak Hours

Corridor	AM Peak Hour	PM Peak Hour
Garbers Church Rd	7:00-8:00AM	3:00-4:00PM
W Market St	7:15-8:15AM	4:15-5:15PM
E Market St	7:45-8:45AM	4:15-5:15PM

Future 2040 volumes were calculated based on 2022 turning movement counts, a regional growth factor of 1% per year as provided by the City, and trip generation for one pending development project provided by the City. Details on land use and trip distribution for this development, as provided by the City is described below. The exiting trip distribution for the AM peak was modified in order to balance operations between the signalized and unsignalized intersections.

A proffered, rezoned development may add trips north of the W Market Street corridor with those trips entering the corridor at W Market Street & Westfield Ct and W Market Street & Brickstone Ct. That development is expected to be up to 350 single family residences. For this study, it is assumed that 1/3 of the trips will be allocated to W Market Street & Brickstone Ct and 2/3 to W Market Street & Westfield Ct. At the W Market Street & Brickstone Ct, it is assumed that all of the traffic will go to/from the downtown direction. At the W Market Street & Westfield Ct, the assumption is that 60% would go to/from the County (west) and the other 40% would go to/from the City.

The City provided signal timing sheets for all signalized intersections. Signal timings at some intersections were modified for the future no build conditions to accommodate the traffic growth.

Analysis Methodology

The traffic operational analysis methodology for motor vehicles is based on the concepts and procedures in the Highway Capacity Manual (HCM)³ utilizing *Synchro 11* software. Results from HCM 6th Edition are reported if results were available for both the no build and preferred alternative conditions. HCM 2000 results are reported when HCM 6th Edition results were not available. The following measures were used to assess the impacts to vehicular travel:

³ Highway Capacity Manual 6th Edition, A Guide for Multimodal Mobility Analysis. Transportation Research Board, National Research Council, Washington, DC 1207, 2016.

Volume-to-Capacity Ratio

Volume-to-capacity (v/c) ratio quantifies the degree to which a phase's capacity is utilized by a lane group at a signalized intersection.

Intersection Delay

Delay is the average amount of time, in seconds, that a vehicle takes to pass through an intersection beyond what would be experienced in a free-flow condition. Intersection delay is reported as overall vehicle delay and vehicle delay by movement for select locations with re-routed traffic.

Level of Service (LOS)

Vehicular Level of Service (LOS) is a qualitative measure of traffic congestion based on the average delay for a motorist. LOS is reported as overall intersection LOS and LOS by movement. LOS A represents minimum traffic delay and is an indication that there is underutilized roadway capacity during the peak hour. LOS F represents high levels of traffic delay. The table below, excerpted from the Highway Capacity Manual, provides LOS criteria for signalized and unsignalized intersections.

Table 11: Level of Service Relationship with Control Delay

Level of Service	Signalized Intersection Control Delay (seconds)	Unsignalized Intersection Control Delay (seconds)
A	0 to 10	0 to 10
B	> 10 to 20	> 10 to 15
C	> 20 to 35	> 15 to 25
D	> 35 to 55	> 25 to 35
E	> 55 to 80	> 35 to 50
F	> 80	> 50

50th and 95th Percentile Queues

The 95th-percentile queue is defined to be the queue length, in vehicles, that only has a 5% probability of being exceeded. It is a useful parameter for determining the appropriate length of turn pockets, but it is not typical of what an average driver would experience. The 50th-percentile queue is the queue length on a typical cycle.

Preferred Alternative Operational Details

Operational details for the preferred alternative including turn lane warrants and time-separated bicycle movement volume considerations. These details are summarized in the section below.

Turn Lanes

Turn lane warrants were evaluated based on the projected 2040 volumes of the higher peak hour for each corridor and the VDOT right- and left-turn lane warrants provided in Attachment B. The left-turn lane warrants are based on advancing volume, opposing volume, and percent left-turns. Right-turn lane warrants are based on the peak hour total approach volume and peak hour right turn volume. Tables 12 and 13 include details on existing turn lane locations, turn lane warrants, and the ultimate turn lane design included in the concept design. In some cases, a turn lane may not be warranted but was included because of the existing configuration. Turn lanes were shown to be warranted in two locations but were triggered by potential development volumes. The development project does not at this time include addition of turn lanes; therefore, turn lanes at these locations were not included in the concept design. These locations are noted with footnotes in the tables. In some locations existing turn lanes exist but are unwarranted and were removed from Concept A and that space was reallocated to provide wider bike lanes and additional buffer space. Existing turn lanes were maintained, or TWLTL was included through most of the corridor in Concept B regardless of warrant results.

Signal Operations

The concepts for the preferred alternative were developed assuming no changes to the existing signal infrastructure. Intersections were designed such that bicyclists could use the vehicle or pedestrian signals at signalized intersection. Conflict points and transitions at intersections are shown with design details to increase visibility and awareness for all users with green pavement markings.

Some locations with high volume of left or right-turning traffic would benefit from upgrades to the signal equipment that would provide an opportunity to include phase separation, such as protected-only left-turns or right-turn overlaps, to remove turning conflicts across the bike lanes. In order to provide this phase separation, left or right-turn lanes must also be provided. Locations that require signal phase changes that are possible with existing signal equipment, locations where there are space constraints that prevented the necessary turn lane for phase separated phasing, and locations that would require new signal equipment and therefore were not included in the models are noted with footnotes in Tables 12 and 13.

The Draft AASHTO Guide for the Development of Bicycle Facilities (Bike Guide) includes a table of volume considerations for time-separated bicycle movements, shown in the figure below. As primary authors of the forthcoming 5th Edition of the AASHTO's Bike Guide, Toole Design has included DRAFT design guidance from this unpublished document, but the same guidance is also available in the adopted MassDOT Separated Bike Lane Planning and Design Guide, as well as the adopted ODOT Multimodal Design Guide for reference. Movements that meet this threshold in at least one peak period were analyzed with separate phasing in the build Synchro

models as a worst case scenario, as these phase separated movements would be a more impactful condition for motor vehicle operations.

Separated Bike Lane Operation	Motor Vehicles per Hour Turning across Separated Bike Lane			
	Two-way Street			One-way Street
	Right Turn	Left Turn across One Lane	Left Turn across Two Lanes	Right or Left Turn
One-way	150	100	50	150
Two-way	100	50	0	100

Figure 15: Volume Considerations for Time-separated Bicycle Movements (DRAFT AASHTO Bike Guide, MassDOT Separated Bike Lane Planning and Design Guide)

Table 12: Turn Lane warrants and phasing considerations by approach (Northbound/Eastbound)

Corridor (Peak used to check warrant)	Intersection	Control	Left	Through	Right	Advancing Volume	Opposing Volume	% Lefts	Existing left-turn lane	VDOT left-turn lane warrant for 2-lane highway	Concept A left-turn lane	Modeled left-turn lane	Existing left-turn phasing	Left-turn phasing considerations	Modeled left-turn phasing	Existing right-turn lane	VDOT right-turn lane warrant for 2-lane highway	Concept A right-turn lane	Modeled right-turn lane	Existing right-turn phasing	Right-turn phasing considerations	Modeled right-turn phasing
Garbers Church Rd – Northbound (AM Peak)	Erickson Ave	Signalized	23	78	35	136	102	17%	Yes	Not warranted	Yes	Yes	Protected-permitted	Concurrent	Protected-permitted	No	Not warranted	No	No	Permitted	Concurrent	Permitted
	HHS south entrance	Signalized	76	434	NA	510	337	15%	Yes	Warranted	Yes	Yes	Protected-permitted	Concurrent	Protected-permitted	NA	NA	NA	NA	NA	NA	NA
	HHS inbound loop	Unsignalized	97	355	NA	452	314	21%	Yes	Warranted	Yes	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	HHS north entrance	Signalized	186	274	0	460	320	40%	Yes	Warranted	Yes	Yes	Protected-permitted	Phase separate	Protected-only ²	No	Not warranted	No	No	Permitted	Concurrent	Permitted
	Bluestone ES inbound	Unsignalized	NA	322	18	340	592	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA
	Heritage Center Way	Unsignalized	0	304	30	334	607	0%	Yes	Not warranted	No	No	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA
	Heritage Estates	Unsignalized	NA	311	0	311	626	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA
	Park Lawn Dr	Unsignalized	NA	295	16	311	584	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA
	Rhianon Ln	Unsignalized	4	295	NA	299	574	1%	No	Not warranted	TWLTL	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lendale Ln	Unsignalized	NA	288	8	296	542	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA
W Market St	Signalized	18	60	270	348	157	5%	No	Not warranted	No	No	Split phased	Concurrent	Split phased	Yes	Warranted	Yes	Yes	Permitted	Phase separate	Overlap only ⁴	
W Market St – Eastbound (PM Peak)	Garbers Church Rd	Signalized	56	290	28	374	343	15%	Yes	Warranted	Yes	Yes	Protected-permitted	Concurrent	Protected-permitted	Yes	Not warranted	Yes	Yes	Permitted	Concurrent	Permitted
	Stoneleigh Dr	Unsignalized	NA	510	8	518	512	0%	NA	NA	NA	NA	NA	NA	NA	Yes	Not warranted	No	No	NA	NA	NA
	THMS/Westfield Ct ⁷	Signalized	109	424	14	547	359	20%	Yes	Warranted	Yes	Yes	Protected-permitted	Phase separate	Protected-only ²	Yes	Warranted ⁷	Yes	Yes	Permitted	Concurrent	Permitted
	Brickstone Ct	Unsignalized	4	545	NA	549	586	1%	Yes	Warranted	Yes	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Waterman Dr	Signalized	100	476	0	576	728	17%	Yes	Warranted	Yes	Yes	Protected-permitted	Phase separate	Protected-only ²	No	Not warranted	No	No	Permitted	Concurrent	Permitted
	Dogwood Dr	Signalized	19	532	92	643	653	3%	No	Warranted	Yes	Yes	Permitted	Concurrent	Permitted	No	Warranted	No	No	Permitted	Concurrent	Permitted
	Willow St	Unsignalized	11	566	11	588	648	2%	No	Warranted	Yes	Yes	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA
High St	Signalized	193	174	224	591	224	33%	Yes	Warranted	Yes	Yes	Protected-permitted	Phase separate	Protected-permitted ⁶	No	Warranted	No	No	Permitted	Phase separate ³	Permitted	
E Market St – Eastbound (PM Peak)	Mason St	Signalized	NA	240	26	266	242	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	Permitted	Concurrent	Permitted
	Broad St	Unsignalized	13	726	NA	739	756	2%	No	Warranted	TWLTL	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Ott St	Unsignalized	NA	791	4	795	800	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA
	Myrtle St	Unsignalized	17	865	NA	882	814	2%	No	Warranted	TWLTL	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Reservoir/Sterling	Signalized	1	607	252	860	500	0%	No	Not warranted	No	No	Permitted	Concurrent	Permitted	No	Warranted	Yes	Yes	Permitted	Phase separate	Overlap only ⁴
	Hill St	Unsignalized	6	666	NA	672	520	1%	No	Warranted	TWLTL	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Old Furnace Rd	Unsignalized	127	620	NA	747	482	17%	Yes	Warranted	Yes	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vine/Hawkins ¹	Signalized	6	542	97	645	524	1%	Yes	Warranted	Yes	Yes	Protected-permitted	Concurrent	·	No	Warranted	No	No	Permitted	Concurrent	Permitted	

1 - Warrants were checked but concept ends before intersection

2 - Requires phasing changes - possible with existing signal equipment

3 - Not incorporated - space constraints

4 - Requires phasing changes - new signal equipment needed (location of bike lane would change in concept if this option is implemented)

5 - NTOR recommended with mixing zone layout

6 - Concept ends at intersection; Phase separation should be considered if it is desired to accommodate bike facilities through the intersection.

7 - Warrants also checked with AM Peak volumes because of school traffic

Table 13: Turn Lane warrants and phasing considerations by approach (Southbound/Westbound)

Corridor (Peak used to check warrant)	Intersection	Control	Left	Through	Right	Advancing Volume	Opposing Volume	% Lefts	Existing left-turn lane	VDOT left-turn lane warrant for 2-lane highway	Concept A left-turn lane	Modeled left-turn lane	Existing left-turn phasing	Left-turn phasing considerations	Modeled left-turn phasing	Existing right-turn lane	VDOT right-turn lane warrant for 2-lane highway	Concept A right-turn lane	Modeled right-turn lane	Existing right-turn phasing	Right-turn phasing considerations	Modeled right-turn phasing	
Garbers Church Rd – Southbound (AM Peak)	Erickson Ave	Signalized	289	102	4	395	78	73%	Yes	Not warranted	Yes	Yes	Protected-permitted	Phase separate	Protected-permitted ⁶	No	Not warranted	No	No	Permitted	Concurrent	Permitted	
	HHS south entrance	Signalized	NA	337	42	379	434	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	Permitted	Concurrent	Permitted	
	HHS inbound loop	Unsignalized	NA	314	65	379	355	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA	
	HHS north entrance	Signalized	0	320	304	624	274	0%	Yes	Not warranted	No	No	Permitted	Concurrent	Permitted	No	Warranted	Yes	Yes	Permitted	Phase separate ³	Permitted	
	Bluestone ES inbound	Unsignalized	23	592	NA	615	322	4%	No	Warranted	Yes	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Heritage Center Way	Unsignalized	26	607	0	633	304	4%	Yes	Warranted	Yes	Yes	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA	
	Heritage Estates	Unsignalized	0	626	NA	626	311	0%	No	Not warranted	TWLTL	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Park Lawn Dr	Unsignalized	1	584	NA	585	295	0%	No	Not warranted	TWLTL	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Rhianon Ln	Unsignalized	NA	574	5	579	295	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA	
	Lendale Ln	Unsignalized	0	542	NA	542	288	0%	No	Not warranted	TWLTL	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W Market St	Signalized	24	157	50	231	60	10%	No	Not warranted	No	No	Split phased	Concurrent	Split phased	Yes	Not warranted	Yes	Yes	Permitted	Concurrent	Permitted		
W Market St – Westbound (PM Peak)	Garbers Church Rd	Signalized	144	343	26	513	290	28%	Yes	Warranted	Yes	Yes	Protected-only	Phase separate	Protected-only	Yes	Not warranted	Yes	Yes	Permitted	Concurrent	Permitted	
	Stoneleigh Dr	Unsignalized	43	512	NA	555	510	8%	Yes	Warranted	Yes	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	THMS/Westfield Ct	Signalized	31	359	82	472	424	7%	Yes	Warranted	Yes	Yes	Protected-permitted	Phase separate	Protected-only ²	No	Warranted with development	No	No	Permitted	Concurrent	Permitted	
	Brickstone Ct	Unsignalized	NA	586	112	698	545	0%	Yes	NA	Yes	NA	NA	NA	NA	No	Warranted with development	No	No	NA	NA	NA	
	Waterman Dr	Signalized	0	728	102	830	476	0%	No	Not warranted	No	No	Permitted	Concurrent	Permitted	Yes	Warranted	Yes	Yes	Permitted	Concurrent	Permitted	
	Dogwood Dr	Signalized	24	653	12	689	532	3%	No	Warranted	Yes	Yes	Permitted	Concurrent	Permitted	No	Not warranted	No	No	Permitted	Concurrent	Permitted	
	Willow St	Unsignalized	23	648	8	679	566	3%	No	Warranted	Yes	Yes	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA	
High St	Signalized	71	224	12	307	174	23%	Yes	Warranted	Yes	Yes	Protected-permitted	Concurrent	Protected-permitted	No	Not warranted	No	No	Permitted	Concurrent	Permitted		
E Market St – Westbound (PM Peak)	Mason St	Signalized	193	242	305	740	240	26%	Yes	Warranted	Yes	Yes	Protected-permitted	Phase separate	Protected-permitted ⁶	No	Warranted	Yes	Yes	Permitted	Phase separate ³	Permitted + NTOR ⁵	
	Broad St	Unsignalized	NA	756	47	803	726	0%	NA	NA	NA	NA	NA	NA	NA	No	Warranted	No	No	NA	NA	NA	
	Ott St	Unsignalized	28	800	NA	828	791	3%	No	Warranted	TWLTL	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Myrtle St	Unsignalized	NA	814	14	828	865	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA	
	Reservoir/Sterling	Signalized	2	500	13	515	607	0%	No	No	No	No	Permitted	NA	Permitted	No	Not warranted	No	No	Permitted	Concurrent	Permitted	
	Hill St	Unsignalized	NA	520	28	548	666	0%	NA	NA	NA	NA	NA	NA	NA	No	Not warranted	No	No	NA	NA	NA	
	Old Furnace Rd	Unsignalized	NA	482	134	616	620	0%	NA	NA	NA	NA	NA	NA	NA	Yes	Warranted	Yes	Yes	NA	NA	NA	
Vine/Hawkins ¹	Signalized	25	524	284	833	542	3%	Yes	Warranted	Yes	Yes	Protected-permitted	Concurrent	Protected-permitted	Yes	Warranted	Yes	Yes	Permitted	Phase separate	Permitted		

1 - Warrants were checked but concept ends before intersection

2 - Requires phasing changes - possible with existing signal equipment

3 - Not incorporated - space constraints

4 - Requires phasing changes - new signal equipment needed (location of bike lane would change in concept if this option is implemented)

5 - NTOR recommended with mixing zone layout

6 - Concept ends at intersection; Phase separation should be considered if it is desired to accommodate bike facilities through the intersection.

7 - Warrants also checked with AM Peak volumes because of school traffic

Analysis Results

Overall intersection analysis results are provided in Table 8. Detailed results by movement and Synchro reports are provided in Attachment C.

As shown in the overall intersection analysis results, all signalized intersections would operate at an overall intersection LOS of D or better, with the exception of E. Market Street at Vine Street, which is projected to operate at LOS E in both the Build and No-Build Alternative. Based on the projected future traffic volumes, which include 1% growth per year to 2040, and roadway reconfiguration alternatives, in the PM peak the northbound approach of West Market St and Willow St, and the southbound approaches of East Market St and Broad St and East Market St and Old Furnace Rd would operate at LOS F. In the AM peak the eastbound right-turn movement at East Market St and Reservoir/Sterling would operate at LOS F. Based on this analysis the **roadway reconfiguration is feasible**, with some potential mitigations needed at specific approach locations if future growth is realized.

Table 14: Overall intersection analysis results

Corridor	Intersection	Control	Reporting	AM No Build		AM Alternative		PM No Build		PM Alternative	
				Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Garbers Church Rd	Erickson Ave	Signalized	HCM6	35.9	D	36.0	D	42.4	D	42.4	D
	HHS south entrance	Signalized	HCM2000	6.3	A	7.7	A	6.4	A	7.3	A
	HHS inbound loop	Unsignalized	HCM2000	1.0	A	1.0	A	0.1	A	0.1	A
	HHS north entrance	Signalized	HCM6	11.9	B	19.3	B	9.8	A	12.4	B
	Bluestone ES inbound	Unsignalized	HCM2000	0.2	A	0.2	A	0.1	A	0.1	A
	Heritage Center Way	Unsignalized	HCM6	0.3	A	0.3	A	2.4	A	2.8	A
	Heritage Estates	Unsignalized	HCM6	0.0	NA	0.1	A	0.2	A	0.2	A
	Park Lawn Dr	Unsignalized	HCM6	0.7	A	1.0	A	0.4	A	0.5	A
	Rhianon Ln	Unsignalized	HCM6	0.4	A	0.5	A	0.4	A	0.4	A
	Lendale Ln	Unsignalized	HCM6	0.5	A	0.6	A	0.2	A	0.2	A
Garbers Church Rd & W Market Street ²	W Market St ¹	Signalized	HCM2000	42.3	D	46.3	D	30.5	C	31.9	C
	Garbers Church Rd & W Market Street ²	Signalized	HCM2000			48.4	D			34.6	C
	Garbers Church Rd ³	Signalized	HCM2000			49.0	D			34.0	C
W Market St	Stoneleigh Dr	Unsignalized	HCM6	0.8	A	0.9	A	0.7	A	0.8	A
	THMS/Westfield Ct	Signalized	HCM6	20.7	C	51.3	D	14.2	B	33.3	C
	Brickstone Ct	Unsignalized	HCM6	2.4	A	1.6	A	1.4	A	1.9	A
	Waterman Dr	Signalized	HCM6	12.5	B	19.7	B	14.4	B	27.4	C
	Dogwood Dr	Signalized	HCM6	8.7	A	12.9	B	8.6	A	13.0	B
	Willow St	Unsignalized	HCM6	1.5	A	1.7	A	2.9	0.0	3.4	A
	High St	Signalized	HCM6	45.9	D	45.9	D	51.5	D	51.5	D
	Mason St	Signalized	HCM6	16.2	B	16.0	B	34.2	C	32.6	C
E Market St	Broad St	Unsignalized	HCM6	0.5	A	0.6	A	1.8	A	3.2	A
	Ott St	Unsignalized	HCM6	0.7	A	0.6	A	1.2	A	1.5	A
	Myrtle St	Unsignalized	HCM6	0.4	A	0.4	A	0.4	A	0.4	A
	Reservoir/Sterling	Signalized	HCM2000	19.5	B	28.4	C	33.3	C	42.5	D
	Hill St	Unsignalized	HCM6	0.5	A	0.6	A	1.3	A	2.0	A
	Old Furnace Rd	Unsignalized	HCM6	2.3	A	2.8	A	5.6	A	12.4	B
	Vine/Hawkins	Signalized	HCM2000	47.8	D	47.8	D	64.1	E	64.1	E

1 – Road reconfiguration on Garbers Church Rd only

2 – Both roads reconfigured

3 - Road reconfiguration on W Market St only

Concept Design Details

The following section includes design details included in the concept designs developed for potential roadway reallocation.

Lane Widths

Motor Vehicle Lane

The City has generally used 11 foot vehicle lane widths with recent roadway designs. Vehicle lane widths of 11 feet were generally used in both concepts. In locations on each concept where a two-way center left-turn lane is included, if ROW is constrained the TWLTL was reduced to 10 feet as needed to maintain minimum widths for the bicycle lanes and buffers.

Bike Lanes

A one-way separated bike lane width of 8 feet was generally used throughout Concept A, measured from the face of curb. This width allows for the physical space associated with side-by-side riding, shy distance from gutter/curb, vertical elements in the buffer, or another without creating confusion with a vehicular lane or parking lane. In Concept B, in order to maintain space for a TWLTL or other turn lanes, the bike lane was reduced to a minimum 6 foot from face of curb, which provides the minimum 5 foot of useable width for the bike lane exclusive of the gutter. VDOT's Road Design Manual allows for a minimum 4 feet of rideable space; however, this does not provide sufficient operating space for the typical rider to feel comfortable.

Buffer Width

The buffer width varies based on available right-of-way. Concept A generally includes a 6 foot minimum buffer, and Concept B includes a minimum 2 foot buffer. In both concepts there are limited pinch points where the buffer is reduced below those minimums or removed entirely; however, generally a consistent width should be provided and only reduced in short sections where necessary based on constraints of the existing curbs. A two foot buffer is the minimum necessary to be able to provide vertical elements in the buffer; however, particularly where vehicular speeds exceed 30 mph, a wider buffer is desirable.

Protected Intersections and Crossing Offsets

The six foot buffer shown in Concept A allows for provision of an offset between the adjacent vehicular lane and the bike lane. The DRAFT 2022 AASHTO Bike Guide, as well as the MassDOT Separated Bike Lane Guide indicate that a desirable bicycle crossing is offset is 6 feet to 16.5 feet from the adjacent travel lane. These offsets have

been found to reduce conflicts between turning motorists and bicyclists by 50%. At all crossing locations, and particularly uncontrolled crossing locations, the bike lane has been shown as slightly bent away from the adjacent travel lane approaching the crossing to maximize this offset within the desired dimensions. This provides space for right-turning vehicles to see, react to and yield to cyclists before completing their turn maneuver.

There are several locations in Concept A where the removal of an existing unwarranted turn lane provides additional roadway space. At those locations, the additional buffer space provided could be used to provide protected intersection elements. Protected intersections maintain separation of bicyclists throughout the intersection. The continued separation of modes reduces potential conflicts and clarifies right-of-way. Design elements of these intersections are shown in Figure 16 and include ⁽¹⁾ a corner refuge island with a small curb radius, ⁽²⁾ a motorist yield zone, ⁽³⁾ bicycle queuing areas, and ⁽⁴⁾ marked pedestrian crossings of the roadway and bicycle lane. Protected intersections make bicyclists and pedestrians more visible to motorists and provide physical space for motorists to yield to vulnerable users as they turn.



Figure 16: Design Elements of a Protected Intersection. Design elements include (1) a corner refuge island with a small curb radius, (2) a motorist yield zone, (3) bicycle queuing areas, and (4) marked pedestrian crossings.

Buffer Material

The concepts show hatching through the buffer zones. In order to provide more comfortable facilities for cyclists and positive guidance for drivers, vertical elements should be provided in the buffer, particularly at intersection approaches or other strategic locations where drivers are likely to attempt to drive in the buffer space. Several

buffer options from the FHWA Separated Bike Lane Planning and Design Guide are listed below and more detail is provided in Attachment D.

- Delineator Posts
- Bollards
- Raised Median
- Planters
- Parking Stops

Design Guidance

The design elements included in the concepts rely on the following design guidance:

- DRAFT 2022 AASHTO Bike Guide (see MassDOT Separated Bike Guide or ODOT Multimodal Design Guide for similar published guidance of some elements)
- FHWA Bikeway Selection Guide
- VDOT Road Design Manual

Next Steps

In order to advance these concepts to final design additional information including topographic survey, signal modification design, and AutoTurn design vehicle turn movement analysis would be required. With additional information design advancement may identify locations where the minimum widths shown cannot be accommodated within the existing curbs or other modifications are needed to the elements shown.

NOTE: Information contained in this document is for planning purposes and should not be used for final design of any project. All results, recommendations, concept drawings, cost opinions, and commentary contained herein are based on limited data and information and on existing conditions that are subject to change. Further analysis and engineering design are necessary prior to implementing any of the recommendations contained herein.

List of Attachments

Attachment A

Traffic Count Data – page 2

Attachment B

VDOT Road Design Manual, Appendix F Access Management Design Standards for Entrances and Intersections – Turn Lane Warrants – page 95

Attachment C

Results by Movement – page 101

Synchro Reports – page 106

Attachment D

FHWA Separated Bike Lane Planning and Design Guide – Forms of Separation – page 451

Attachment A

Traffic Count Data

MCV Associates, Inc
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
Phone: 703-914-4850

Site Code: J 968
 Station ID: N:023585
 East Market Street
 Between Old Furnace Rd and Vine St
 Latitude: 0' 0.0000 Undefined

Start Time	12-Apr-22		13-Apr-22		14-Apr-22		15-Apr-22		16-Apr-22		17-Apr-22		18-Apr-22		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	44	29	64	34	*	*	*	*	*	*	*	*	*	*	54	32
01:00	27	27	36	49	*	*	*	*	*	*	*	*	*	*	32	38
02:00	20	29	36	34	*	*	*	*	*	*	*	*	*	*	28	32
03:00	23	23	29	23	*	*	*	*	*	*	*	*	*	*	26	23
04:00	45	35	46	46	*	*	*	*	*	*	*	*	*	*	46	40
05:00	72	77	91	67	*	*	*	*	*	*	*	*	*	*	82	72
06:00	155	127	153	143	*	*	*	*	*	*	*	*	*	*	154	135
07:00	372	269	352	215	*	*	*	*	*	*	*	*	*	*	362	242
08:00	430	249	442	238	*	*	*	*	*	*	*	*	*	*	436	244
09:00	352	249	371	276	*	*	*	*	*	*	*	*	*	*	362	262
10:00	342	333	326	350	*	*	*	*	*	*	*	*	*	*	334	342
11:00	379	374	413	410	*	*	*	*	*	*	*	*	*	*	396	392
12:00 PM	486	411	422	454	*	*	*	*	*	*	*	*	*	*	454	432
01:00	411	452	483	465	*	*	*	*	*	*	*	*	*	*	447	458
02:00	439	427	470	449	*	*	*	*	*	*	*	*	*	*	454	438
03:00	510	509	471	442	*	*	*	*	*	*	*	*	*	*	490	476
04:00	502	536	491	521	*	*	*	*	*	*	*	*	*	*	496	528
05:00	514	520	470	516	*	*	*	*	*	*	*	*	*	*	492	518
06:00	411	331	444	385	*	*	*	*	*	*	*	*	*	*	428	358
07:00	321	302	349	310	*	*	*	*	*	*	*	*	*	*	335	306
08:00	216	212	285	266	*	*	*	*	*	*	*	*	*	*	250	239
09:00	183	174	182	164	*	*	*	*	*	*	*	*	*	*	182	169
10:00	108	103	159	113	*	*	*	*	*	*	*	*	*	*	134	108
11:00	90	60	90	76	*	*	*	*	*	*	*	*	*	*	90	68
Total	6452	5858	6675	6046	0	0	0	0	0	0	0	0	0	0	6564	5952
Day	12310		12721		0	0	0	0	0	0	0	0	0	0	12516	
AM Peak	08:00	11:00	08:00	11:00	-	-	-	-	-	-	-	-	-	-	08:00	11:00
Vol.	430	374	442	410	-	-	-	-	-	-	-	-	-	-	436	392
PM Peak	17:00	16:00	16:00	16:00	-	-	-	-	-	-	-	-	-	-	16:00	16:00
Vol.	514	536	491	521	-	-	-	-	-	-	-	-	-	-	496	528

Comb. Total	12310	12721	0	0	0	0	0	0	0	0	0	0	0	0	12516	
ADT	ADT 12,516		AADT 12,516													

MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 1. Garbers Church Rd @ HHS Ent Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Garbers Church Rd From North					From East					Garbers Church Rd From South					HHS South Entrance From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	52	7	0	59	0	0	0	0	0	17	49	0	0	66	3	0	9	0	12	137
07:15 AM	0	53	22	0	75	0	0	0	0	0	27	121	0	0	148	9	0	9	0	18	241
07:30 AM	0	111	5	0	116	0	0	0	0	0	13	135	0	0	148	2	0	1	0	3	267
07:45 AM	0	65	1	0	66	0	0	0	0	0	6	57	0	0	63	1	0	2	0	3	132
Total	0	281	35	0	316	0	0	0	0	0	63	362	0	0	425	15	0	21	0	36	777
08:00 AM	0	27	1	0	28	0	0	0	0	0	4	46	0	0	50	1	0	1	0	2	80
08:15 AM	0	43	0	0	43	0	0	0	0	0	2	37	0	0	39	0	0	0	0	0	82
08:30 AM	0	67	0	0	67	0	0	0	0	0	0	55	0	0	55	0	0	2	0	2	124
08:45 AM	0	62	0	0	62	0	0	0	0	0	2	52	0	0	54	1	0	0	0	1	117
Total	0	199	1	0	200	0	0	0	0	0	8	190	0	0	198	2	0	3	0	5	403
01:45 PM	0	97	3	0	100	0	0	0	0	0	0	48	0	0	48	16	0	5	0	21	169
Total	0	97	3	0	100	0	0	0	0	0	0	48	0	0	48	16	0	5	0	21	169
02:00 PM	0	54	2	0	56	0	0	0	0	0	2	46	0	0	48	4	0	7	0	11	115
02:15 PM	0	44	0	0	44	0	0	0	0	0	3	48	0	0	51	0	0	3	0	3	98
02:30 PM	0	54	2	0	56	0	0	0	0	0	3	56	0	0	59	3	0	7	0	10	125
02:45 PM	0	64	5	0	69	0	0	0	0	0	5	68	0	0	73	8	0	15	0	23	165
Total	0	216	9	0	225	0	0	0	0	0	13	218	0	0	231	15	0	32	0	47	503
03:00 PM	0	92	6	0	98	0	0	0	0	0	6	58	0	0	64	13	0	12	0	25	187
03:15 PM	0	67	4	0	71	0	0	0	0	0	4	64	0	0	68	6	0	8	0	14	153
03:30 PM	0	58	0	0	58	0	0	0	0	0	2	65	0	0	67	2	0	3	0	5	130
03:45 PM	0	62	1	1	64	0	0	0	0	0	0	87	0	0	87	1	0	4	0	5	156
Total	0	279	11	1	291	0	0	0	0	0	12	274	0	0	286	22	0	27	0	49	626
04:00 PM	0	81	0	0	81	0	0	0	0	0	2	67	0	0	69	3	0	3	0	6	156
04:15 PM	0	54	2	0	56	0	0	0	0	0	2	79	0	0	81	1	0	2	0	3	140
04:30 PM	0	46	0	0	46	0	0	0	0	0	0	64	0	0	64	1	0	1	0	2	112
04:45 PM	0	50	4	0	54	0	0	0	0	0	7	55	0	0	62	2	0	2	0	4	120
Total	0	231	6	0	237	0	0	0	0	0	11	265	0	0	276	7	0	8	0	15	528
05:00 PM	0	52	7	0	59	0	0	0	0	0	1	83	0	0	84	13	0	9	0	22	165
05:15 PM	0	59	0	0	59	0	0	0	0	0	1	102	0	0	103	1	0	0	0	1	163
05:30 PM	0	51	0	0	51	0	0	0	0	0	1	75	0	0	76	0	0	0	0	0	127
Grand Total	0	1465	72	1	1538	0	0	0	0	0	110	1617	0	0	1727	91	0	105	0	196	3461
Apprch %	0	95.3	4.7	0.1		0	0	0	0	0	6.4	93.6	0	0		46.4	0	53.6	0		
Total %	0	42.3	2.1	0	44.4	0	0	0	0	0	3.2	46.7	0	0	49.9	2.6	0	3	0	5.7	

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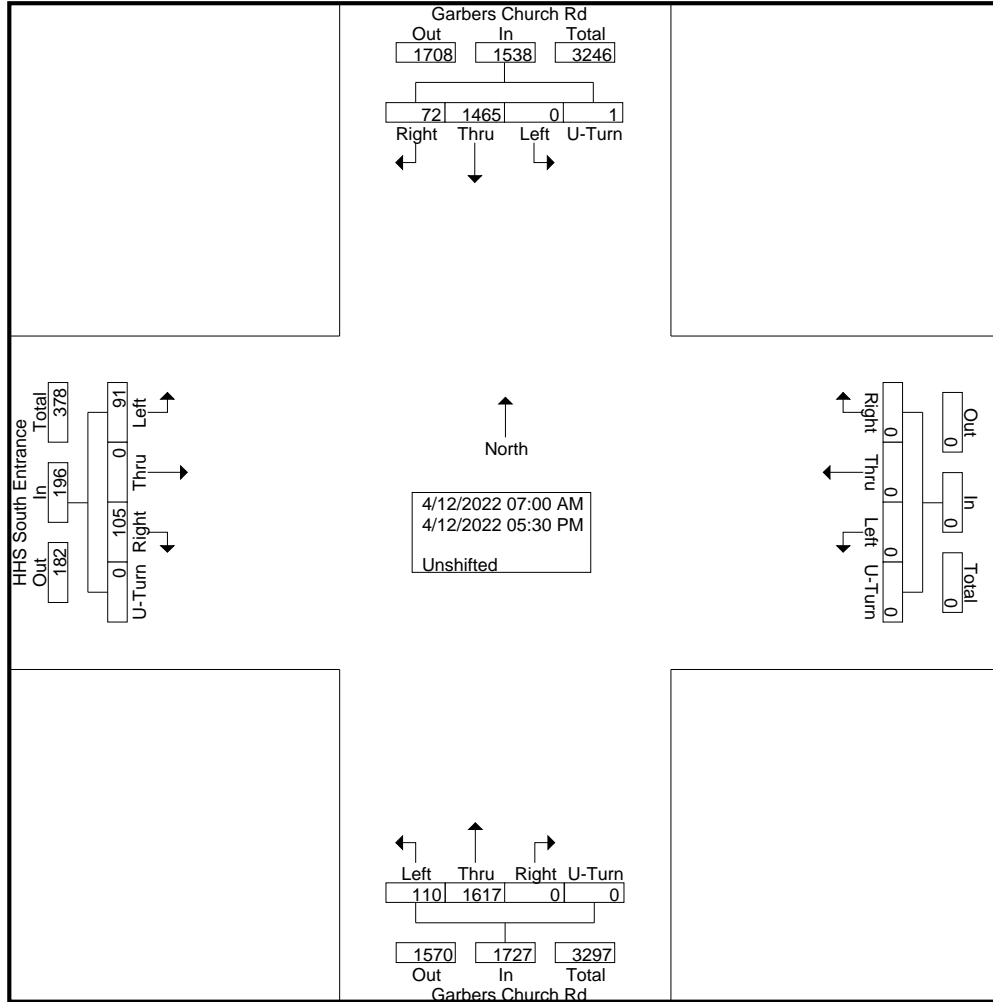
Phone: 703-914-4850

File Name : 1. Garbers Church Rd @ HHS Ent Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 2



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Alexandria, VA - 22312

Phone: 703-914-4850

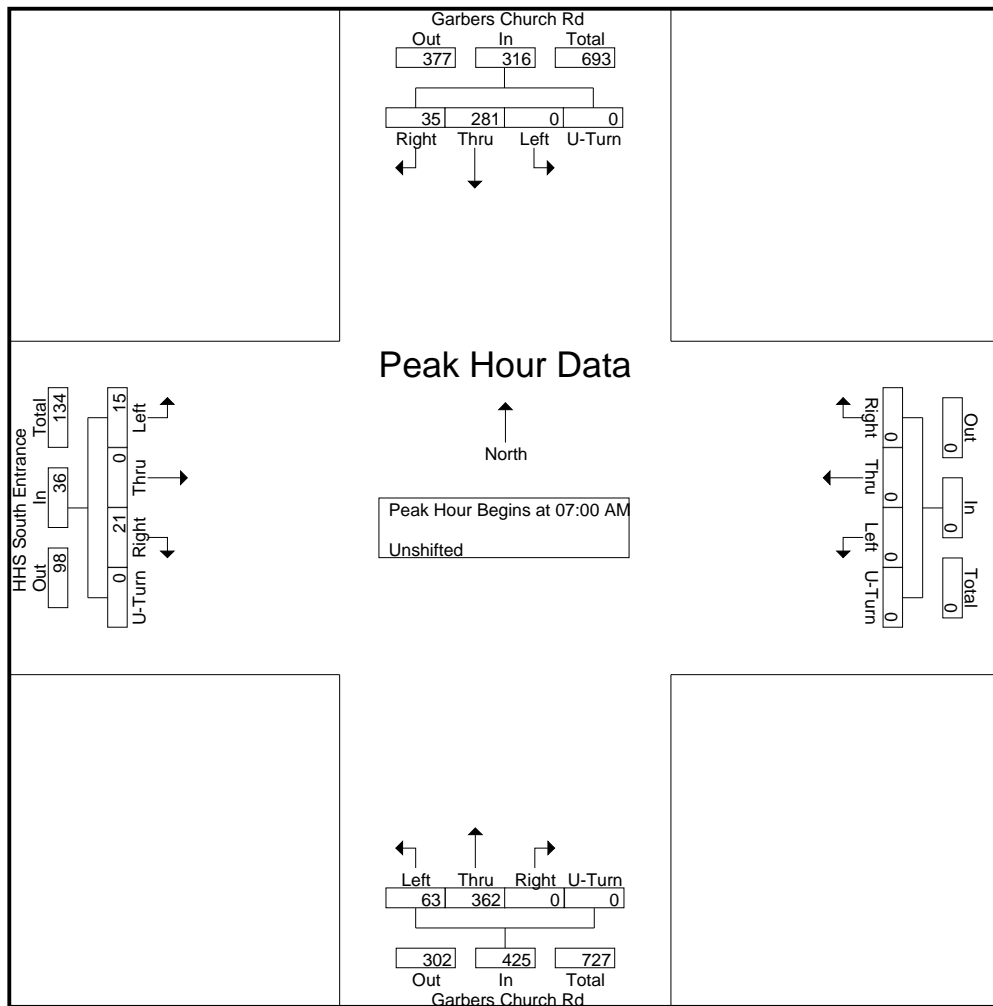
File Name : 1. Garbers Church Rd @ HHS Ent Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 3

Start Time	Garbers Church Rd From North					From East					Garbers Church Rd From South					HHS South Entrance From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	52	7	0	59	0	0	0	0	0	17	49	0	0	66	3	0	9	0	12	137
07:15 AM	0	53	22	0	75	0	0	0	0	0	27	121	0	0	148	9	0	9	0	18	241
07:30 AM	0	111	5	0	116	0	0	0	0	0	13	135	0	0	148	2	0	1	0	3	267
07:45 AM	0	65	1	0	66	0	0	0	0	0	6	57	0	0	63	1	0	2	0	3	132
Total Volume	0	281	35	0	316	0	0	0	0	0	63	362	0	0	425	15	0	21	0	36	777
% App. Total	0	88.9	11.1	0		0	0	0	0		14.8	85.2	0	0		41.7	0	58.3	0		
PHF	.000	.633	.398	.000	.681	.000	.000	.000	.000	.000	.583	.670	.000	.000	.718	.417	.000	.583	.000	.500	.728



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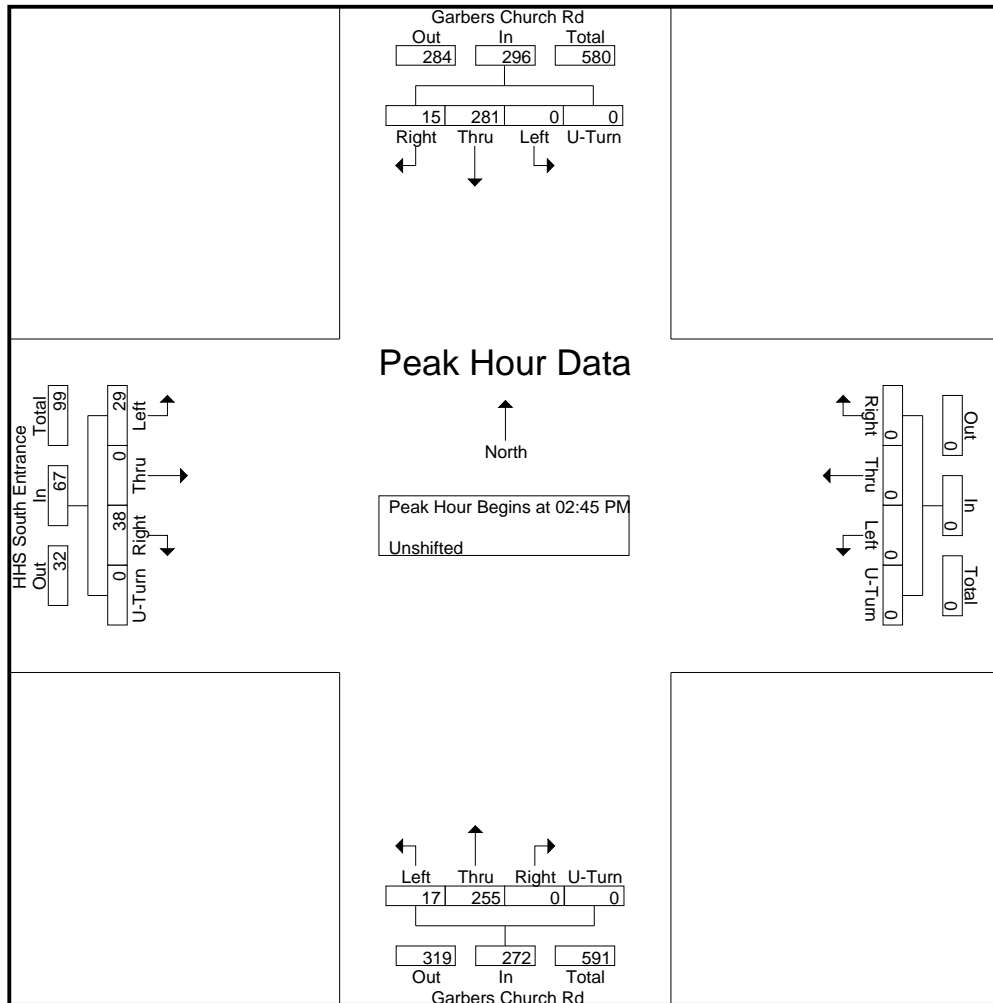
File Name : 1. Garbers Church Rd @ HHS Ent Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 4

Start Time	Garbers Church Rd From North					From East					Garbers Church Rd From South					HHS South Entrance From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	0	64	5	0	69	0	0	0	0	0	5	68	0	0	73	8	0	15	0	23	165
03:00 PM	0	92	6	0	98	0	0	0	0	0	6	58	0	0	64	13	0	12	0	25	187
03:15 PM	0	67	4	0	71	0	0	0	0	0	4	64	0	0	68	6	0	8	0	14	153
03:30 PM	0	58	0	0	58	0	0	0	0	0	2	65	0	0	67	2	0	3	0	5	130
Total Volume	0	281	15	0	296	0	0	0	0	0	17	255	0	0	272	29	0	38	0	67	635
% App. Total	0	94.9	5.1	0		0	0	0	0	0	6.2	93.8	0	0		43.3	0	56.7	0		
PHF	.000	.764	.625	.000	.755	.000	.000	.000	.000	.000	.708	.938	.000	.000	.932	.558	.000	.633	.000	.670	.849



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File Name : 2. Garbers Church Rd @ HHS Inbound Un Sig

Site Code : J 968

Start Date : 4/12/2022

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Groups Printed- Unshifted

Start Time	Garbers Church Road From North					From East					Garbers Church Road From South					HHS Inbound Entrance(Un Sig) From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	53	6	0	59	0	0	0	0	0	8	44	0	0	52	0	0	0	0	0	111
07:15 AM	0	66	9	0	75	0	0	0	0	0	20	110	0	0	130	0	0	0	0	0	205
07:30 AM	0	87	29	0	116	0	0	0	0	0	47	90	0	0	137	0	0	0	0	0	253
07:45 AM	0	56	10	0	66	0	0	0	0	0	6	52	0	0	58	0	0	0	0	0	124
Total	0	262	54	0	316	0	0	0	0	0	81	296	0	0	377	0	0	0	0	0	693
08:00 AM	0	23	5	0	28	0	0	0	0	0	1	46	0	0	47	0	0	0	0	0	75
08:15 AM	0	40	3	0	43	0	0	0	0	0	2	35	0	0	37	0	0	0	0	0	80
08:30 AM	0	65	2	0	67	0	0	0	0	0	2	53	0	0	55	0	0	0	0	0	122
08:45 AM	0	57	5	0	62	0	0	0	0	0	2	51	0	0	53	0	0	0	0	0	115
Total	0	185	15	0	200	0	0	0	0	0	7	185	0	0	192	0	0	0	0	0	392
01:45 PM	0	98	2	0	100	0	0	0	0	0	4	60	0	0	64	0	0	0	0	0	164
Total	0	98	2	0	100	0	0	0	0	0	4	60	0	0	64	0	0	0	0	0	164
02:00 PM	0	52	4	0	56	0	0	0	0	0	1	49	0	0	50	0	0	0	0	0	106
02:15 PM	0	43	1	0	44	0	0	0	0	0	1	47	0	0	48	0	0	0	0	0	92
02:30 PM	0	55	1	0	56	0	0	0	0	0	2	57	0	0	59	0	0	0	0	0	115
02:45 PM	0	66	3	0	69	0	0	0	0	0	6	70	0	0	76	0	0	0	0	0	145
Total	0	216	9	0	225	0	0	0	0	0	10	223	0	0	233	0	0	0	0	0	458
03:00 PM	0	95	3	0	98	0	0	0	0	0	2	69	0	0	71	0	0	0	0	0	169
03:15 PM	0	69	2	0	71	0	0	0	0	0	2	68	0	0	70	0	0	0	0	0	141
03:30 PM	0	57	1	0	58	0	0	0	0	0	0	67	0	0	67	0	0	0	0	0	125
03:45 PM	0	62	1	0	63	0	0	0	0	0	2	86	0	0	88	0	0	0	0	0	151
Total	0	283	7	0	290	0	0	0	0	0	6	290	0	0	296	0	0	0	0	0	586
04:00 PM	0	81	0	0	81	0	0	0	0	0	1	69	0	0	70	0	0	0	0	0	151
04:15 PM	0	56	0	0	56	0	0	0	0	0	1	79	0	0	80	0	0	0	0	0	136
04:30 PM	0	46	0	0	46	0	0	0	0	0	0	65	0	0	65	0	0	0	0	0	111
04:45 PM	0	53	1	0	54	0	0	0	0	0	1	56	0	0	57	0	0	0	0	0	111
Total	0	236	1	0	237	0	0	0	0	0	3	269	0	0	272	0	0	0	0	0	509
05:00 PM	0	57	2	0	59	0	0	0	0	0	0	96	0	0	96	0	0	0	0	0	155
05:15 PM	0	59	0	0	59	0	0	0	0	0	1	102	0	0	103	0	0	0	0	0	162
05:30 PM	0	51	0	0	51	0	0	0	0	0	1	74	0	0	75	0	0	0	0	0	126
Grand Total	0	1447	90	0	1537	0	0	0	0	0	113	1595	0	0	1708	0	0	0	0	0	3245
Apprch %	0	94.1	5.9	0		0	0	0	0	0	6.6	93.4	0	0		0	0	0	0	0	
Total %	0	44.6	2.8	0	47.4	0	0	0	0	0	3.5	49.2	0	0	52.6	0	0	0	0	0	

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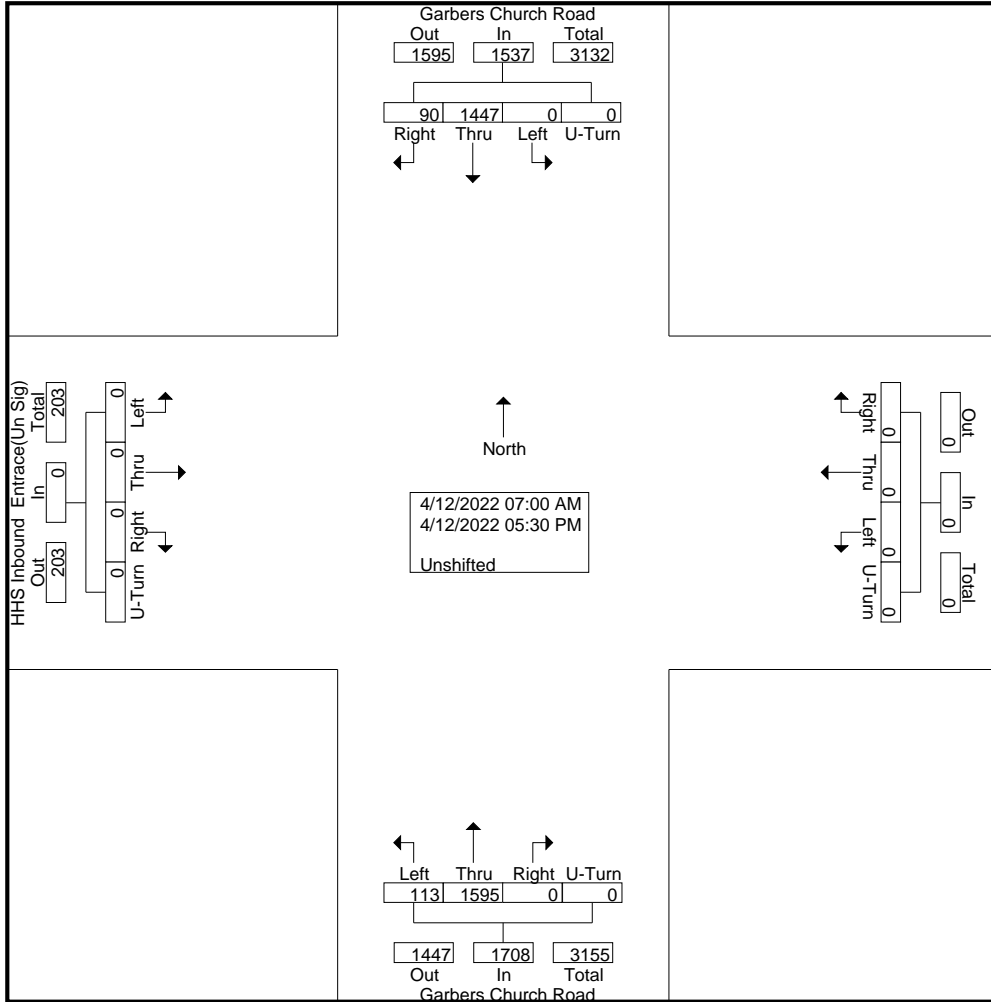
Phone: 703-914-4850

File Name : 2. Garbers Church Rd @ HHS Inbound Un Sig

Site Code : J 968

Start Date : 4/12/2022

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Phone: 703-914-4850

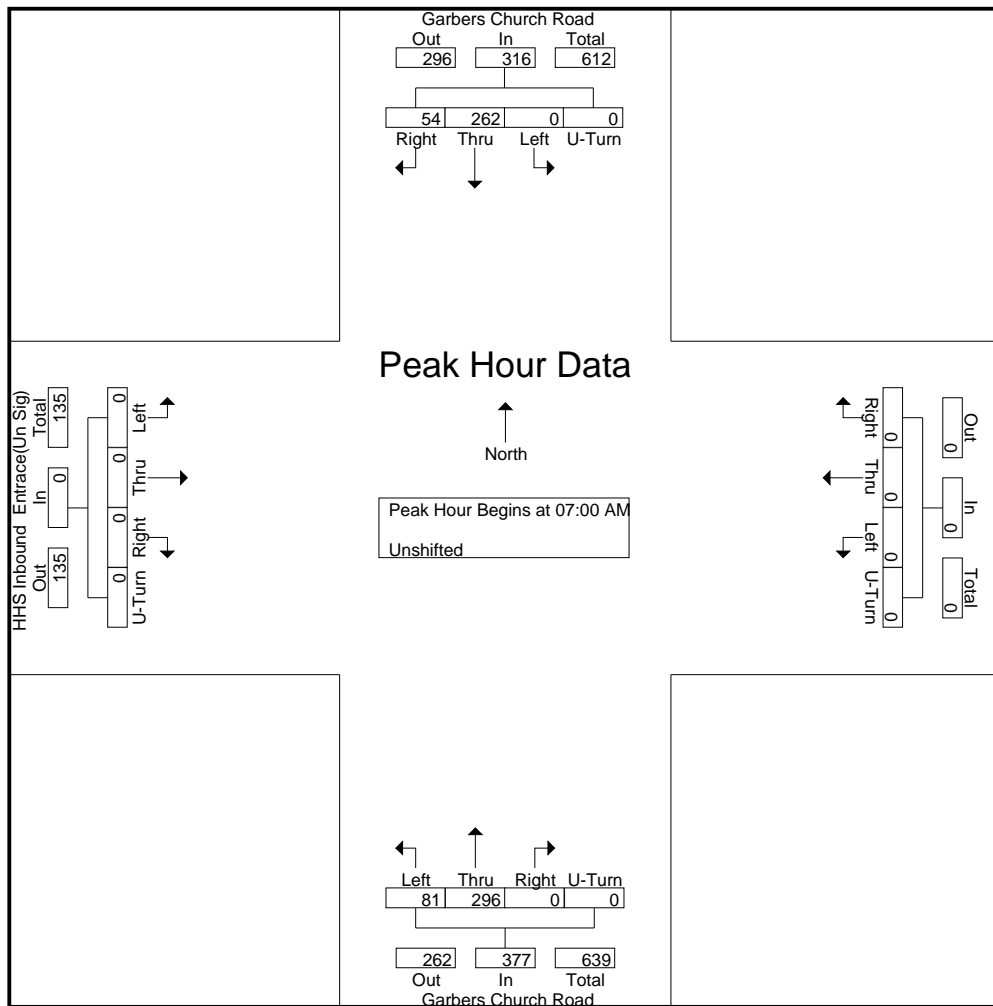
File Name : 2. Garbers Church Rd @ HHS Inbound Un Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 3

Start Time	Garbers Church Road From North					From East					Garbers Church Road From South					HHS Inbound Entrance(Un Sig) From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	53	6	0	59	0	0	0	0	0	8	44	0	0	52	0	0	0	0	0	111
07:15 AM	0	66	9	0	75	0	0	0	0	0	20	110	0	0	130	0	0	0	0	0	205
07:30 AM	0	87	29	0	116	0	0	0	0	0	47	90	0	0	137	0	0	0	0	0	253
07:45 AM	0	56	10	0	66	0	0	0	0	0	6	52	0	0	58	0	0	0	0	0	124
Total Volume	0	262	54	0	316	0	0	0	0	0	81	296	0	0	377	0	0	0	0	0	693
% App. Total	0	82.9	17.1	0		0	0	0	0	0	21.5	78.5	0	0		0	0	0	0		
PHF	.000	.753	.466	.000	.681	.000	.000	.000	.000	.000	.431	.673	.000	.000	.688	.000	.000	.000	.000	.000	.685



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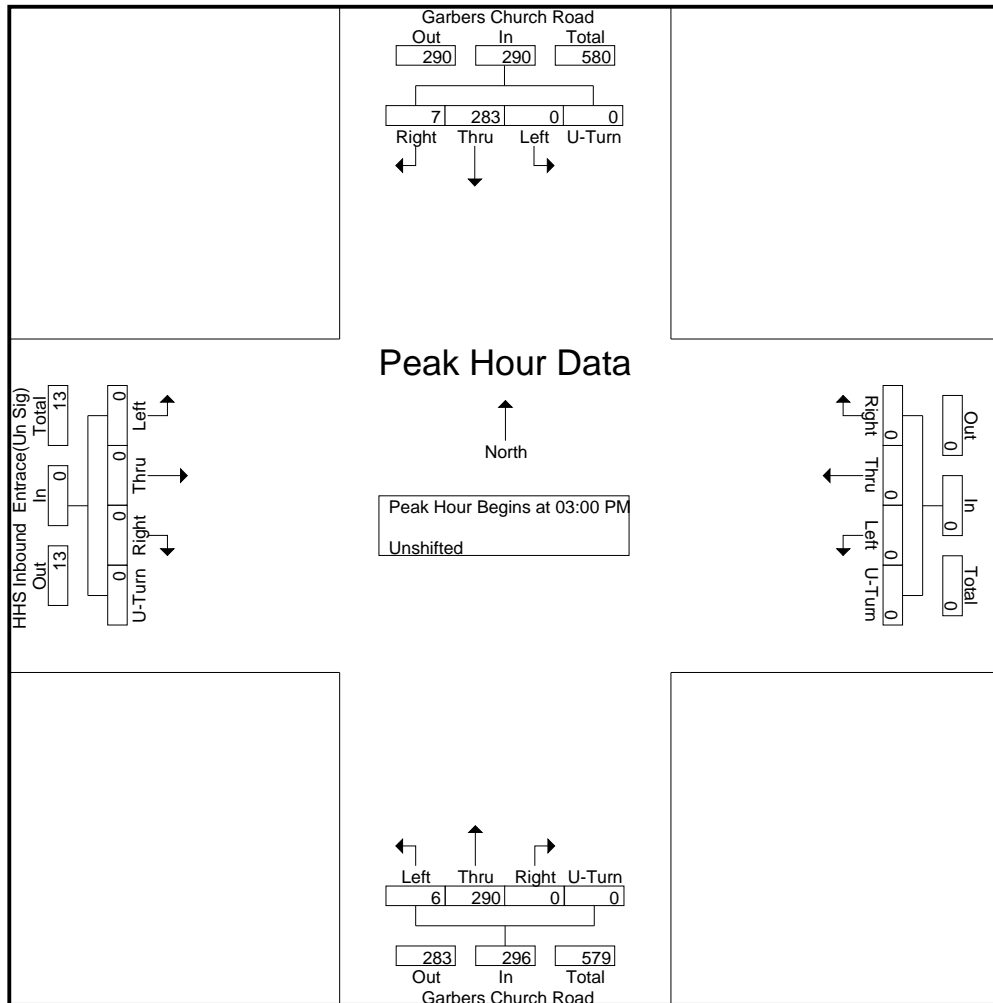
File Name : 2. Garbers Church Rd @ HHS Inbound Un Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 4

Start Time	Garbers Church Road From North					From East					Garbers Church Road From South					HHS Inbound Entrance(Un Sig) From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:00 PM																					
03:00 PM	0	95	3	0	98	0	0	0	0	0	2	69	0	0	71	0	0	0	0	0	169
03:15 PM	0	69	2	0	71	0	0	0	0	0	2	68	0	0	70	0	0	0	0	0	141
03:30 PM	0	57	1	0	58	0	0	0	0	0	0	67	0	0	67	0	0	0	0	0	125
03:45 PM	0	62	1	0	63	0	0	0	0	0	2	86	0	0	88	0	0	0	0	0	151
Total Volume	0	283	7	0	290	0	0	0	0	0	6	290	0	0	296	0	0	0	0	0	586
% App. Total	0	97.6	2.4	0		0	0	0	0	0	2	98	0	0		0	0	0	0		
PHF	.000	.745	.583	.000	.740	.000	.000	.000	.000	.000	.750	.843	.000	.000	.841	.000	.000	.000	.000	.000	.867



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Phone: 703-914-4850

File Name : 3. Garbers Church Rd @ HHS North Ent Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Garbers Church Road From North					From East					Garbers Church Rd From South					HHS North Entrance From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	52	32	0	84	0	0	0	0	0	18	31	0	0	49	5	0	7	0	12	145
07:15 AM	0	59	78	0	137	0	0	0	0	0	68	67	0	0	135	25	0	16	0	41	313
07:30 AM	0	93	131	0	224	0	0	0	0	0	63	76	0	0	139	49	0	23	0	72	435
07:45 AM	0	63	12	0	75	0	0	0	0	0	6	54	0	0	60	8	0	3	0	11	146
Total	0	267	253	0	520	0	0	0	0	0	155	228	0	0	383	87	0	49	0	136	1039
08:00 AM	0	26	4	0	30	0	0	0	0	0	2	44	0	0	46	0	0	2	0	2	78
08:15 AM	0	40	6	0	46	0	0	0	0	0	3	33	0	0	36	1	0	3	0	4	86
08:30 AM	0	66	2	0	68	0	0	0	0	0	3	50	0	0	53	0	0	1	0	1	122
08:45 AM	0	61	6	0	67	0	0	0	0	0	5	47	0	0	52	1	0	1	0	2	121
Total	0	193	18	0	211	0	0	0	0	0	13	174	0	0	187	2	0	7	0	9	407
01:45 PM	0	47	16	0	63	0	0	0	0	0	8	61	0	0	69	9	0	53	0	62	194
Total	0	47	16	0	63	0	0	0	0	0	8	61	0	0	69	9	0	53	0	62	194
02:00 PM	0	43	7	0	50	0	0	0	0	0	6	59	0	0	65	16	0	13	0	29	144
02:15 PM	0	33	7	0	40	0	0	0	0	0	4	54	0	0	58	11	0	11	0	22	120
02:30 PM	0	47	3	0	50	0	0	0	0	0	7	60	0	0	67	10	0	9	0	19	136
02:45 PM	0	49	12	0	61	0	0	0	0	0	10	82	0	0	92	22	0	20	0	42	195
Total	0	172	29	0	201	0	0	0	0	0	27	255	0	0	282	59	0	53	0	112	595
03:00 PM	0	74	27	0	101	0	0	0	0	0	7	90	0	0	97	28	0	24	0	52	250
03:15 PM	0	55	13	0	68	0	0	0	0	0	11	71	0	0	82	14	0	16	0	30	180
03:30 PM	0	50	6	0	56	0	0	0	0	0	7	75	0	0	82	15	0	8	0	23	161
03:45 PM	0	57	1	0	58	0	0	0	0	0	6	85	0	0	91	5	0	6	0	11	160
Total	0	236	47	0	283	0	0	0	0	0	31	321	0	0	352	62	0	54	0	116	751
04:00 PM	0	71	4	0	75	0	0	0	0	0	3	77	0	0	80	11	0	10	0	21	176
04:15 PM	0	50	6	0	56	0	0	0	0	0	7	81	0	0	88	9	0	6	0	15	159
04:30 PM	0	41	10	0	51	0	0	0	0	0	7	69	0	0	76	11	0	5	0	16	143
04:45 PM	0	52	8	0	60	0	0	0	0	0	5	54	0	0	59	3	0	2	0	5	124
Total	0	214	28	0	242	0	0	0	0	0	22	281	0	0	303	34	0	23	0	57	602
05:00 PM	0	56	14	0	70	0	0	0	0	0	10	91	0	0	101	5	0	3	0	8	179
05:15 PM	0	56	13	0	69	0	0	0	0	0	22	83	0	0	105	3	0	3	0	6	180
05:30 PM	0	47	16	0	63	0	0	0	0	0	15	63	0	0	78	4	0	4	0	8	149
Grand Total	0	1288	434	0	1722	0	0	0	0	0	303	1557	0	0	1860	265	0	249	0	514	4096
Apprch %	0	74.8	25.2	0		0	0	0	0	0	16.3	83.7	0	0		51.6	0	48.4	0		
Total %	0	31.4	10.6	0	42	0	0	0	0	0	7.4	38	0	0	45.4	6.5	0	6.1	0	12.5	

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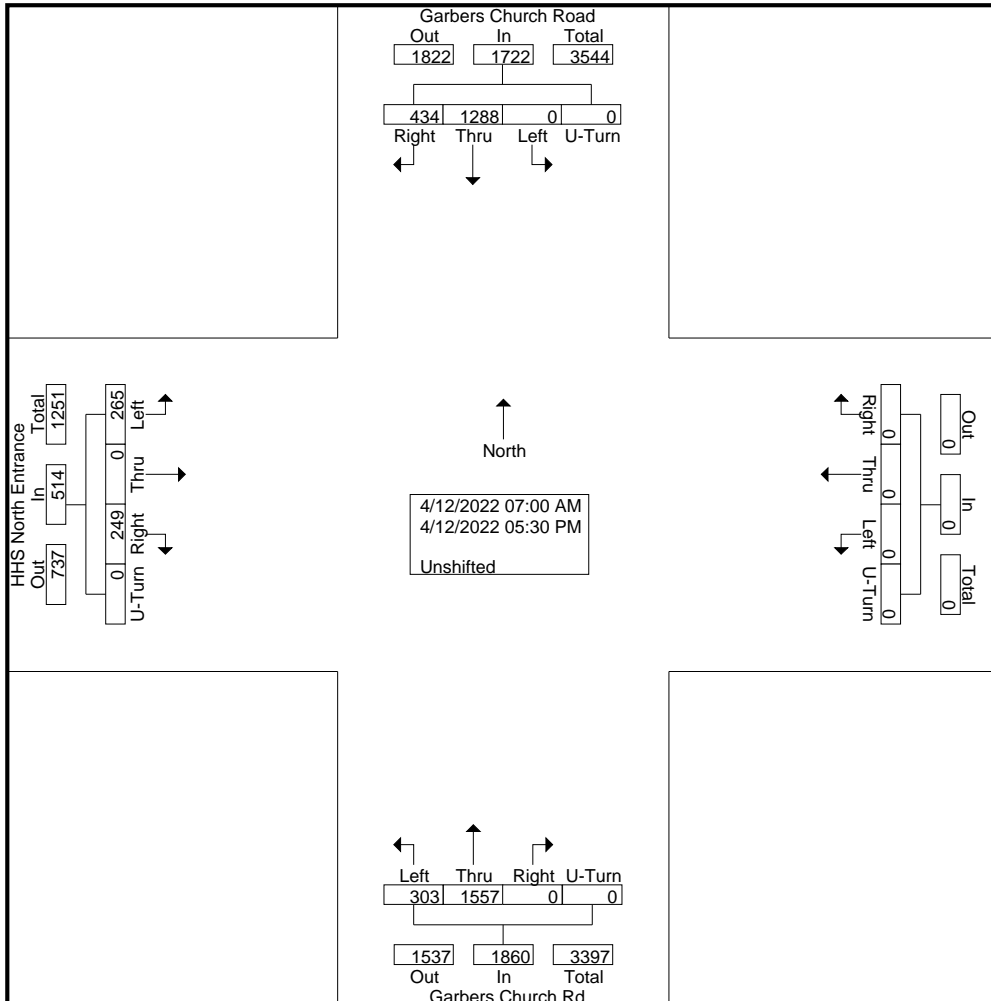
Phone: 703-914-4850

File Name : 3. Garbers Church Rd @ HHS North Ent Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 2



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Alexandria, VA - 22312

Phone: 703-914-4850

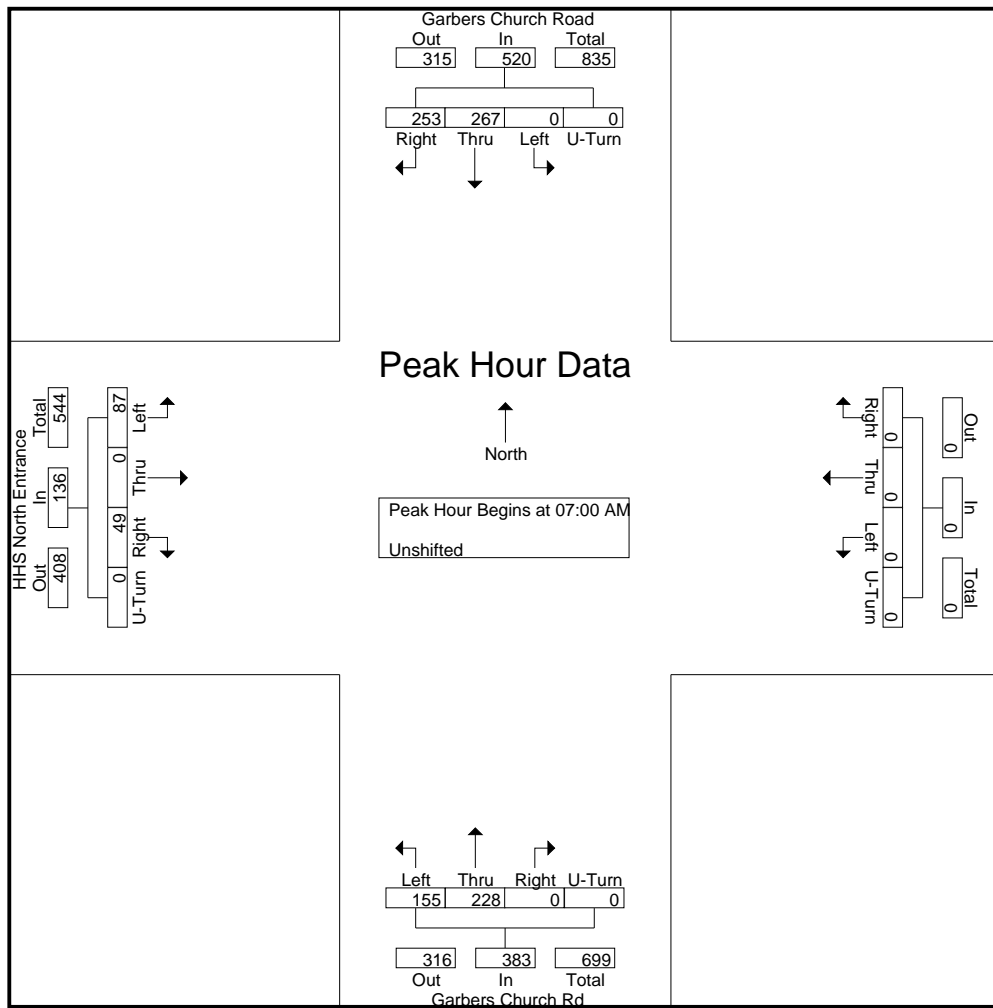
File Name : 3. Garbers Church Rd @ HHS North Ent Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 3

Start Time	Garbers Church Road From North					From East					Garbers Church Rd From South					HHS North Entrance From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	52	32	0	84	0	0	0	0	0	18	31	0	0	49	5	0	7	0	12	145
07:15 AM	0	59	78	0	137	0	0	0	0	0	68	67	0	0	135	25	0	16	0	41	313
07:30 AM	0	93	131	0	224	0	0	0	0	0	63	76	0	0	139	49	0	23	0	72	435
07:45 AM	0	63	12	0	75	0	0	0	0	0	6	54	0	0	60	8	0	3	0	11	146
Total Volume	0	267	253	0	520	0	0	0	0	0	155	228	0	0	383	87	0	49	0	136	1039
% App. Total	0	51.3	48.7	0		0	0	0	0	0	40.5	59.5	0	0		64	0	36	0		
PHF	.000	.718	.483	.000	.580	.000	.000	.000	.000	.000	.570	.750	.000	.000	.689	.444	.000	.533	.000	.472	.597



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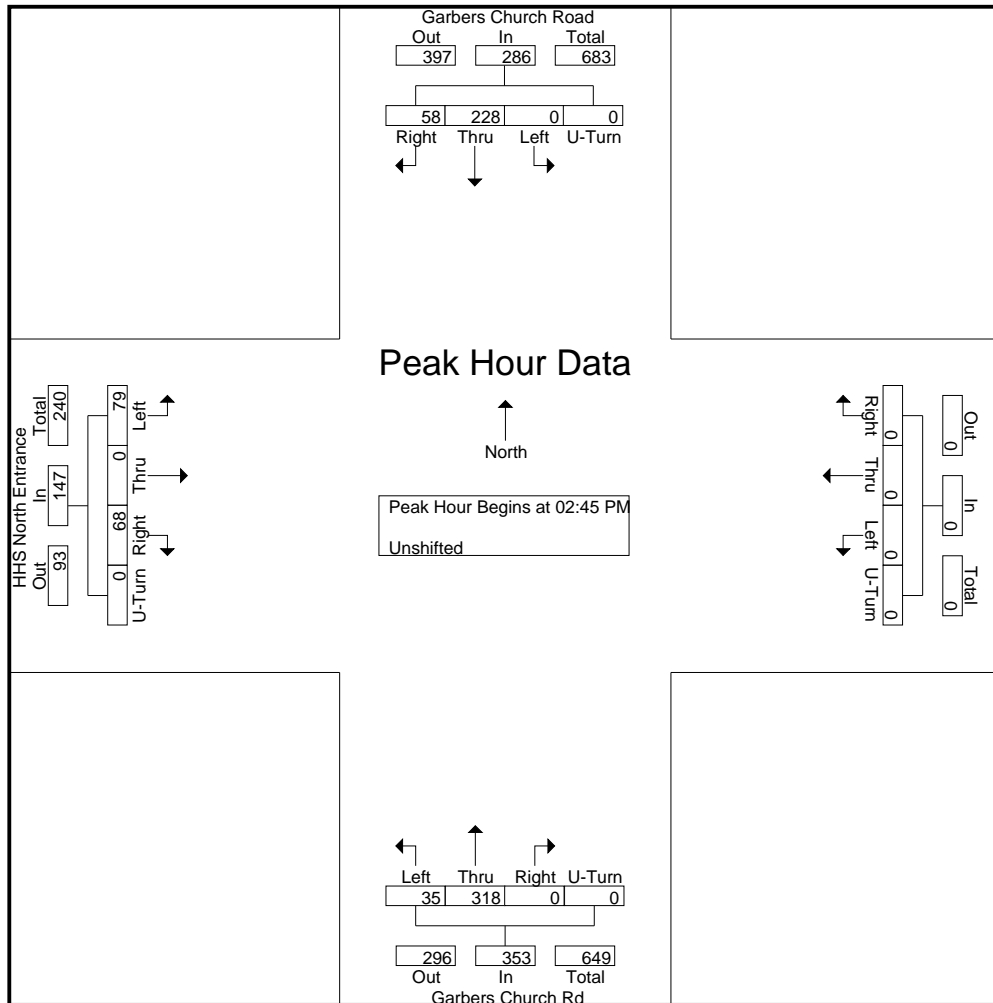
File Name : 3. Garbers Church Rd @ HHS North Ent Sig

Site Code : J 968

Start Date : 4/12/2022

Page No : 4

Start Time	Garbers Church Road From North					From East					Garbers Church Rd From South					HHS North Entrance From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	0	49	12	0	61	0	0	0	0	0	10	82	0	0	92	22	0	20	0	42	195
03:00 PM	0	74	27	0	101	0	0	0	0	0	7	90	0	0	97	28	0	24	0	52	250
03:15 PM	0	55	13	0	68	0	0	0	0	0	11	71	0	0	82	14	0	16	0	30	180
03:30 PM	0	50	6	0	56	0	0	0	0	0	7	75	0	0	82	15	0	8	0	23	161
Total Volume	0	228	58	0	286	0	0	0	0	0	35	318	0	0	353	79	0	68	0	147	786
% App. Total	0	79.7	20.3	0		0	0	0	0	0	9.9	90.1	0	0		53.7	0	46.3	0		
PHF	.000	.770	.537	.000	.708	.000	.000	.000	.000	.000	.795	.883	.000	.000	.910	.705	.000	.708	.000	.707	.786



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File Name : 4. Garbers Church Rd @ Bluestone ES In Bound Ent

Site Code : J 968

Start Date : 4/12/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Garbers Church Road From North					Bluestone ES Inbound Entrance From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	3	78	0	0	81	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	105
07:15 AM	3	129	0	0	132	0	0	0	0	0	0	71	5	0	76	0	0	0	0	0	208
07:30 AM	8	214	0	0	222	0	0	0	0	0	0	106	6	1	113	0	0	0	0	0	335
07:45 AM	5	72	0	0	77	0	0	0	0	0	0	67	4	0	71	0	0	0	0	0	148
Total	19	493	0	0	512	0	0	0	0	0	0	268	15	1	284	0	0	0	0	0	796
08:00 AM	1	36	0	0	37	0	0	0	0	0	0	44	3	0	47	0	0	0	0	0	84
08:15 AM	0	46	0	0	46	0	0	0	0	0	0	31	4	0	35	0	0	0	0	0	81
08:30 AM	4	70	0	0	74	0	0	0	0	0	0	49	4	0	53	0	0	0	0	0	127
08:45 AM	2	64	0	0	66	0	0	0	0	0	0	47	1	0	48	0	0	0	0	0	114
Total	7	216	0	0	223	0	0	0	0	0	0	171	12	0	183	0	0	0	0	0	406
01:45 PM	0	45	0	0	45	0	0	0	0	0	0	139	0	0	139	0	0	0	0	0	184
Total	0	45	0	0	45	0	0	0	0	0	0	139	0	0	139	0	0	0	0	0	184
02:00 PM	0	49	0	0	49	0	0	0	0	0	0	68	0	0	68	0	0	0	0	0	117
02:15 PM	1	39	0	0	40	0	0	0	0	0	0	57	0	0	57	0	0	0	0	0	97
02:30 PM	2	48	0	0	50	0	0	0	0	0	0	63	1	0	64	0	0	0	0	0	114
02:45 PM	4	60	0	0	64	0	0	0	0	0	0	81	2	0	83	0	0	0	0	0	147
Total	7	196	0	0	203	0	0	0	0	0	0	269	3	0	272	0	0	0	0	0	475
03:00 PM	0	97	0	0	97	0	0	0	0	0	0	91	1	0	92	0	0	0	0	0	189
03:15 PM	1	68	0	0	69	0	0	0	0	0	0	76	1	0	77	0	0	0	0	0	146
03:30 PM	3	50	0	0	53	0	0	0	0	0	0	79	1	0	80	0	0	0	0	0	133
03:45 PM	1	55	0	0	56	0	0	0	0	0	0	84	0	0	84	0	0	0	0	0	140
Total	5	270	0	0	275	0	0	0	0	0	0	330	3	0	333	0	0	0	0	0	608
04:00 PM	1	73	0	0	74	0	0	0	0	0	0	75	0	0	75	0	0	0	0	0	149
04:15 PM	1	51	0	0	52	0	0	0	0	0	0	75	2	0	77	0	0	0	0	0	129
04:30 PM	1	52	0	0	53	0	0	0	0	0	0	75	1	0	76	0	0	0	0	0	129
04:45 PM	2	59	0	0	61	0	0	0	0	0	0	55	0	0	55	0	0	0	0	0	116
Total	5	235	0	0	240	0	0	0	0	0	0	280	3	0	283	0	0	0	0	0	523
05:00 PM	2	68	0	0	70	0	0	0	0	0	0	89	0	0	89	0	0	0	0	0	159
05:15 PM	1	72	0	0	73	0	0	0	0	0	0	79	4	0	83	0	0	0	0	0	156
05:30 PM	0	60	0	0	60	0	0	0	0	0	0	65	2	0	67	0	0	0	0	0	127
Grand Total	46	1655	0	0	1701	0	0	0	0	0	0	1690	42	1	1733	0	0	0	0	0	3434
Apprch %	2.7	97.3	0	0		0	0	0	0	0	0	97.5	2.4	0.1		0	0	0	0	0	
Total %	1.3	48.2	0	0	49.5	0	0	0	0	0	0	49.2	1.2	0	50.5	0	0	0	0	0	

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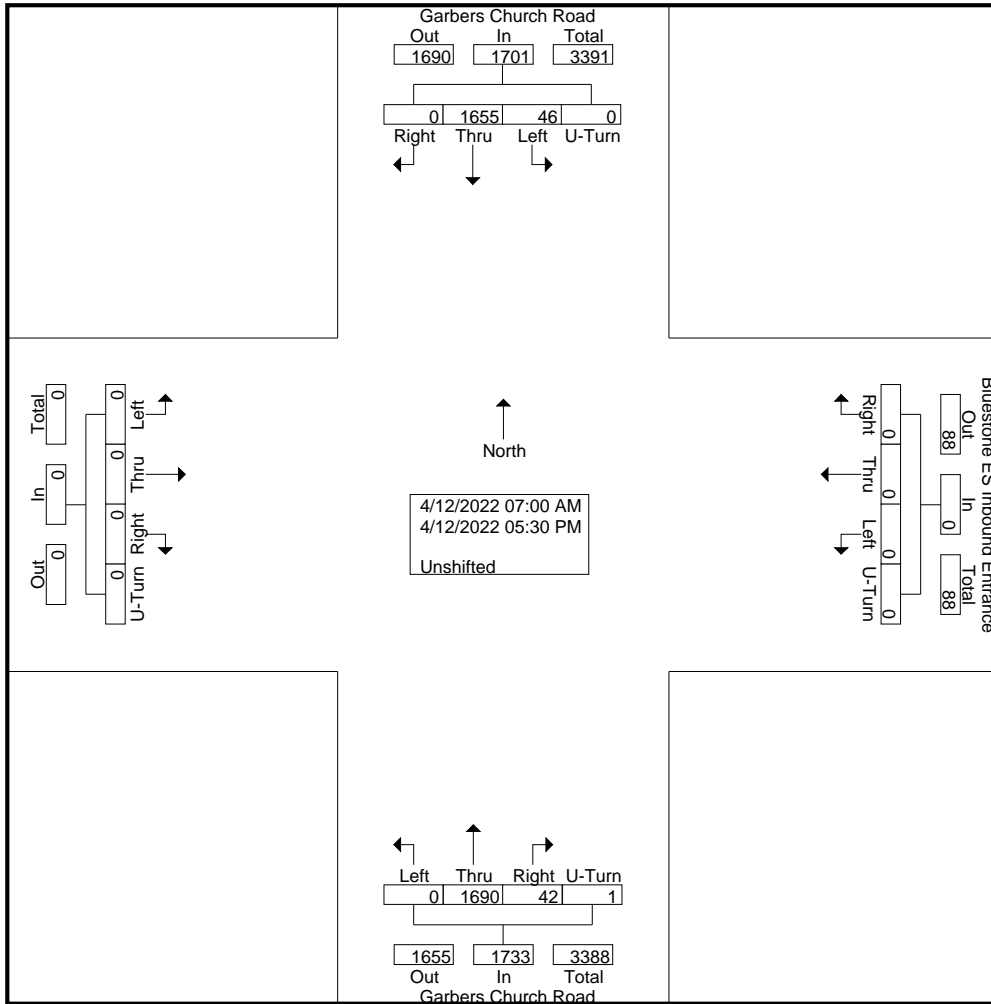
Phone: 703-914-4850

File Name : 4. Garbers Church Rd @ Bluestone ES In Bound Ent

Site Code : J 968

Start Date : 4/12/2022

Page No : 2

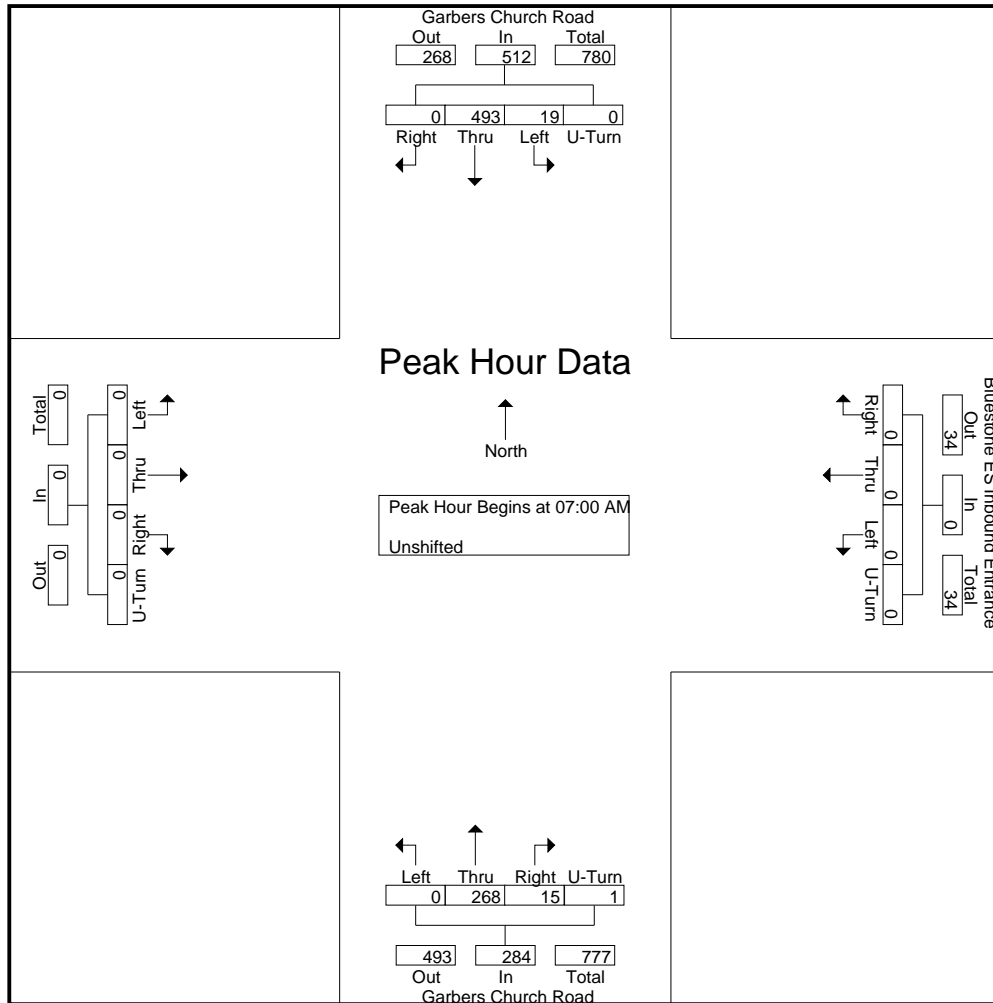


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Phone: 703-914-4850

File Name : 4. Garbers Church Rd @ Bluestone ES In Bound Ent
Site Code : J 968
Start Date : 4/12/2022
Page No : 3

Start Time	Garbers Church Road From North					Bluestone ES Inbound Entrance From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	3	78	0	0	81	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	105
07:15 AM	3	129	0	0	132	0	0	0	0	0	0	71	5	0	76	0	0	0	0	0	208
07:30 AM	8	214	0	0	222	0	0	0	0	0	0	106	6	1	113	0	0	0	0	0	335
07:45 AM	5	72	0	0	77	0	0	0	0	0	0	67	4	0	71	0	0	0	0	0	148
Total Volume	19	493	0	0	512	0	0	0	0	0	0	268	15	1	284	0	0	0	0	0	796
% App. Total	3.7	96.3	0	0		0	0	0	0	0	0	94.4	5.3	0.4		0	0	0	0	0	
PHF	.594	.576	.000	.000	.577	.000	.000	.000	.000	.000	.000	.632	.625	.250	.628	.000	.000	.000	.000	.000	.594



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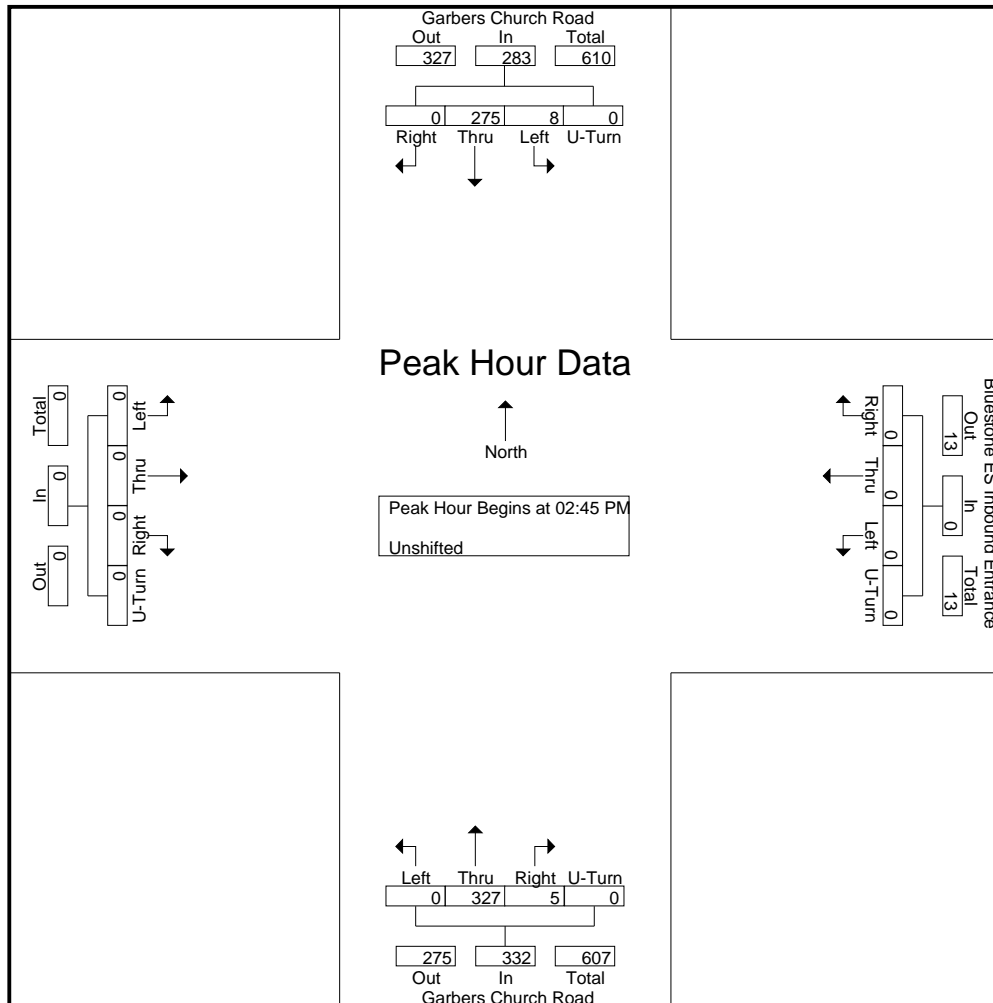
File Name : 4. Garbers Church Rd @ Bluestone ES In Bound Ent

Site Code : J 968

Start Date : 4/12/2022

Page No : 4

Start Time	Garbers Church Road From North					Bluestone ES Inbound Entrance From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	4	60	0	0	64	0	0	0	0	0	0	81	2	0	83	0	0	0	0	0	147
03:00 PM	0	97	0	0	97	0	0	0	0	0	0	91	1	0	92	0	0	0	0	0	189
03:15 PM	1	68	0	0	69	0	0	0	0	0	0	76	1	0	77	0	0	0	0	0	146
03:30 PM	3	50	0	0	53	0	0	0	0	0	0	79	1	0	80	0	0	0	0	0	133
Total Volume	8	275	0	0	283	0	0	0	0	0	0	327	5	0	332	0	0	0	0	0	615
% App. Total	2.8	97.2	0.0	0.0		0.0	0.0	0.0	0.0		0.0	98.5	1.5	0.0		0.0	0.0	0.0	0.0		
PHF	.500	.709	.000	.000	.729	.000	.000	.000	.000	.000	.000	.898	.625	.000	.902	.000	.000	.000	.000	.000	.813



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Phone: 703-914-4850

File Name : 5. Garbers Church Rd @ Heritage Ctr & Golf

Site Code : J 968

Start Date : 4/12/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Garbers Church Road From North					ES Golf Course From East					Garbers Church Road From South					Heritage Center Way From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	2	82	0	0	84	0	0	0	0	0	0	23	1	0	24	0	0	0	0	0	108
07:15 AM	1	132	0	0	133	0	0	1	0	1	0	70	2	0	72	0	0	0	0	0	206
07:30 AM	5	221	0	0	226	0	0	1	0	1	0	100	11	0	111	0	0	0	0	0	338
07:45 AM	14	71	0	0	85	1	0	3	0	4	0	60	11	0	71	0	0	0	0	0	160
Total	22	506	0	0	528	1	0	5	0	6	0	253	25	0	278	0	0	0	0	0	812
08:00 AM	11	36	1	0	48	0	0	1	0	1	2	34	8	0	44	1	0	0	0	1	94
08:15 AM	11	43	0	0	54	2	0	2	0	4	1	21	10	0	32	0	0	0	0	0	90
08:30 AM	25	48	1	0	74	22	0	21	0	43	3	31	22	0	56	0	0	1	0	1	174
08:45 AM	24	46	3	0	73	22	0	22	0	44	0	31	21	0	52	1	0	0	0	1	170
Total	71	173	5	0	249	46	0	46	0	92	6	117	61	0	184	2	0	1	0	3	528
01:45 PM	8	37	2	0	47	2	0	1	0	3	0	134	5	0	139	0	0	5	0	5	194
Total	8	37	2	0	47	2	0	1	0	3	0	134	5	0	139	0	0	5	0	5	194
02:00 PM	1	45	1	0	47	3	0	3	0	6	2	64	2	0	68	1	0	2	0	3	124
02:15 PM	7	37	0	0	44	1	0	4	0	5	1	48	8	0	57	0	0	1	0	1	107
02:30 PM	12	45	2	0	59	4	0	7	0	11	0	54	9	0	63	0	0	0	0	0	133
02:45 PM	15	54	2	0	71	9	0	23	0	32	1	68	14	0	83	3	0	7	0	10	196
Total	35	181	5	0	221	17	0	37	0	54	4	234	33	0	271	4	0	10	0	14	560
03:00 PM	10	72	0	0	82	20	0	38	0	58	0	83	10	0	93	0	0	0	0	0	233
03:15 PM	7	61	0	0	68	6	0	8	0	14	1	74	3	0	78	0	0	1	0	1	161
03:30 PM	2	42	2	0	46	6	0	3	0	9	1	74	3	0	78	1	0	3	0	4	137
03:45 PM	1	43	0	0	44	8	0	7	0	15	0	83	4	0	87	1	0	2	0	3	149
Total	20	218	2	0	240	40	0	56	0	96	2	314	20	0	336	2	0	6	0	8	680
04:00 PM	3	47	0	0	50	23	0	16	0	39	2	73	2	0	77	0	0	0	0	0	166
04:15 PM	3	41	0	0	44	8	0	14	0	22	1	64	12	0	77	0	0	0	0	0	143
04:30 PM	2	48	0	0	50	2	0	3	0	5	0	74	2	0	76	0	0	1	0	1	132
04:45 PM	1	57	0	0	58	3	0	2	0	5	0	51	5	0	56	0	0	1	0	1	120
Total	9	193	0	0	202	36	0	35	0	71	3	262	21	0	286	0	0	2	0	2	561
05:00 PM	2	58	0	0	60	9	0	5	0	14	1	88	3	1	93	0	0	0	0	0	167
05:15 PM	3	63	1	0	67	7	0	1	0	8	0	78	4	0	82	1	0	0	0	1	158
05:30 PM	2	47	1	0	50	10	0	6	0	16	0	60	4	1	65	0	0	0	0	0	131
Grand Total	172	1476	16	0	1664	168	0	192	0	360	16	1540	176	2	1734	9	0	24	0	33	3791
Apprch %	10.3	88.7	1	0		46.7	0	53.3	0		0.9	88.8	10.1	0.1		27.3	0	72.7	0		
Total %	4.5	38.9	0.4	0	43.9	4.4	0	5.1	0	9.5	0.4	40.6	4.6	0.1	45.7	0.2	0	0.6	0	0.9	

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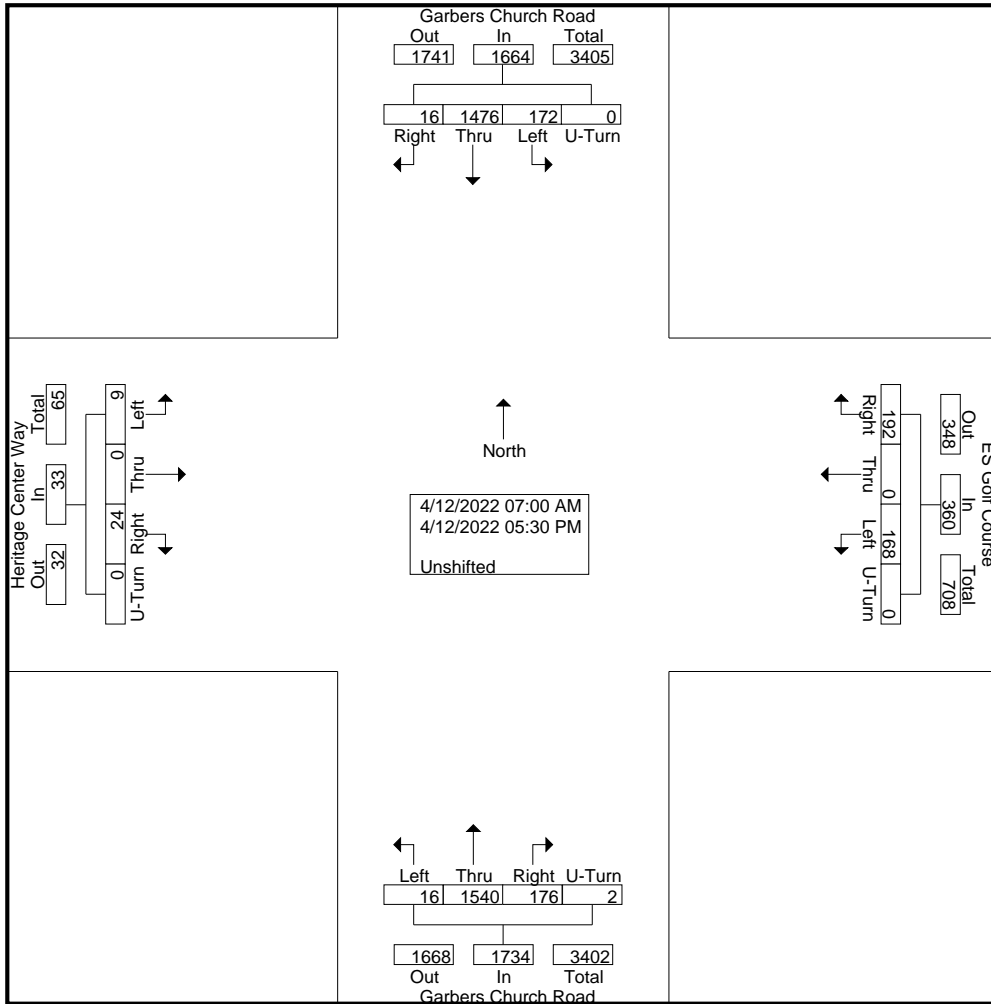
Phone: 703-914-4850

File Name : 5. Garbers Church Rd @ Heritage Ctr & Golf

Site Code : J 968

Start Date : 4/12/2022

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Phone: 703-914-4850

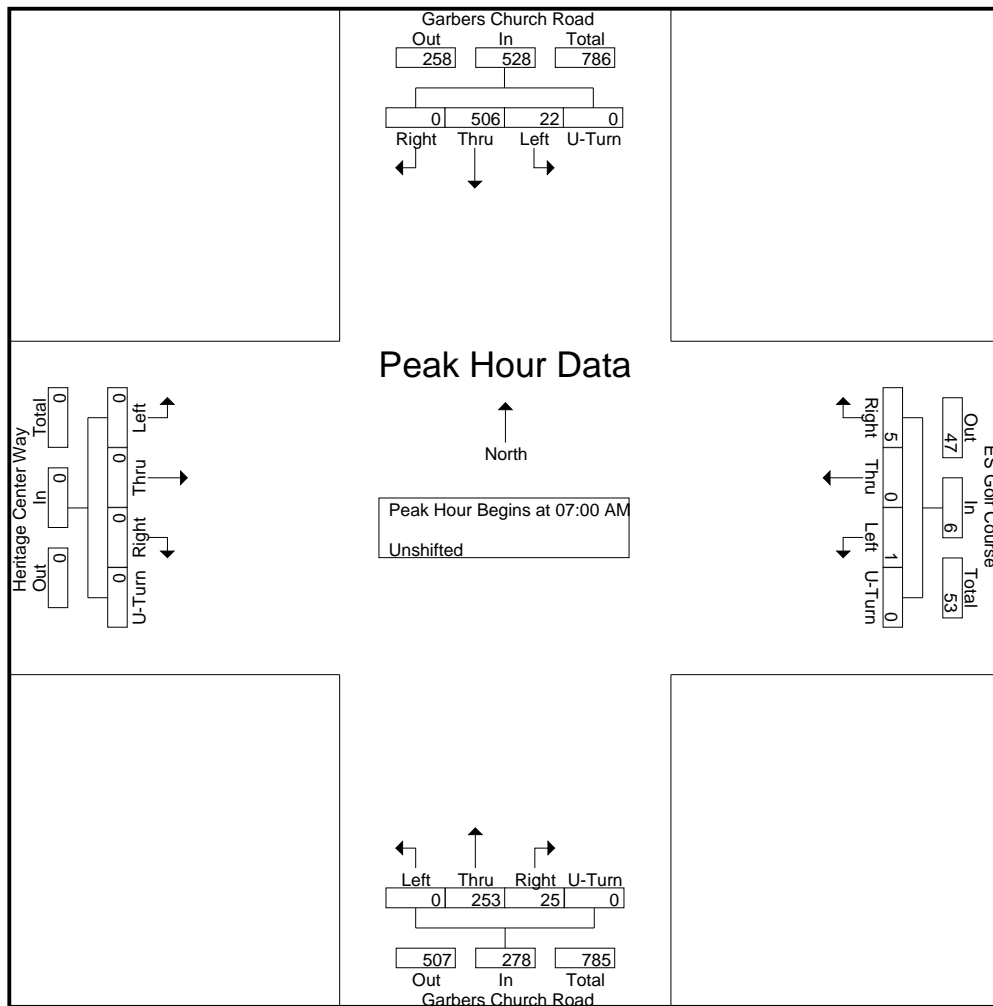
File Name : 5. Garbers Church Rd @ Heritage Ctr & Golf

Site Code : J 968

Start Date : 4/12/2022

Page No : 3

Start Time	Garbers Church Road From North					ES Golf Course From East					Garbers Church Road From South					Heritage Center Way From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	2	82	0	0	84	0	0	0	0	0	0	23	1	0	24	0	0	0	0	0	108
07:15 AM	1	132	0	0	133	0	0	1	0	1	0	70	2	0	72	0	0	0	0	0	206
07:30 AM	5	221	0	0	226	0	0	1	0	1	0	100	11	0	111	0	0	0	0	0	338
07:45 AM	14	71	0	0	85	1	0	3	0	4	0	60	11	0	71	0	0	0	0	0	160
Total Volume	22	506	0	0	528	1	0	5	0	6	0	253	25	0	278	0	0	0	0	0	812
% App. Total	4.2	95.8	0	0		16.7	0	83.3	0		0	91	9	0		0	0	0	0		
PHF	.393	.572	.000	.000	.584	.250	.000	.417	.000	.375	.000	.633	.568	.000	.626	.000	.000	.000	.000	.000	.601



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Phone: 703-914-4850

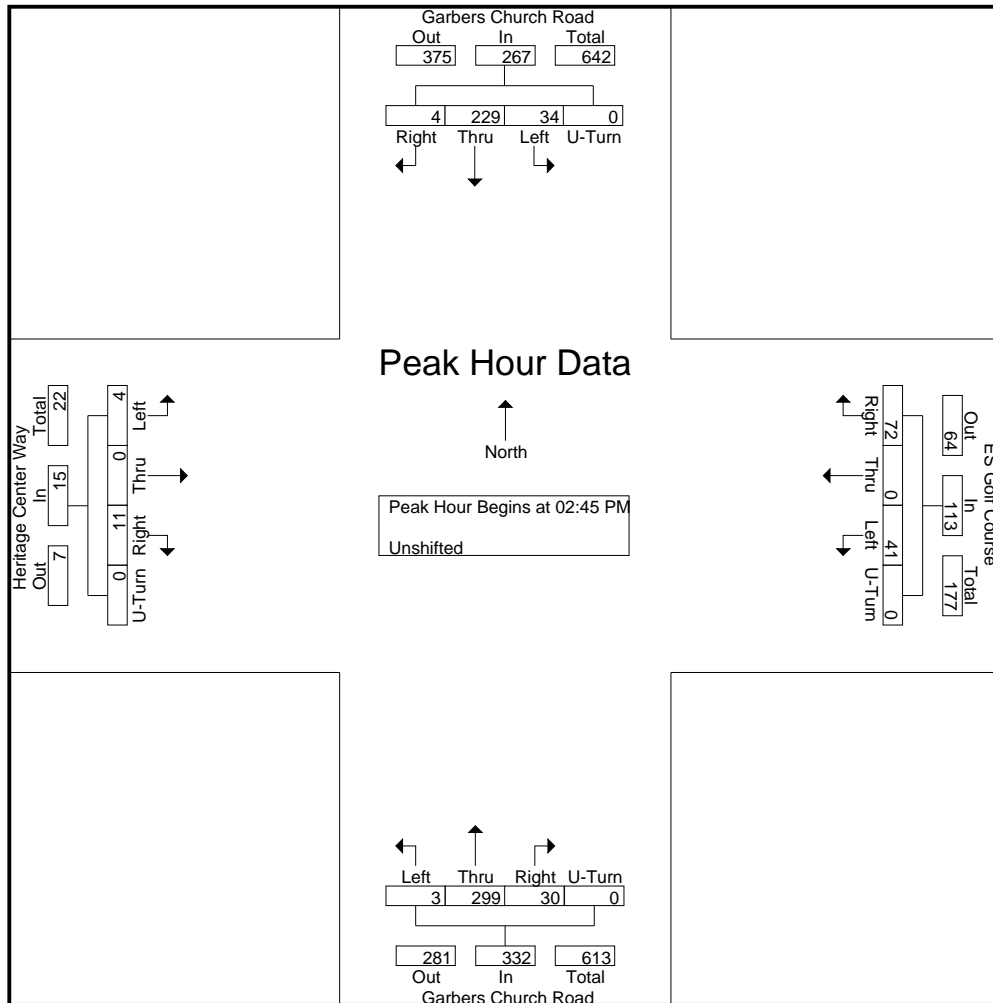
File Name : 5. Garbers Church Rd @ Heritage Ctr & Golf

Site Code : J 968

Start Date : 4/12/2022

Page No : 4

Start Time	Garbers Church Road From North					ES Golf Course From East					Garbers Church Road From South					Heritage Center Way From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	15	54	2	0	71	9	0	23	0	32	1	68	14	0	83	3	0	7	0	10	196
03:00 PM	10	72	0	0	82	20	0	38	0	58	0	83	10	0	93	0	0	0	0	0	233
03:15 PM	7	61	0	0	68	6	0	8	0	14	1	74	3	0	78	0	0	1	0	1	161
03:30 PM	2	42	2	0	46	6	0	3	0	9	1	74	3	0	78	1	0	3	0	4	137
Total Volume	34	229	4	0	267	41	0	72	0	113	3	299	30	0	332	4	0	11	0	15	727
% App. Total	12.7	85.8	1.5	0		36.3	0	63.7	0		0.9	90.1	9	0		26.7	0	73.3	0		
PHF	.567	.795	.500	.000	.814	.513	.000	.474	.000	.487	.750	.901	.536	.000	.892	.333	.000	.393	.000	.375	.780



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Phone: 703-914-4850

File Name : 6. Garbers Church Rd @ Heritage Estates

Site Code : J 968

Start Date : 4/12/2022

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Groups Printed- Unshifted

Start Time	Garbers Church Road From North					Heritage Estates From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	83	0	0	83	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	105
07:15 AM	0	130	0	0	130	1	0	0	0	1	0	72	0	0	72	0	0	0	0	0	203
07:30 AM	0	228	0	0	228	0	0	0	0	0	0	95	0	0	95	0	0	0	0	0	323
07:45 AM	0	81	0	0	81	1	0	0	0	1	0	70	0	0	70	0	0	0	0	0	152
Total	0	522	0	0	522	2	0	0	0	2	0	259	0	0	259	0	0	0	0	0	783
08:00 AM	0	51	0	0	51	0	0	1	0	1	0	36	0	0	36	0	0	0	0	0	88
08:15 AM	0	51	0	1	52	0	0	2	0	2	0	26	0	0	26	0	0	0	0	0	80
08:30 AM	0	75	0	0	75	1	0	0	0	1	0	51	0	0	51	0	0	0	0	0	127
08:45 AM	0	71	0	0	71	1	0	0	0	1	0	56	0	0	56	0	0	0	0	0	128
Total	0	248	0	1	249	2	0	3	0	5	0	169	0	0	169	0	0	0	0	0	423
01:45 PM	0	45	0	0	45	2	0	1	0	3	0	139	0	0	139	0	0	0	0	0	187
Total	0	45	0	0	45	2	0	1	0	3	0	139	0	0	139	0	0	0	0	0	187
02:00 PM	0	47	0	0	47	1	0	1	0	2	0	65	2	0	67	0	0	0	0	0	116
02:15 PM	1	42	0	0	43	2	0	0	0	2	0	49	1	0	50	0	0	0	0	0	95
02:30 PM	2	58	0	0	60	1	0	1	0	2	0	56	3	0	59	0	0	0	0	0	121
02:45 PM	1	70	0	0	71	1	0	0	0	1	0	91	3	0	94	0	0	0	0	0	166
Total	4	217	0	0	221	5	0	2	0	7	0	261	9	0	270	0	0	0	0	0	498
03:00 PM	0	81	0	0	81	2	0	1	0	3	0	117	1	0	118	0	0	0	0	0	202
03:15 PM	0	66	0	0	66	1	0	1	0	2	0	83	1	0	84	0	0	0	0	0	152
03:30 PM	2	45	0	0	47	1	0	0	0	1	0	77	0	0	77	0	0	0	0	0	125
03:45 PM	0	39	0	0	39	2	0	0	0	2	0	93	1	0	94	0	0	0	0	0	135
Total	2	231	0	0	233	6	0	2	0	8	0	370	3	0	373	0	0	0	0	0	614
04:00 PM	1	45	0	0	46	3	0	0	0	3	0	85	1	0	86	0	0	0	0	0	135
04:15 PM	0	41	0	0	41	1	0	0	0	1	0	78	0	0	78	1	0	1	0	2	122
04:30 PM	0	48	0	0	48	2	0	2	0	4	1	74	1	0	76	0	0	0	0	0	128
04:45 PM	1	55	0	0	56	2	0	0	0	2	0	55	0	0	55	0	0	0	0	0	113
Total	2	189	0	0	191	8	0	2	0	10	1	292	2	0	295	1	0	1	0	2	498
05:00 PM	1	57	0	0	58	2	0	0	0	2	0	92	0	0	92	0	0	0	0	0	152
05:15 PM	4	67	0	0	71	0	0	0	0	0	0	74	2	0	76	0	0	0	0	0	147
05:30 PM	0	50	0	0	50	1	0	1	0	2	0	67	1	0	68	0	0	0	0	0	120
Grand Total	13	1626	0	1	1640	28	0	11	0	39	1	1723	17	0	1741	1	0	1	0	2	3422
Apprch %	0.8	99.1	0	0.1		71.8	0	28.2	0		0.1	99	1	0		50	0	50	0		
Total %	0.4	47.5	0	0	47.9	0.8	0	0.3	0	1.1	0	50.4	0.5	0	50.9	0	0	0	0	0.1	

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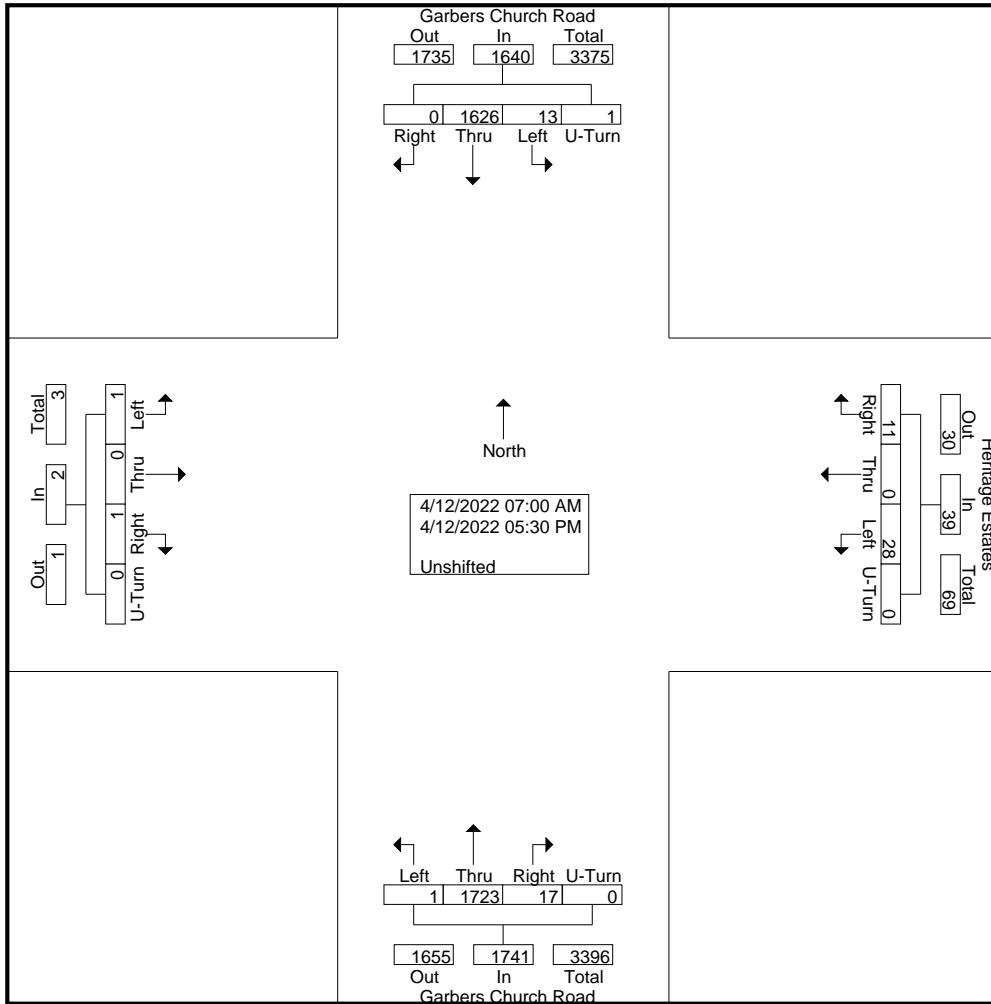
Phone: 703-914-4850

File Name : 6. Garbers Church Rd @ Heritage Estates

Site Code : J 968

Start Date : 4/12/2022

Page No : 2



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Alexandria, VA - 22312

Phone: 703-914-4850

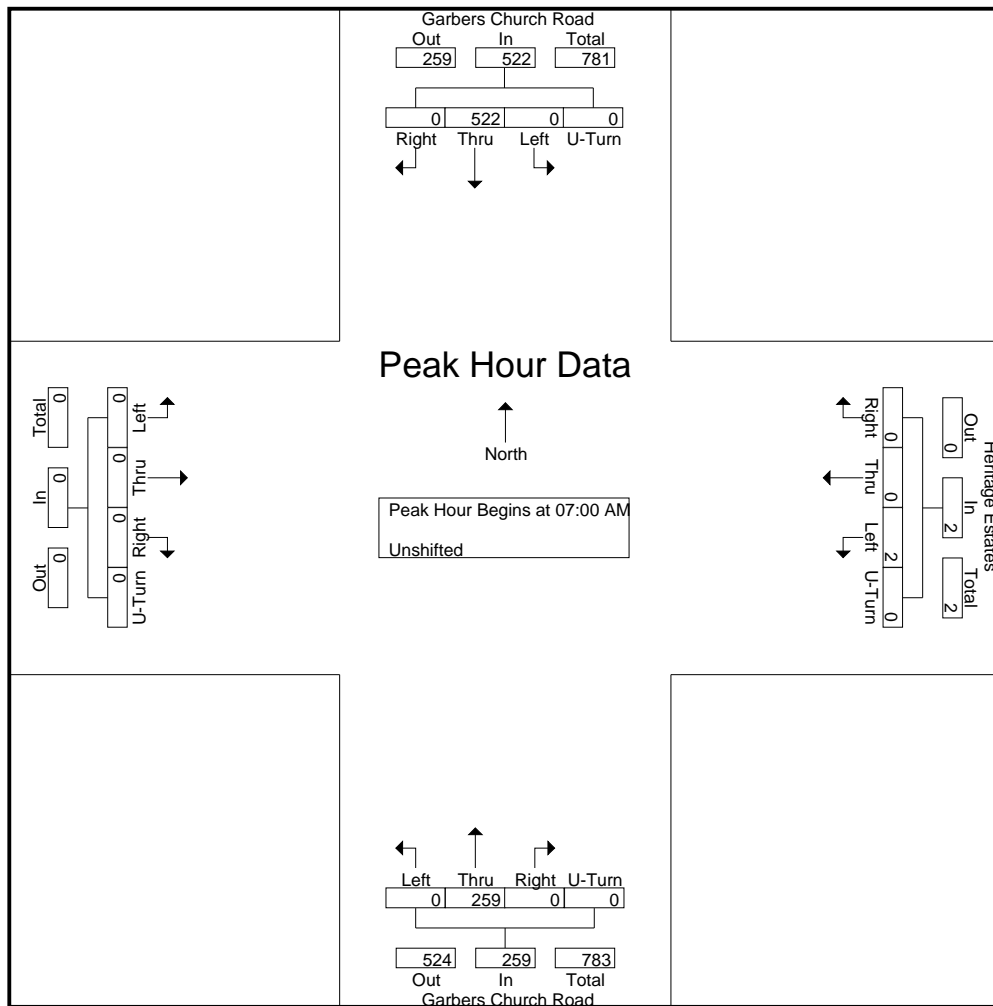
File Name : 6. Garbers Church Rd @ Heritage Estates

Site Code : J 968

Start Date : 4/12/2022

Page No : 3

Start Time	Garbers Church Road From North					Heritage Estates From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	83	0	0	83	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	105
07:15 AM	0	130	0	0	130	1	0	0	0	1	0	72	0	0	72	0	0	0	0	0	203
07:30 AM	0	228	0	0	228	0	0	0	0	0	0	95	0	0	95	0	0	0	0	0	323
07:45 AM	0	81	0	0	81	1	0	0	0	1	0	70	0	0	70	0	0	0	0	0	152
Total Volume	0	522	0	0	522	2	0	0	0	2	0	259	0	0	259	0	0	0	0	0	783
% App. Total	0	100	0	0		100	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.572	.000	.000	.572	.500	.000	.000	.000	.500	.000	.682	.000	.000	.682	.000	.000	.000	.000	.000	.606



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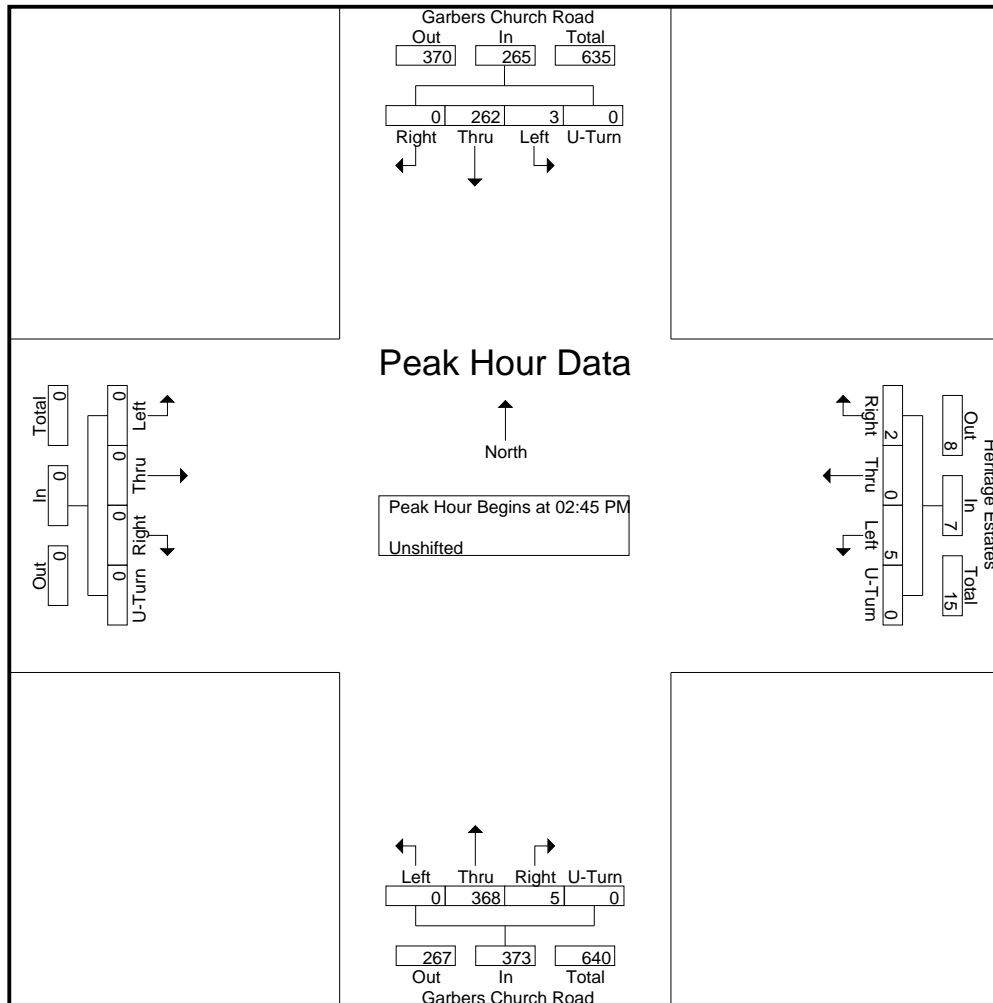
File Name : 6. Garbers Church Rd @ Heritage Estates

Site Code : J 968

Start Date : 4/12/2022

Page No : 4

Start Time	Garbers Church Road From North					Heritage Estates From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	1	70	0	0	71	1	0	0	0	1	0	91	3	0	94	0	0	0	0	0	166
03:00 PM	0	81	0	0	81	2	0	1	0	3	0	117	1	0	118	0	0	0	0	0	202
03:15 PM	0	66	0	0	66	1	0	1	0	2	0	83	1	0	84	0	0	0	0	0	152
03:30 PM	2	45	0	0	47	1	0	0	0	1	0	77	0	0	77	0	0	0	0	0	125
Total Volume	3	262	0	0	265	5	0	2	0	7	0	368	5	0	373	0	0	0	0	0	645
% App. Total	1.1	98.9	0	0		71.4	0	28.6	0		0	98.7	1.3	0		0	0	0	0		
PHF	.375	.809	.000	.000	.818	.625	.000	.500	.000	.583	.000	.786	.417	.000	.790	.000	.000	.000	.000	.000	.798



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Phone: 703-914-4850

File Name : 7. Garbers Church Rd @ Parklawn Dr

Site Code : J 968

Start Date : 4/12/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Garbers Church Road From North					Park Lawn Drive From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	74	0	0	74	9	0	0	0	9	0	20	2	0	22	0	0	0	0	0	105
07:15 AM	1	124	0	0	125	6	0	0	0	6	0	68	4	0	72	0	0	0	0	0	203
07:30 AM	0	213	0	0	213	15	0	2	0	17	0	90	5	0	95	0	0	0	0	0	325
07:45 AM	0	76	0	0	76	5	0	1	0	6	0	68	2	0	70	0	0	0	0	0	152
Total	1	487	0	0	488	35	0	3	0	38	0	246	13	0	259	0	0	0	0	0	785
08:00 AM	0	47	0	0	47	4	0	1	0	5	0	34	3	0	37	0	0	0	0	0	89
08:15 AM	0	46	0	0	46	6	0	0	0	6	0	27	1	0	28	0	0	0	0	0	80
08:30 AM	0	70	0	0	70	5	0	0	0	5	0	49	2	0	51	0	0	0	0	0	126
08:45 AM	1	62	0	0	63	9	0	1	0	10	0	52	4	0	56	0	0	0	0	0	129
Total	1	225	0	0	226	24	0	2	0	26	0	162	10	0	172	0	0	0	0	0	424
01:45 PM	0	42	0	0	42	3	0	0	0	3	0	135	5	0	140	0	0	0	0	0	185
Total	0	42	0	0	42	3	0	0	0	3	0	135	5	0	140	0	0	0	0	0	185
02:00 PM	0	43	0	0	43	4	0	0	0	4	0	61	5	0	66	0	0	0	0	0	113
02:15 PM	2	36	0	0	38	6	0	2	0	8	0	47	2	0	49	0	0	0	0	0	95
02:30 PM	0	56	0	0	56	2	0	0	0	2	0	51	6	0	57	0	0	0	0	0	115
02:45 PM	1	67	0	0	68	3	0	1	0	4	0	86	5	0	91	0	0	0	0	0	163
Total	3	202	0	0	205	15	0	3	0	18	0	245	18	0	263	0	0	0	0	0	486
03:00 PM	0	73	0	0	73	8	0	2	0	10	0	108	10	0	118	0	0	0	0	0	201
03:15 PM	0	65	0	0	65	1	0	1	0	2	0	74	10	0	84	0	0	0	0	0	151
03:30 PM	0	43	0	0	43	2	0	0	0	2	0	70	7	0	77	0	0	0	0	0	122
03:45 PM	0	34	0	0	34	5	0	0	0	5	0	83	10	0	93	0	0	0	0	0	132
Total	0	215	0	0	215	16	0	3	0	19	0	335	37	0	372	0	0	0	0	0	606
04:00 PM	0	43	0	0	43	2	0	0	0	2	0	77	8	0	85	0	0	0	0	0	130
04:15 PM	0	37	0	0	37	4	0	2	0	6	0	69	9	0	78	0	0	0	0	0	121
04:30 PM	1	42	0	0	43	6	0	3	0	9	0	71	5	0	76	0	0	0	0	0	128
04:45 PM	1	51	0	0	52	4	0	1	0	5	0	51	4	0	55	0	0	0	0	0	112
Total	2	173	0	0	175	16	0	6	0	22	0	268	26	0	294	0	0	0	0	0	491
05:00 PM	1	56	0	0	57	1	0	0	0	1	0	88	4	0	92	0	0	0	0	0	150
05:15 PM	0	67	0	0	67	0	0	0	0	0	0	74	0	0	74	0	0	0	0	0	141
05:30 PM	0	50	0	0	50	0	0	0	0	0	0	68	0	0	68	0	0	0	0	0	118
Grand Total	8	1517	0	0	1525	110	0	17	0	127	0	1621	113	0	1734	0	0	0	0	0	3386
Apprch %	0.5	99.5	0	0		86.6	0	13.4	0		0	93.5	6.5	0		0	0	0	0		
Total %	0.2	44.8	0	0	45	3.2	0	0.5	0	3.8	0	47.9	3.3	0	51.2	0	0	0	0	0	

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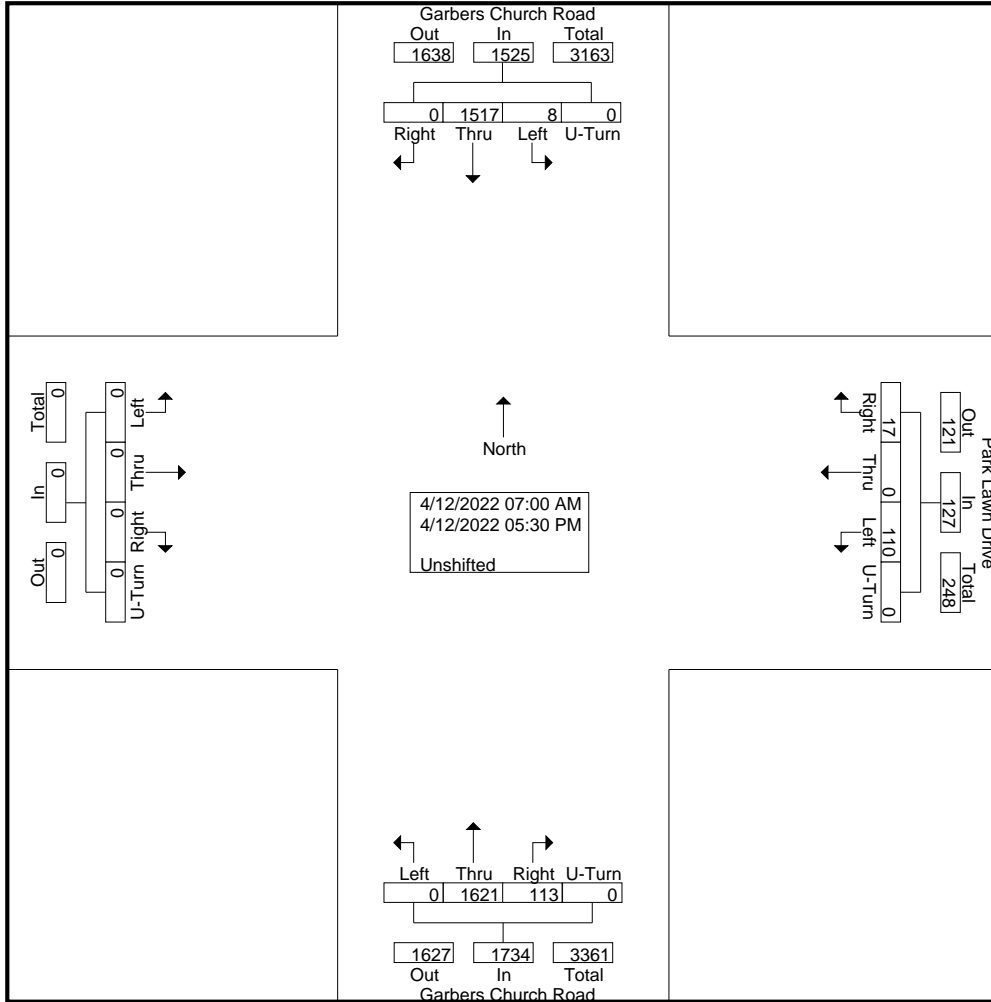
Phone: 703-914-4850

File Name : 7. Garbers Church Rd @ Parklawn Dr

Site Code : J 968

Start Date : 4/12/2022

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Alexandria, VA - 22312

Phone: 703-914-4850

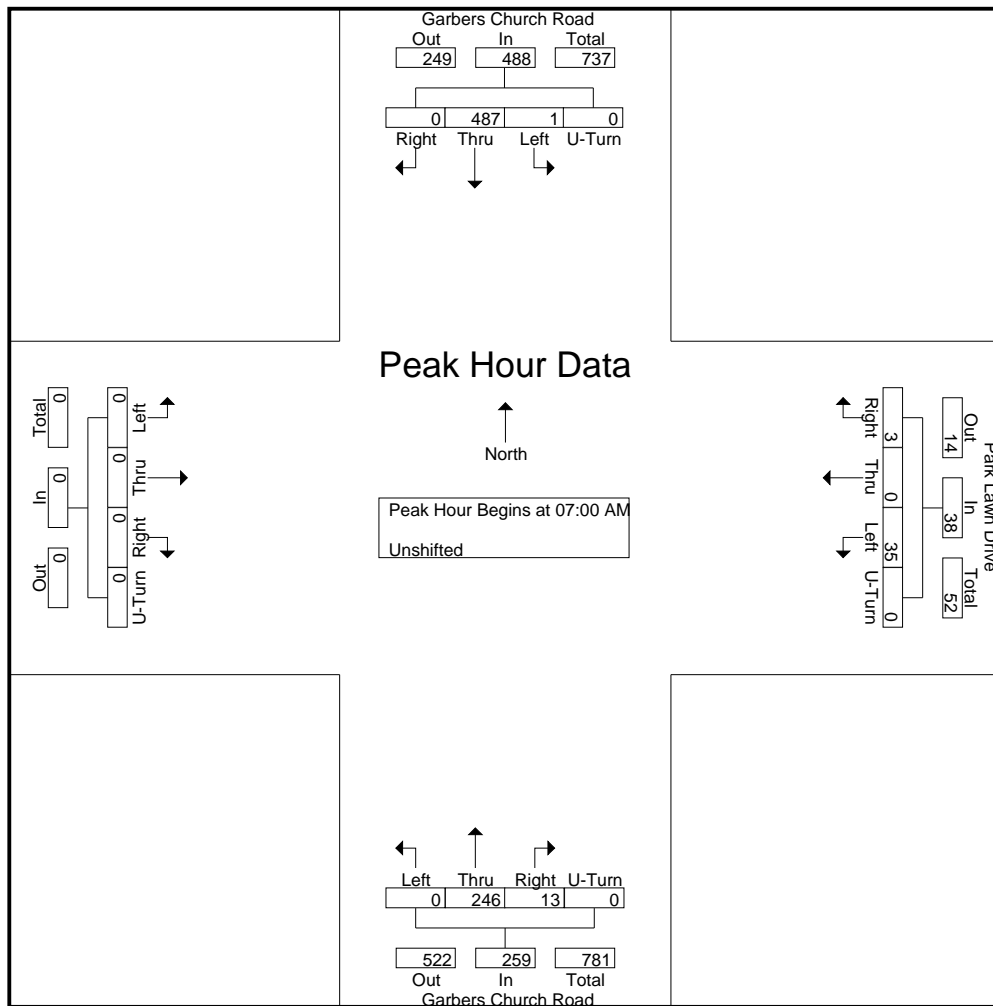
File Name : 7. Garbers Church Rd @ Parklawn Dr

Site Code : J 968

Start Date : 4/12/2022

Page No : 3

Start Time	Garbers Church Road From North					Park Lawn Drive From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	74	0	0	74	9	0	0	0	9	0	20	2	0	22	0	0	0	0	0	105
07:15 AM	1	124	0	0	125	6	0	0	0	6	0	68	4	0	72	0	0	0	0	0	203
07:30 AM	0	213	0	0	213	15	0	2	0	17	0	90	5	0	95	0	0	0	0	0	325
07:45 AM	0	76	0	0	76	5	0	1	0	6	0	68	2	0	70	0	0	0	0	0	152
Total Volume	1	487	0	0	488	35	0	3	0	38	0	246	13	0	259	0	0	0	0	0	785
% App. Total	0.2	99.8	0	0		92.1	0	7.9	0		0	95	5	0		0	0	0	0		
PHF	.250	.572	.000	.000	.573	.583	.000	.375	.000	.559	.000	.683	.650	.000	.682	.000	.000	.000	.000	.000	.604



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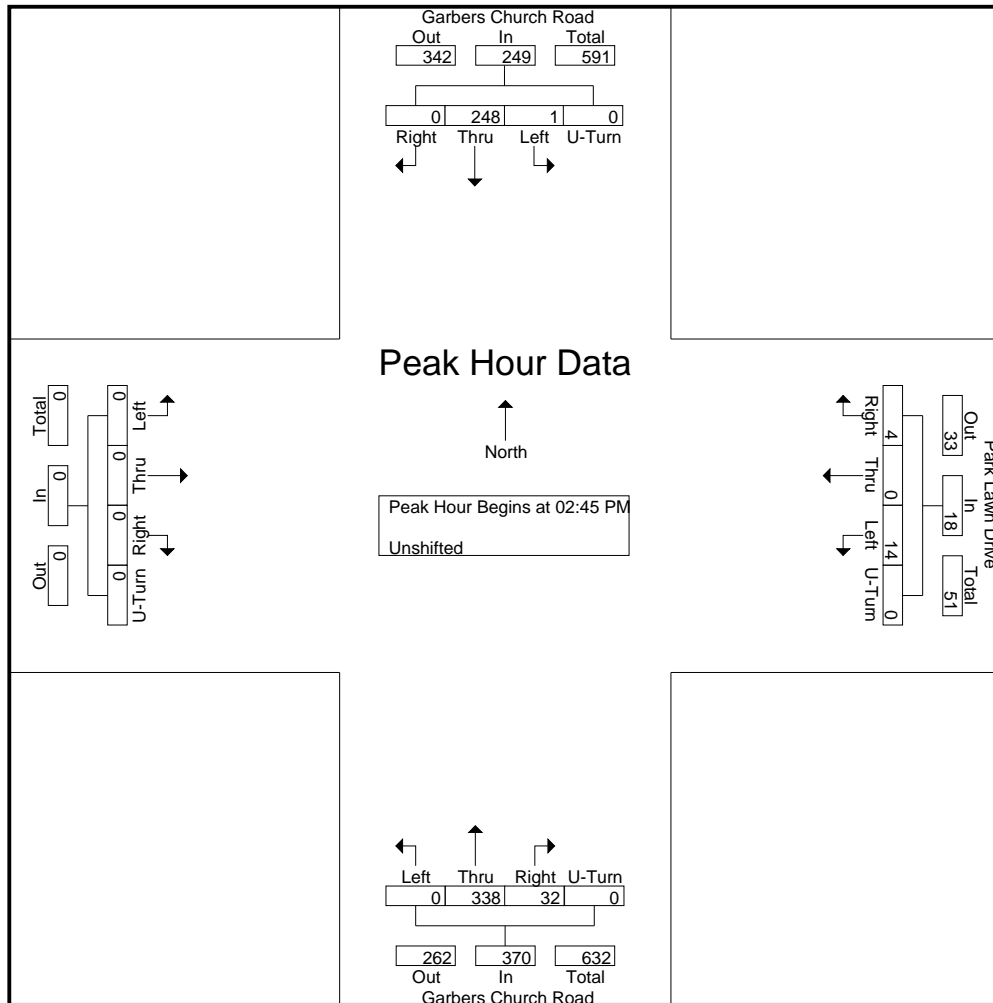
File Name : 7. Garbers Church Rd @ Parklawn Dr

Site Code : J 968

Start Date : 4/12/2022

Page No : 4

Start Time	Garbers Church Road From North					Park Lawn Drive From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	1	67	0	0	68	3	0	1	0	4	0	86	5	0	91	0	0	0	0	0	163
03:00 PM	0	73	0	0	73	8	0	2	0	10	0	108	10	0	118	0	0	0	0	0	201
03:15 PM	0	65	0	0	65	1	0	1	0	2	0	74	10	0	84	0	0	0	0	0	151
03:30 PM	0	43	0	0	43	2	0	0	0	2	0	70	7	0	77	0	0	0	0	0	122
Total Volume	1	248	0	0	249	14	0	4	0	18	0	338	32	0	370	0	0	0	0	0	637
% App. Total	0.4	99.6	0.0	0.0		77.8	0.0	22.2	0.0		0.0	91.4	8.6	0.0		0.0	0.0	0.0	0.0		
PHF	.250	.849	.000	.000	.853	.438	.000	.500	.000	.450	.000	.782	.800	.000	.784	.000	.000	.000	.000	.000	.792



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

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Phone: 703-914-4850

File Name : 8. Garber Church Rd - Rhianon Ln

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Garbers Church Rd From North					From East					Garbers Church Rd From South					Rhianon Ln From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	74	1	0	75	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	95
07:15 AM	0	125	1	0	126	0	0	0	0	0	0	68	0	0	68	0	0	6	0	6	200
07:30 AM	0	209	0	0	209	0	0	0	0	0	1	91	0	0	92	4	0	3	0	7	308
07:45 AM	0	70	2	0	72	0	0	0	0	0	2	67	0	0	69	6	0	1	0	7	148
Total	0	478	4	0	482	0	0	0	0	0	3	246	0	0	249	10	0	10	0	20	751
08:00 AM	0	43	2	0	45	0	0	0	0	0	0	35	0	0	35	4	0	0	0	4	84
08:15 AM	0	43	4	0	47	0	0	0	0	0	0	27	0	0	27	3	0	1	0	4	78
08:30 AM	0	68	2	0	70	0	0	0	0	0	0	49	0	0	49	2	0	6	0	8	127
08:45 AM	0	62	0	0	62	0	0	0	0	0	2	51	0	0	53	1	0	0	0	1	116
Total	0	216	8	0	224	0	0	0	0	0	2	162	0	0	164	10	0	7	0	17	405
01:45 PM	0	40	2	0	42	0	0	0	0	0	2	133	0	0	135	2	0	0	0	2	179
Total	0	40	2	0	42	0	0	0	0	0	2	133	0	0	135	2	0	0	0	2	179
02:00 PM	0	41	0	0	41	0	0	0	0	0	1	60	0	0	61	2	0	1	0	3	105
02:15 PM	0	36	1	0	37	0	0	0	0	0	3	46	0	0	49	2	0	0	0	2	88
02:30 PM	0	54	2	0	56	0	0	0	0	0	1	50	0	0	51	2	0	0	0	2	109
02:45 PM	0	67	2	0	69	0	0	0	0	0	3	84	0	0	87	1	0	3	0	4	160
Total	0	198	5	0	203	0	0	0	0	0	8	240	0	0	248	7	0	4	0	11	462
03:00 PM	0	70	3	0	73	0	0	0	0	0	3	107	0	0	110	3	0	2	0	5	188
03:15 PM	0	65	1	0	66	0	0	0	0	0	1	74	0	0	75	0	0	1	0	1	142
03:30 PM	0	43	2	0	45	0	0	0	0	0	2	68	0	0	70	0	0	3	0	3	118
03:45 PM	0	31	1	0	32	0	0	0	0	0	3	80	0	0	83	3	0	0	0	3	118
Total	0	209	7	0	216	0	0	0	0	0	9	329	0	0	338	6	0	6	0	12	566
04:00 PM	0	43	2	0	45	0	0	0	0	0	1	76	0	0	77	0	0	1	0	1	123
04:15 PM	0	33	6	0	39	0	0	0	0	0	1	70	0	0	71	4	0	0	0	4	114
04:30 PM	0	42	2	0	44	0	0	0	0	0	2	72	0	0	74	1	0	1	0	2	120
04:45 PM	0	48	3	0	51	0	0	0	0	0	2	50	0	0	52	4	0	2	0	6	109
Total	0	166	13	0	179	0	0	0	0	0	6	268	0	0	274	9	0	4	0	13	466
05:00 PM	0	57	1	0	58	0	0	0	0	0	1	87	0	0	88	1	0	1	0	2	148
05:15 PM	0	67	0	0	67	0	0	0	0	0	0	74	0	0	74	0	0	0	0	0	141
05:30 PM	0	50	0	0	50	0	0	0	0	0	0	68	0	0	68	1	0	0	0	1	119
Grand Total	0	1481	40	0	1521	0	0	0	0	0	31	1607	0	0	1638	46	0	32	0	78	3237
Apprch %	0	97.4	2.6	0		0	0	0	0	0	1.9	98.1	0	0		59	0	41	0		
Total %	0	45.8	1.2	0	47	0	0	0	0	0	1	49.6	0	0	50.6	1.4	0	1	0	2.4	

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Alexandria, VA - 22312

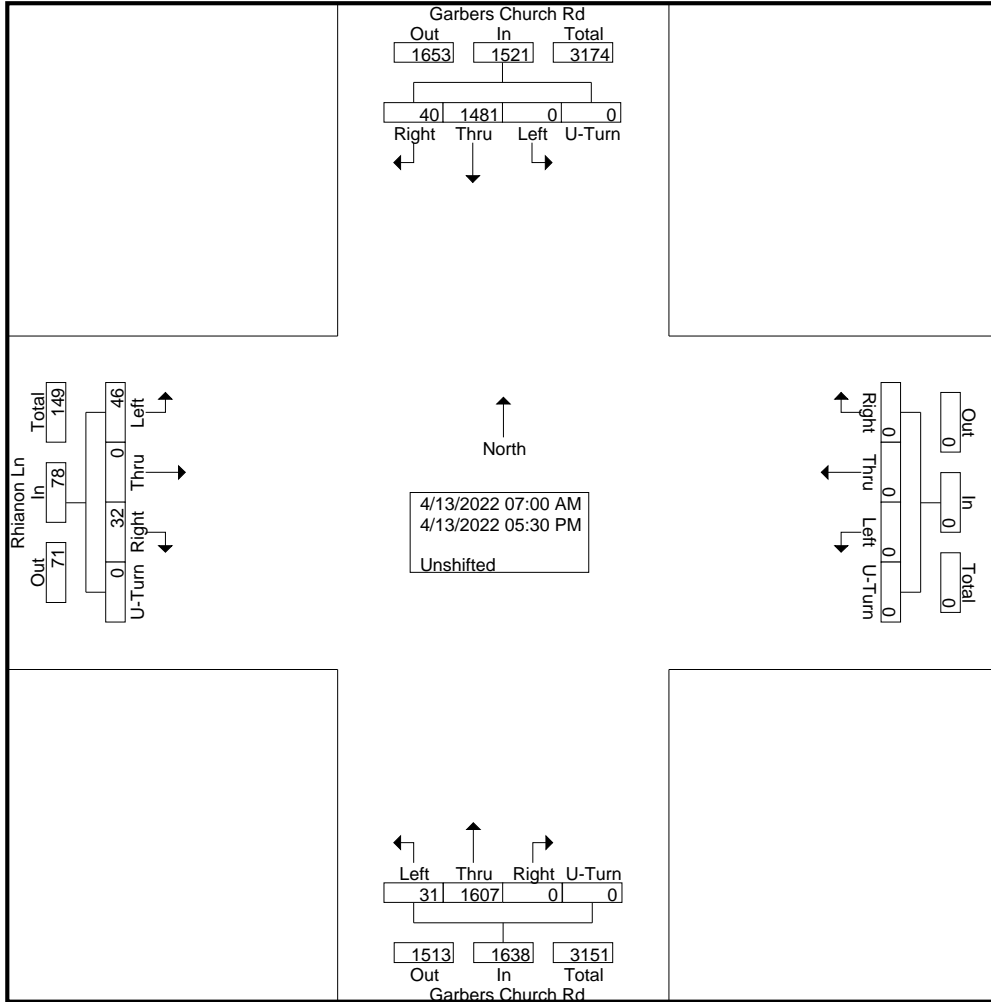
Phone: 703-914-4850

File Name : 8. Garber Church Rd - Rhianon Ln

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



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Phone: 703-914-4850

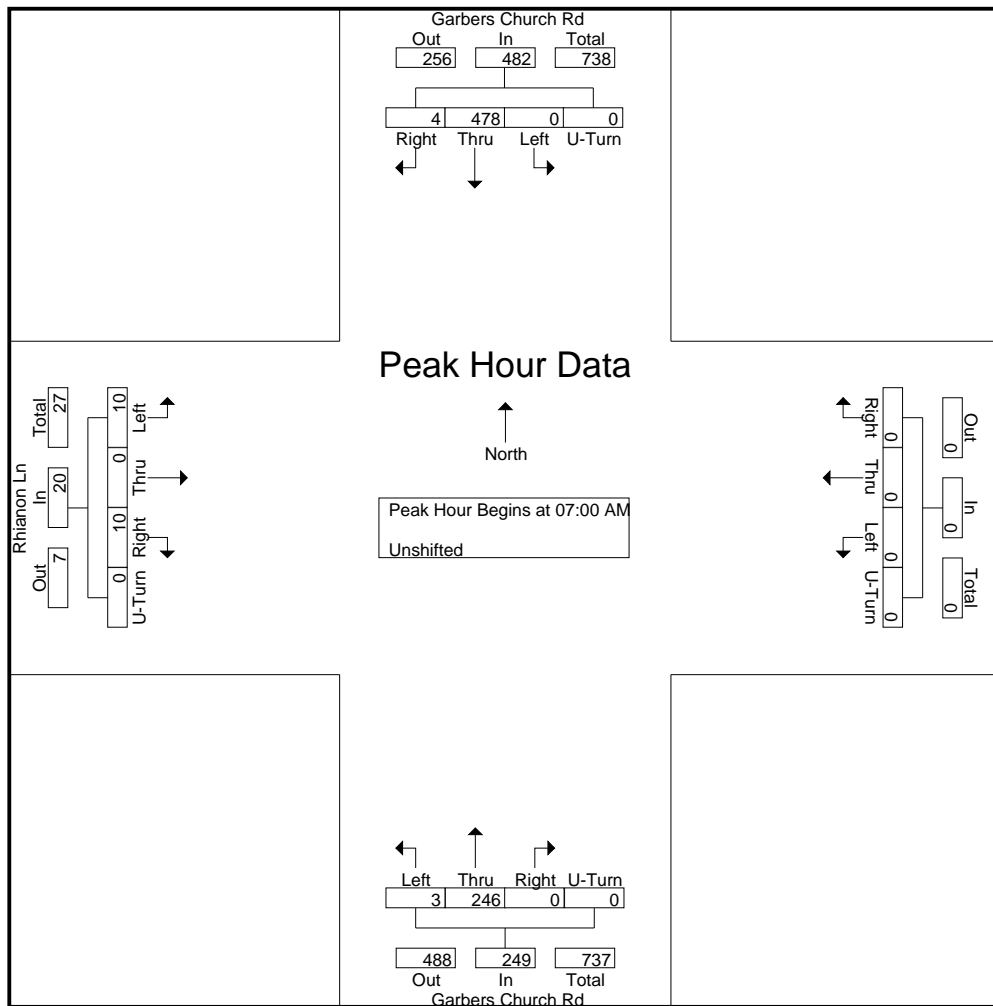
File Name : 8. Garber Church Rd - Rhianon Ln

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	Garbers Church Rd From North					From East					Garbers Church Rd From South					Rhianon Ln From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	74	1	0	75	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	95
07:15 AM	0	125	1	0	126	0	0	0	0	0	0	68	0	0	68	0	0	6	0	6	200
07:30 AM	0	209	0	0	209	0	0	0	0	0	1	91	0	0	92	4	0	3	0	7	308
07:45 AM	0	70	2	0	72	0	0	0	0	0	2	67	0	0	69	6	0	1	0	7	148
Total Volume	0	478	4	0	482	0	0	0	0	0	3	246	0	0	249	10	0	10	0	20	751
% App. Total	0	99.2	0.8	0		0	0	0	0		1.2	98.8	0	0		50	0	50	0		
PHF	.000	.572	.500	.000	.577	.000	.000	.000	.000	.000	.375	.676	.000	.000	.677	.417	.000	.417	.000	.714	.610



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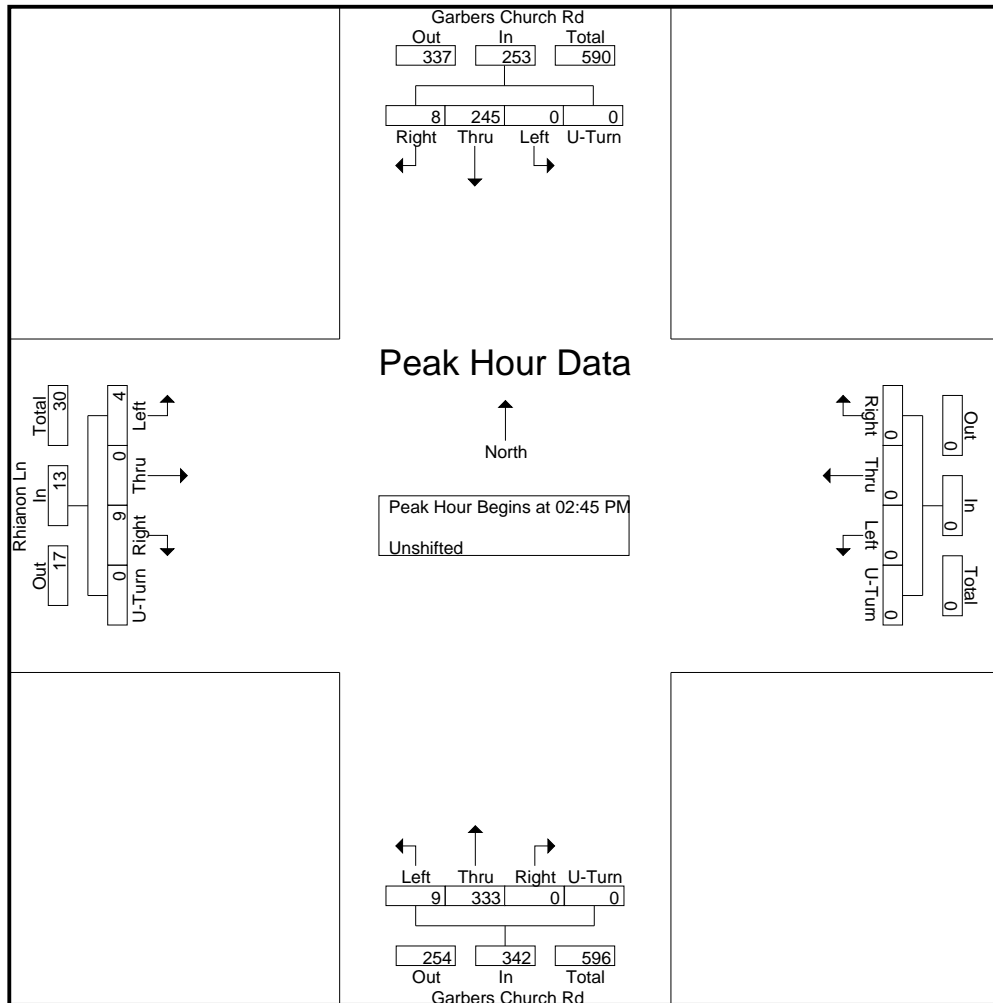
File Name : 8. Garber Church Rd - Rhianon Ln

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Garbers Church Rd From North					From East					Garbers Church Rd From South					Rhianon Ln From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	0	67	2	0	69	0	0	0	0	0	3	84	0	0	87	1	0	3	0	4	160
03:00 PM	0	70	3	0	73	0	0	0	0	0	3	107	0	0	110	3	0	2	0	5	188
03:15 PM	0	65	1	0	66	0	0	0	0	0	1	74	0	0	75	0	0	1	0	1	142
03:30 PM	0	43	2	0	45	0	0	0	0	0	2	68	0	0	70	0	0	3	0	3	118
Total Volume	0	245	8	0	253	0	0	0	0	0	9	333	0	0	342	4	0	9	0	13	608
% App. Total	0	96.8	3.2	0		0	0	0	0		2.6	97.4	0	0		30.8	0	69.2	0		
PHF	.000	.875	.667	.000	.866	.000	.000	.000	.000	.000	.750	.778	.000	.000	.777	.333	.000	.750	.000	.650	.809



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Phone: 703-914-4850

File Name : 9. Garbers Church Rd @ Lendale Ln

Site Code : J 968

Start Date : 4/12/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Garbers Church Road From North					Lendale Lane From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	73	0	0	73	0	0	0	0	0	0	16	1	0	17	0	0	0	0	0	90
07:15 AM	0	124	0	0	124	6	0	2	0	8	0	62	4	0	66	0	0	0	0	0	198
07:30 AM	0	179	0	0	179	15	0	1	0	16	0	86	1	0	87	0	0	0	0	0	282
07:45 AM	0	76	0	0	76	1	0	0	0	1	0	76	1	0	77	0	0	0	0	0	154
Total	0	452	0	0	452	22	0	3	0	25	0	240	7	0	247	0	0	0	0	0	724
08:00 AM	2	45	0	0	47	1	0	1	0	2	0	43	2	0	45	0	0	0	0	0	94
08:15 AM	0	48	0	0	48	1	0	0	0	1	0	30	0	0	30	0	0	0	0	0	79
08:30 AM	0	63	0	0	63	1	0	0	0	1	0	52	1	0	53	0	0	0	0	0	117
08:45 AM	0	58	0	0	58	1	0	0	0	1	0	53	0	0	53	0	0	0	0	0	112
Total	2	214	0	0	216	4	0	1	0	5	0	178	3	0	181	0	0	0	0	0	402
01:45 PM	0	44	0	0	44	0	0	0	0	0	0	132	2	0	134	0	0	0	0	0	178
Total	0	44	0	0	44	0	0	0	0	0	0	132	2	0	134	0	0	0	0	0	178
02:00 PM	0	41	0	0	41	0	0	0	0	0	0	61	0	0	61	0	0	0	0	0	102
02:15 PM	0	43	0	0	43	1	0	0	0	1	1	51	0	0	52	0	0	0	0	0	96
02:30 PM	0	56	0	0	56	1	0	0	0	1	0	51	0	0	51	0	0	0	0	0	108
02:45 PM	0	67	0	0	67	2	0	0	0	2	0	82	0	0	82	0	0	0	0	0	151
Total	0	207	0	0	207	4	0	0	0	4	1	245	0	0	246	0	0	0	0	0	457
03:00 PM	0	73	0	0	73	1	0	0	0	1	0	110	0	0	110	0	0	0	0	0	184
03:15 PM	0	55	0	0	55	3	0	0	0	3	0	69	0	0	69	0	0	0	0	0	127
03:30 PM	0	46	0	0	46	1	0	0	0	1	0	68	1	0	69	0	0	0	0	0	116
03:45 PM	0	34	0	0	34	1	0	1	0	2	0	78	1	0	79	1	0	0	0	1	116
Total	0	208	0	0	208	6	0	1	0	7	0	325	2	0	327	1	0	0	0	1	543
04:00 PM	0	46	0	0	46	0	0	1	0	1	0	76	0	0	76	0	0	0	0	0	123
04:15 PM	1	40	0	0	41	0	0	0	0	0	0	81	0	0	81	0	0	0	0	0	122
04:30 PM	0	47	0	0	47	0	0	0	0	0	0	68	0	0	68	0	0	0	0	0	115
04:45 PM	0	55	0	0	55	1	0	0	0	1	0	55	0	0	55	0	0	0	0	0	111
Total	1	188	0	0	189	1	0	1	0	2	0	280	0	0	280	0	0	0	0	0	471
05:00 PM	1	55	0	0	56	1	0	0	0	1	0	87	0	0	87	0	0	0	0	0	144
05:15 PM	0	70	0	0	70	0	0	0	0	0	0	67	0	0	67	0	0	0	0	0	137
05:30 PM	1	44	0	0	45	0	0	1	0	1	0	61	4	0	65	0	0	0	0	0	111
Grand Total	5	1482	0	0	1487	38	0	7	0	45	1	1615	18	0	1634	1	0	0	0	1	3167
Apprch %	0.3	99.7	0	0		84.4	0	15.6	0		0.1	98.8	1.1	0		100	0	0	0		
Total %	0.2	46.8	0	0	47	1.2	0	0.2	0	1.4	0	51	0.6	0	51.6	0	0	0	0	0	

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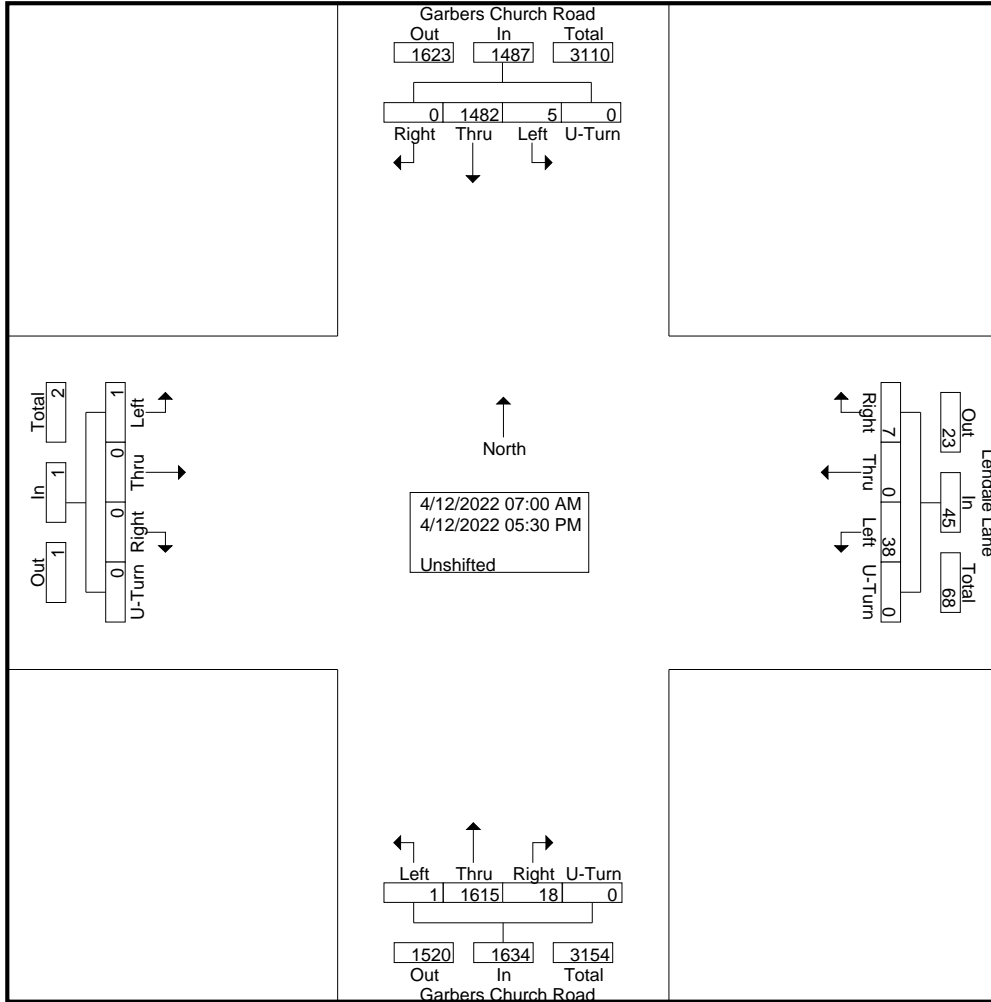
Phone: 703-914-4850

File Name : 9. Garbers Church Rd @ Lendale Ln

Site Code : J 968

Start Date : 4/12/2022

Page No : 2



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4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

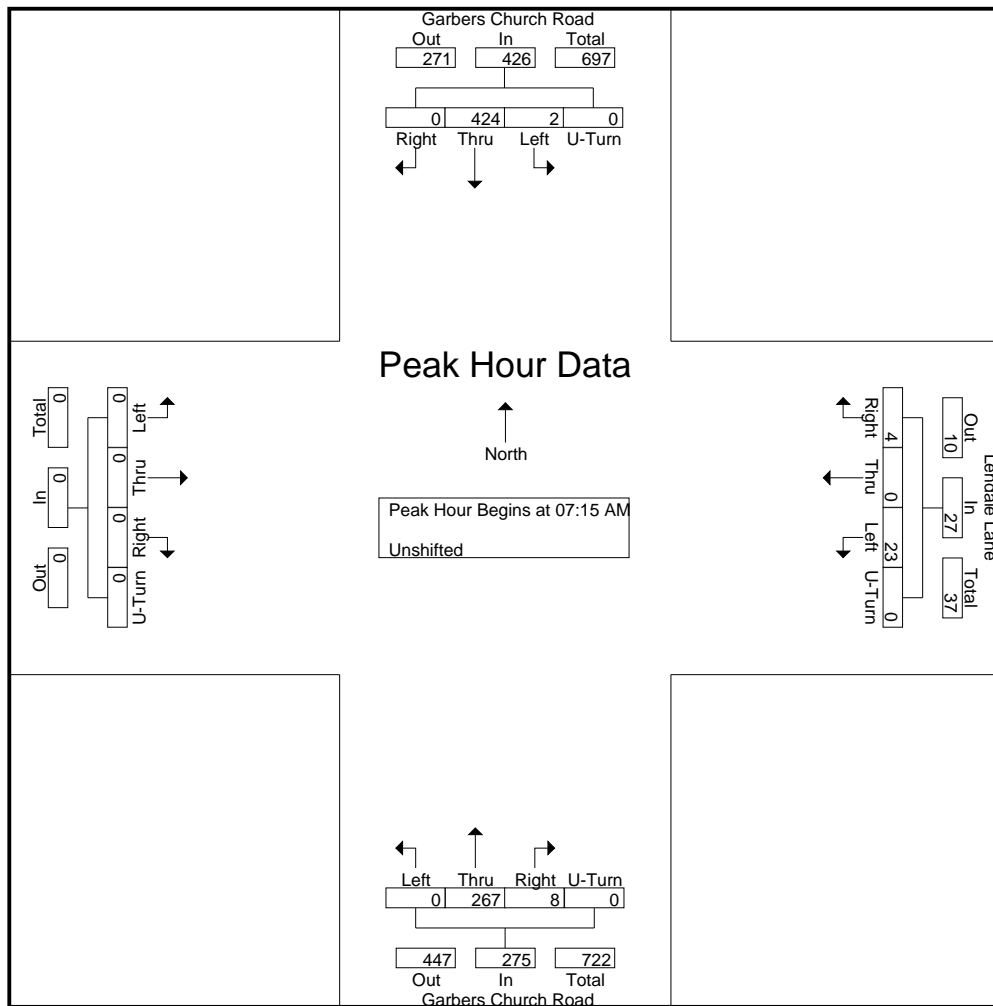
File Name : 9. Garbers Church Rd @ Lendale Ln

Site Code : J 968

Start Date : 4/12/2022

Page No : 3

Start Time	Garbers Church Road From North					Lendale Lane From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	124	0	0	124	6	0	2	0	8	0	62	4	0	66	0	0	0	0	0	198
07:30 AM	0	179	0	0	179	15	0	1	0	16	0	86	1	0	87	0	0	0	0	0	282
07:45 AM	0	76	0	0	76	1	0	0	0	1	0	76	1	0	77	0	0	0	0	0	154
08:00 AM	2	45	0	0	47	1	0	1	0	2	0	43	2	0	45	0	0	0	0	0	94
Total Volume	2	424	0	0	426	23	0	4	0	27	0	267	8	0	275	0	0	0	0	0	728
% App. Total	0.5	99.5	0	0		85.2	0	14.8	0		0	97.1	2.9	0		0	0	0	0		
PHF	.250	.592	.000	.000	.595	.383	.000	.500	.000	.422	.000	.776	.500	.000	.790	.000	.000	.000	.000	.000	.645



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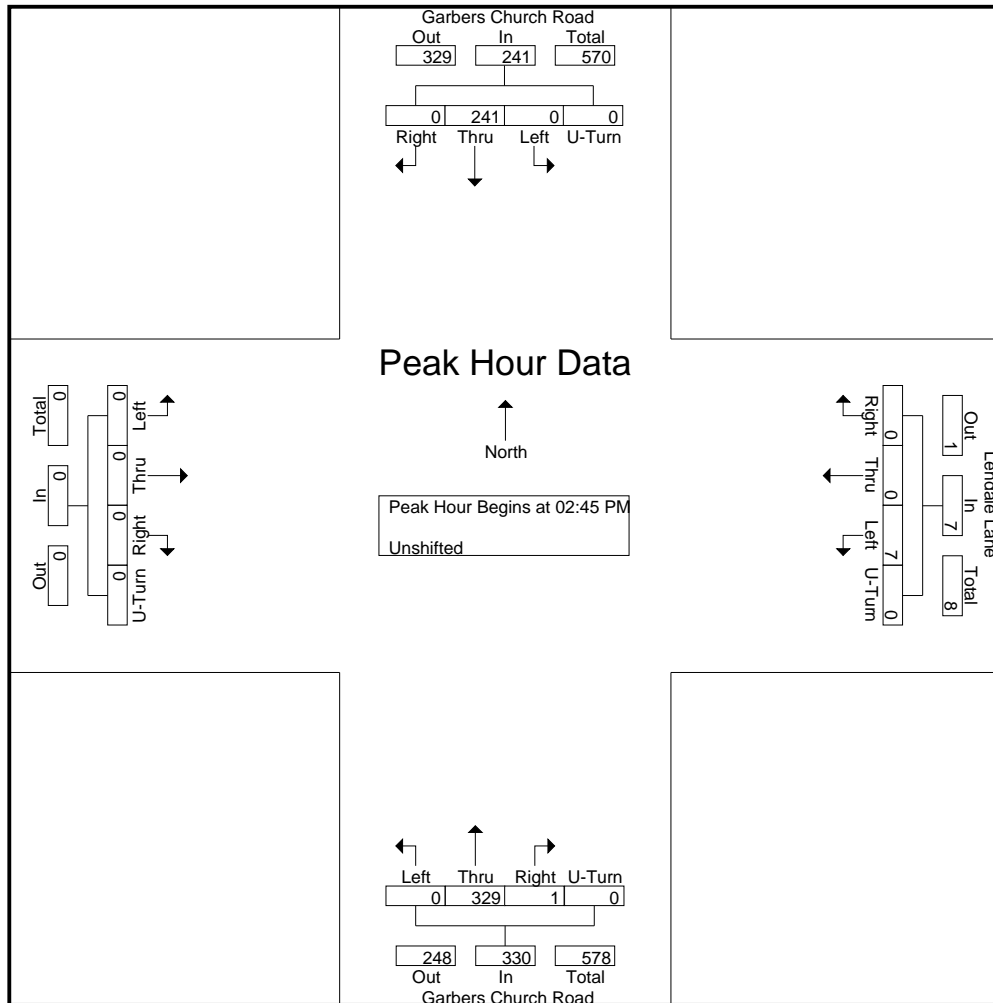
File Name : 9. Garbers Church Rd @ Lendale Ln

Site Code : J 968

Start Date : 4/12/2022

Page No : 4

Start Time	Garbers Church Road From North					Lendale Lane From East					Garbers Church Road From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 01:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	0	67	0	0	67	2	0	0	0	2	0	82	0	0	82	0	0	0	0	0	151
03:00 PM	0	73	0	0	73	1	0	0	0	1	0	110	0	0	110	0	0	0	0	0	184
03:15 PM	0	55	0	0	55	3	0	0	0	3	0	69	0	0	69	0	0	0	0	0	127
03:30 PM	0	46	0	0	46	1	0	0	0	1	0	68	1	0	69	0	0	0	0	0	116
Total Volume	0	241	0	0	241	7	0	0	0	7	0	329	1	0	330	0	0	0	0	0	578
% App. Total	0	100	0	0		100	0	0	0		0	99.7	0.3	0		0	0	0	0		
PHF	.000	.825	.000	.000	.825	.583	.000	.000	.000	.583	.000	.748	.250	.000	.750	.000	.000	.000	.000	.000	.785



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4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 1. W Market St @ Garber Church Rd

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Switchboard From North					W Market St From East					Garbers Church Road From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	2	16	3	0	21	50	21	4	1	76	0	4	12	0	16	18	25	2	0	45	158
07:15 AM	3	38	5	0	46	105	19	4	0	128	3	13	51	0	67	15	40	1	0	56	297
07:30 AM	6	36	5	0	47	126	20	0	0	146	3	11	88	0	102	19	52	2	1	74	369
07:45 AM	7	34	14	0	55	49	21	3	0	73	2	12	69	0	83	16	59	3	0	78	289
Total	18	124	27	0	169	330	81	11	1	423	8	40	220	0	268	68	176	8	1	253	1113
08:00 AM	4	23	18	0	45	29	16	2	0	47	7	14	17	0	38	21	49	8	0	78	208
08:15 AM	1	21	10	0	32	21	24	1	0	46	3	8	20	0	31	22	54	7	0	83	192
08:30 AM	3	29	12	0	44	27	23	2	0	52	2	15	28	0	45	16	30	3	0	49	190
08:45 AM	0	14	9	0	23	28	17	3	0	48	2	14	51	0	67	6	39	4	0	49	187
Total	8	87	49	0	144	105	80	8	0	193	14	51	116	0	181	65	172	22	0	259	777
02:00 PM	4	8	7	0	19	19	37	3	0	59	0	17	42	0	59	9	25	8	0	42	179
02:15 PM	4	7	9	0	20	36	47	4	0	87	1	12	40	0	53	9	34	1	0	44	204
02:30 PM	0	6	15	0	21	42	48	2	0	92	3	10	38	0	51	13	38	7	0	58	222
02:45 PM	3	11	14	0	28	45	49	5	0	99	4	26	39	0	69	19	35	0	0	54	250
Total	11	32	45	0	88	142	181	14	0	337	8	65	159	0	232	50	132	16	0	198	855
03:00 PM	0	16	11	0	27	37	36	1	0	74	4	23	65	0	92	12	43	3	0	58	251
03:15 PM	1	19	27	0	47	26	36	1	0	63	3	25	34	0	62	9	22	3	0	34	206
03:30 PM	1	13	10	0	24	42	35	5	0	82	4	18	38	0	60	14	33	2	0	49	215
03:45 PM	3	16	15	0	34	29	40	5	0	74	1	19	41	0	61	8	47	2	0	57	226
Total	5	64	63	0	132	134	147	12	0	293	12	85	178	0	275	43	145	10	0	198	898
04:00 PM	4	14	17	0	35	43	56	3	0	102	7	27	52	0	86	9	47	3	0	59	282
04:15 PM	2	12	15	0	29	36	55	3	0	94	6	23	62	0	91	10	39	2	0	51	265
04:30 PM	6	12	20	0	38	20	71	7	0	98	4	14	34	0	52	9	41	5	0	55	243
04:45 PM	4	14	12	0	30	28	53	4	0	85	3	25	34	0	62	16	52	6	0	74	251
Total	16	52	64	0	132	127	235	17	0	379	20	89	182	0	291	44	179	16	0	239	1041
05:00 PM	4	7	15	0	26	36	65	8	0	109	7	21	44	0	72	12	39	10	0	61	268
05:15 PM	5	17	18	0	40	33	67	5	0	105	3	27	44	0	74	8	40	3	0	51	270
05:30 PM	5	16	15	0	36	28	44	4	0	76	3	17	42	0	62	10	41	3	0	54	228
05:45 PM	1	7	10	0	18	20	47	4	1	72	4	21	34	0	59	9	26	1	0	36	185
Total	15	47	58	0	120	117	223	21	1	362	17	86	164	0	267	39	146	17	0	202	951
Grand Total	73	406	306	0	785	955	947	83	2	1987	79	416	1019	0	1514	309	950	89	1	1349	5635
Apprch %	9.3	51.7	39	0		48.1	47.7	4.2	0.1		5.2	27.5	67.3	0		22.9	70.4	6.6	0.1		
Total %	1.3	7.2	5.4	0	13.9	16.9	16.8	1.5	0	35.3	1.4	7.4	18.1	0	26.9	5.5	16.9	1.6	0	23.9	

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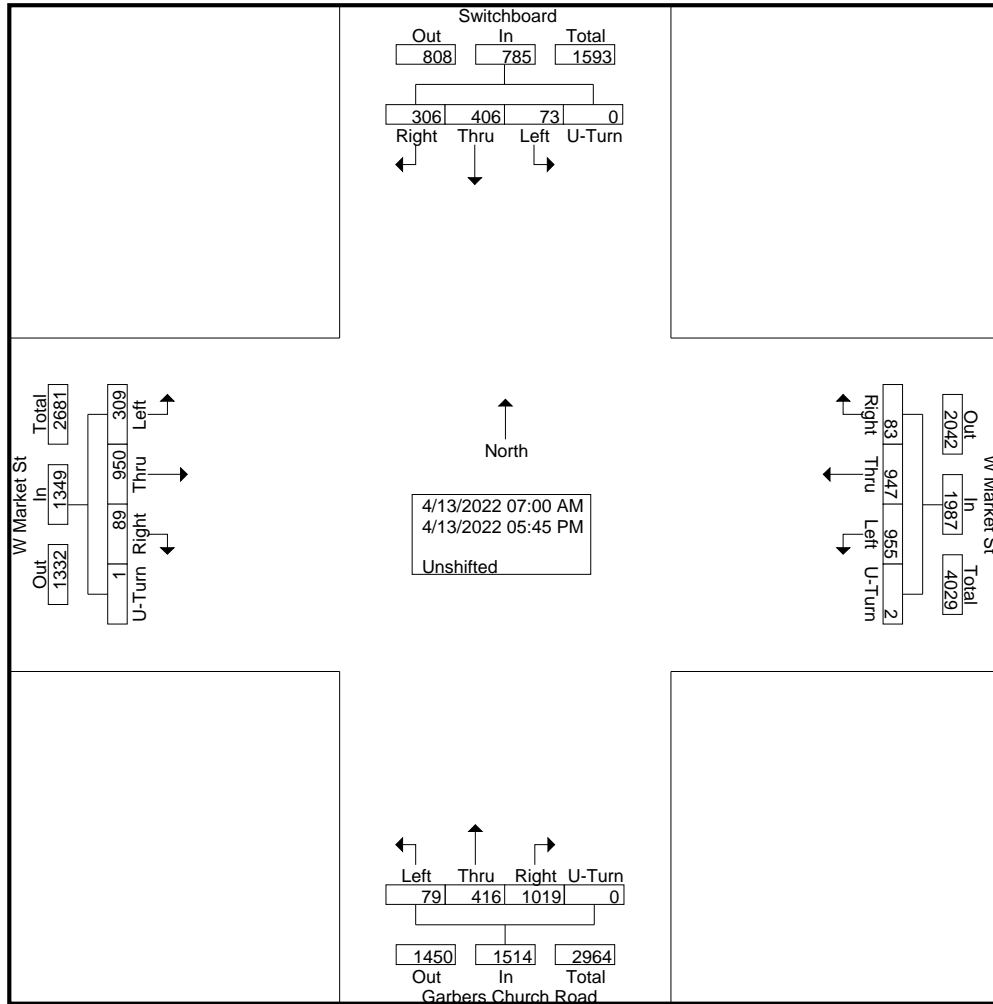
Phone: 703-914-4850

File Name : 1. W Market St @ Garber Church Rd

Site Code : J 968

Start Date : 4/13/2022

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MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

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Phone: 703-914-4850

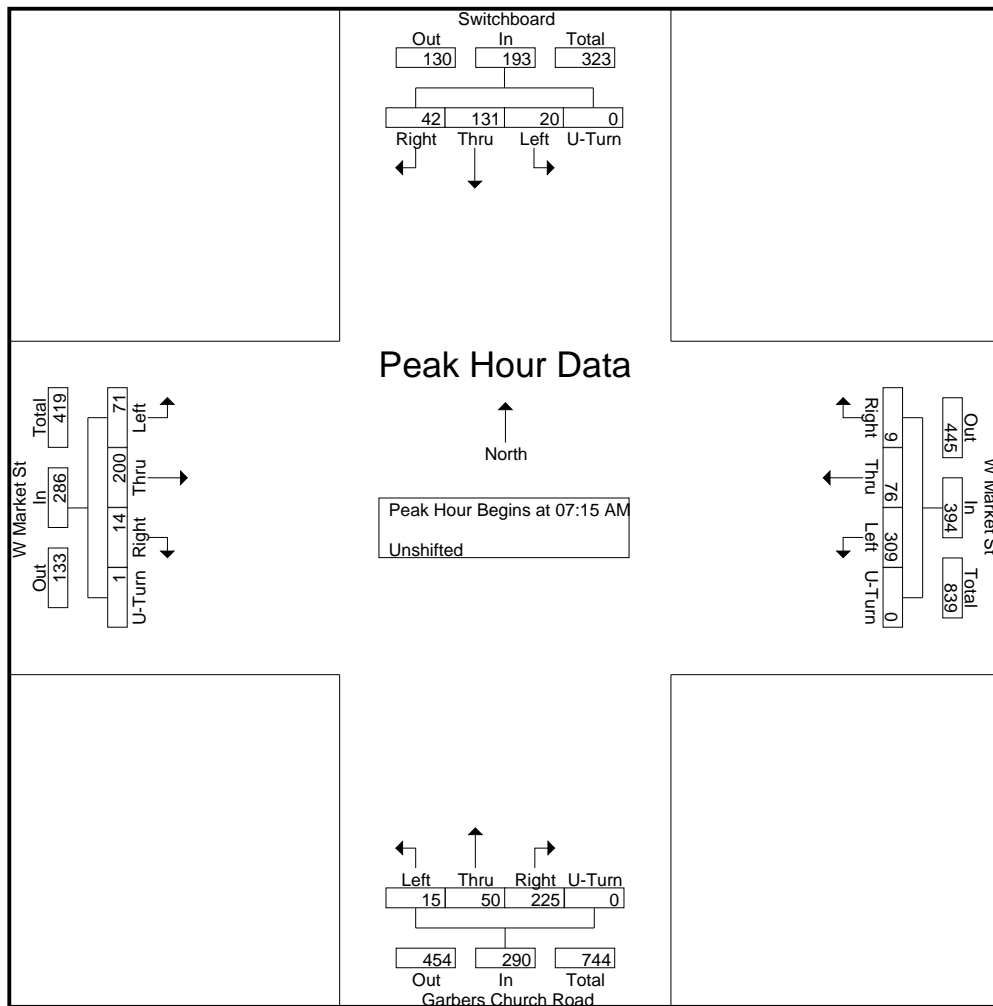
File Name : 1. W Market St @ Garber Church Rd

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	Switchboard From North					W Market St From East					Garbers Church Road From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	3	38	5	0	46	105	19	4	0	128	3	13	51	0	67	15	40	1	0	56	297
07:30 AM	6	36	5	0	47	126	20	0	0	146	3	11	88	0	102	19	52	2	1	74	369
07:45 AM	7	34	14	0	55	49	21	3	0	73	2	12	69	0	83	16	59	3	0	78	289
08:00 AM	4	23	18	0	45	29	16	2	0	47	7	14	17	0	38	21	49	8	0	78	208
Total Volume	20	131	42	0	193	309	76	9	0	394	15	50	225	0	290	71	200	14	1	286	1163
% App. Total	10.4	67.9	21.8	0		78.4	19.3	2.3	0		5.2	17.2	77.6	0		24.8	69.9	4.9	0.3		
PHF	.714	.862	.583	.000	.877	.613	.905	.563	.000	.675	.536	.893	.639	.000	.711	.845	.847	.438	.250	.917	.788



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Phone: 703-914-4850

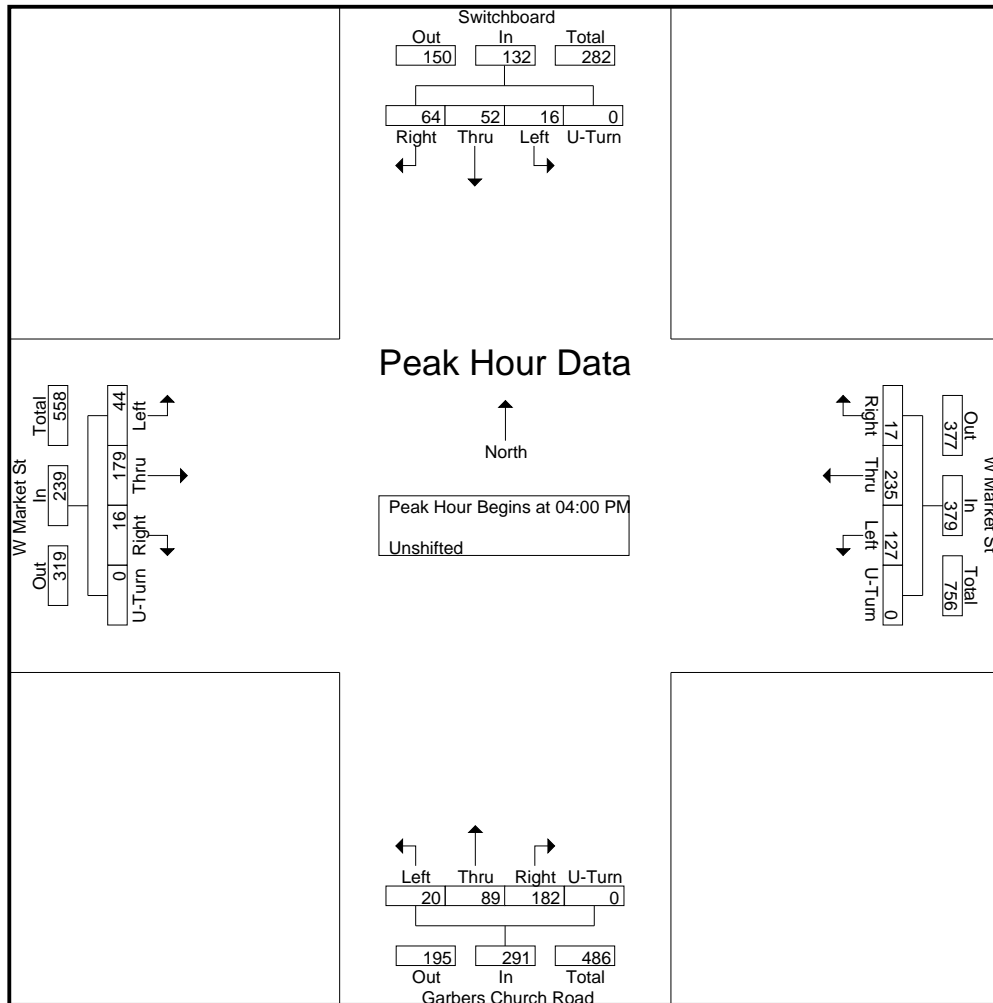
File Name : 1. W Market St @ Garber Church Rd

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Switchboard From North					W Market St From East					Garbers Church Road From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	4	14	17	0	35	43	56	3	0	102	7	27	52	0	86	9	47	3	0	59	282
04:15 PM	2	12	15	0	29	36	55	3	0	94	6	23	62	0	91	10	39	2	0	51	265
04:30 PM	6	12	20	0	38	20	71	7	0	98	4	14	34	0	52	9	41	5	0	55	243
04:45 PM	4	14	12	0	30	28	53	4	0	85	3	25	34	0	62	16	52	6	0	74	251
Total Volume	16	52	64	0	132	127	235	17	0	379	20	89	182	0	291	44	179	16	0	239	1041
% App. Total	12.1	39.4	48.5	0		33.5	62	4.5	0		6.9	30.6	62.5	0		18.4	74.9	6.7	0		
PHF	.667	.929	.800	.000	.868	.738	.827	.607	.000	.929	.714	.824	.734	.000	.799	.688	.861	.667	.000	.807	.923



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 2. W Market St @ Stoneleigh Dr

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	From North					W Market St From East					Stoneleigh Dr From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	0	0	0	0	2	74	0	0	76	2	0	7	0	9	0	40	0	0	40	125
07:15 AM	0	0	0	0	0	12	125	0	0	137	3	0	6	0	9	0	94	0	0	94	240
07:30 AM	0	0	0	0	0	7	146	0	0	153	0	0	12	0	12	0	145	1	0	146	311
07:45 AM	0	0	0	0	0	8	72	0	0	80	1	0	14	0	15	0	134	1	0	135	230
Total	0	0	0	0	0	29	417	0	0	446	6	0	39	0	45	0	413	2	0	415	906
08:00 AM	0	0	0	0	0	4	47	0	0	51	0	0	3	0	3	0	69	1	0	70	124
08:15 AM	0	0	0	0	0	1	46	0	0	47	0	0	5	0	5	0	75	0	0	75	127
08:30 AM	0	0	0	0	0	3	51	0	0	54	1	0	4	0	5	0	60	1	0	61	120
08:45 AM	0	0	0	0	0	3	48	0	0	51	0	0	4	0	4	0	90	0	0	90	145
Total	0	0	0	0	0	11	192	0	0	203	1	0	16	0	17	0	294	2	0	296	516
02:00 PM	0	0	0	0	0	7	59	0	0	66	0	0	4	0	4	0	71	0	0	71	141
02:15 PM	0	0	0	0	0	3	86	0	0	89	1	0	2	0	3	0	77	1	0	78	170
02:30 PM	0	0	0	0	0	8	92	0	0	100	0	0	6	0	6	0	76	0	0	76	182
02:45 PM	0	0	0	0	0	5	99	0	0	104	0	0	8	0	8	0	77	0	0	77	189
Total	0	0	0	0	0	23	336	0	0	359	1	0	20	0	21	0	301	1	0	302	682
03:00 PM	0	0	0	0	0	9	73	0	0	82	1	0	2	0	3	0	107	1	0	108	193
03:15 PM	0	0	0	0	0	6	62	0	0	68	1	0	3	0	4	0	57	0	0	57	129
03:30 PM	0	0	0	0	0	8	82	0	0	90	0	0	5	0	5	0	70	2	0	72	167
03:45 PM	0	0	0	0	0	5	72	0	0	77	2	0	2	0	4	0	91	0	0	91	172
Total	0	0	0	0	0	28	289	0	0	317	4	0	12	0	16	0	325	3	0	328	661
04:00 PM	0	0	0	0	0	10	101	0	0	111	1	0	5	0	6	0	102	1	0	103	220
04:15 PM	0	0	0	0	0	5	94	0	0	99	0	0	8	0	8	0	102	1	0	103	210
04:30 PM	0	0	0	0	0	6	98	0	0	104	0	0	7	0	7	0	79	2	0	81	192
04:45 PM	0	0	0	0	0	13	84	0	0	97	1	0	8	0	9	0	87	3	0	90	196
Total	0	0	0	0	0	34	377	0	0	411	2	0	28	0	30	0	370	7	0	377	818
05:00 PM	0	0	0	0	0	12	109	0	0	121	0	0	6	0	6	0	86	1	0	87	214
05:15 PM	0	0	0	0	0	10	105	0	0	115	0	0	4	0	4	0	87	2	0	89	208
05:30 PM	0	0	0	0	0	8	75	0	0	83	1	0	7	0	8	0	88	0	0	88	179
05:45 PM	0	0	0	0	0	9	71	0	0	80	1	0	5	0	6	0	62	0	0	62	148
Total	0	0	0	0	0	39	360	0	0	399	2	0	22	0	24	0	323	3	0	326	749
Grand Total	0	0	0	0	0	164	1971	0	0	2135	16	0	137	0	153	0	2026	18	0	2044	4332
Apprch %	0	0	0	0	0	7.7	92.3	0	0	49.3	10.5	0	89.5	0	3.5	0	99.1	0.9	0	47.2	
Total %	0	0	0	0	0	3.8	45.5	0	0	49.3	0.4	0	3.2	0	3.5	0	46.8	0.4	0	47.2	

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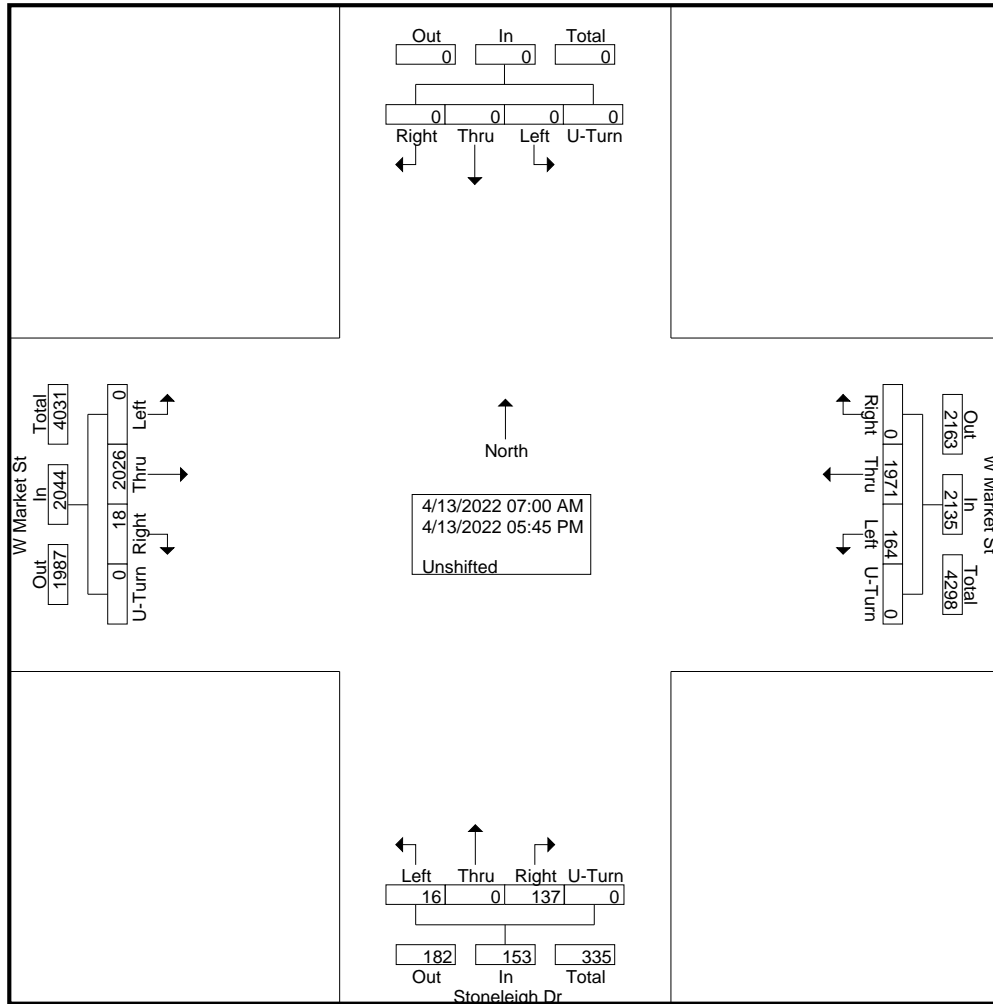
Phone: 703-914-4850

File Name : 2. W Market St @ Stoneleigh Dr

Site Code : J 968

Start Date : 4/13/2022

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4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

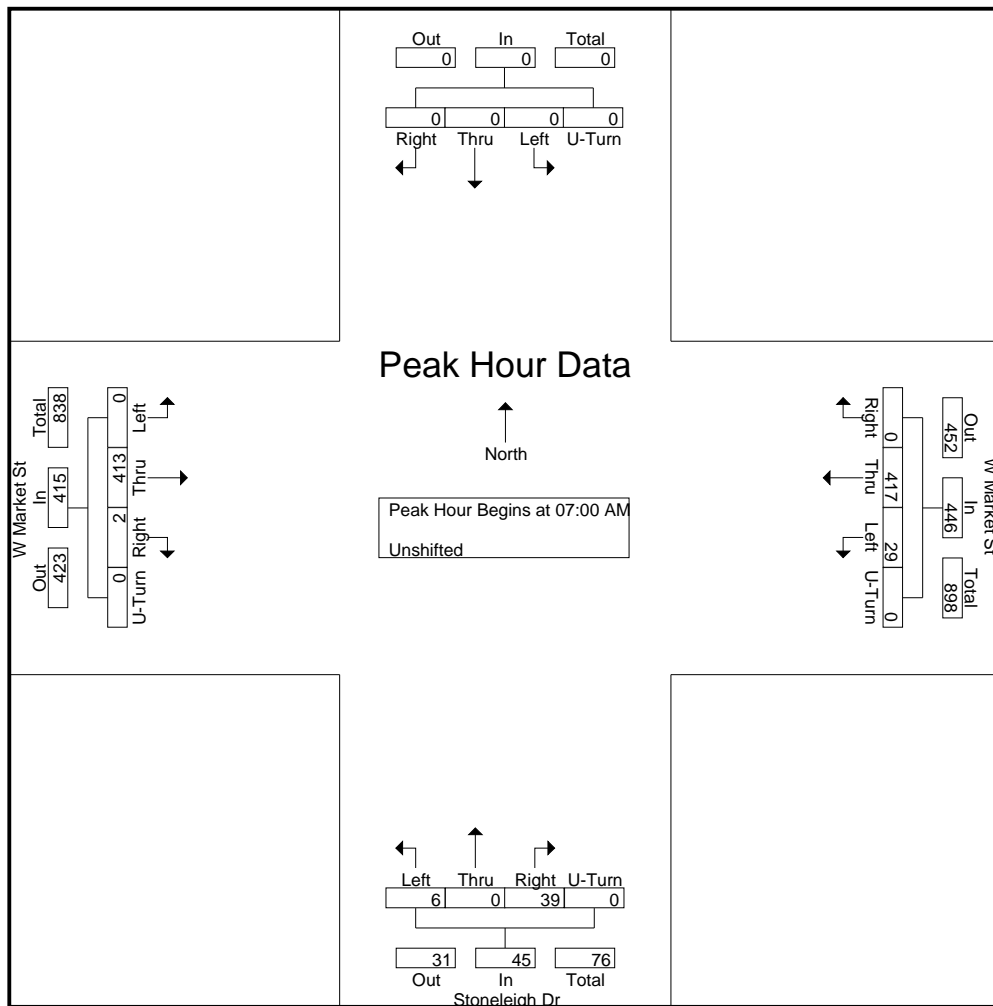
File Name : 2. W Market St @ Stoneleigh Dr

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	From North					W Market St From East					Stoneleigh Dr From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	2	74	0	0	76	2	0	7	0	9	0	40	0	0	40	125
07:15 AM	0	0	0	0	0	12	125	0	0	137	3	0	6	0	9	0	94	0	0	94	240
07:30 AM	0	0	0	0	0	7	146	0	0	153	0	0	12	0	12	0	145	1	0	146	311
07:45 AM	0	0	0	0	0	8	72	0	0	80	1	0	14	0	15	0	134	1	0	135	230
Total Volume	0	0	0	0	0	29	417	0	0	446	6	0	39	0	45	0	413	2	0	415	906
% App. Total	0	0	0	0	0	6.5	93.5	0	0		13.3	0	86.7	0		0	99.5	0.5	0		
PHF	.000	.000	.000	.000	.000	.604	.714	.000	.000	.729	.500	.000	.696	.000	.750	.000	.712	.500	.000	.711	.728



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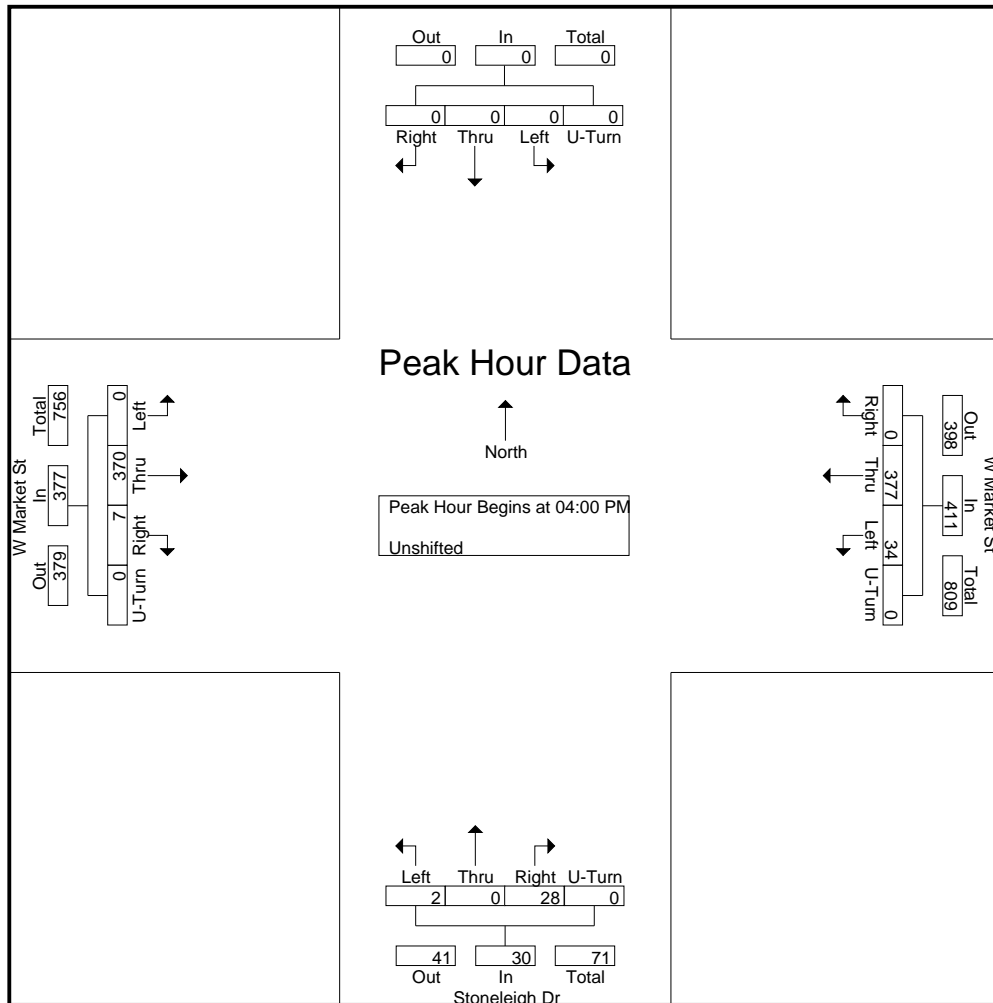
File Name : 2. W Market St @ Stoneleigh Dr

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	From North					W Market St From East					Stoneleigh Dr From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	10	101	0	0	111	1	0	5	0	6	0	102	1	0	103	220
04:15 PM	0	0	0	0	0	5	94	0	0	99	0	0	8	0	8	0	102	1	0	103	210
04:30 PM	0	0	0	0	0	6	98	0	0	104	0	0	7	0	7	0	79	2	0	81	192
04:45 PM	0	0	0	0	0	13	84	0	0	97	1	0	8	0	9	0	87	3	0	90	196
Total Volume	0	0	0	0	0	34	377	0	0	411	2	0	28	0	30	0	370	7	0	377	818
% App. Total	0	0	0	0	0	8.3	91.7	0	0		6.7	0	93.3	0		0	98.1	1.9	0		
PHF	.000	.000	.000	.000	.000	.654	.933	.000	.000	.926	.500	.000	.875	.000	.833	.000	.907	.583	.000	.915	.930



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Phone: 703-914-4850

File Name : 3. W Market St @ THMS & Westfield Ct

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Westfield Ct From North					W Market St From East					THM School From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	3	0	2	0	5	5	74	2	0	81	0	0	0	0	0	0	44	3	0	47	133
07:15 AM	9	0	10	0	19	22	130	2	0	154	2	0	1	0	3	2	84	12	0	98	274
07:30 AM	5	1	9	0	15	40	137	1	0	178	4	0	19	0	23	3	120	29	0	152	368
07:45 AM	5	8	9	0	22	69	53	4	0	126	21	4	63	0	88	3	114	30	0	147	383
Total	22	9	30	0	61	136	394	9	0	539	27	4	83	0	114	8	362	74	0	444	1158
08:00 AM	4	1	0	0	5	29	40	0	0	69	9	1	40	0	50	0	73	9	1	83	207
08:15 AM	3	0	3	0	6	8	46	1	0	55	1	0	7	0	8	2	74	1	0	77	146
08:30 AM	5	0	6	0	11	1	48	0	0	49	1	0	3	0	4	5	65	1	0	71	135
08:45 AM	3	0	4	0	7	1	46	2	0	49	0	0	1	0	1	2	94	1	0	97	154
Total	15	1	13	0	29	39	180	3	0	222	11	1	51	0	63	9	306	12	1	328	642
02:00 PM	7	1	4	0	12	21	59	4	0	84	1	0	3	0	4	5	65	6	1	77	177
02:15 PM	3	2	5	0	10	25	78	1	0	104	10	6	40	0	56	5	69	4	0	78	248
02:30 PM	2	0	4	0	6	4	88	1	0	93	7	0	26	0	33	8	77	1	1	87	219
02:45 PM	6	0	11	0	17	6	90	7	0	103	2	0	10	0	12	5	81	0	0	86	218
Total	18	3	24	0	45	56	315	13	0	384	20	6	79	0	105	23	292	11	2	328	862
03:00 PM	5	0	2	0	7	5	75	4	1	85	1	0	9	0	10	9	99	1	1	110	212
03:15 PM	4	0	5	0	9	4	68	7	0	79	4	0	15	0	19	7	53	1	0	61	168
03:30 PM	4	1	7	0	12	4	82	4	0	90	1	0	16	0	17	3	80	1	1	85	204
03:45 PM	2	0	2	0	4	14	79	4	0	97	4	0	13	0	17	6	82	2	0	90	208
Total	15	1	16	0	32	27	304	19	1	351	10	0	53	0	63	25	314	5	2	346	792
04:00 PM	6	0	0	0	6	10	94	3	0	107	8	1	25	0	34	5	93	5	1	104	251
04:15 PM	9	0	1	0	10	7	92	6	0	105	9	1	17	0	27	8	103	4	0	115	257
04:30 PM	3	0	5	0	8	7	103	4	0	114	0	1	7	0	8	5	76	3	0	84	214
04:45 PM	5	0	7	0	12	9	84	4	0	97	1	0	10	0	11	3	90	3	0	96	216
Total	23	0	13	0	36	33	373	17	0	423	18	3	59	0	80	21	362	15	1	399	938
05:00 PM	7	0	5	0	12	3	120	7	0	130	4	0	15	0	19	4	84	2	0	90	251
05:15 PM	6	0	4	0	10	0	105	5	0	110	0	0	3	0	3	8	83	0	0	91	214
05:30 PM	5	1	1	0	7	0	91	4	0	95	0	0	1	0	1	5	86	2	0	93	196
05:45 PM	5	0	6	0	11	0	63	8	0	71	0	0	3	0	3	4	62	0	1	67	152
Total	23	1	16	0	40	3	379	24	0	406	4	0	22	0	26	21	315	4	1	341	813
Grand Total	116	15	112	0	243	294	1945	85	1	2325	90	14	347	0	451	107	1951	121	7	2186	5205
Apprch %	47.7	6.2	46.1	0		12.6	83.7	3.7	0		20	3.1	76.9	0		4.9	89.2	5.5	0.3		
Total %	2.2	0.3	2.2	0	4.7	5.6	37.4	1.6	0	44.7	1.7	0.3	6.7	0	8.7	2.1	37.5	2.3	0.1	42	

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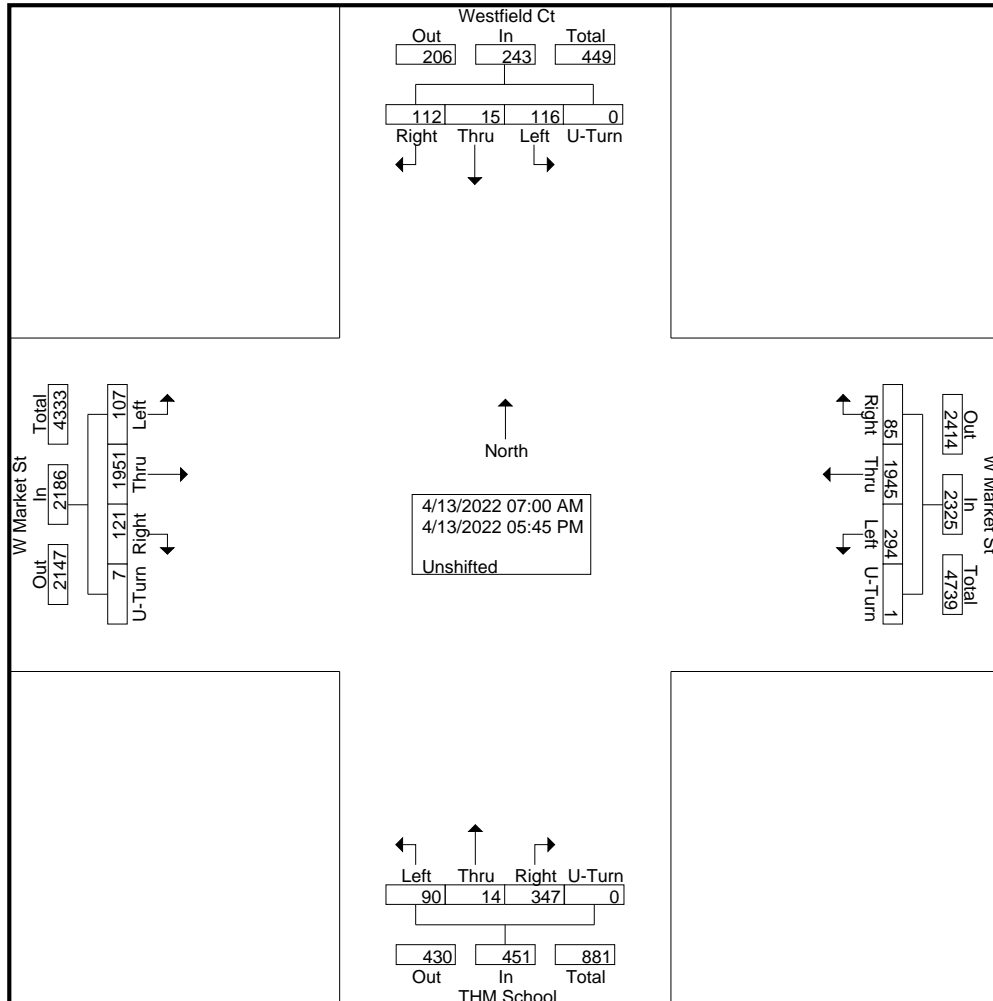
Phone: 703-914-4850

File Name : 3. W Market St @ THMS & Westfield Ct

Site Code : J 968

Start Date : 4/13/2022

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MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

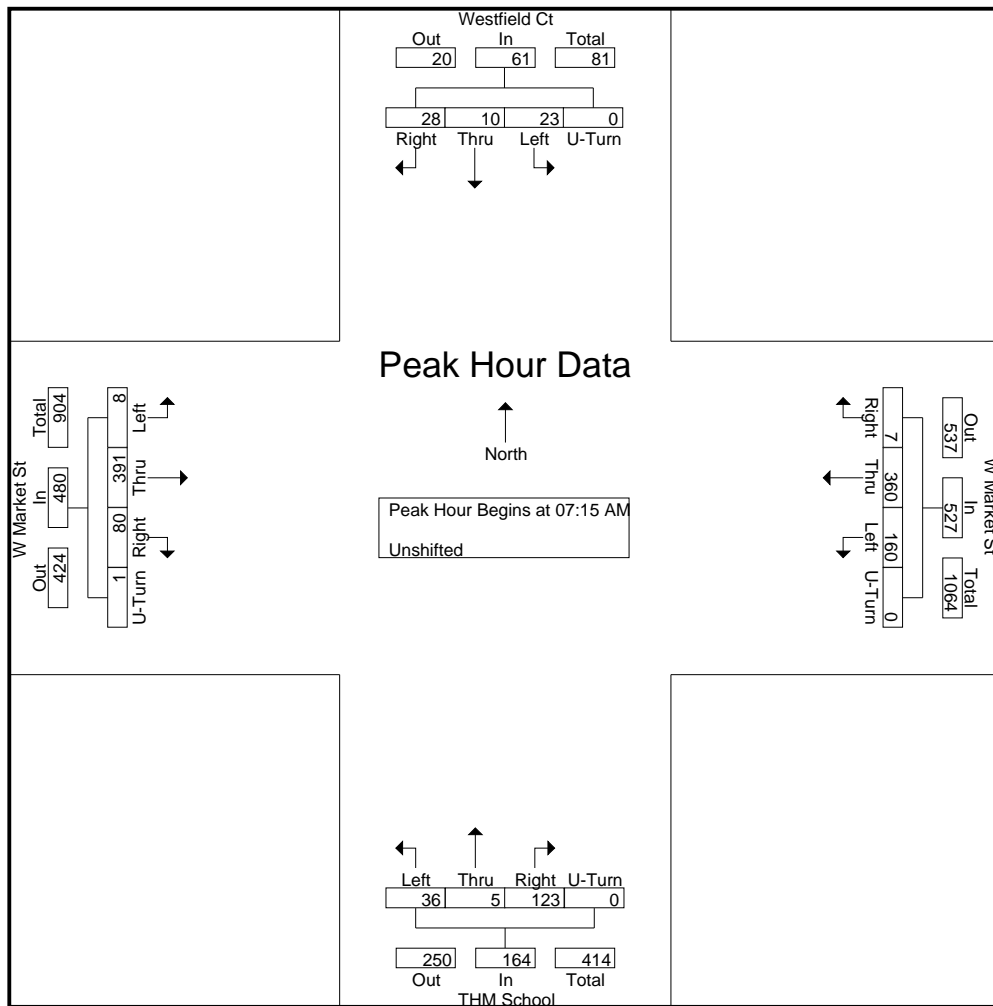
File Name : 3. W Market St @ THMS & Westfield Ct

Site Code : J 968

Start Date : 4/13/2022

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Start Time	Westfield Ct From North					W Market St From East					THM School From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	9	0	10	0	19	22	130	2	0	154	2	0	1	0	3	2	84	12	0	98	274
07:30 AM	5	1	9	0	15	40	137	1	0	178	4	0	19	0	23	3	120	29	0	152	368
07:45 AM	5	8	9	0	22	69	53	4	0	126	21	4	63	0	88	3	114	30	0	147	383
08:00 AM	4	1	0	0	5	29	40	0	0	69	9	1	40	0	50	0	73	9	1	83	207
Total Volume	23	10	28	0	61	160	360	7	0	527	36	5	123	0	164	8	391	80	1	480	1232
% App. Total	37.7	16.4	45.9	0		30.4	68.3	1.3	0		22	3	75	0		1.7	81.5	16.7	0.2		
PHF	.639	.313	.700	.000	.693	.580	.657	.438	.000	.740	.429	.313	.488	.000	.466	.667	.815	.667	.250	.789	.804



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Phone: 703-914-4850

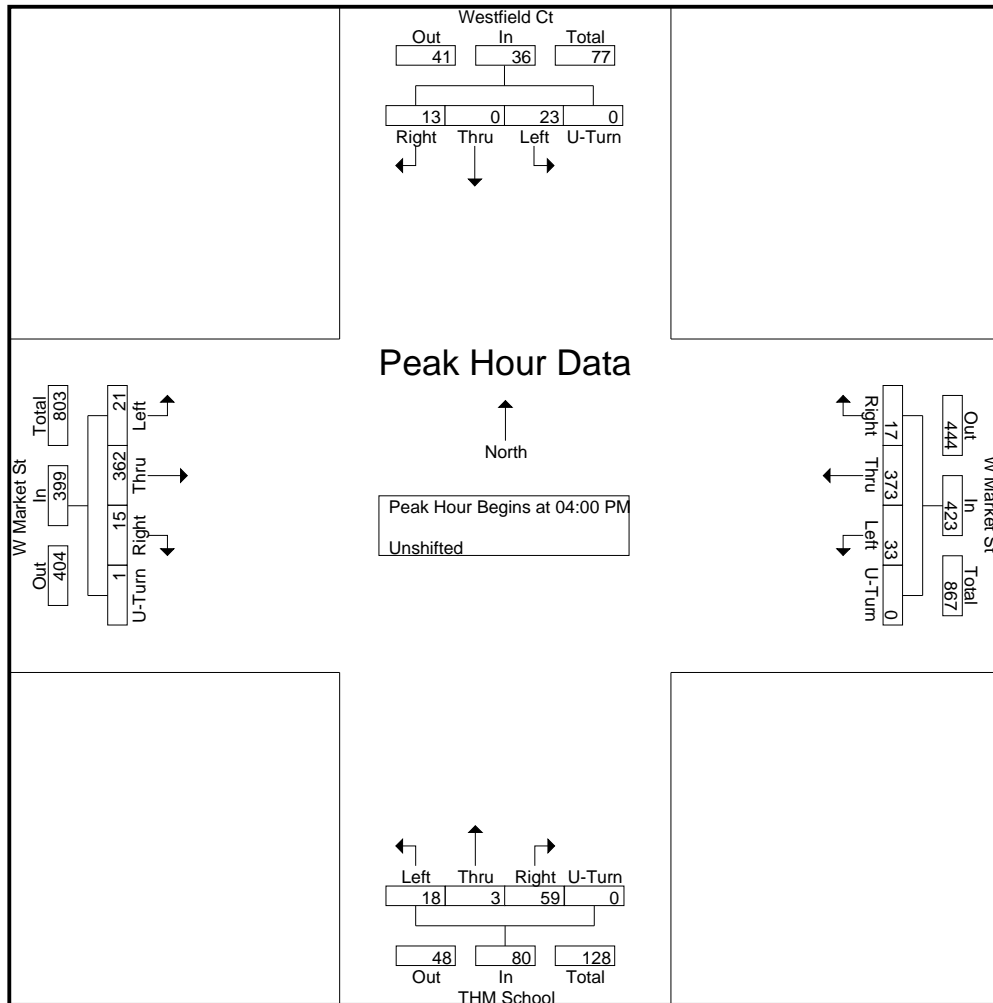
File Name : 3. W Market St @ THMS & Westfield Ct

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Westfield Ct From North					W Market St From East					THM School From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	6	0	0	0	6	10	94	3	0	107	8	1	25	0	34	5	93	5	1	104	251
04:15 PM	9	0	1	0	10	7	92	6	0	105	9	1	17	0	27	8	103	4	0	115	257
04:30 PM	3	0	5	0	8	7	103	4	0	114	0	1	7	0	8	5	76	3	0	84	214
04:45 PM	5	0	7	0	12	9	84	4	0	97	1	0	10	0	11	3	90	3	0	96	216
Total Volume	23	0	13	0	36	33	373	17	0	423	18	3	59	0	80	21	362	15	1	399	938
% App. Total	63.9	0	36.1	0		7.8	88.2	4	0		22.5	3.8	73.8	0		5.3	90.7	3.8	0.3		
PHF	.639	.000	.464	.000	.750	.825	.905	.708	.000	.928	.500	.750	.590	.000	.588	.656	.879	.750	.250	.867	.912



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 4. W. Market St @ Brickstone Ct

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Brickstone Ct From North					W Market St From East					From South					Brickstone Ct From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	2	0	0	0	2	0	80	1	0	81	0	0	0	0	0	0	49	0	0	49	132
07:15 AM	5	0	0	0	5	0	155	4	0	159	0	0	0	0	0	1	90	0	0	91	255
07:30 AM	3	0	0	0	3	0	183	1	0	184	0	0	0	0	0	1	128	0	0	129	316
07:45 AM	6	0	0	0	6	0	121	4	1	126	0	0	0	0	0	1	186	0	0	187	319
Total	16	0	0	0	16	0	539	10	1	550	0	0	0	0	0	3	453	0	0	456	1022
08:00 AM	7	0	0	0	7	0	69	3	1	73	0	0	0	0	0	2	116	0	0	118	198
08:15 AM	8	0	0	0	8	0	56	5	0	61	0	0	0	0	0	0	91	0	0	91	160
08:30 AM	4	0	0	0	4	0	49	0	1	50	0	0	0	0	0	0	73	0	0	73	127
08:45 AM	2	0	0	0	2	0	49	2	0	51	0	0	0	0	0	1	94	0	0	95	148
Total	21	0	0	0	21	0	223	10	2	235	0	0	0	0	0	3	374	0	0	377	633
02:00 PM	2	0	2	0	4	0	84	8	0	92	0	0	0	0	0	2	88	0	0	90	186
02:15 PM	2	0	1	0	3	0	105	7	0	112	0	0	0	0	0	1	100	0	0	101	216
02:30 PM	4	0	1	0	5	0	89	8	2	99	0	0	0	0	0	0	108	0	0	108	212
02:45 PM	8	0	1	0	9	0	102	11	1	114	0	0	0	0	0	0	92	0	0	92	215
Total	16	0	5	0	21	0	380	34	3	417	0	0	0	0	0	3	388	0	0	391	829
03:00 PM	3	0	0	0	3	0	91	3	2	96	0	0	0	0	0	0	124	0	0	124	223
03:15 PM	3	0	0	0	3	0	78	5	0	83	0	0	0	0	0	2	70	0	0	72	158
03:30 PM	8	0	0	0	8	0	89	6	0	95	0	0	0	0	0	2	97	0	0	99	202
03:45 PM	2	0	1	0	3	0	96	9	0	105	0	0	0	0	0	2	90	0	0	92	200
Total	16	0	1	0	17	0	354	23	2	379	0	0	0	0	0	6	381	0	0	387	783
04:00 PM	5	0	2	0	7	0	113	3	0	116	0	0	0	0	0	0	122	0	0	122	245
04:15 PM	3	0	0	0	3	0	103	4	0	107	0	0	0	0	0	1	132	0	0	133	243
04:30 PM	10	0	0	0	10	0	110	7	0	117	0	0	0	0	0	0	88	0	0	88	215
04:45 PM	5	0	0	0	5	0	102	12	0	114	0	0	0	0	0	1	106	0	0	107	226
Total	23	0	2	0	25	0	428	26	0	454	0	0	0	0	0	2	448	0	0	450	929
05:00 PM	4	0	0	0	4	0	126	11	0	137	0	0	0	0	0	1	100	0	0	101	242
05:15 PM	10	0	0	0	10	0	118	12	0	130	0	0	0	0	0	0	95	0	1	96	236
05:30 PM	6	0	0	0	6	0	91	8	1	100	0	0	0	0	0	1	99	0	0	100	206
05:45 PM	7	0	0	0	7	0	77	9	0	86	0	0	0	0	0	0	70	0	0	70	163
Total	27	0	0	0	27	0	412	40	1	453	0	0	0	0	0	2	364	0	1	367	847
Grand Total	119	0	8	0	127	0	2336	143	9	2488	0	0	0	0	0	19	2408	0	1	2428	5043
Apprch %	93.7	0	6.3	0		0	93.9	5.7	0.4		0	0	0	0	0	0.8	99.2	0	0		
Total %	2.4	0	0.2	0	2.5	0	46.3	2.8	0.2	49.3	0	0	0	0	0	0.4	47.7	0	0	48.1	

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4605-C Pinecrest Office Park Dr

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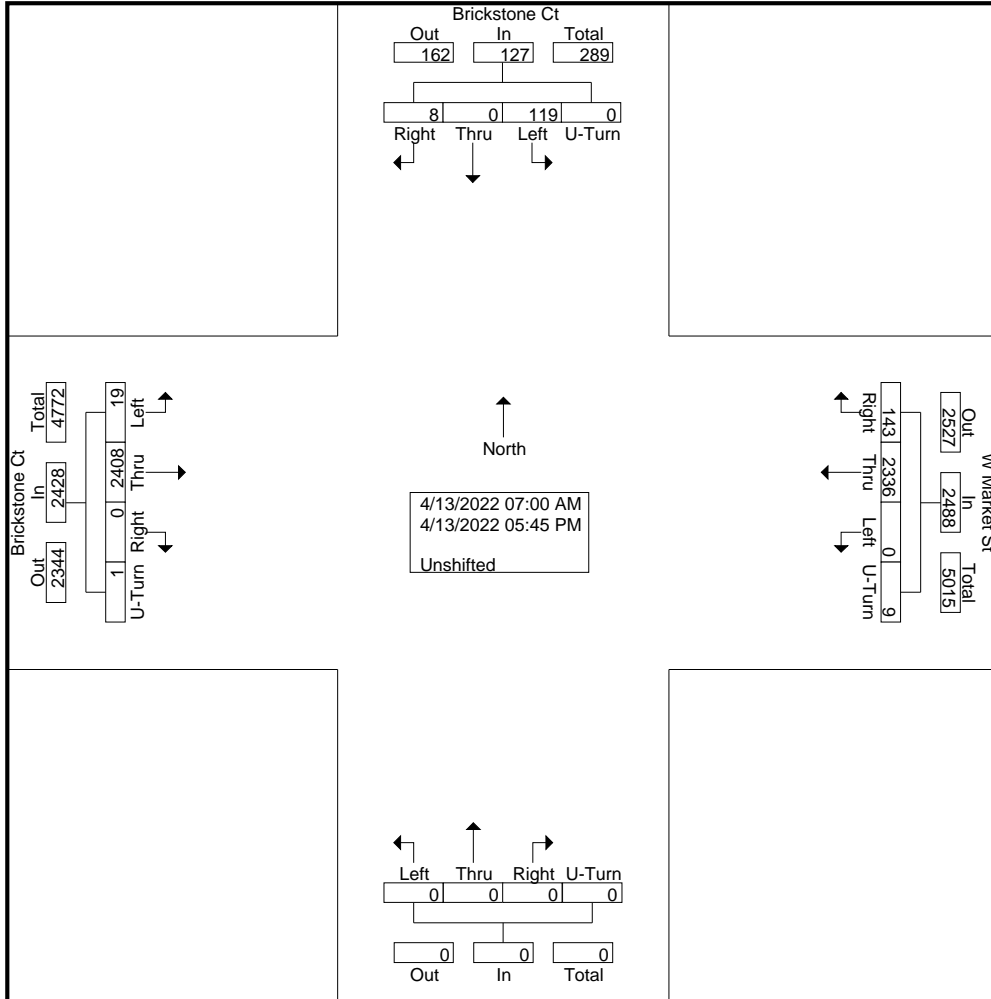
Phone: 703-914-4850

File Name : 4. W. Market St @ Brickstone Ct

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



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Phone: 703-914-4850

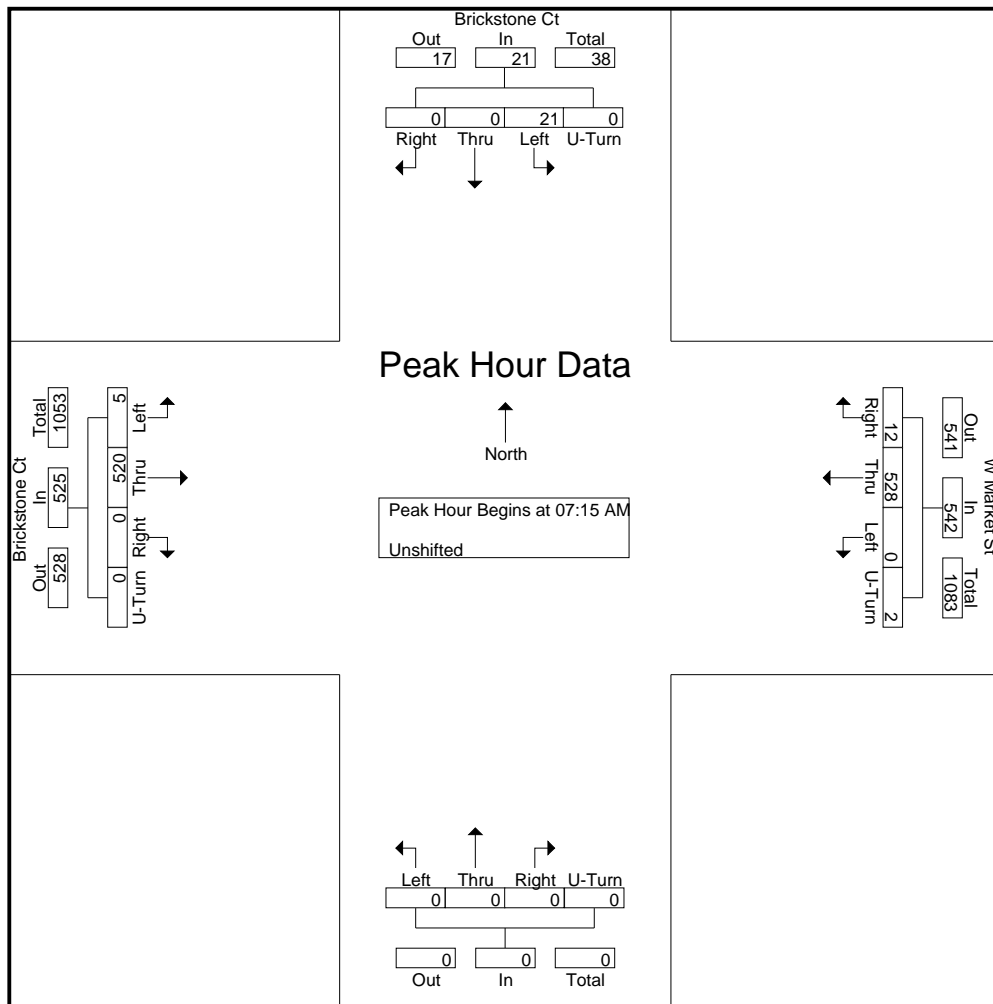
File Name : 4. W. Market St @ Brickstone Ct

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	Brickstone Ct From North					W Market St From East					From South					Brickstone Ct From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	5	0	0	0	5	0	155	4	0	159	0	0	0	0	0	1	90	0	0	91	255
07:30 AM	3	0	0	0	3	0	183	1	0	184	0	0	0	0	0	1	128	0	0	129	316
07:45 AM	6	0	0	0	6	0	121	4	1	126	0	0	0	0	0	1	186	0	0	187	319
08:00 AM	7	0	0	0	7	0	69	3	1	73	0	0	0	0	0	2	116	0	0	118	198
Total Volume	21	0	0	0	21	0	528	12	2	542	0	0	0	0	0	5	520	0	0	525	1088
% App. Total	100	0	0	0		0	97.4	2.2	0.4		0	0	0	0		1	99	0	0		
PHF	.750	.000	.000	.000	.750	.000	.721	.750	.500	.736	.000	.000	.000	.000	.000	.625	.699	.000	.000	.702	.853



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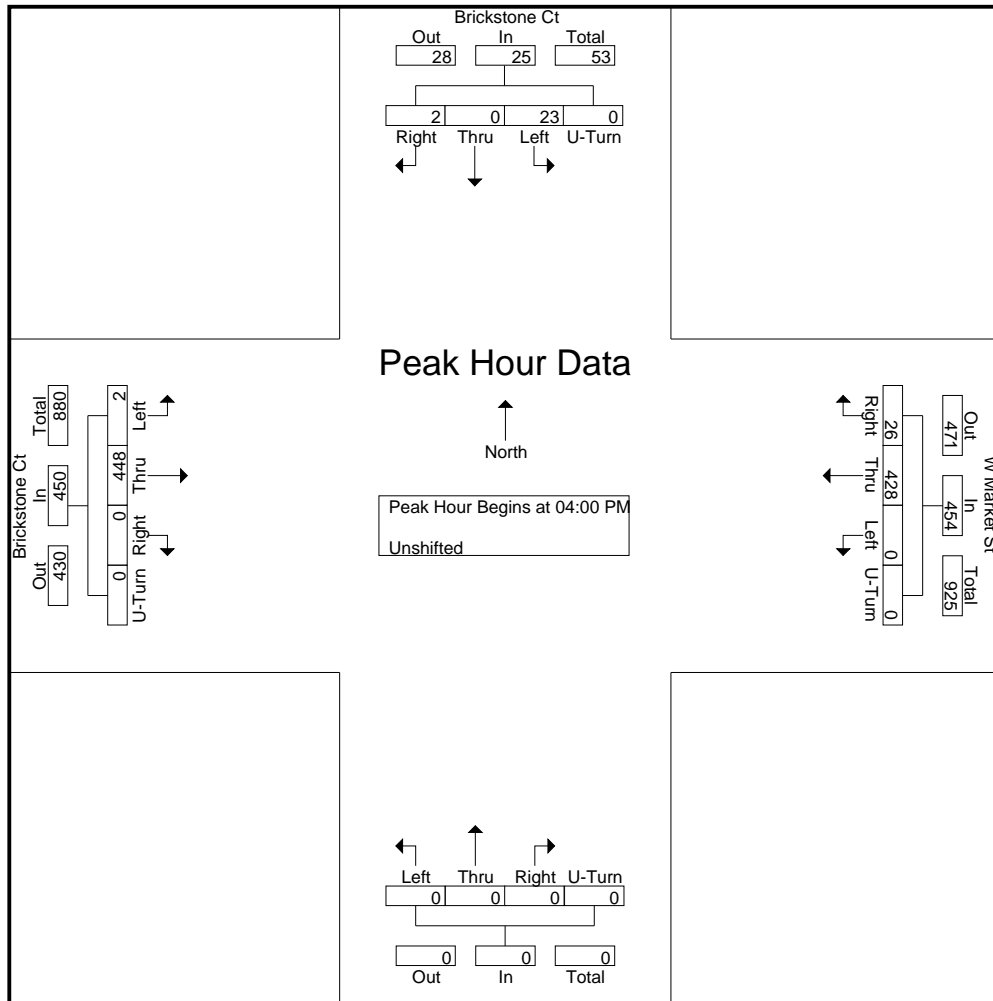
File Name : 4. W. Market St @ Brickstone Ct

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Brickstone Ct From North					W Market St From East					From South					Brickstone Ct From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	5	0	2	0	7	0	113	3	0	116	0	0	0	0	0	0	122	0	0	122	245
04:15 PM	3	0	0	0	3	0	103	4	0	107	0	0	0	0	0	1	132	0	0	133	243
04:30 PM	10	0	0	0	10	0	110	7	0	117	0	0	0	0	0	0	88	0	0	88	215
04:45 PM	5	0	0	0	5	0	102	12	0	114	0	0	0	0	0	1	106	0	0	107	226
Total Volume	23	0	2	0	25	0	428	26	0	454	0	0	0	0	0	2	448	0	0	450	929
% App. Total	92	0	8	0		0	94.3	5.7	0		0	0	0	0		0.4	99.6	0	0		
PHF	.575	.000	.250	.000	.625	.000	.947	.542	.000	.970	.000	.000	.000	.000	.000	.500	.848	.000	.000	.846	.948



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File Name : 5. W Market St @ Waterman Drive

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Waterman Drive From North					W Market St From East					From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	13	0	16	0	29	0	77	13	0	90	0	0	0	0	0	6	43	0	0	49	168
07:15 AM	15	0	38	0	53	0	140	14	0	154	0	0	0	0	0	19	79	0	0	98	305
07:30 AM	13	0	41	0	54	0	141	10	0	151	0	0	0	0	0	25	104	0	0	129	334
07:45 AM	17	0	31	0	48	2	87	16	0	105	0	1	0	0	1	32	154	0	0	186	340
Total	58	0	126	0	184	2	445	53	0	500	0	1	0	0	1	82	380	0	0	462	1147
08:00 AM	11	0	20	0	31	0	56	19	0	75	0	0	0	0	0	25	106	0	0	131	237
08:15 AM	18	0	24	0	42	0	43	17	0	60	0	0	0	0	0	25	80	0	0	105	207
08:30 AM	15	0	21	0	36	0	41	21	0	62	0	0	0	0	0	20	68	0	0	88	186
08:45 AM	19	0	21	0	40	1	39	17	0	57	0	1	1	0	2	20	77	0	0	97	196
Total	63	0	86	0	149	1	179	74	0	254	0	1	1	0	2	90	331	0	0	421	826
02:00 PM	19	0	16	0	35	0	77	33	0	110	0	0	0	0	0	21	78	0	0	99	244
02:15 PM	18	0	17	0	35	0	95	12	0	107	0	0	0	0	0	24	84	0	0	108	250
02:30 PM	30	0	25	0	55	0	82	21	0	103	0	0	0	0	0	23	106	0	0	129	287
02:45 PM	15	0	21	0	36	0	85	16	0	101	0	0	0	0	0	10	96	0	0	106	243
Total	82	0	79	0	161	0	339	82	0	421	0	0	0	0	0	78	364	0	0	442	1024
03:00 PM	12	0	27	0	39	0	84	24	0	108	0	0	0	0	0	27	114	0	0	141	288
03:15 PM	22	0	28	0	50	0	77	26	0	103	0	0	0	0	0	16	95	0	0	111	264
03:30 PM	14	0	20	0	34	0	81	11	0	92	0	0	0	0	0	21	81	0	0	102	228
03:45 PM	17	0	31	0	48	0	75	24	0	99	0	0	0	0	0	20	75	0	0	95	242
Total	65	0	106	0	171	0	317	85	0	402	0	0	0	0	0	84	365	0	0	449	1022
04:00 PM	30	0	44	0	74	0	124	22	0	146	0	0	0	0	0	29	90	0	0	119	339
04:15 PM	16	0	43	0	59	0	137	18	0	155	0	0	0	0	0	24	103	0	0	127	341
04:30 PM	29	0	41	0	70	0	132	25	0	157	0	0	0	0	0	22	68	0	0	90	317
04:45 PM	24	0	27	0	51	0	109	19	0	128	0	0	0	0	0	14	78	0	0	92	271
Total	99	0	155	0	254	0	502	84	0	586	0	0	0	0	0	89	339	0	0	428	1268
05:00 PM	20	0	34	0	54	0	122	23	0	145	0	0	0	0	0	23	85	0	0	108	307
05:15 PM	15	0	36	0	51	0	128	19	0	147	0	0	0	0	0	22	96	0	0	118	316
05:30 PM	21	0	22	0	43	0	89	16	0	105	0	0	0	0	0	22	78	0	0	100	248
05:45 PM	20	0	18	0	38	0	79	18	0	97	0	0	0	0	0	19	82	0	0	101	236
Total	76	0	110	0	186	0	418	76	0	494	0	0	0	0	0	86	341	0	0	427	1107
Grand Total	443	0	662	0	1105	3	2200	454	0	2657	0	2	1	0	3	509	2120	0	0	2629	6394
Apprch %	40.1	0	59.9	0		0.1	82.8	17.1	0		0	66.7	33.3	0		19.4	80.6	0	0		
Total %	6.9	0	10.4	0	17.3	0	34.4	7.1	0	41.6	0	0	0	0	0	8	33.2	0	0	41.1	

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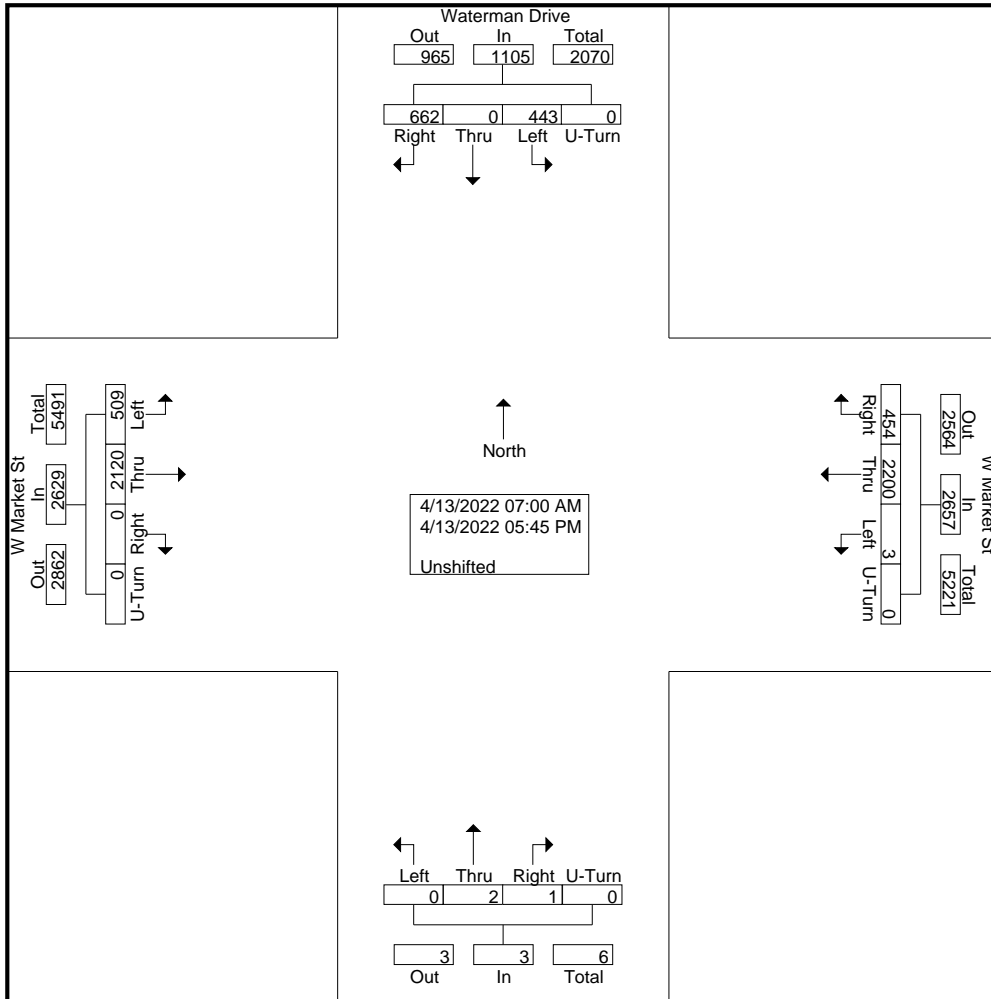
Phone: 703-914-4850

File Name : 5. W Market St @ Waterman Drive

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



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Alexandria, VA - 22312

Phone: 703-914-4850

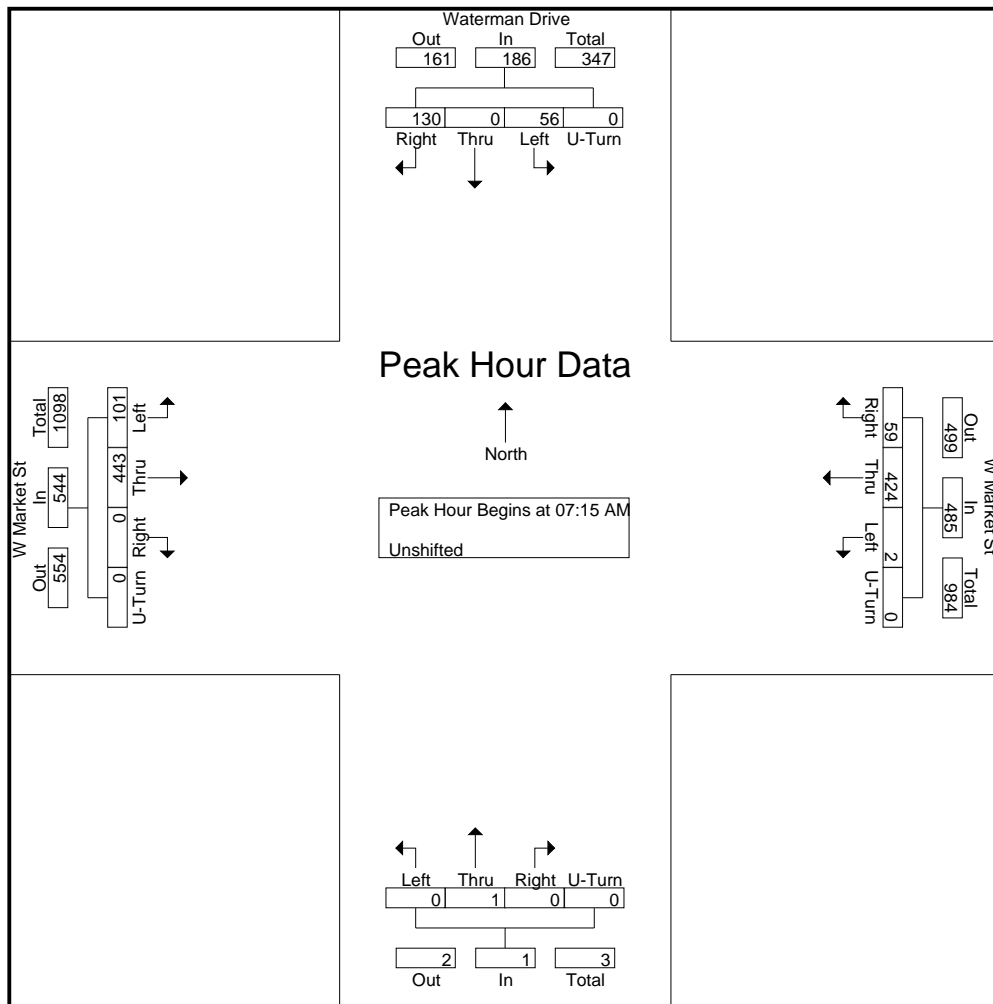
File Name : 5. W Market St @ Waterman Drive

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	Waterman Drive From North					W Market St From East					From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	15	0	38	0	53	0	140	14	0	154	0	0	0	0	0	19	79	0	0	98	305
07:30 AM	13	0	41	0	54	0	141	10	0	151	0	0	0	0	0	25	104	0	0	129	334
07:45 AM	17	0	31	0	48	2	87	16	0	105	0	1	0	0	1	32	154	0	0	186	340
08:00 AM	11	0	20	0	31	0	56	19	0	75	0	0	0	0	0	25	106	0	0	131	237
Total Volume	56	0	130	0	186	2	424	59	0	485	0	1	0	0	1	101	443	0	0	544	1216
% App. Total	30.1	0	69.9	0		0.4	87.4	12.2	0		0	100	0	0		18.6	81.4	0	0		
PHF	.824	.000	.793	.000	.861	.250	.752	.776	.000	.787	.000	.250	.000	.000	.250	.789	.719	.000	.000	.731	.894



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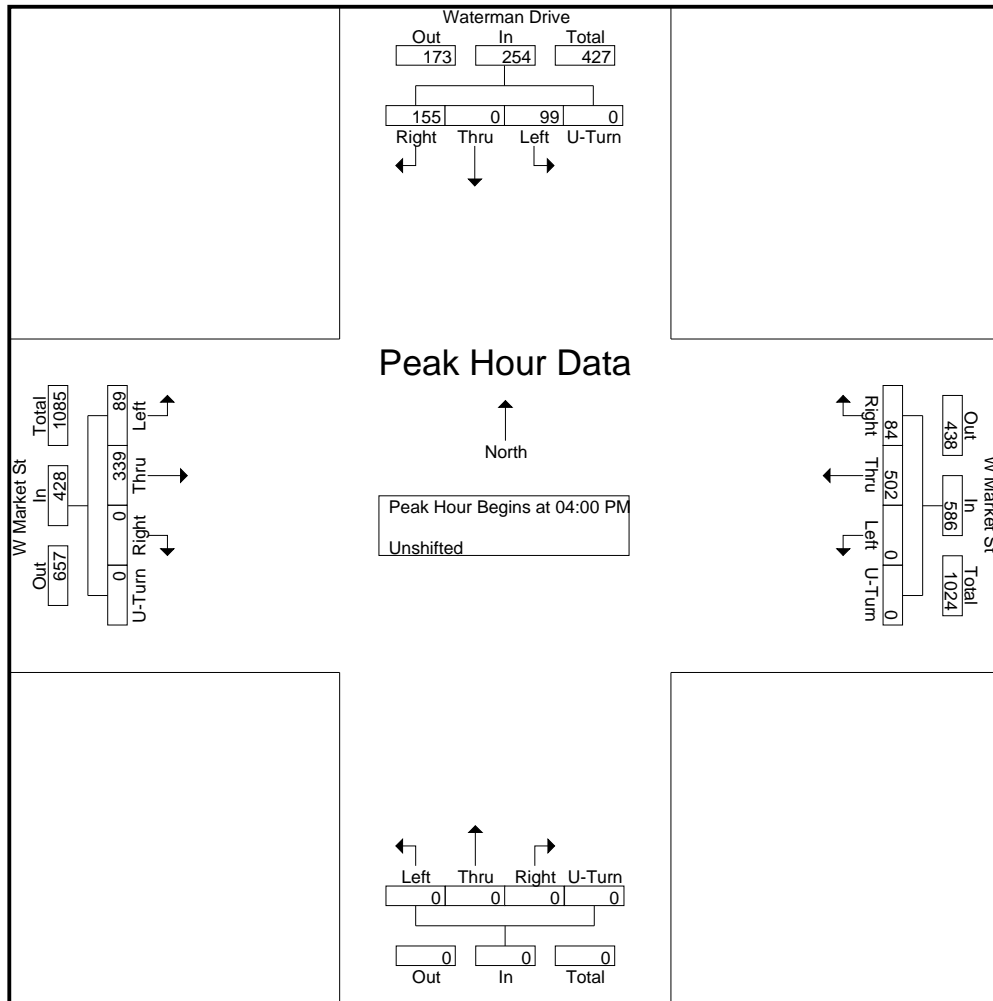
File Name : 5. W Market St @ Waterman Drive

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Waterman Drive From North					W Market St From East					From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	30	0	44	0	74	0	124	22	0	146	0	0	0	0	0	29	90	0	0	119	339
04:15 PM	16	0	43	0	59	0	137	18	0	155	0	0	0	0	0	24	103	0	0	127	341
04:30 PM	29	0	41	0	70	0	132	25	0	157	0	0	0	0	0	22	68	0	0	90	317
04:45 PM	24	0	27	0	51	0	109	19	0	128	0	0	0	0	0	14	78	0	0	92	271
Total Volume	99	0	155	0	254	0	502	84	0	586	0	0	0	0	0	89	339	0	0	428	1268
% App. Total	39	0	61	0		0	85.7	14.3	0		0	0	0	0		20.8	79.2	0	0		
PHF	.825	.000	.881	.000	.858	.000	.916	.840	.000	.933	.000	.000	.000	.000	.000	.767	.823	.000	.000	.843	.930



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 6. W Market St @ Dogwood Dr

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	N Dogwood Dr From North					W Market St From East					S Dogwood Dr From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	3	9	0	12	0	66	1	0	67	14	1	2	0	17	1	42	7	1	51	147
07:15 AM	3	4	16	0	23	1	110	0	0	111	29	1	3	0	33	2	76	10	0	88	255
07:30 AM	2	3	8	0	13	1	116	2	0	119	26	3	2	0	31	1	85	15	0	101	264
07:45 AM	8	2	6	0	16	1	56	3	0	60	36	3	4	0	43	1	153	31	0	185	304
Total	13	12	39	0	64	3	348	6	0	357	105	8	11	0	124	5	356	63	1	425	970
08:00 AM	2	5	2	0	9	0	66	1	0	67	16	1	9	0	26	5	91	15	0	111	213
08:15 AM	2	4	1	0	7	3	44	1	0	48	12	6	8	0	26	3	77	13	0	93	174
08:30 AM	0	4	5	0	9	7	43	3	0	53	14	1	5	0	20	1	75	6	0	82	164
08:45 AM	3	2	1	0	6	1	47	0	0	48	15	3	7	0	25	4	82	6	0	92	171
Total	7	15	9	0	31	11	200	5	0	216	57	11	29	0	97	13	325	40	0	378	722
02:00 PM	5	1	4	0	10	6	85	2	0	93	15	3	5	0	23	3	79	15	0	97	223
02:15 PM	3	1	4	0	8	5	91	3	0	99	22	5	4	0	31	7	76	10	0	93	231
02:30 PM	2	4	2	0	8	1	101	4	0	106	17	5	6	0	28	3	107	15	0	125	267
02:45 PM	2	6	7	0	15	1	96	2	0	99	13	7	3	0	23	5	86	25	0	116	253
Total	12	12	17	0	41	13	373	11	0	397	67	20	18	0	105	18	348	65	0	431	974
03:00 PM	1	3	1	0	5	2	92	4	0	98	18	3	9	0	30	7	106	19	0	132	265
03:15 PM	2	2	5	0	9	4	77	3	0	84	11	3	6	0	20	1	83	19	0	103	216
03:30 PM	2	3	4	0	9	2	82	0	0	84	25	2	8	0	35	6	73	21	0	100	228
03:45 PM	2	4	6	0	12	6	80	1	0	87	29	2	9	0	40	1	92	16	0	109	248
Total	7	12	16	0	35	14	331	8	0	353	83	10	32	0	125	15	354	75	0	444	957
04:00 PM	4	6	8	0	18	7	80	3	0	90	17	7	5	0	29	1	91	33	0	125	262
04:15 PM	2	2	6	0	10	3	96	3	0	102	20	6	10	0	36	4	111	19	0	134	282
04:30 PM	3	1	4	0	8	5	105	1	0	111	16	6	3	0	25	4	90	14	0	108	252
04:45 PM	1	5	7	0	13	7	120	3	0	130	19	3	17	0	39	4	104	23	0	131	313
Total	10	14	25	0	49	22	401	10	0	433	72	22	35	0	129	13	396	89	0	498	1109
05:00 PM	1	6	4	0	11	5	116	3	0	124	12	11	8	0	31	4	75	21	0	100	266
05:15 PM	2	5	6	0	13	6	94	2	0	102	29	12	8	0	49	2	99	19	0	120	284
05:30 PM	1	2	4	0	7	5	81	1	0	87	22	2	8	0	32	0	92	16	0	108	234
05:45 PM	1	4	3	0	8	2	72	2	0	76	14	3	7	0	24	4	74	22	0	100	208
Total	5	17	17	0	39	18	363	8	0	389	77	28	31	0	136	10	340	78	0	428	992
Grand Total	54	82	123	0	259	81	2016	48	0	2145	461	99	156	0	716	74	2119	410	1	2604	5724
Apprch %	20.8	31.7	47.5	0		3.8	94	2.2	0		64.4	13.8	21.8	0		2.8	81.4	15.7	0		
Total %	0.9	1.4	2.1	0	4.5	1.4	35.2	0.8	0	37.5	8.1	1.7	2.7	0	12.5	1.3	37	7.2	0	45.5	

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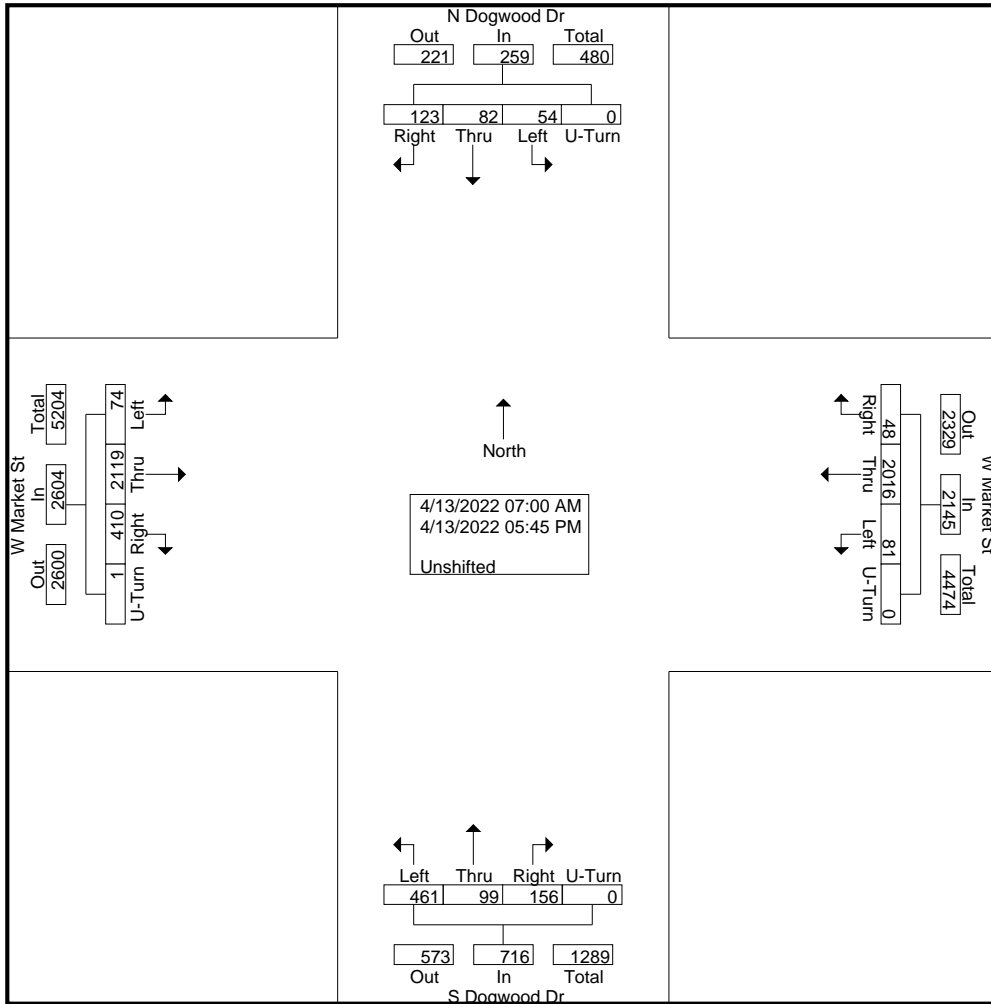
Phone: 703-914-4850

File Name : 6. W Market St @ Dogwood Dr

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



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4605-C Pinecrest Office Park Dr

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Phone: 703-914-4850

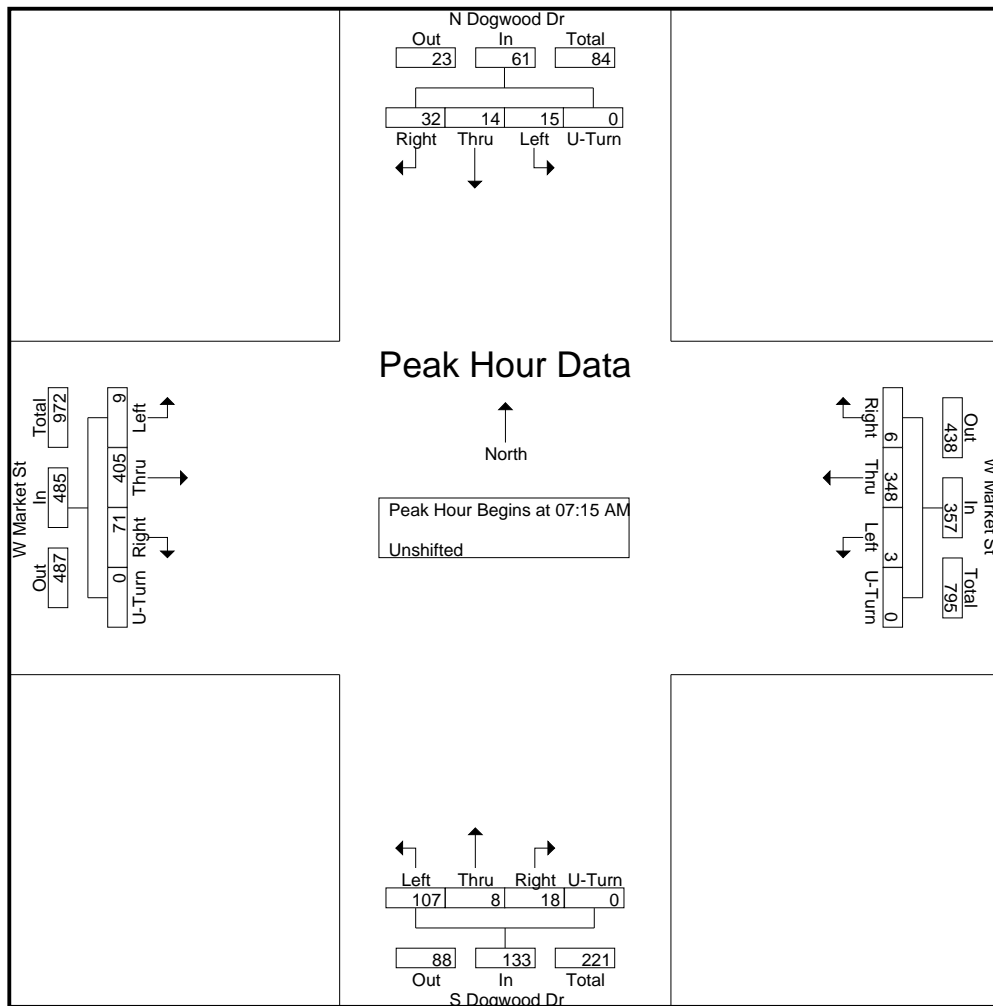
File Name : 6. W Market St @ Dogwood Dr

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	N Dogwood Dr From North					W Market St From East					S Dogwood Dr From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	3	4	16	0	23	1	110	0	0	111	29	1	3	0	33	2	76	10	0	88	255
07:30 AM	2	3	8	0	13	1	116	2	0	119	26	3	2	0	31	1	85	15	0	101	264
07:45 AM	8	2	6	0	16	1	56	3	0	60	36	3	4	0	43	1	153	31	0	185	304
08:00 AM	2	5	2	0	9	0	66	1	0	67	16	1	9	0	26	5	91	15	0	111	213
Total Volume	15	14	32	0	61	3	348	6	0	357	107	8	18	0	133	9	405	71	0	485	1036
% App. Total	24.6	23	52.5	0		0.8	97.5	1.7	0		80.5	6	13.5	0		1.9	83.5	14.6	0		
PHF	.469	.700	.500	.000	.663	.750	.750	.500	.000	.750	.743	.667	.500	.000	.773	.450	.662	.573	.000	.655	.852



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Phone: 703-914-4850

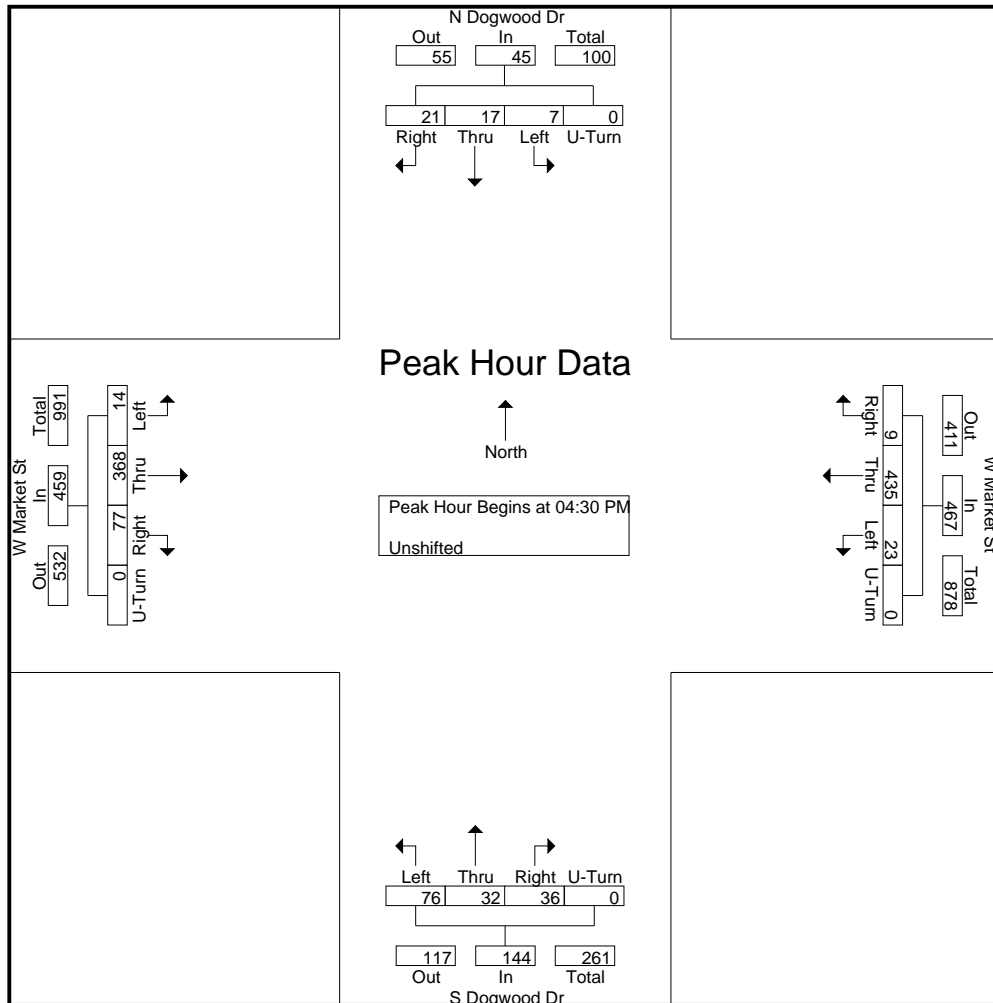
File Name : 6. W Market St @ Dogwood Dr

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	N Dogwood Dr From North					W Market St From East					S Dogwood Dr From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	3	1	4	0	8	5	105	1	0	111	16	6	3	0	25	4	90	14	0	108	252
04:45 PM	1	5	7	0	13	7	120	3	0	130	19	3	17	0	39	4	104	23	0	131	313
05:00 PM	1	6	4	0	11	5	116	3	0	124	12	11	8	0	31	4	75	21	0	100	266
05:15 PM	2	5	6	0	13	6	94	2	0	102	29	12	8	0	49	2	99	19	0	120	284
Total Volume	7	17	21	0	45	23	435	9	0	467	76	32	36	0	144	14	368	77	0	459	1115
% App. Total	15.6	37.8	46.7	0		4.9	93.1	1.9	0		52.8	22.2	25	0		3.1	80.2	16.8	0		
PHF	.583	.708	.750	.000	.865	.821	.906	.750	.000	.898	.655	.667	.529	.000	.735	.875	.885	.837	.000	.876	.891



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 7. W Market St @ Willow St

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	N Willow St From North					W Market St From East					From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	1	2	1	0	4	2	63	1	0	66	3	1	1	0	5	1	40	5	0	46	121
07:15 AM	0	1	7	0	8	1	101	1	0	103	4	5	2	0	11	3	78	1	0	82	204
07:30 AM	1	1	1	0	3	1	117	1	0	119	3	0	3	0	6	5	75	3	0	83	211
07:45 AM	2	3	0	0	5	1	62	0	0	63	4	1	4	0	9	7	158	5	0	170	247
Total	4	7	9	0	20	5	343	3	0	351	14	7	10	0	31	16	351	14	0	381	783
08:00 AM	1	2	7	0	10	5	52	2	0	59	2	1	2	0	5	1	98	3	0	102	176
08:15 AM	1	2	4	0	7	0	41	2	0	43	1	2	2	0	5	5	77	4	0	86	141
08:30 AM	2	2	7	0	11	2	43	0	0	45	3	5	1	0	9	4	72	4	0	80	145
08:45 AM	0	3	3	0	6	1	44	0	0	45	1	2	2	0	5	0	90	2	0	92	148
Total	4	9	21	0	34	8	180	4	0	192	7	10	7	0	24	10	337	13	0	360	610
02:00 PM	0	3	4	0	7	1	88	1	0	90	4	1	2	0	7	2	82	6	0	90	194
02:15 PM	0	2	0	0	2	2	99	1	0	102	5	1	5	0	11	2	80	0	0	82	197
02:30 PM	2	2	4	0	8	1	94	0	0	95	4	1	4	0	9	5	106	4	0	115	227
02:45 PM	5	4	6	0	15	2	92	2	0	96	2	1	1	0	4	1	90	4	0	95	210
Total	7	11	14	0	32	6	373	4	0	383	15	4	12	0	31	10	358	14	0	382	828
03:00 PM	1	2	3	0	6	6	95	0	0	101	3	0	1	0	4	2	108	6	0	116	227
03:15 PM	1	1	1	0	3	2	79	0	0	81	3	2	3	0	8	2	84	5	0	91	183
03:30 PM	1	4	2	0	7	5	80	1	0	86	4	1	7	0	12	3	78	3	0	84	189
03:45 PM	2	3	1	0	6	4	90	0	0	94	3	4	0	0	7	0	98	5	0	103	210
Total	5	10	7	0	22	17	344	1	0	362	13	7	11	0	31	7	368	19	0	394	809
04:00 PM	0	4	4	0	8	1	78	0	0	79	2	6	2	0	10	1	99	1	0	101	198
04:15 PM	0	6	2	0	8	5	93	5	0	103	5	2	3	0	10	2	115	4	0	121	242
04:30 PM	2	3	8	0	13	3	102	1	0	106	4	4	2	0	10	1	97	2	0	100	229
04:45 PM	0	3	4	0	7	5	122	1	0	128	3	8	2	0	13	3	117	2	0	122	270
Total	2	16	18	0	36	14	395	7	0	416	14	20	9	0	43	7	428	9	0	444	939
05:00 PM	5	3	5	0	13	6	116	0	0	122	3	5	2	0	10	3	80	1	0	84	229
05:15 PM	2	3	4	0	9	5	94	0	0	99	2	5	4	0	11	5	100	4	0	109	228
05:30 PM	2	2	5	0	9	5	77	1	0	83	5	1	2	0	8	3	93	4	0	100	200
05:45 PM	2	0	4	0	6	2	71	5	0	78	3	3	4	0	10	2	75	5	0	82	176
Total	11	8	18	0	37	18	358	6	0	382	13	14	12	0	39	13	348	14	0	375	833
Grand Total	33	61	87	0	181	68	1993	25	0	2086	76	62	61	0	199	63	2190	83	0	2336	4802
Apprch %	18.2	33.7	48.1	0	3.8	3.3	95.5	1.2	0	43.4	38.2	31.2	30.7	0	4.1	2.7	93.8	3.6	0	48.6	
Total %	0.7	1.3	1.8	0	3.8	1.4	41.5	0.5	0	43.4	1.6	1.3	1.3	0	4.1	1.3	45.6	1.7	0	48.6	

MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

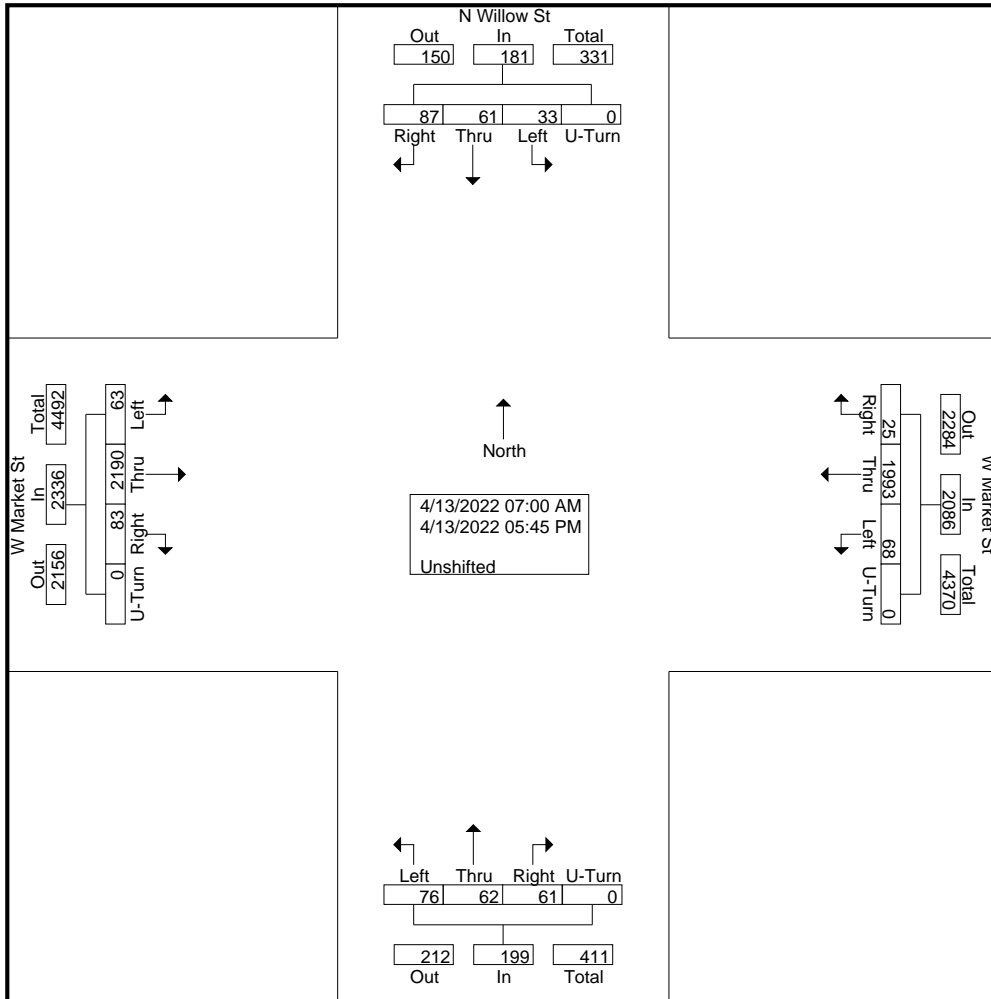
Phone: 703-914-4850

File Name : 7. W Market St @ Willow St

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

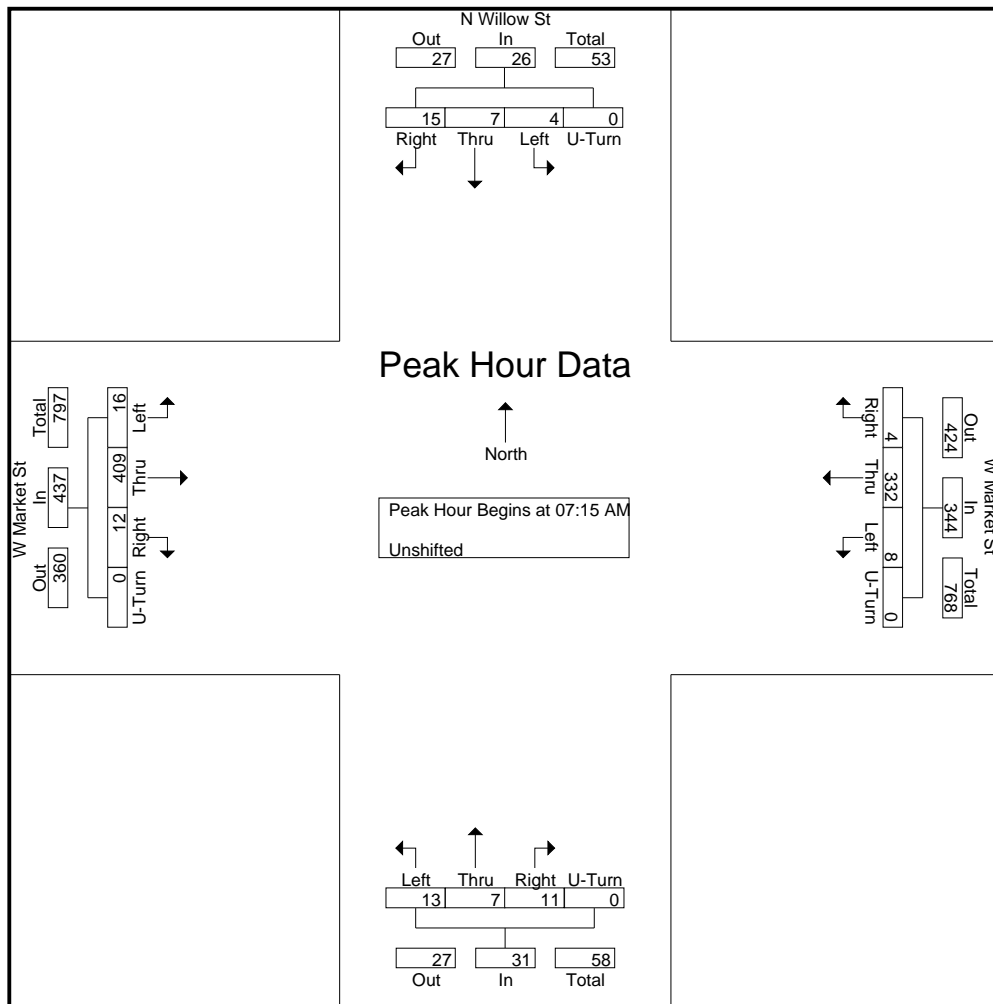
File Name : 7. W Market St @ Willow St

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	N Willow St From North					W Market St From East					From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	1	7	0	8	1	101	1	0	103	4	5	2	0	11	3	78	1	0	82	204
07:30 AM	1	1	1	0	3	1	117	1	0	119	3	0	3	0	6	5	75	3	0	83	211
07:45 AM	2	3	0	0	5	1	62	0	0	63	4	1	4	0	9	7	158	5	0	170	247
08:00 AM	1	2	7	0	10	5	52	2	0	59	2	1	2	0	5	1	98	3	0	102	176
Total Volume	4	7	15	0	26	8	332	4	0	344	13	7	11	0	31	16	409	12	0	437	838
% App. Total	15.4	26.9	57.7	0		2.3	96.5	1.2	0		41.9	22.6	35.5	0		3.7	93.6	2.7	0		
PHF	.500	.583	.536	.000	.650	.400	.709	.500	.000	.723	.813	.350	.688	.000	.705	.571	.647	.600	.000	.643	.848



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Alexandria, VA - 22312

Phone: 703-914-4850

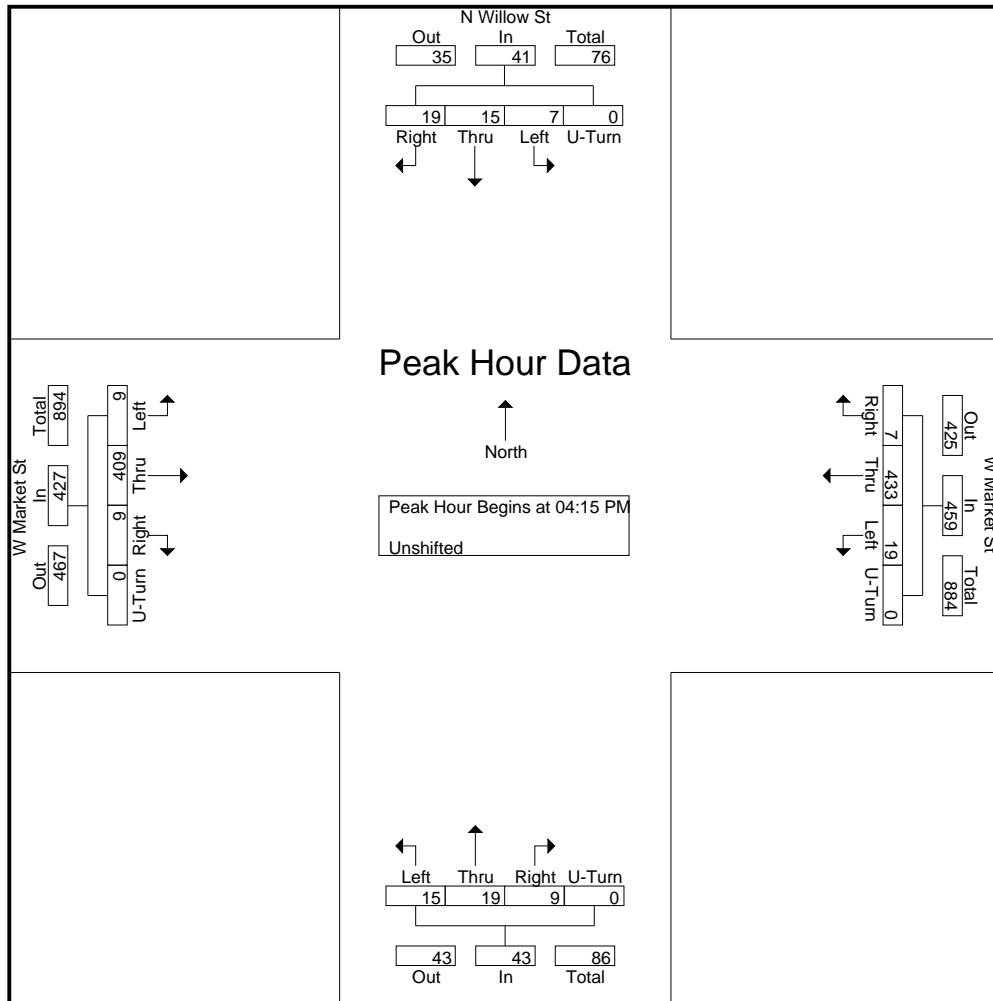
File Name : 7. W Market St @ Willow St

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	N Willow St From North					W Market St From East					From South					W Market St From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	6	2	0	8	5	93	5	0	103	5	2	3	0	10	2	115	4	0	121	242
04:30 PM	2	3	8	0	13	3	102	1	0	106	4	4	2	0	10	1	97	2	0	100	229
04:45 PM	0	3	4	0	7	5	122	1	0	128	3	8	2	0	13	3	117	2	0	122	270
05:00 PM	5	3	5	0	13	6	116	0	0	122	3	5	2	0	10	3	80	1	0	84	229
Total Volume	7	15	19	0	41	19	433	7	0	459	15	19	9	0	43	9	409	9	0	427	970
% App. Total	17.1	36.6	46.3	0		4.1	94.3	1.5	0		34.9	44.2	20.9	0		2.1	95.8	2.1	0		
PHF	.350	.625	.594	.000	.788	.792	.887	.350	.000	.896	.750	.594	.750	.000	.827	.750	.874	.563	.000	.875	.898



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 1. East Market St @ Broad st

Site Code : J 1009

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Broad Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	7	0	3	0	10	0	71	6	0	77	0	0	0	0	0	0	48	0	0	48	135
07:15 AM	2	0	0	0	2	0	113	6	0	119	0	0	0	0	0	0	57	0	0	57	178
07:30 AM	1	0	2	0	3	0	130	9	0	139	0	0	0	0	0	0	61	0	0	61	203
07:45 AM	7	0	1	0	8	0	141	13	0	154	0	0	0	0	0	1	74	0	0	75	237
Total	17	0	6	0	23	0	455	34	0	489	0	0	0	0	0	1	240	0	0	241	753
08:00 AM	2	0	0	0	2	0	122	11	0	133	0	0	0	0	0	1	82	0	0	83	218
08:15 AM	6	0	2	0	8	0	136	16	0	152	0	0	0	0	0	0	59	0	0	59	219
08:30 AM	3	0	2	0	5	0	125	11	0	136	0	0	0	0	0	0	63	0	0	63	204
08:45 AM	4	0	3	0	7	0	119	14	0	133	0	0	0	0	0	1	76	0	0	77	217
Total	15	0	7	0	22	0	502	52	0	554	0	0	0	0	0	2	280	0	0	282	858
02:00 PM	10	0	1	0	11	0	121	11	0	132	0	0	0	0	0	0	127	0	0	127	270
02:15 PM	6	0	1	0	7	0	167	8	0	175	0	0	0	0	0	0	123	0	0	123	305
02:30 PM	5	0	1	0	6	0	146	10	0	156	0	0	0	0	0	0	130	0	0	130	292
02:45 PM	8	0	1	0	9	0	154	6	0	160	0	0	0	0	0	0	121	0	0	121	290
Total	29	0	4	0	33	0	588	35	0	623	0	0	0	0	0	0	501	0	0	501	1157
03:00 PM	7	0	6	0	13	0	134	16	0	150	0	0	0	0	0	1	138	0	0	139	302
03:15 PM	5	0	4	0	9	0	143	8	0	151	0	0	0	0	0	2	151	0	0	153	313
03:30 PM	7	0	2	0	9	0	154	10	0	164	0	0	0	0	0	1	137	0	0	138	311
03:45 PM	7	0	3	0	10	0	147	11	0	158	0	0	0	0	0	5	141	0	0	146	314
Total	26	0	15	0	41	0	578	45	0	623	0	0	0	0	0	9	567	0	0	576	1240
04:00 PM	12	0	3	0	15	0	151	14	0	165	0	0	0	0	0	0	145	0	0	145	325
04:15 PM	11	0	3	0	14	0	155	13	0	168	0	0	0	0	0	3	151	0	0	154	336
04:30 PM	18	0	5	0	23	0	159	9	0	168	0	0	0	0	0	4	145	0	0	149	340
04:45 PM	11	0	1	0	12	0	155	7	0	162	0	0	0	0	0	2	145	0	0	147	321
Total	52	0	12	0	64	0	620	43	0	663	0	0	0	0	0	9	586	0	0	595	1322
05:00 PM	11	0	2	0	13	0	161	10	0	171	0	0	0	0	0	2	164	0	0	166	350
05:15 PM	10	0	3	0	13	0	158	8	0	166	0	0	0	0	0	4	147	0	0	151	330
05:30 PM	5	0	2	0	7	0	150	14	0	164	0	0	0	0	0	3	114	0	0	117	288
05:45 PM	7	0	1	0	8	0	141	9	0	150	0	0	0	0	0	0	109	0	0	109	267
Total	33	0	8	0	41	0	610	41	0	651	0	0	0	0	0	9	534	0	0	543	1235
Grand Total	172	0	52	0	224	0	3353	250	0	3603	0	0	0	0	0	30	2708	0	0	2738	6565
Apprch %	76.8	0	23.2	0		0	93.1	6.9	0		0	0	0	0	0	1.1	98.9	0	0		
Total %	2.6	0	0.8	0	3.4	0	51.1	3.8	0	54.9	0	0	0	0	0	0.5	41.2	0	0	41.7	

MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

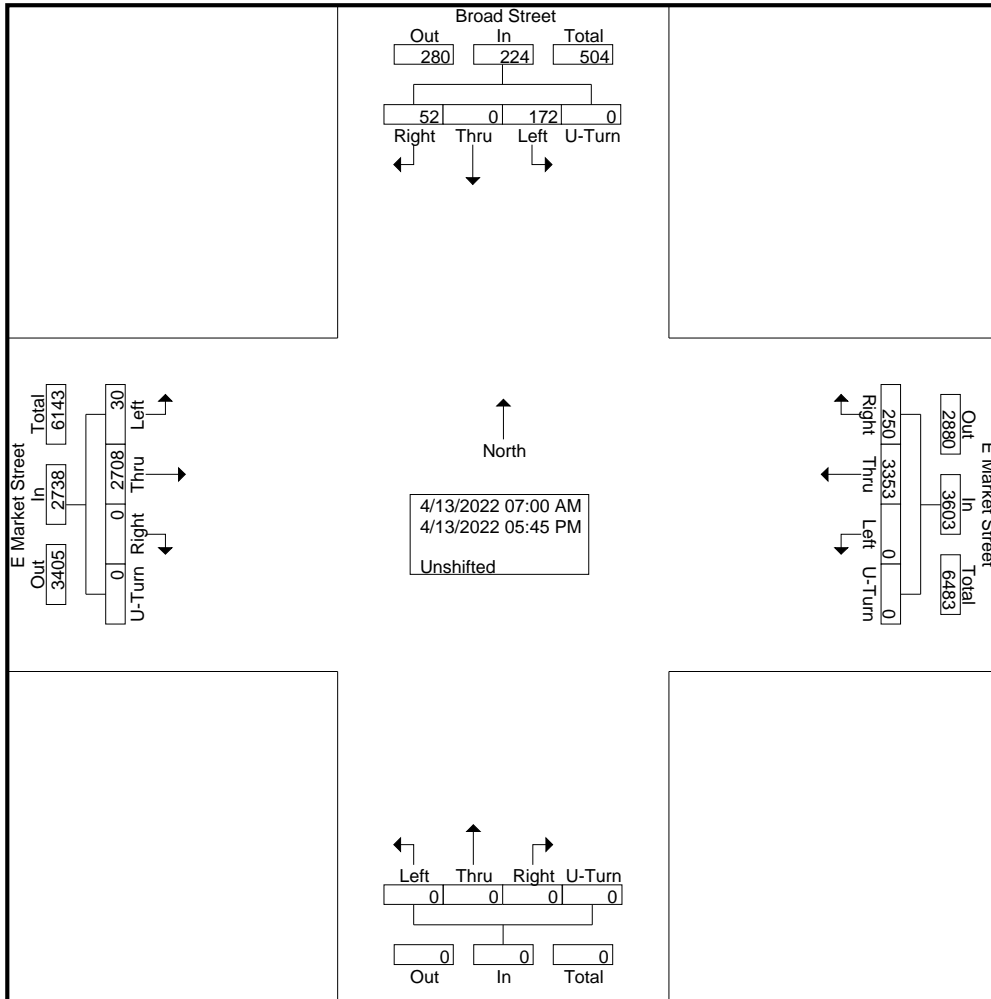
Phone: 703-914-4850

File Name : 1. East Market St @ Broad st

Site Code : J 1009

Start Date : 4/13/2022

Page No : 2



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

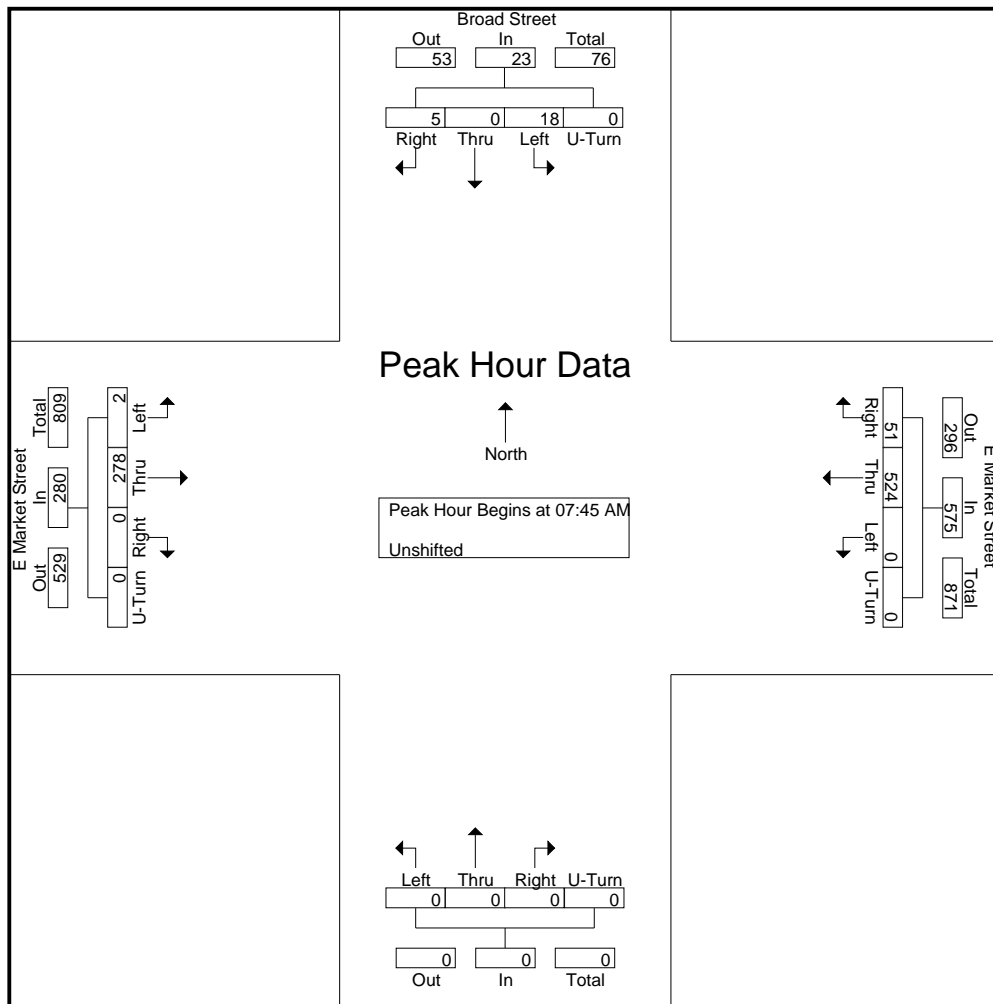
File Name : 1. East Market St @ Broad st

Site Code : J 1009

Start Date : 4/13/2022

Page No : 3

Start Time	Broad Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	7	0	1	0	8	0	141	13	0	154	0	0	0	0	0	1	74	0	0	75	237
08:00 AM	2	0	0	0	2	0	122	11	0	133	0	0	0	0	0	1	82	0	0	83	218
08:15 AM	6	0	2	0	8	0	136	16	0	152	0	0	0	0	0	0	59	0	0	59	219
08:30 AM	3	0	2	0	5	0	125	11	0	136	0	0	0	0	0	0	63	0	0	63	204
Total Volume	18	0	5	0	23	0	524	51	0	575	0	0	0	0	0	2	278	0	0	280	878
% App. Total	78.3	0	21.7	0		0	91.1	8.9	0		0	0	0	0		0.7	99.3	0	0		
PHF	.643	.000	.625	.000	.719	.000	.929	.797	.000	.933	.000	.000	.000	.000	.000	.500	.848	.000	.000	.843	.926



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

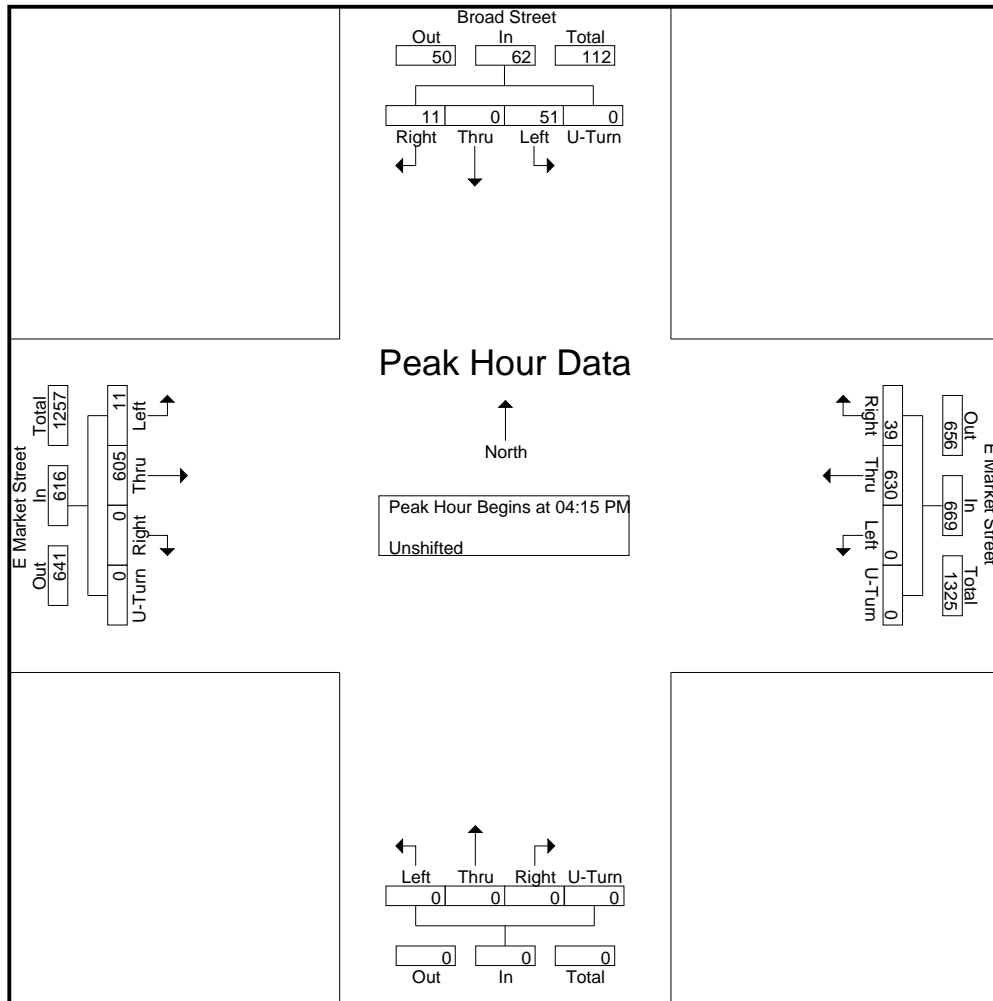
File Name : 1. East Market St @ Broad st

Site Code : J 1009

Start Date : 4/13/2022

Page No : 4

Start Time	Broad Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	11	0	3	0	14	0	155	13	0	168	0	0	0	0	0	3	151	0	0	154	336
04:30 PM	18	0	5	0	23	0	159	9	0	168	0	0	0	0	0	4	145	0	0	149	340
04:45 PM	11	0	1	0	12	0	155	7	0	162	0	0	0	0	0	2	145	0	0	147	321
05:00 PM	11	0	2	0	13	0	161	10	0	171	0	0	0	0	0	2	164	0	0	166	350
Total Volume	51	0	11	0	62	0	630	39	0	669	0	0	0	0	0	11	605	0	0	616	1347
% App. Total	82.3	0	17.7	0		0	94.2	5.8	0		0	0	0	0		1.8	98.2	0	0		
PHF	.708	.000	.550	.000	.674	.000	.978	.750	.000	.978	.000	.000	.000	.000	.000	.688	.922	.000	.000	.928	.962



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 2. E Market St @ Ott St

Site Code : J 1009

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	From North					E Market Street From East					Ott Street From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	0	0	0	0	0	3	75	0	0	78	0	0	3	0	3	0	58	0	0	58	139
07:15 AM	0	0	0	0	0	3	119	0	0	122	1	0	4	0	5	0	57	0	0	57	184
07:30 AM	0	0	0	0	0	2	145	0	0	147	1	0	6	0	7	0	62	0	0	62	216
07:45 AM	0	0	0	0	0	5	156	0	0	161	2	0	3	0	5	0	84	3	0	87	253
Total	0	0	0	0	0	13	495	0	0	508	4	0	16	0	20	0	261	3	0	264	792
08:00 AM	0	0	0	0	0	4	132	0	0	136	2	0	8	0	10	0	84	0	0	84	230
08:15 AM	0	0	0	0	0	12	156	0	0	168	1	0	4	0	5	0	64	1	0	65	238
08:30 AM	0	0	0	0	0	9	138	0	0	147	0	0	5	0	5	0	62	3	0	65	217
08:45 AM	0	0	0	0	0	3	132	0	0	135	1	0	9	0	10	0	82	3	0	85	230
Total	0	0	0	0	0	28	558	0	0	586	4	0	26	0	30	0	292	7	0	299	915
02:00 PM	0	0	0	0	0	8	133	0	0	141	2	0	3	0	5	0	133	3	0	136	282
02:15 PM	0	0	0	0	0	4	174	0	0	178	4	0	9	0	13	0	129	1	0	130	321
02:30 PM	0	0	0	0	0	5	157	0	0	162	1	0	12	0	13	0	135	0	0	135	310
02:45 PM	0	0	0	0	0	7	162	0	0	169	2	0	7	0	9	0	126	2	0	128	306
Total	0	0	0	0	0	24	626	0	0	650	9	0	31	0	40	0	523	6	0	529	1219
03:00 PM	0	0	0	0	0	6	154	0	0	160	0	0	7	0	7	0	145	3	0	148	315
03:15 PM	0	0	0	0	0	5	150	0	0	155	2	0	4	0	6	0	155	0	0	155	316
03:30 PM	0	0	0	0	0	4	163	0	0	167	2	0	8	0	10	0	144	1	0	145	322
03:45 PM	0	0	0	0	0	8	160	0	0	168	0	0	8	0	8	0	147	3	0	150	326
Total	0	0	0	0	0	23	627	0	0	650	4	0	27	0	31	0	591	7	0	598	1279
04:00 PM	0	0	0	0	0	8	164	0	0	172	4	0	14	0	18	0	157	3	0	160	350
04:15 PM	0	0	0	0	0	6	166	0	0	172	3	0	8	0	11	0	163	1	0	164	347
04:30 PM	0	0	0	0	0	3	170	0	0	173	0	0	9	0	9	0	164	1	0	165	347
04:45 PM	0	0	0	0	0	5	161	0	0	166	2	0	16	0	18	0	156	1	0	157	341
Total	0	0	0	0	0	22	661	0	0	683	9	0	47	0	56	0	640	6	0	646	1385
05:00 PM	0	0	0	0	0	9	170	0	0	179	2	0	36	0	38	0	176	0	0	176	393
05:15 PM	0	0	0	0	0	7	165	0	0	172	2	0	9	0	11	0	157	1	0	158	341
05:30 PM	0	0	0	0	0	5	163	0	0	168	2	0	12	0	14	0	119	1	0	120	302
05:45 PM	0	0	0	0	0	2	148	0	0	150	1	0	14	0	15	0	119	0	0	119	284
Total	0	0	0	0	0	23	646	0	0	669	7	0	71	0	78	0	571	2	0	573	1320
Grand Total	0	0	0	0	0	133	3613	0	0	3746	37	0	218	0	255	0	2878	31	0	2909	6910
Apprch %	0	0	0	0	0	3.6	96.4	0	0	54.2	14.5	0	85.5	0	3.7	0	98.9	1.1	0	42.1	
Total %	0	0	0	0	0	1.9	52.3	0	0	54.2	0.5	0	3.2	0	3.7	0	41.6	0.4	0	42.1	

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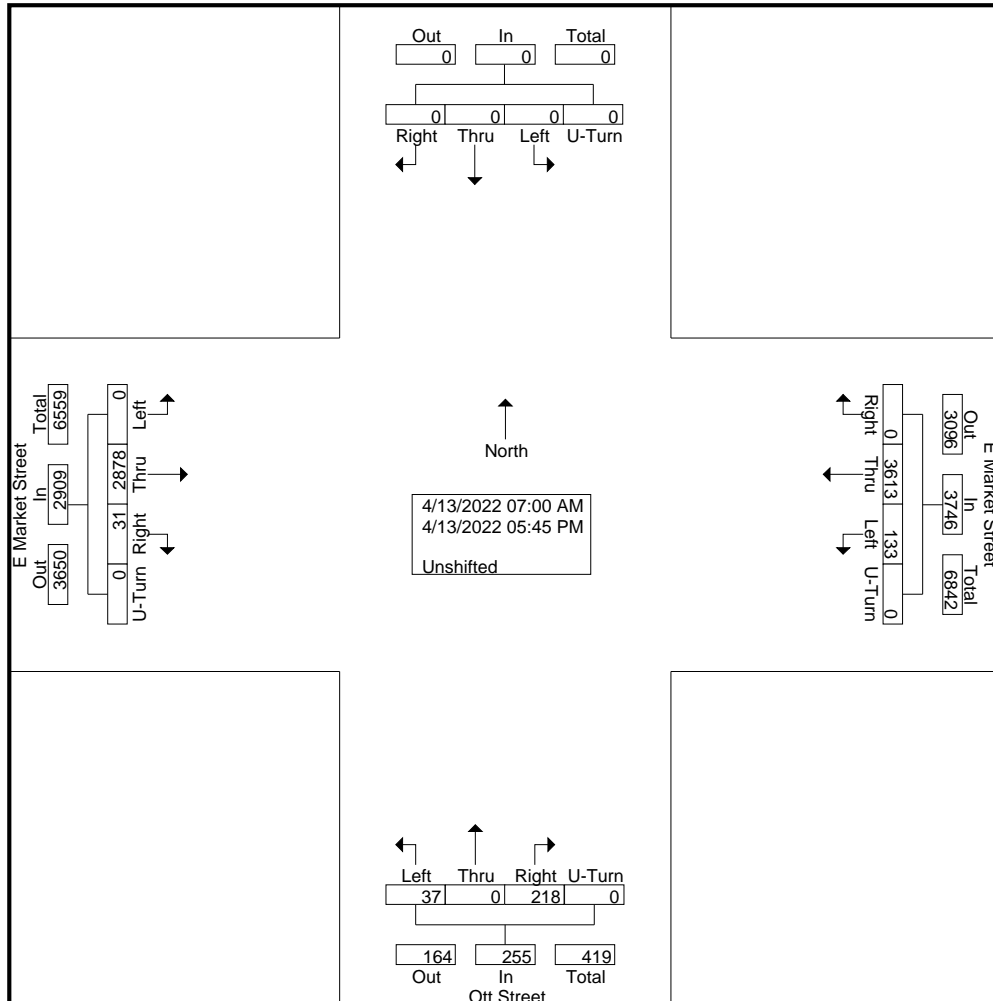
Phone: 703-914-4850

File Name : 2. E Market St @ Ott St

Site Code : J 1009

Start Date : 4/13/2022

Page No : 2



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Phone: 703-914-4850

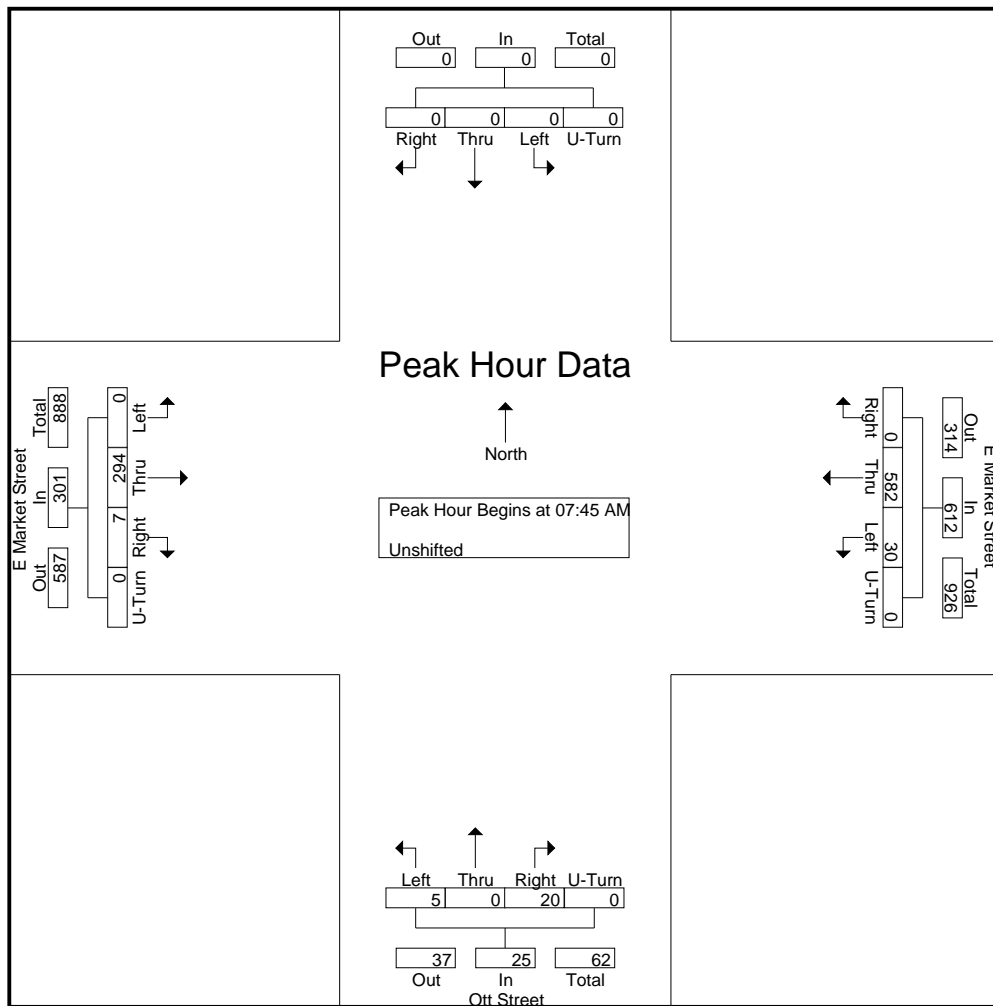
File Name : 2. E Market St @ Ott St

Site Code : J 1009

Start Date : 4/13/2022

Page No : 3

Start Time	From North					E Market Street From East					Ott Street From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	5	156	0	0	161	2	0	3	0	5	0	84	3	0	87	253
08:00 AM	0	0	0	0	0	4	132	0	0	136	2	0	8	0	10	0	84	0	0	84	230
08:15 AM	0	0	0	0	0	12	156	0	0	168	1	0	4	0	5	0	64	1	0	65	238
08:30 AM	0	0	0	0	0	9	138	0	0	147	0	0	5	0	5	0	62	3	0	65	217
Total Volume	0	0	0	0	0	30	582	0	0	612	5	0	20	0	25	0	294	7	0	301	938
% App. Total	0	0	0	0	0	4.9	95.1	0	0		20	0	80	0		0	97.7	2.3	0		
PHF	.000	.000	.000	.000	.000	.625	.933	.000	.000	.911	.625	.000	.625	.000	.625	.000	.875	.583	.000	.865	.927



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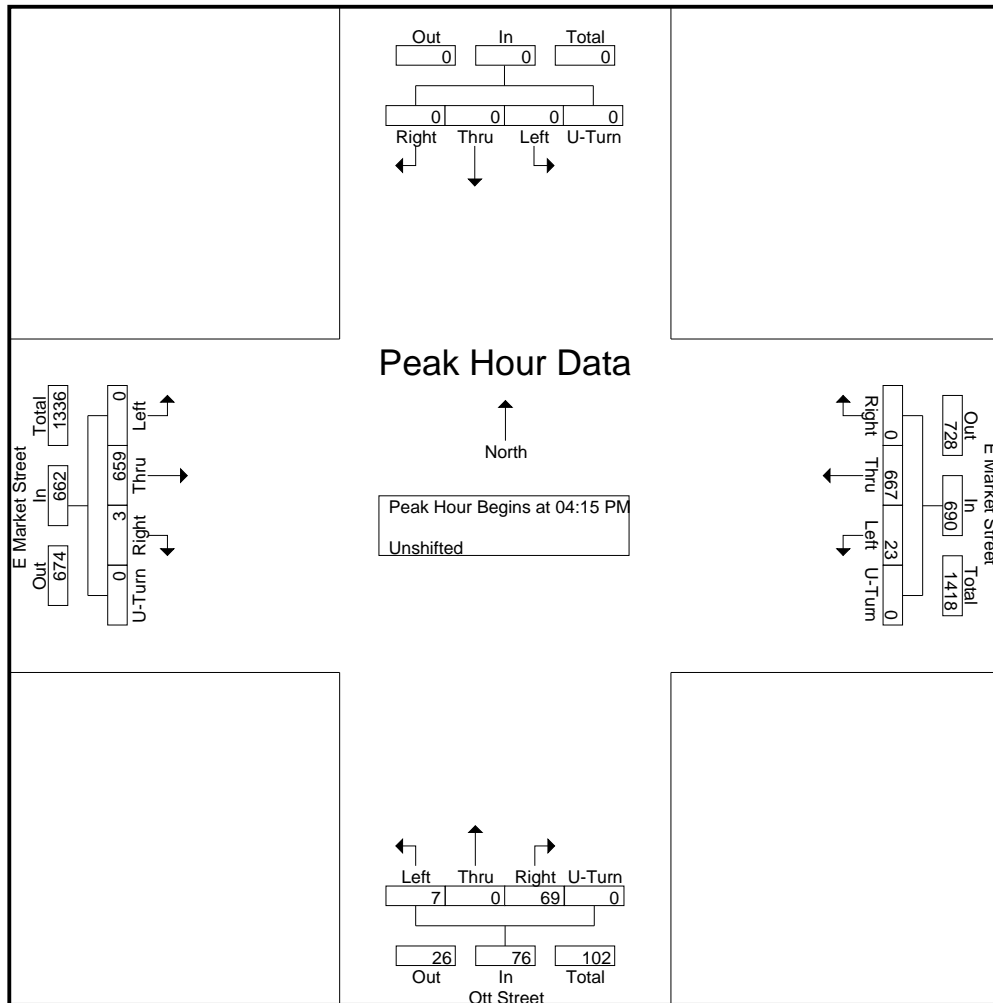
File Name : 2. E Market St @ Ott St

Site Code : J 1009

Start Date : 4/13/2022

Page No : 4

Start Time	From North					E Market Street From East					Ott Street From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	0	0	0	0	6	166	0	0	172	3	0	8	0	11	0	163	1	0	164	347
04:30 PM	0	0	0	0	0	3	170	0	0	173	0	0	9	0	9	0	164	1	0	165	347
04:45 PM	0	0	0	0	0	5	161	0	0	166	2	0	16	0	18	0	156	1	0	157	341
05:00 PM	0	0	0	0	0	9	170	0	0	179	2	0	36	0	38	0	176	0	0	176	393
Total Volume	0	0	0	0	0	23	667	0	0	690	7	0	69	0	76	0	659	3	0	662	1428
% App. Total	0	0	0	0	0	3.3	96.7	0	0		9.2	0	90.8	0		0	99.5	0.5	0		
PHF	.000	.000	.000	.000	.000	.639	.981	.000	.000	.964	.583	.000	.479	.000	.500	.000	.936	.750	.000	.940	.908



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Phone: 703-914-4850

File Name : 3. E Market St @ Myrtle St

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Myrtle Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	1	0	1	0	2	0	77	0	0	77	0	0	0	0	0	1	60	0	0	61	140
07:15 AM	0	0	0	0	0	0	125	0	0	125	0	0	0	0	0	1	61	0	0	62	187
07:30 AM	2	0	2	0	4	0	142	2	0	144	0	0	0	0	0	2	66	0	0	68	216
07:45 AM	2	0	1	0	3	0	161	0	0	161	0	0	0	0	0	3	83	0	0	86	250
Total	5	0	4	0	9	0	505	2	0	507	0	0	0	0	0	7	270	0	0	277	793
08:00 AM	1	0	4	0	5	0	133	1	0	134	0	0	0	0	0	2	90	0	0	92	231
08:15 AM	1	0	4	0	5	0	164	3	0	167	0	0	0	0	0	3	66	0	0	69	241
08:30 AM	0	0	2	0	2	0	147	1	0	148	0	0	0	0	0	2	63	0	0	65	215
08:45 AM	2	0	2	0	4	0	133	1	0	134	0	0	0	0	0	2	89	0	0	91	229
Total	4	0	12	0	16	0	577	6	0	583	0	0	0	0	0	9	308	0	0	317	916
02:00 PM	5	0	1	0	6	0	138	2	0	140	0	0	0	0	0	1	136	0	0	137	283
02:15 PM	3	0	1	0	4	0	176	2	0	178	0	0	0	0	0	2	137	0	0	139	321
02:30 PM	3	0	6	0	9	0	155	4	0	159	0	0	0	0	0	2	143	0	0	145	313
02:45 PM	1	0	2	0	3	0	169	1	0	170	0	0	0	0	0	3	132	0	0	135	308
Total	12	0	10	0	22	0	638	9	0	647	0	0	0	0	0	8	548	0	0	556	1225
03:00 PM	3	0	3	0	6	0	155	1	0	156	0	0	0	0	0	5	145	0	0	150	312
03:15 PM	2	0	4	0	6	0	151	2	0	153	0	0	0	0	0	1	160	0	0	161	320
03:30 PM	2	0	0	0	2	0	167	5	0	172	0	0	0	0	0	5	145	0	0	150	324
03:45 PM	1	0	1	0	2	0	162	1	0	163	0	0	0	0	0	2	152	0	0	154	319
Total	8	0	8	0	16	0	635	9	0	644	0	0	0	0	0	13	602	0	0	615	1275
04:00 PM	2	0	2	0	4	0	173	1	0	174	0	0	0	0	0	4	168	0	0	172	350
04:15 PM	1	0	0	0	1	0	169	2	0	171	0	0	0	0	0	1	172	0	0	173	345
04:30 PM	2	0	2	0	4	0	169	3	0	172	0	0	0	0	0	4	170	0	0	174	350
04:45 PM	0	0	3	0	3	0	166	3	0	169	0	0	0	0	0	5	166	0	0	171	343
Total	5	0	7	0	12	0	677	9	0	686	0	0	0	0	0	14	676	0	0	690	1388
05:00 PM	3	0	3	0	6	0	174	4	0	178	0	0	0	0	0	4	213	0	0	217	401
05:15 PM	3	0	2	0	5	0	169	4	0	173	0	0	0	0	0	3	165	0	0	168	346
05:30 PM	3	0	1	0	4	0	169	2	0	171	0	0	0	0	0	5	125	0	0	130	305
05:45 PM	2	0	1	0	3	0	150	1	0	151	0	0	0	0	0	2	132	0	0	134	288
Total	11	0	7	0	18	0	662	11	0	673	0	0	0	0	0	14	635	0	0	649	1340
Grand Total	45	0	48	0	93	0	3694	46	0	3740	0	0	0	0	0	65	3039	0	0	3104	6937
Apprch %	48.4	0	51.6	0		0	98.8	1.2	0		0	0	0	0		2.1	97.9	0	0		
Total %	0.6	0	0.7	0	1.3	0	53.3	0.7	0	53.9	0	0	0	0	0	0.9	43.8	0	0	44.7	

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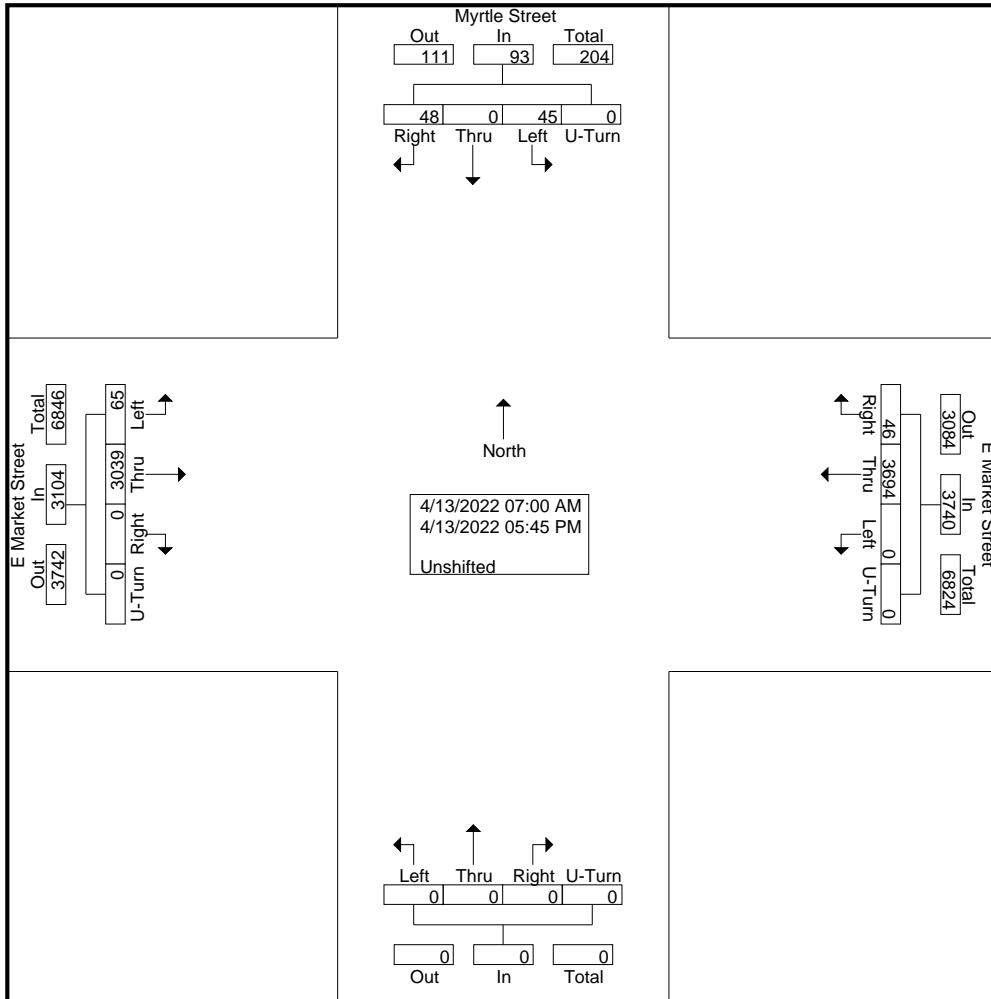
Phone: 703-914-4850

File Name : 3. E Market St @ Myrtle St

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



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Phone: 703-914-4850

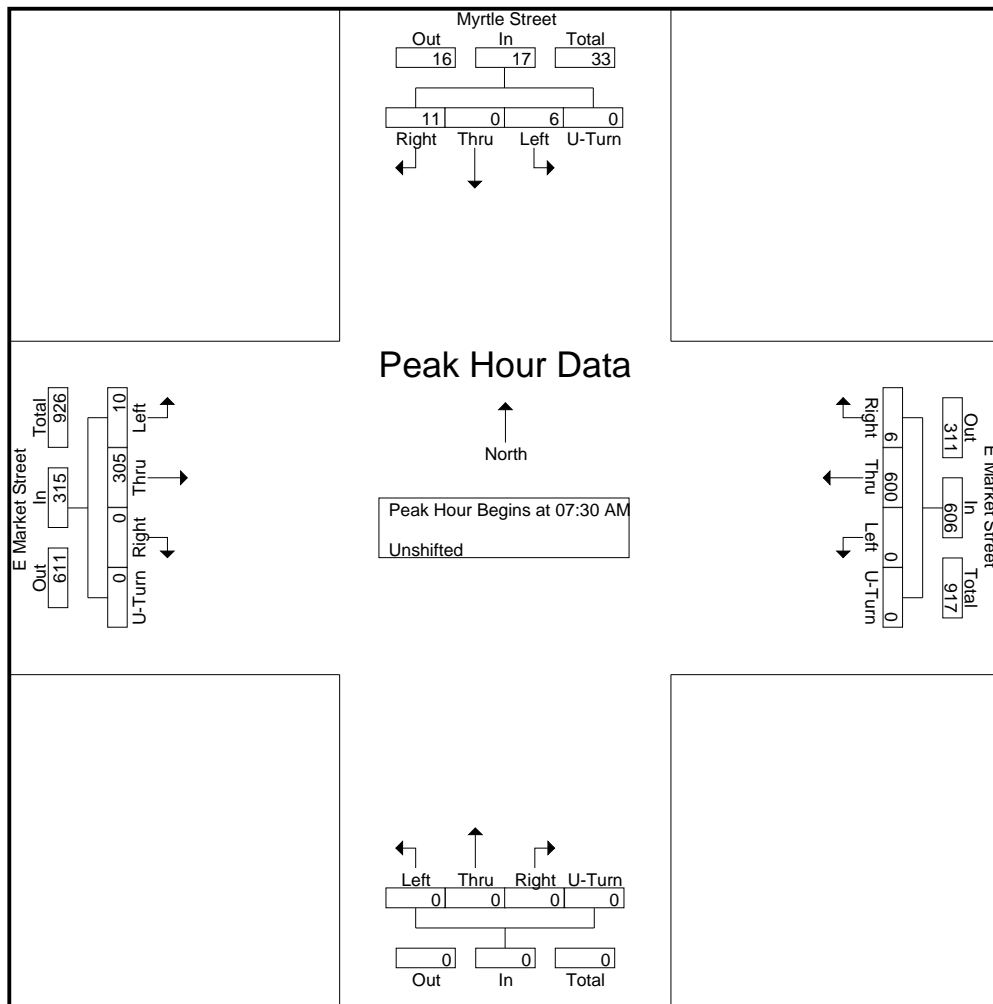
File Name : 3. E Market St @ Myrtle St

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	Myrtle Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	2	0	2	0	4	0	142	2	0	144	0	0	0	0	0	2	66	0	0	68	216
07:45 AM	2	0	1	0	3	0	161	0	0	161	0	0	0	0	0	3	83	0	0	86	250
08:00 AM	1	0	4	0	5	0	133	1	0	134	0	0	0	0	0	2	90	0	0	92	231
08:15 AM	1	0	4	0	5	0	164	3	0	167	0	0	0	0	0	3	66	0	0	69	241
Total Volume	6	0	11	0	17	0	600	6	0	606	0	0	0	0	0	10	305	0	0	315	938
% App. Total	35.3	0	64.7	0		0	99	1	0		0	0	0	0		3.2	96.8	0	0		
PHF	.750	.000	.688	.000	.850	.000	.915	.500	.000	.907	.000	.000	.000	.000	.000	.833	.847	.000	.000	.856	.938



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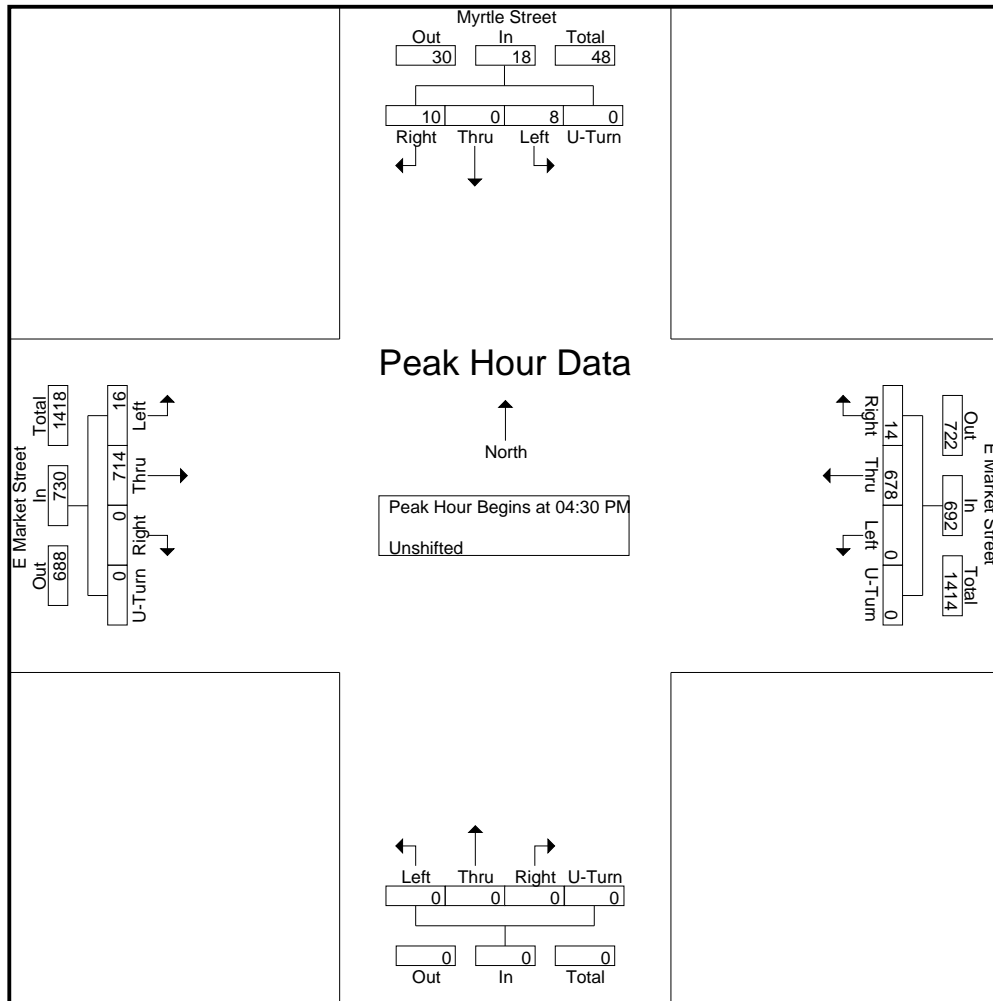
File Name : 3. E Market St @ Myrtle St

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Myrtle Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	2	0	2	0	4	0	169	3	0	172	0	0	0	0	0	4	170	0	0	174	350
04:45 PM	0	0	3	0	3	0	166	3	0	169	0	0	0	0	0	5	166	0	0	171	343
05:00 PM	3	0	3	0	6	0	174	4	0	178	0	0	0	0	0	4	213	0	0	217	401
05:15 PM	3	0	2	0	5	0	169	4	0	173	0	0	0	0	0	3	165	0	0	168	346
Total Volume	8	0	10	0	18	0	678	14	0	692	0	0	0	0	0	16	714	0	0	730	1440
% App. Total	44.4	0	55.6	0		0	98	2	0		0	0	0	0		2.2	97.8	0	0		
PHF	.667	.000	.833	.000	.750	.000	.974	.875	.000	.972	.000	.000	.000	.000	.000	.800	.838	.000	.000	.841	.898



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4605-C Pinecrest Office Park Dr

Alexandria, VA - 22312

Phone: 703-914-4850

File Name : 4. E Market St @ Reservoir St

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Sterling St From North					E Market Street From East					Reservoir St From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	3	7	2	0	12	0	50	1	0	51	26	2	3	0	31	0	39	22	0	61	155
07:15 AM	1	5	1	0	7	0	99	1	0	100	28	2	2	0	32	0	49	14	0	63	202
07:30 AM	2	11	1	0	14	0	115	1	0	116	27	5	4	0	36	0	41	24	0	65	231
07:45 AM	1	14	1	0	16	0	127	0	0	127	33	15	9	0	57	0	49	40	0	89	289
Total	7	37	5	0	49	0	391	3	0	394	114	24	18	0	156	0	178	100	0	278	877
08:00 AM	3	36	1	0	40	0	104	2	0	106	29	14	4	0	47	0	55	36	0	91	284
08:15 AM	0	19	0	0	19	0	131	3	0	134	38	18	4	0	60	1	42	29	0	72	285
08:30 AM	2	11	0	0	13	0	112	0	0	112	35	7	1	0	43	0	42	22	0	64	232
08:45 AM	3	10	2	0	15	0	95	2	0	97	41	8	2	0	51	1	55	34	0	90	253
Total	8	76	3	0	87	0	442	7	0	449	143	47	11	0	201	2	194	121	0	317	1054
02:00 PM	1	12	1	0	14	0	89	3	0	92	55	17	5	0	77	0	110	39	0	149	332
02:15 PM	4	15	0	0	19	0	111	1	0	112	67	20	3	0	90	1	102	42	0	145	366
02:30 PM	8	13	0	0	21	0	105	2	0	107	58	22	3	0	83	2	101	42	0	145	356
02:45 PM	5	12	2	0	19	0	106	2	0	108	58	12	9	0	79	0	82	43	0	125	331
Total	18	52	3	0	73	0	411	8	0	419	238	71	20	0	329	3	395	166	0	564	1385
03:00 PM	4	10	1	0	15	0	96	6	0	102	62	18	2	0	82	0	96	50	0	146	345
03:15 PM	8	11	1	0	20	1	85	1	0	87	69	17	6	0	92	0	103	61	0	164	363
03:30 PM	6	24	1	0	31	1	120	1	0	122	52	14	8	0	74	0	88	53	0	141	368
03:45 PM	5	21	0	0	26	0	103	1	0	104	64	18	4	0	86	1	101	52	0	154	370
Total	23	66	3	0	92	2	404	9	0	415	247	67	20	0	334	1	388	216	0	605	1446
04:00 PM	7	16	2	0	25	0	103	3	0	106	68	35	7	0	110	2	109	62	0	173	414
04:15 PM	3	17	3	0	23	1	99	1	0	101	69	32	3	0	104	1	122	55	0	178	406
04:30 PM	7	20	3	0	30	1	102	1	0	104	69	14	6	0	89	0	118	52	0	170	393
04:45 PM	8	15	3	0	26	0	110	6	0	116	55	20	4	0	79	0	112	43	0	155	376
Total	25	68	11	0	104	2	414	11	0	427	261	101	20	0	382	3	461	212	0	676	1589
05:00 PM	16	32	4	0	52	0	106	3	0	109	68	20	6	0	94	0	154	60	0	214	469
05:15 PM	11	23	2	0	36	0	105	0	0	105	66	22	3	0	91	0	116	62	0	178	410
05:30 PM	5	14	0	0	19	1	106	0	0	107	71	21	3	0	95	1	93	43	0	137	358
05:45 PM	7	20	4	0	31	0	93	0	0	93	44	18	2	0	64	0	76	51	0	127	315
Total	39	89	10	0	138	1	410	3	0	414	249	81	14	0	344	1	439	216	0	656	1552
Grand Total	120	388	35	0	543	5	2472	41	0	2518	1252	391	103	0	1746	10	2055	1031	0	3096	7903
Apprch %	22.1	71.5	6.4	0		0.2	98.2	1.6	0		71.7	22.4	5.9	0		0.3	66.4	33.3	0		
Total %	1.5	4.9	0.4	0	6.9	0.1	31.3	0.5	0	31.9	15.8	4.9	1.3	0	22.1	0.1	26	13	0	39.2	

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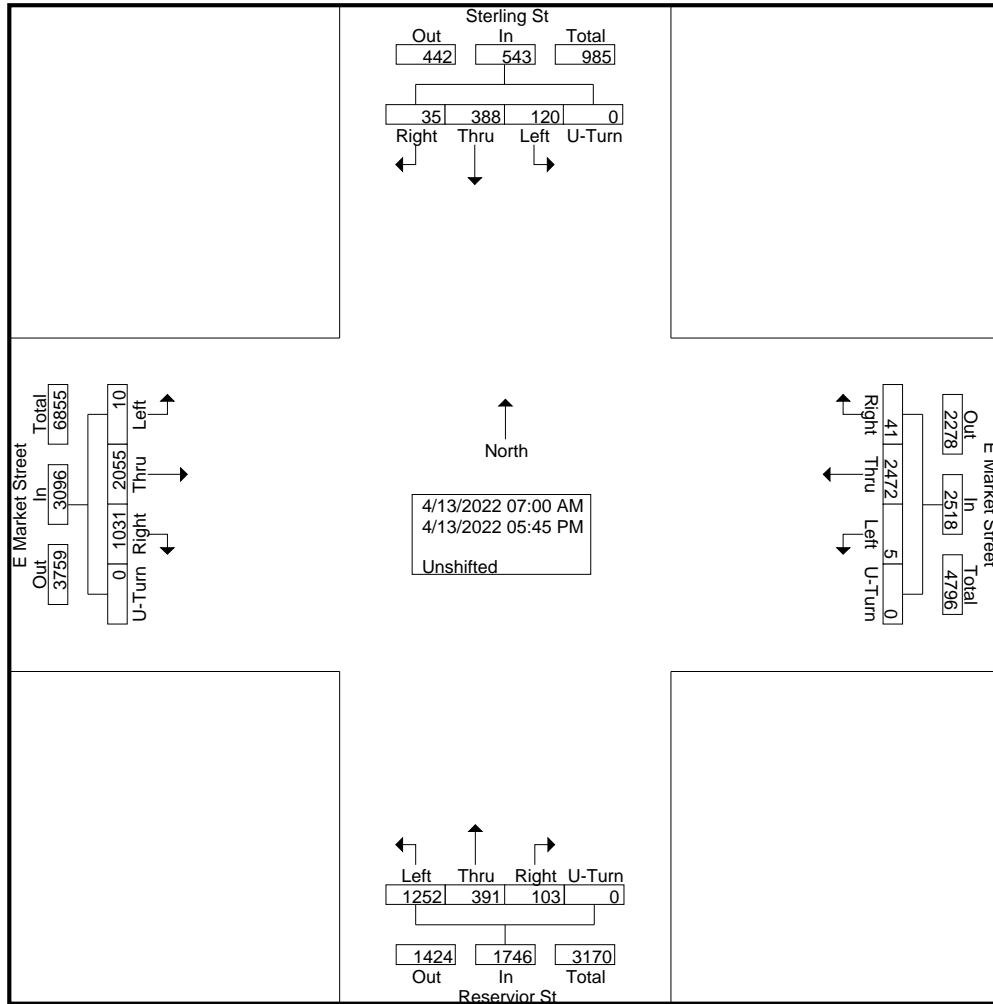
Phone: 703-914-4850

File Name : 4. E Market St @ Reservoir St

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



MCV Associates, Inc.

4605-C Pinecrest Office Park Dr

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Phone: 703-914-4850

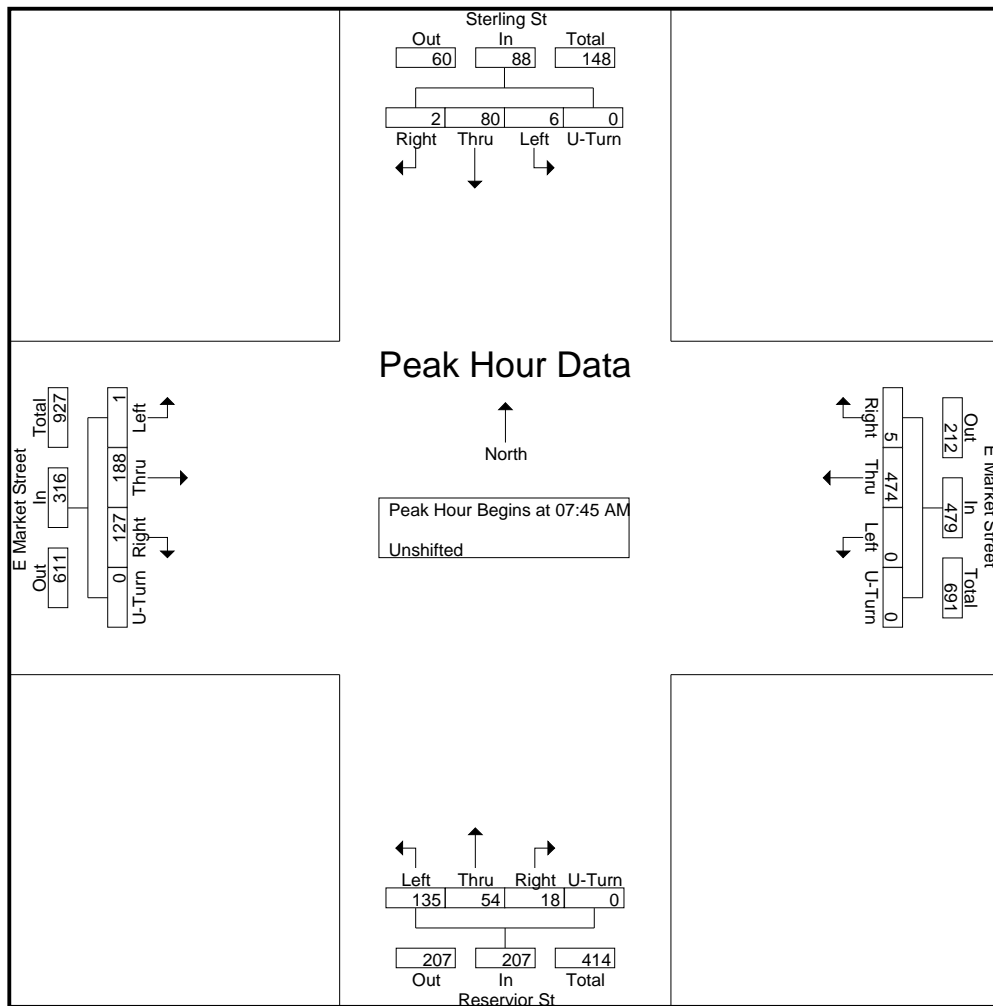
File Name : 4. E Market St @ Reservoir St

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	Sterling St From North					E Market Street From East					Reservoir St From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	1	14	1	0	16	0	127	0	0	127	33	15	9	0	57	0	49	40	0	89	289
08:00 AM	3	36	1	0	40	0	104	2	0	106	29	14	4	0	47	0	55	36	0	91	284
08:15 AM	0	19	0	0	19	0	131	3	0	134	38	18	4	0	60	1	42	29	0	72	285
08:30 AM	2	11	0	0	13	0	112	0	0	112	35	7	1	0	43	0	42	22	0	64	232
Total Volume	6	80	2	0	88	0	474	5	0	479	135	54	18	0	207	1	188	127	0	316	1090
% App. Total	6.8	90.9	2.3	0		0	99	1	0		65.2	26.1	8.7	0		0.3	59.5	40.2	0		
PHF	.500	.556	.500	.000	.550	.000	.905	.417	.000	.894	.888	.750	.500	.000	.863	.250	.855	.794	.000	.868	.943



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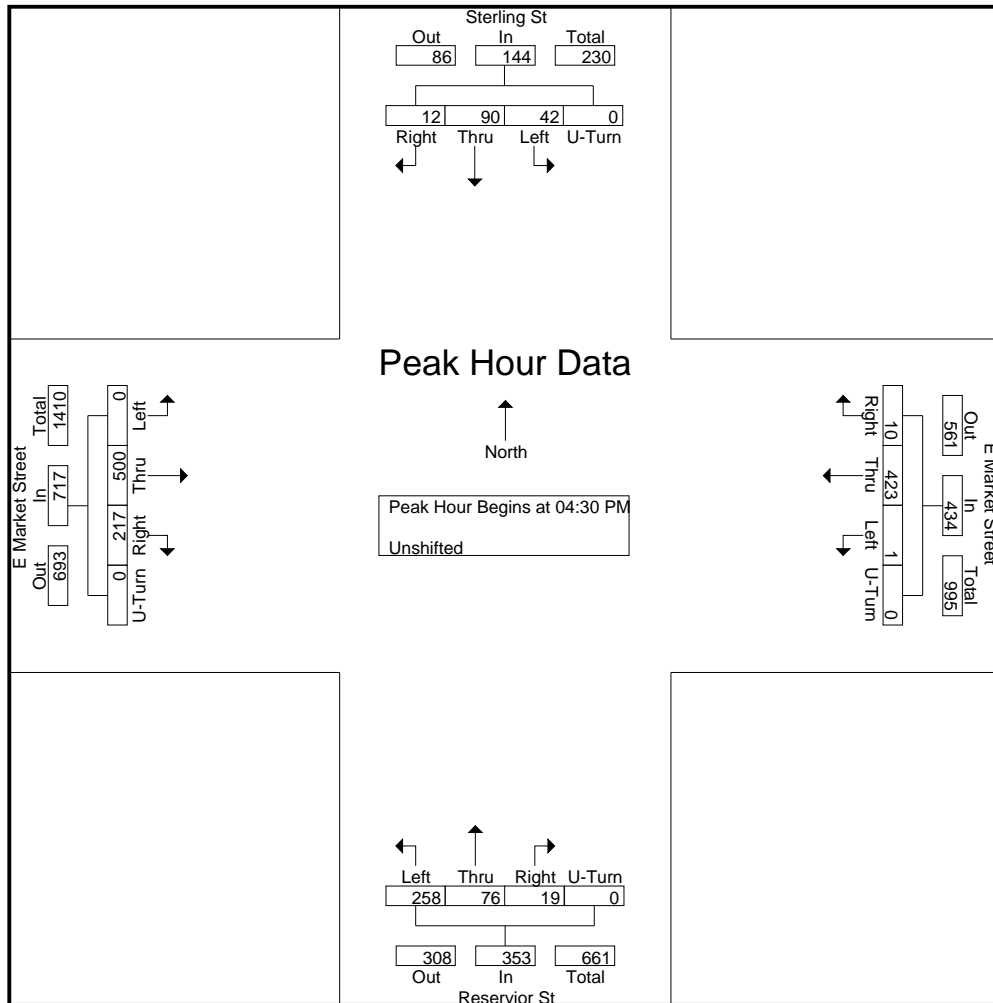
File Name : 4. E Market St @ Reservoir St

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Sterling St From North					E Market Street From East					Reservoir St From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	7	20	3	0	30	1	102	1	0	104	69	14	6	0	89	0	118	52	0	170	393
04:45 PM	8	15	3	0	26	0	110	6	0	116	55	20	4	0	79	0	112	43	0	155	376
05:00 PM	16	32	4	0	52	0	106	3	0	109	68	20	6	0	94	0	154	60	0	214	469
05:15 PM	11	23	2	0	36	0	105	0	0	105	66	22	3	0	91	0	116	62	0	178	410
Total Volume	42	90	12	0	144	1	423	10	0	434	258	76	19	0	353	0	500	217	0	717	1648
% App. Total	29.2	62.5	8.3	0		0.2	97.5	2.3	0		73.1	21.5	5.4	0		0	69.7	30.3	0		
PHF	.656	.703	.750	.000	.692	.250	.961	.417	.000	.935	.935	.864	.792	.000	.939	.000	.812	.875	.000	.838	.878



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File Name : 5. E Market St @ Hill St

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Hill Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	2	0	0	0	2	0	50	1	0	51	0	0	0	0	0	1	45	0	0	46	99
07:15 AM	2	0	0	0	2	0	98	1	0	99	0	0	0	0	0	1	53	0	0	54	155
07:30 AM	7	0	0	0	7	0	118	6	0	124	0	0	0	0	0	0	46	0	0	46	177
07:45 AM	4	0	1	0	5	0	121	12	0	133	0	0	0	0	0	2	57	0	0	59	197
Total	15	0	1	0	16	0	387	20	0	407	0	0	0	0	0	4	201	0	0	205	628
08:00 AM	6	0	0	0	6	0	115	8	0	123	0	0	0	0	0	1	62	0	0	63	192
08:15 AM	6	0	0	0	6	0	126	2	0	128	0	0	0	0	0	1	43	0	0	44	178
08:30 AM	3	0	3	0	6	0	112	4	0	116	0	0	0	0	0	0	42	0	0	42	164
08:45 AM	3	0	0	0	3	0	93	5	0	98	0	0	0	0	0	0	60	0	0	60	161
Total	18	0	3	0	21	0	446	19	0	465	0	0	0	0	0	2	207	0	0	209	695
02:00 PM	5	0	0	0	5	0	94	4	0	98	0	0	0	0	0	1	111	0	0	112	215
02:15 PM	4	0	1	0	5	0	106	6	0	112	0	0	0	0	0	0	113	0	0	113	230
02:30 PM	2	0	0	0	2	0	107	3	0	110	0	0	0	0	0	0	112	0	0	112	224
02:45 PM	7	0	0	0	7	0	108	8	0	116	0	0	0	0	0	3	94	0	0	97	220
Total	18	0	1	0	19	0	415	21	0	436	0	0	0	0	0	4	430	0	0	434	889
03:00 PM	6	0	0	0	6	0	103	6	0	109	0	0	0	0	0	1	99	0	0	100	215
03:15 PM	5	0	0	0	5	0	88	5	0	93	0	0	0	0	0	0	117	0	0	117	215
03:30 PM	3	0	1	0	4	0	118	2	0	120	0	0	0	0	0	4	98	0	0	102	226
03:45 PM	5	0	2	0	7	0	112	3	0	115	0	0	0	0	0	0	108	0	0	108	230
Total	19	0	3	0	22	0	421	16	0	437	0	0	0	0	0	5	422	0	0	427	886
04:00 PM	8	0	0	0	8	0	101	3	0	104	0	0	0	0	0	3	120	0	0	123	235
04:15 PM	6	0	0	0	6	0	104	5	0	109	0	0	0	0	0	1	128	0	0	129	244
04:30 PM	13	0	1	0	14	0	99	6	0	105	0	0	0	0	0	2	129	0	0	131	250
04:45 PM	6	0	0	0	6	0	111	7	0	118	0	0	0	0	0	2	123	0	0	125	249
Total	33	0	1	0	34	0	415	21	0	436	0	0	0	0	0	8	500	0	0	508	978
05:00 PM	26	0	1	0	27	0	119	5	0	124	0	0	0	0	0	0	175	0	0	175	326
05:15 PM	7	0	1	0	8	0	90	6	0	96	0	0	0	0	0	3	121	0	0	124	228
05:30 PM	4	0	1	0	5	0	108	2	0	110	0	0	0	0	0	2	97	0	0	99	214
05:45 PM	6	0	2	0	8	0	86	3	0	89	0	0	0	0	0	1	84	0	0	85	182
Total	43	0	5	0	48	0	403	16	0	419	0	0	0	0	0	6	477	0	0	483	950
Grand Total	146	0	14	0	160	0	2487	113	0	2600	0	0	0	0	0	29	2237	0	0	2266	5026
Apprch %	91.2	0	8.8	0		0	95.7	4.3	0		0	0	0	0		1.3	98.7	0	0		
Total %	2.9	0	0.3	0	3.2	0	49.5	2.2	0	51.7	0	0	0	0	0	0.6	44.5	0	0	45.1	

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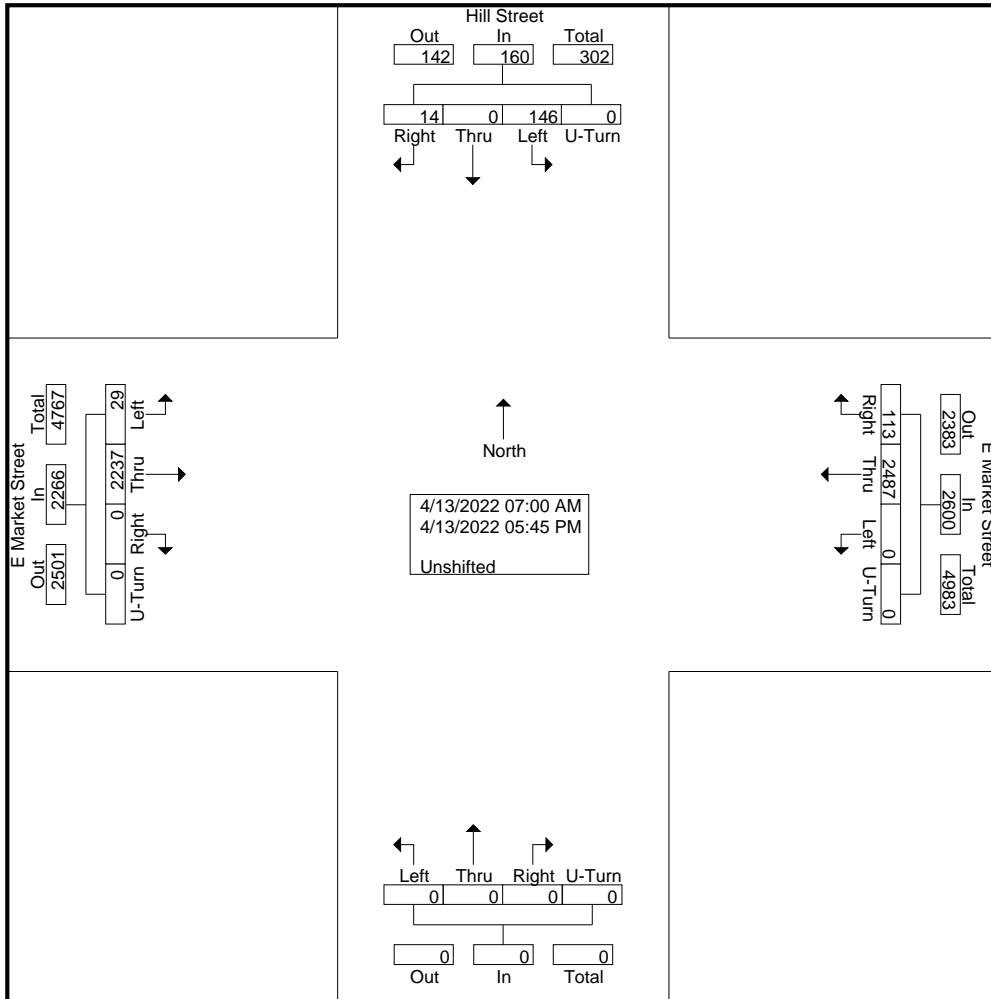
Phone: 703-914-4850

File Name : 5. E Market St @ Hill St

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



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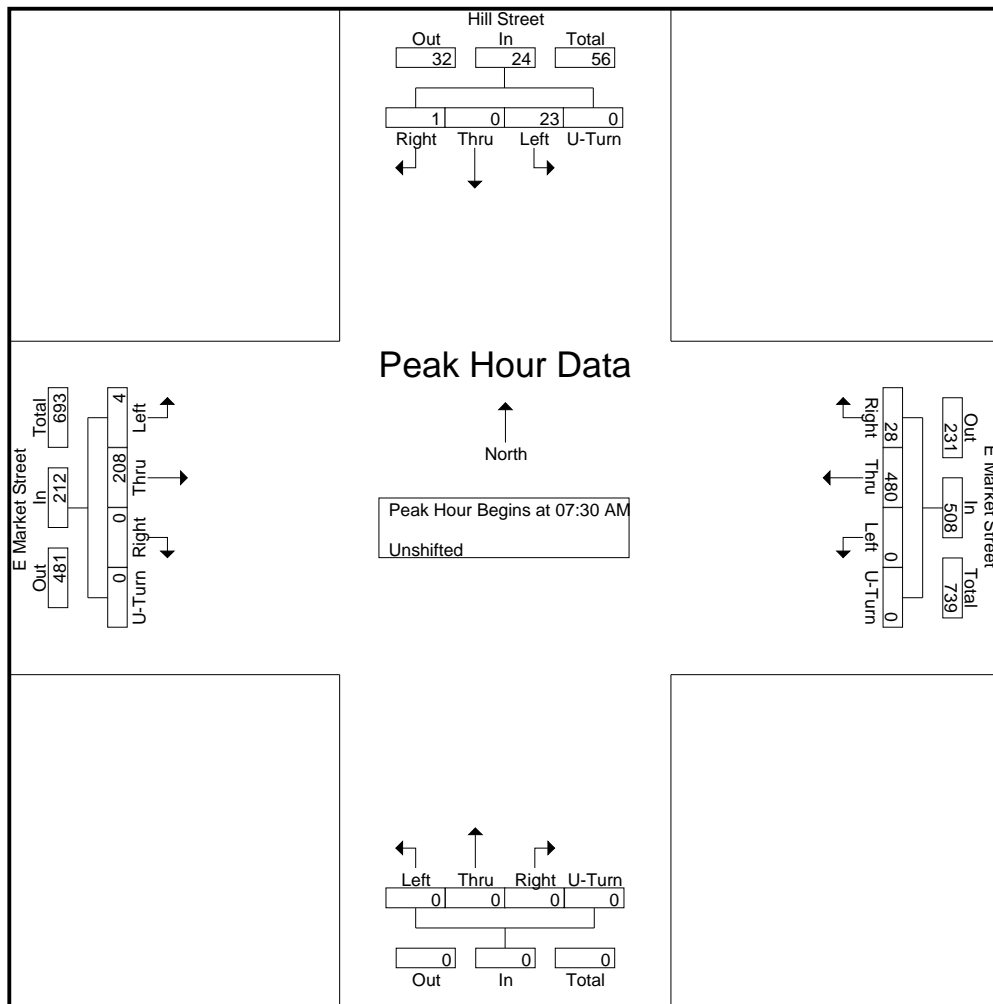
File Name : 5. E Market St @ Hill St

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	Hill Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	7	0	0	0	7	0	118	6	0	124	0	0	0	0	0	0	46	0	0	46	177
07:45 AM	4	0	1	0	5	0	121	12	0	133	0	0	0	0	0	2	57	0	0	59	197
08:00 AM	6	0	0	0	6	0	115	8	0	123	0	0	0	0	0	1	62	0	0	63	192
08:15 AM	6	0	0	0	6	0	126	2	0	128	0	0	0	0	0	1	43	0	0	44	178
Total Volume	23	0	1	0	24	0	480	28	0	508	0	0	0	0	0	4	208	0	0	212	744
% App. Total	95.8	0	4.2	0		0	94.5	5.5	0		0	0	0	0		1.9	98.1	0	0		
PHF	.821	.000	.250	.000	.857	.000	.952	.583	.000	.955	.000	.000	.000	.000	.000	.500	.839	.000	.000	.841	.944



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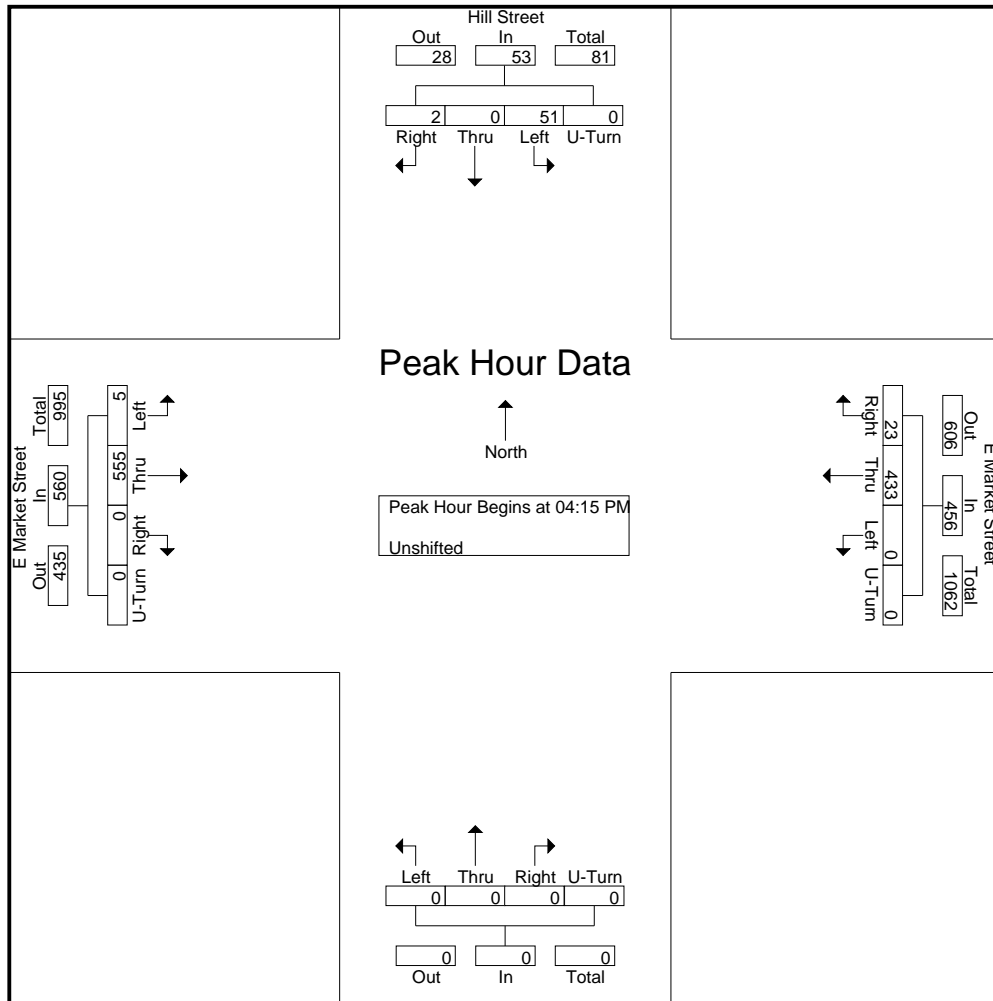
File Name : 5. E Market St @ Hill St

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Hill Street From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	6	0	0	0	6	0	104	5	0	109	0	0	0	0	0	1	128	0	0	129	244
04:30 PM	13	0	1	0	14	0	99	6	0	105	0	0	0	0	0	2	129	0	0	131	250
04:45 PM	6	0	0	0	6	0	111	7	0	118	0	0	0	0	0	2	123	0	0	125	249
05:00 PM	26	0	1	0	27	0	119	5	0	124	0	0	0	0	0	0	175	0	0	175	326
Total Volume	51	0	2	0	53	0	433	23	0	456	0	0	0	0	0	5	555	0	0	560	1069
% App. Total	96.2	0	3.8	0		0	95	5	0		0	0	0	0		0.9	99.1	0	0		
PHF	.490	.000	.500	.000	.491	.000	.910	.821	.000	.919	.000	.000	.000	.000	.000	.625	.793	.000	.000	.800	.820



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File Name : 6. E Market St @ Old Furnace Rd

Site Code : J 968

Start Date : 4/13/2022

Page No : 1

Groups Printed- Unshifted

Start Time	Old Furnace Road From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
07:00 AM	5	0	13	0	18	0	38	8	0	46	0	0	0	0	0	1	47	0	0	48	112
07:15 AM	3	0	38	0	41	1	71	4	0	76	0	0	0	0	0	6	44	0	0	50	167
07:30 AM	8	0	32	0	40	0	88	10	1	99	0	0	0	0	0	7	45	0	1	53	192
07:45 AM	8	0	27	0	35	0	109	11	0	120	0	0	0	0	0	11	48	0	0	59	214
Total	24	0	110	0	134	1	306	33	1	341	0	0	0	0	0	25	184	0	1	210	685
08:00 AM	5	0	17	0	22	1	112	7	0	120	0	0	0	0	0	9	61	0	0	70	212
08:15 AM	6	0	18	0	24	0	118	11	0	129	0	0	1	0	1	7	43	0	0	50	204
08:30 AM	15	0	21	0	36	0	93	15	0	108	0	0	0	0	0	5	44	0	0	49	193
08:45 AM	10	0	14	0	24	0	84	6	0	90	0	0	0	0	0	10	56	0	0	66	180
Total	36	0	70	0	106	1	407	39	0	447	0	0	1	0	1	31	204	0	0	235	789
02:00 PM	21	0	9	0	30	1	97	19	1	118	0	0	1	0	1	12	102	0	0	114	263
02:15 PM	11	0	18	0	29	2	91	17	0	110	0	0	0	0	0	11	103	0	0	114	253
02:30 PM	10	0	13	0	23	0	96	24	0	120	0	0	0	0	0	16	102	0	0	118	261
02:45 PM	13	0	21	0	34	0	103	22	0	125	0	0	0	0	0	11	89	0	0	100	259
Total	55	0	61	0	116	3	387	82	1	473	0	0	1	0	1	50	396	0	0	446	1036
03:00 PM	7	0	16	0	23	1	85	19	0	105	0	0	0	0	0	17	89	0	0	106	234
03:15 PM	8	0	10	0	18	0	79	14	1	94	0	0	0	0	0	21	104	0	0	125	237
03:30 PM	11	2	12	0	25	0	112	22	0	134	0	0	0	0	0	18	83	0	0	101	260
03:45 PM	21	0	13	0	34	0	106	26	0	132	0	0	1	0	1	14	99	0	0	113	280
Total	47	2	51	0	100	1	382	81	1	465	0	0	1	0	1	70	375	0	0	445	1011
04:00 PM	17	1	24	0	42	0	76	28	0	104	0	0	0	0	0	24	108	0	0	132	278
04:15 PM	12	1	14	0	27	1	96	31	0	128	0	0	0	0	0	18	118	0	1	137	292
04:30 PM	21	0	11	1	33	1	91	23	0	115	0	0	0	0	0	30	116	0	0	146	294
04:45 PM	22	0	12	0	34	1	109	32	0	142	1	0	0	0	1	18	114	0	0	132	309
Total	72	2	61	1	136	3	372	114	0	489	1	0	0	0	1	90	456	0	1	547	1173
05:00 PM	21	0	17	0	38	2	106	26	0	134	0	0	0	0	0	40	169	1	0	210	382
05:15 PM	14	0	5	0	19	0	89	17	0	106	0	0	2	0	2	25	108	0	0	133	260
05:30 PM	20	0	9	0	29	2	102	25	0	129	0	0	0	0	0	23	83	0	0	106	264
05:45 PM	13	0	10	0	23	1	79	15	0	95	0	0	1	0	1	15	80	0	0	95	214
Total	68	0	41	0	109	5	376	83	0	464	0	0	3	0	3	103	440	1	0	544	1120
Grand Total	302	4	394	1	701	14	2230	432	3	2679	1	0	6	0	7	369	2055	1	2	2427	5814
Apprch %	43.1	0.6	56.2	0.1		0.5	83.2	16.1	0.1		14.3	0	85.7	0		15.2	84.7	0	0.1		
Total %	5.2	0.1	6.8	0	12.1	0.2	38.4	7.4	0.1	46.1	0	0	0.1	0	0.1	6.3	35.3	0	0	41.7	

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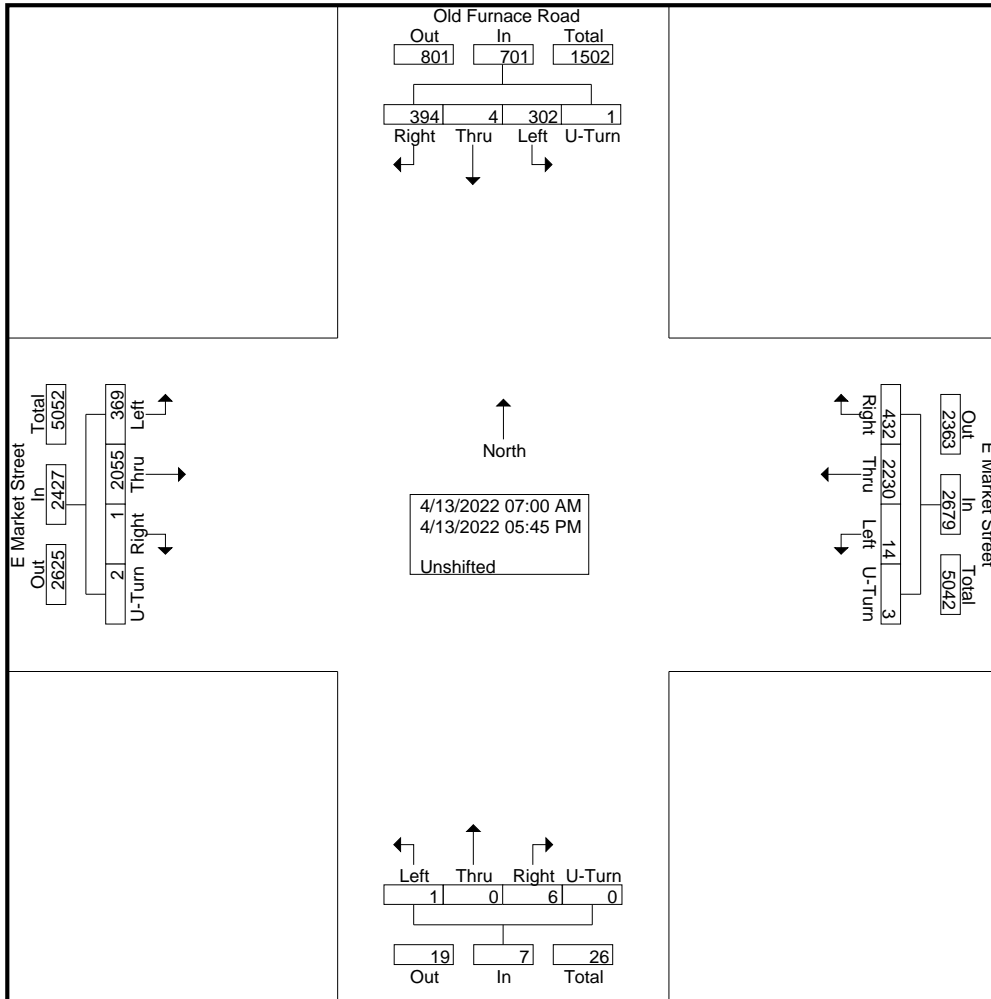
Phone: 703-914-4850

File Name : 6. E Market St @ Old Furnace Rd

Site Code : J 968

Start Date : 4/13/2022

Page No : 2



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Phone: 703-914-4850

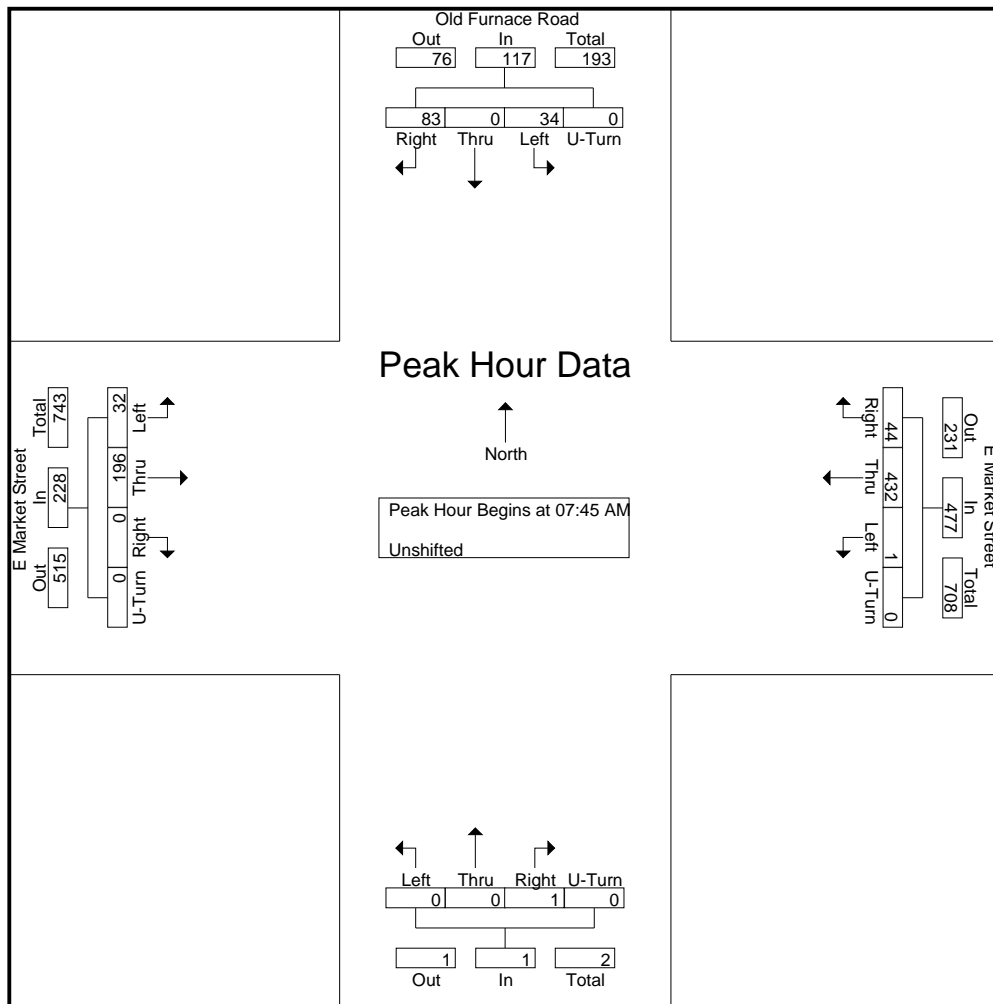
File Name : 6. E Market St @ Old Furnace Rd

Site Code : J 968

Start Date : 4/13/2022

Page No : 3

Start Time	Old Furnace Road From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	8	0	27	0	35	0	109	11	0	120	0	0	0	0	0	11	48	0	0	59	214
08:00 AM	5	0	17	0	22	1	112	7	0	120	0	0	0	0	0	9	61	0	0	70	212
08:15 AM	6	0	18	0	24	0	118	11	0	129	0	0	1	0	1	7	43	0	0	50	204
08:30 AM	15	0	21	0	36	0	93	15	0	108	0	0	0	0	0	5	44	0	0	49	193
Total Volume	34	0	83	0	117	1	432	44	0	477	0	0	1	0	1	32	196	0	0	228	823
% App. Total	29.1	0	70.9	0		0.2	90.6	9.2	0		0	0	100	0		14	86	0	0		
PHF	.567	.000	.769	.000	.813	.250	.915	.733	.000	.924	.000	.000	.250	.000	.250	.727	.803	.000	.000	.814	.961



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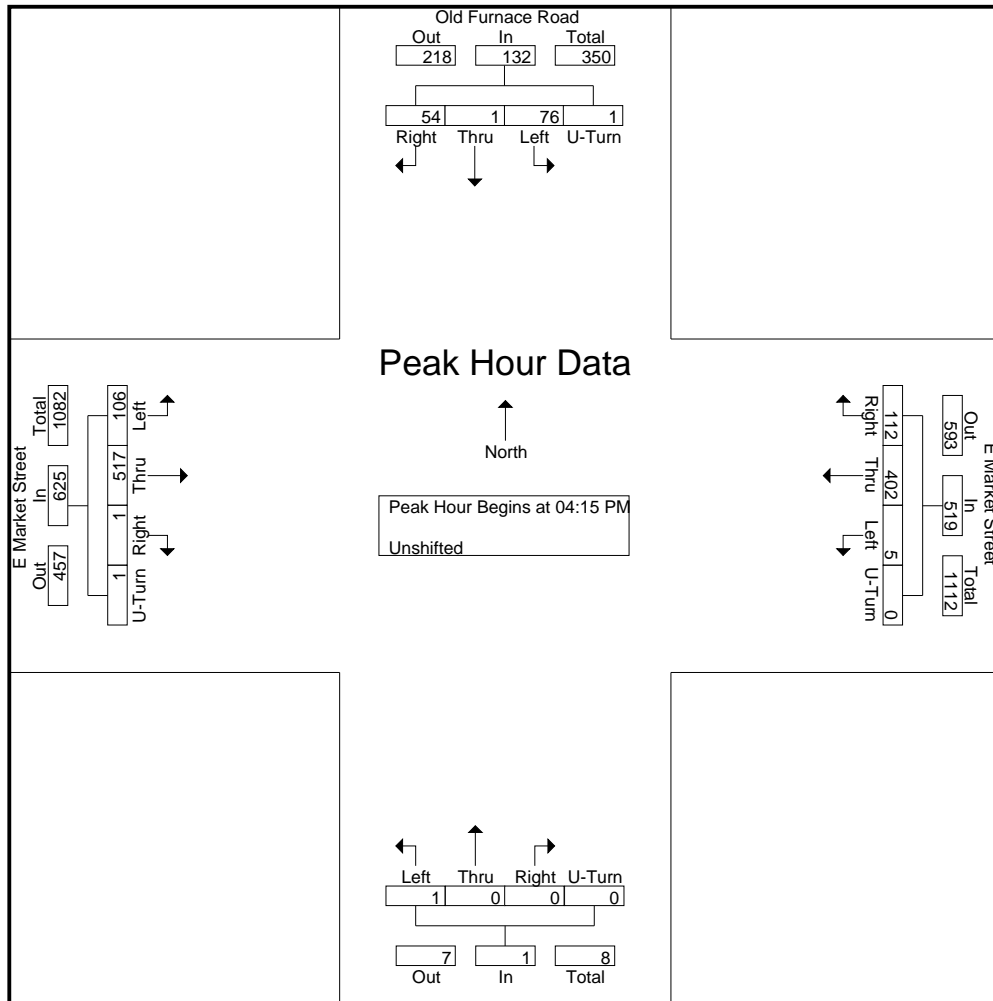
File Name : 6. E Market St @ Old Furnace Rd

Site Code : J 968

Start Date : 4/13/2022

Page No : 4

Start Time	Old Furnace Road From North					E Market Street From East					From South					E Market Street From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	12	1	14	0	27	1	96	31	0	128	0	0	0	0	0	18	118	0	1	137	292
04:30 PM	21	0	11	1	33	1	91	23	0	115	0	0	0	0	0	30	116	0	0	146	294
04:45 PM	22	0	12	0	34	1	109	32	0	142	1	0	0	0	1	18	114	0	0	132	309
05:00 PM	21	0	17	0	38	2	106	26	0	134	0	0	0	0	0	40	169	1	0	210	382
Total Volume	76	1	54	1	132	5	402	112	0	519	1	0	0	0	1	106	517	1	1	625	1277
% App. Total	57.6	0.8	40.9	0.8		1	77.5	21.6	0		100	0	0	0		17	82.7	0.2	0.2		
PHF	.864	.250	.794	.250	.868	.625	.922	.875	.000	.914	.250	.000	.000	.000	.250	.663	.765	.250	.250	.744	.836



Attachment B

VDOT Turn Lane Warrants



WARRANT FOR LEFT-TURN STORAGE LANES ON TWO-LANE HIGHWAY

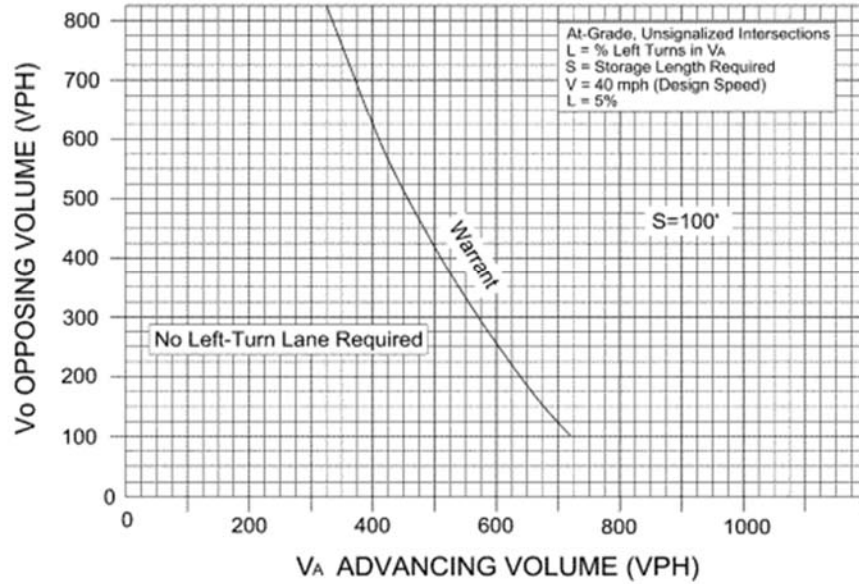


FIGURE 3-4 WARRANT FOR LEFT TURN STORAGE LANES ON TWO LANE HIGHWAY

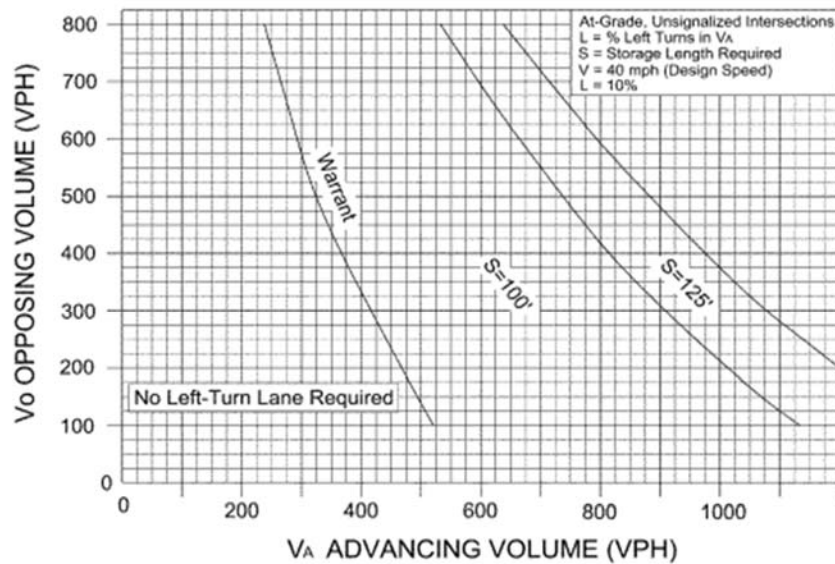


FIGURE 3-5 WARRANT FOR LEFT TURN STORAGE LANES ON TWO LANE HIGHWAY

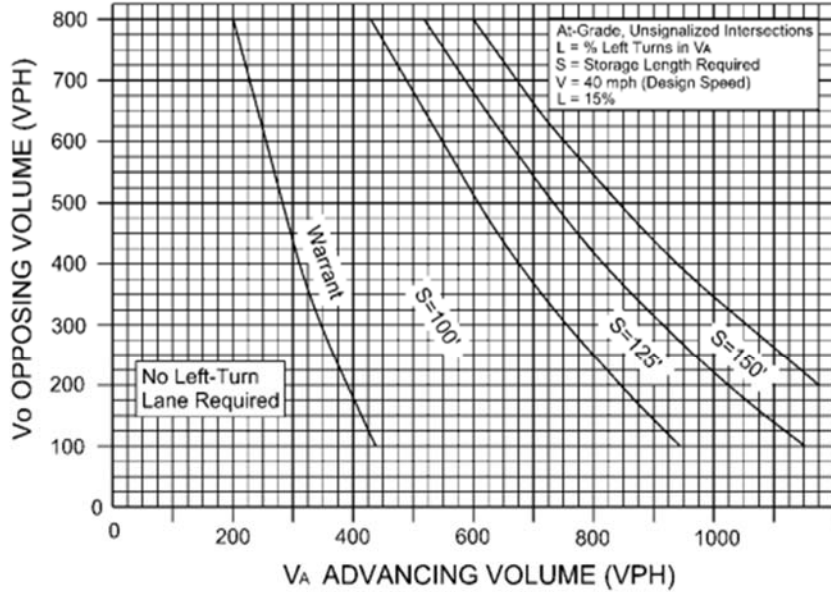


FIGURE 3-6 WARRANT FOR LEFT TURN STORAGE LANES ON TWO LANE HIGHWAY

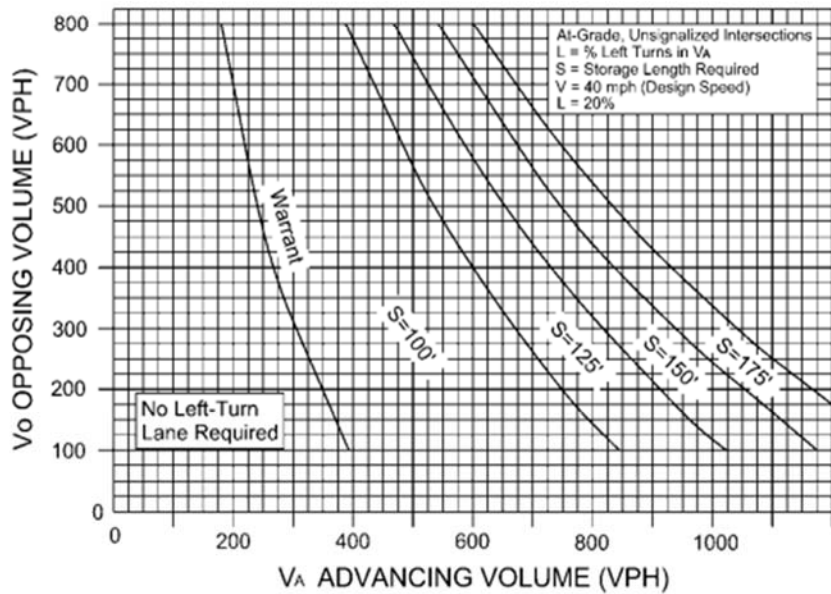


FIGURE 3-7 WARRANT FOR LEFT TURN STORAGE LANES ON TWO LANE HIGHWAY

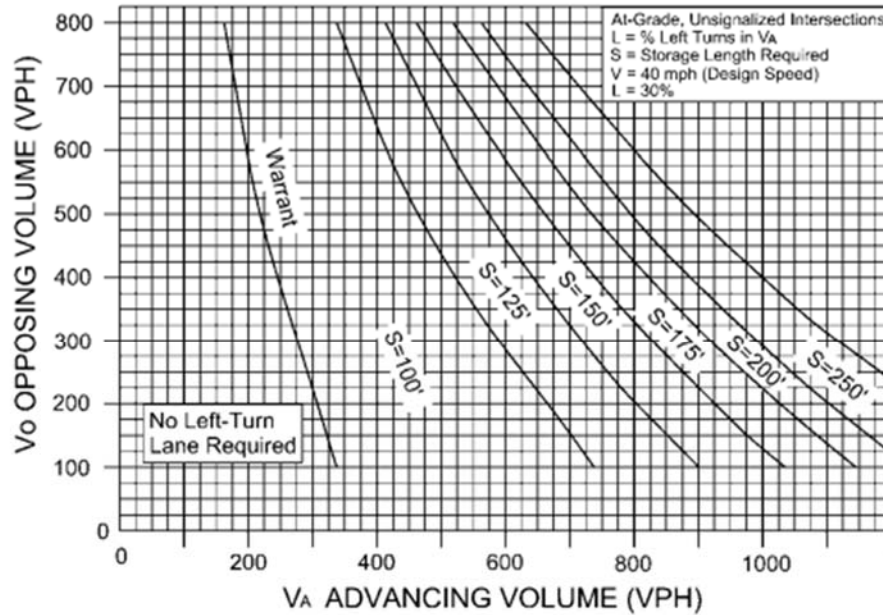


FIGURE 3-8 WARRANT FOR LEFT TURN STORAGE LANES ON TWO LANE HIGHWAY

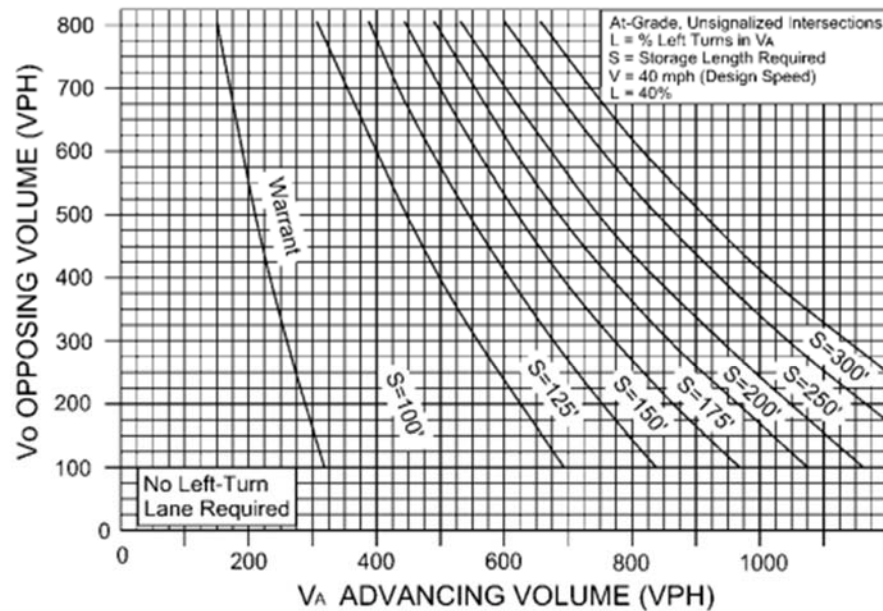


FIGURE 3-9 WARRANT FOR LEFT TURN STORAGE LANES ON TWO LANE HIGHWAY

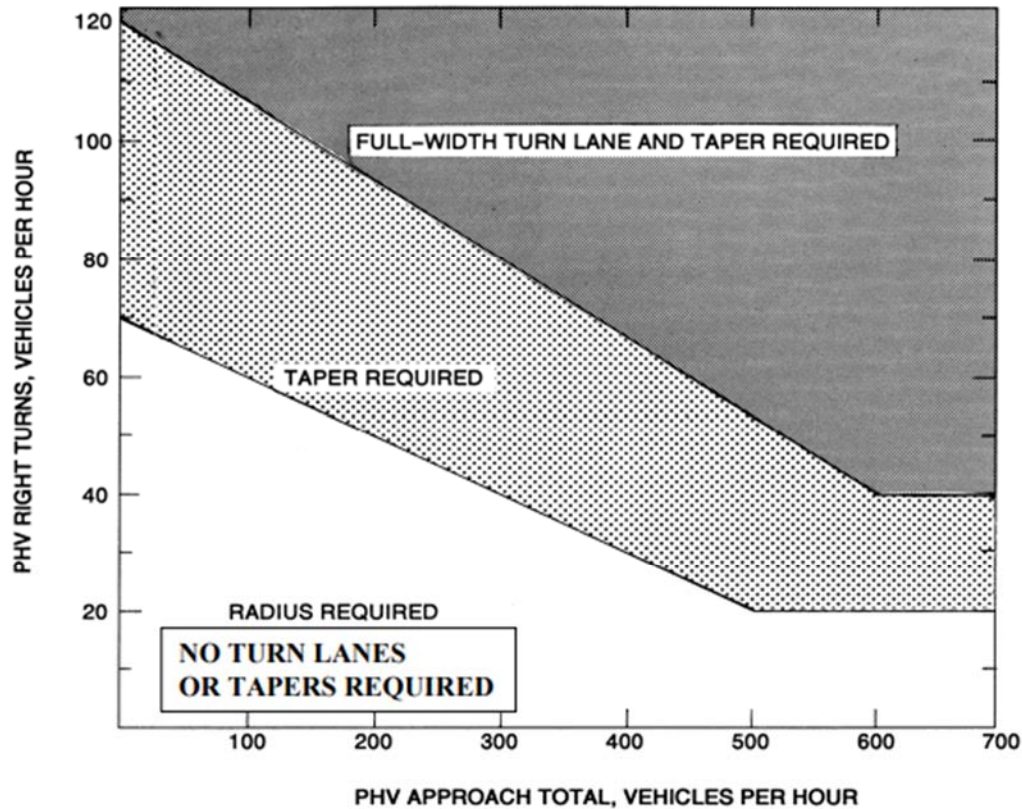


FIGURE 3-26 WARRANTS FOR RIGHT TURN TREATMENT (2-LANE HIGHWAY)

Appropriate Radius required at all Intersections and Entrances (Commercial or Private).

LEGEND

PHV - Peak Hour Volume (also Design Hourly Volume equivalent)

Adjustment for Right Turns

For posted speeds at or under 45 mph, PHV right turns > 40, and PHV total < 300.

Adjusted right turns = PHV Right Turns - 20

If PHV is not known use formula: $PHV = ADT \times K \times D$

K = the percent of AADT occurring in the peak hour

D = the percent of traffic in the peak direction of flow

Note: An average of 11% for K x D will suffice.

When right turn facilities are warranted, see [Figure 3-1](#) for design criteria.



Growth & Accessibility Planning

TECHNICAL ASSISTANCE PROGRAM

Continuous Two-Way Left-Turn Lanes (TWLTL's)

Continuous two-way left-turn lanes (TWLTL's) should be considered on low-speed arterial highways (25 to 45 MPH) with no heavy concentrations of left-turn traffic. TWLTL's also may be used where an arterial or major route must pass through a developed area having numerous street intersections and entrances, and where it is impractical to limit left turns. The minimum width for this application shall be 13 feet, which is an 11 foot lane plus 2 feet for a solid yellow line and a dotted yellow line on each side of the 11 foot lane.

TWLTL's shall only be used with roadways having a maximum of 2 through lanes in each direction, and shall be shown in accordance with [Figure 3-24](#).

Advantages are:

- Reduced travel time.
- Improved capacity.
- Flexibility of using as temporary detour during closure of through lane.
- Does not control or limit the number of left turns.
- Minimizes interference to through traffic lanes.
- Separates opposing traffic flows by one full lane.
- Public preference (both from drivers and owners of abutting properties.)
- Reduced accident frequency, particularly rear-end collisions.

Disadvantages:

- Poor visibility (corrected by using proper delineation)

Attachment C

Results by Movement

Table 15: Detailed analysis results – AM Peak

Intersection	Control	Reporting	AM Peak													
			No Build							Alternative						
			Mvmt	Storage Length (ft)	V/C	Delay (sec)	LOS	50th %ile Queue	95th %ile Queue	Mvmt	Storage Length (ft)	V/C	Delay (sec)	LOS	50th %ile Queue	95th %ile Queue
Garbers Church Rd and Erickson Ave	Signalized	HCM6	EBL	150	0.10	19.6	B	8	21	EBL	150	0.10	19.6	B	8	21
	Signalized	HCM6	EBTR		0.77	29.4	C	326	597	EBTR		0.77	29.4	C	326	597
	Signalized	HCM6	WBL	150	0.03	19.2	B	2	9	WBL	150	0.03	19.2	B	2	9
	Signalized	HCM6	WBTR		0.76	31.4	C	231	354	WBTR		0.76	31.4	C	231	354
	Signalized	HCM6	NBL	75	0.08	30.3	C	13	33	NBL	75	0.07	30.4	C	13	33
	Signalized	HCM6	NBTR		0.80	62.7	E	80	142	NBTR		0.80	62.7	E	80	142
	Signalized	HCM6	SBL	550	0.82	49.2	D	199	308	SBL	400	0.82	49.2	D	199	308
	Signalized	HCM6	SBTR		0.27	34.2	C	74	127	SBTR		0.30	36.2	D	74	127
	Signalized	HCM6	Overall			35.9	D			Overall			36.0	D		
Garbers Church Rd and HHS south entrance (signalized)	Signalized	HCM2000	EBL		0.19	31.9	C	8	26	EBL		0.19	31.9	C	8	26
	Signalized	HCM2000	EBR		0.02	30.8	C	0	21	EBR		0.02	30.8	C	0	21
	Signalized	HCM2000	NBL	200	0.13	2.9	A	9	20	NBL	200	0.13	3.2	A	9	20
	Signalized	HCM2000	NBT		0.19	2.8	A	30	44	NBT		0.36	3.8	A	68	109
	Signalized	HCM2000	SBTR		0.22	8.2	A	51	76	SBTR		0.42	10.4	B	113	182
	Signalized	HCM2000	Overall		0.23	6.3	A			Overall		0.43	7.7	A		
Garbers Church Rd and HHS inbound unsignalized entrance	Unsignalized	HCM2000	NBL	350	0.10	8.5	A		8	NBL	350	0.10	8.5	A		8
	Unsignalized	HCM2000	NBT		0.12	0.0	NA		0	NBT		0.24	0.0	NA		0
	Unsignalized	HCM2000	SBTR	300	0.14	0.0	NA		0	SBTR	300	0.25	0.0	NA		0
	Unsignalized	HCM2000	Overall			1.0	A			Overall			1.0	A		
Garbers Church Rd and HHS north entrance (signalized)	Signalized	HCM6	EBL		0.69	37.1	D	54	100	EBL		0.72	42.9	D	63	113
	Signalized	HCM6	EBR		0.44	33.4	C	0	10	EBR		0.45	38.5	D	0	10
	Signalized	HCM6	NBL	300	0.39	6.8	A	30	61	NBL	300	0.83	42.2	D	111	175
	Signalized	HCM6	NBT	300	0.12	3.3	A	22	41	NBT	300	0.22	3.7	A	49	91
	Signalized	HCM6	SBL	80	0.38	10.8	B	0	0	SBL		0.37	13.2	B	130	239
	Signalized	HCM6	SBTR		0.40	11.2	B	70	127	SBR	200	0.42	14.0	B	0	49
	Signalized	HCM6	Overall			11.9	B			Overall			19.3	B		
Garbers Church Rd and Bluestone ES inbound entrance	Unsignalized	HCM2000	NBTR		0.14	0.0	NA		0	NBTR		0.23	0.0	NA		0
	Unsignalized	HCM2000	SBLT		0.26	1.0	A		2	SBL	100	0.02	8.1	A		2
	Unsignalized	HCM2000	-							SBT		0.40	0.0	NA		0
	Unsignalized	HCM2000	Overall			0.2	A			Overall			0.2	A		
Garbers Church Rd and Heritage Center Way/Elementary School/Golf course	Unsignalized	HCM6	EBLTR		0.00	0.0	NA		0	EBLTR		0.00	0.0	NA		0
	Unsignalized	HCM6	WBLTR		0.01	10.8	B		0	WBLTR		0.02	12.8	B		3
	Unsignalized	HCM6	NBL	90	0.00	0.0	NA		0	NBLTR	90	0.00	0.0	NA		0
	Unsignalized	HCM6	NBTR		0.00	0.0	NA		0							
	Unsignalized	HCM6	SBL	125	0.03	8.1	A		3	SBL	125	0.03	8.1	A		3
	Unsignalized	HCM6	SBTR		0.00	0.0	NA		0	SBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	Overall			0.3	A			Overall			0.3	A		
Garbers Church Rd and Heritage Estates	Unsignalized	HCM6	WBLR		0.01	14.9	B		0	WBLR		0.01	19.9	C		0
	Unsignalized	HCM6	NBTR		0.00	0.0	NA		0	NBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLT		0.00	0.0	NA		0	SBLT		0.00	0.0	NA		0
	Unsignalized	HCM6	Overall			0.0	NA			Overall			0.1	A		
Garbers Church Rd and Park Lawn Dr	Unsignalized	HCM6	WBLR		0.13	15.2	C		10	WBLR		0.19	20.8	C		18
	Unsignalized	HCM6	NBTR		0.00	0.0	NA		0	NBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLT		0.00	8.0	A		0	SBLT		0.00	8.0	A		0
	Unsignalized	HCM6	Overall			0.7	A			Overall			1.0	A		
Garbers Church Rd and Rhianon Ln	Unsignalized	HCM6	EBLR		0.07	14.2	B		5	EBLR		0.08	16.5	C		8
	Unsignalized	HCM6	NBLT		0.00	8.9	A		0	NBLT		0.00	8.9	A		0
	Unsignalized	HCM6	SBTR		0.00	0.0	NA		0	SBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	Overall			0.4	A			Overall			0.5	A		
Garbers Church Rd and Lendale Ln	Unsignalized	HCM6	WBLR		0.08	14.0	B		8	WBLR		0.11	18.0	C		10
	Unsignalized	HCM6	NBTR		0.00	0.0	NA		0	NBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLT		0.00	0.0	NA		0	SBLT		0.00	0.0	NA		0
	Unsignalized	HCM6	Overall			0.5	A			Overall			0.6	A		
Garbers Church Rd and West Market St (both reconfigured)	Signalized	HCM2000	EBL	360	0.33	34.2	C	28	83	EBL	360	0.25	29.6	C	28	82
	Signalized	HCM2000	EBT		0.52	42.9	D	88	169	EBT		0.69	47.3	D	180	418
	Signalized	HCM2000	EBR	180	0.01	36.5	D	0	0	EBR	180	0.01	32.3	C	0	0
	Signalized	HCM2000	WBL	450	0.87	52.6	D	238	564	WBL	450	0.97	76.9	E	266	619
	Signalized	HCM2000	WBT		0.13	20.9	C	39	89	WBT		0.23	20.7	C	81	183
	Signalized	HCM2000	WBR	140	0.01	19.7	B	0	0	WBR		0.01	18.2	B	0	0
	Signalized	HCM2000	NBLT		0.39	41.5	D	51	94	NBLT		0.46	45.9	D	54	99
	Signalized	HCM2000	NBR		0.19	39.6	D	0	66	NBR	200	0.19	32.9	C	0	80
	Signalized	HCM2000	SBLT		0.73	51.3	D	116	277	SBLT		0.76	56.0	E	124	292
	Signalized	HCM2000	SBR	100	0.03	37.6	D	0	0	SBR	100	0.03	39.6	D	0	0
	Signalized	HCM2000	Overall		0.67	42.3	D			Overall		0.76	48.4	D		
West Market St and Stoneleigh Dr	Unsignalized	HCM6	EBT		0.00	0.0	NA		0	EBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	EBR	100	0.00	0.0	NA		0							
	Unsignalized	HCM6	WBL	260	0.04	11.8	B		3	WBL	260	0.04	8.9	A		3
	Unsignalized	HCM6	WBT		0.00	0.0	NA		0	WBT		0.00	0.0	NA		0
	Unsignalized	HCM6	NBLR		0.09	8.9	A		8	NBLR		0.12	14.8	B		10
	Unsignalized	HCM6	Overall			0.8	A			Overall			0.9	A		
West Market St and THMS/Westfield Ct	Signalized	HCM6	EBL	250	0.07	11.0	B	14	43	EBL	250	0.66	60.6	E	24	68
	Signalized	HCM6	EBT		0.29	16.8	B	166	294	EBT		0.94	62.3	E	319	728
	Signalized	HCM6	EBR	225	0.14	15.4	B	11	66	EBR	225	0.23	28.6	C	0	0
	Signalized	HCM6	WBL	500	0.39	12.3	B	85	179	WBL	500	0.86	55.6	E	129	283
	Signalized	HCM6	WBTR		0.26	14.5	B	144	248	WBTR		0.70	32.0	C	272	620
	Signalized	HCM6	NBLT		0.19	34.3	C	44	102	NBLT		0.24	40.6	D	34	86
	Signalized	HCM6	NBR		0.46	36.7	D	0	69	NBR		0.83	64.4	E	0	0
	Signalized	HCM6	SBLTR		0.63	40.7	D	160	270	SBLTR		0.89	64.6	E	142	243
	Signalized	HCM6	Overall			20.7	C			Overall			51.3	D		
West Market St and Brickstone Ct	Unsignalized	HCM6	EBL	100	0.01	9.2	A		0	EBL	100	0.01	9.2	A		0
	Unsignalized	HCM6	EBT		0.00	0.0	NA		0	EBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBTR		0.00	0.0	NA		0	WBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.48	38.1	E		58	SBLR		0.39	48.9	E		40
	Unsignalized	HCM6	Overall			2.4	A			Overall			1.6	A		
West Market St and Waterman Dr	Signalized	HCM6	EBL	150	0.28	9.7	A	27	108	EBL	150	0.79	42.0	D	55	202
	Signalized	HCM6	EBTR		0.31	5.8	A	88	262	EBTR		0.57	8.4	A	147	660
	Signalized	HCM6	WBLT		0.37	14.5	B	118	291	WBLT		0.68	20.3	C	22	

Table 16: Detailed analysis results – AM Peak (cont.)

Intersection	Control	Reporting	AM Peak													
			No Build							Alternative						
			Mvmt	Storage Length (ft)	V/C	Delay (sec)	LOS	50th %ile Queue	95th %ile Queue	Mvmt	Storage Length (ft)	V/C	Delay (sec)	LOS	50th %ile Queue	95th %ile Queue
West Market St and Dogwood Dr	Signalized	HCM6	EBLTR		0.41	7.8	A	132	316	EBL	100	0.03	9.5	A	3	19
	Signalized	HCM6	-							EBTR		0.78	14.4	B	361	834
	Signalized	HCM6	WBLTR		0.27	6.5	A	82	190	WBL	100	0.01	14.3	B	1	10
	Signalized	HCM6	-							WBLR		0.51	8.7	A	178	502
	Signalized	HCM6	NBLT		0.37	17.6	B	60	162	NBLT		0.37	17.6	B	59	174
	Signalized	HCM6	NBR	125	0.09	16.0	B	0	0	NBR	125	0.09	16.0	B	0	0
	Signalized	HCM6	SBLTR		0.24	16.7	B	16	82	SBLTR		0.24	16.7	B	16	74
	Signalized	HCM6	Overall		8.7	A			Overall		12.9	B				
West Market St and Willow St	Unsignalized	HCM6	EBLTR		0.02	8.4	A		3	EBL	100	0.02	8.4	A		3
	Unsignalized	HCM6	-							EBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	WBLTR		0.01	9.0	A		0	WBL	100	0.01	9.0	A		0
	Unsignalized	HCM6	-							WBLR		0.00	0.0	NA		0
	Unsignalized	HCM6	NBLTR		0.16	22.5	C		15	NBLTR		0.20	27.5	D		18
	Unsignalized	HCM6	SBLTR		0.10	17.1	C		8	SBLTR		0.12	19.7	C		10
	Unsignalized	HCM6	Overall		1.5	A			Overall		1.7	A				
West Market St and High St	Signalized	HCM6	EBL		0.63	61.0	E	103	164	EBL	200	0.63	61.0	E	103	164
	Signalized	HCM6	EBTR		0.95	65.5	E	221	391	EBTR		0.95	65.5	E	221	391
	Signalized	HCM6	WBL		0.24	33.9	C	13	33	WBL		0.24	33.9	C	13	33
	Signalized	HCM6	WBTR	320	0.57	39.0	D	109	180	WBTR	320	0.57	39.0	D	109	180
	Signalized	HCM6	NBL	150	0.76	40.7	D	61	175	NBL	150	0.76	40.7	D	61	175
	Signalized	HCM6	NBTR		0.58	29.3	C	179	298	NBTR		0.58	29.3	C	179	298
	Signalized	HCM6	SBL	130	0.09	20.6	C	8	22	SBL	130	0.09	20.6	C	8	22
	Signalized	HCM6	SBTR		0.93	56.4	E	376	508	SBTR		0.93	56.4	E	376	508
	Signalized	HCM6	Overall		45.9	D			Overall		45.9	D				
East Market St and Mason St	Signalized	HCM6	EBTR		0.11	17.2	B	31	62	EBTR		0.20	18.2	B	63	125
	Signalized	HCM6	WBL		0.31	12.5	B	39	60	WBL		0.32	12.6	B	38	43
	Signalized	HCM6	WBTR		0.46	1.9	A	61	87	WBTR		0.18	0.8	A	33	38
	Signalized	HCM6	-							WBR		0.28	1.2	A	51	59
	Signalized	HCM6	NBL		0.00	29.7	C	0	4	NBL		0.00	29.7	C	0	4
	Signalized	HCM6	NBTR		0.63	45.0	D	47	89	NBTR		0.63	45.0	D	47	89
	Signalized	HCM6	SBL		0.56	34.6	C	78	125	SBL		0.56	34.6	C	78	125
	Signalized	HCM6	SBTR		0.25	31.5	C	33	77	SBTR		0.25	31.5	C	33	78
		Signalized	HCM6	Overall		16.2	B			Overall		16.0	B			
East Market St and Broad St	Unsignalized	HCM6	EBLT		0.00	9.2	A		0	EBL	100	0.00	9.2	A		0
	Unsignalized	HCM6	EBT							EBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBTR		0.00	0.0	NA		0	WBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.09	17.6	C		8	SBLR		0.11	20.2	C		10
	Unsignalized	HCM6	Overall		0.5	A			Overall		0.6	A				
East Market St and Ott St	Unsignalized	HCM6	EBTR		0.00	0.0	NA		0	EBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	WBLT		0.03	8.2	A		3	WBL	100	0.03	8.2	A		3
	Unsignalized	HCM6	-							WBT		0.00	0.0	NA		0
	Unsignalized	HCM6	NBLR		0.06	11.4	B		5	NBLR		0.07	13.7	B		5
	Unsignalized	HCM6	Overall		0.7	A			Overall		0.6	A				
East Market St and Myrtle St	Unsignalized	HCM6	EBLT		0.02	9.4	A		0	EBL	100	0.02	9.4	A		0
	Unsignalized	HCM6	EBT							EBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBTR		0.00	0.0	NA		0	WBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.05	13.8	B		3	SBLR		0.06	17.1	C		5
	Unsignalized	HCM6	Overall		0.4	A			Overall		0.4	A				
East Market St and Reservoir/Sterling	Signalized	HCM2000	EBLTR		0.21	6.9	A	32	60	EBLT		0.26	20.0	B	86	135
	Signalized	HCM2000	-							EBR		0.10	39.8	D	1	28
	Signalized	HCM2000	WBLTR		0.35	14.3	B	110	183	WBLTR		0.66	20.5	C	257	502
	Signalized	HCM2000	NBLTR		0.72	40.1	D	138	202	NBLTR		0.73	41.5	D	139	211
	Signalized	HCM2000	SBLTR		0.61	44.3	D	61	111	SBLTR		0.57	42.4	D	61	108
	Signalized	HCM2000	Overall		0.47	19.5	B			Overall		0.67	28.4	C		
East Market St and Hill St	Unsignalized	HCM6	EBLT		0.01	8.9	A		0	EBLT		0.01	8.8	A		0
	Unsignalized	HCM6	WBTR		0.00	0.0	NA		0	WBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.08	15.6	C		8	SBLR		0.09	17.1	C		7
		Unsignalized	HCM6	Overall		0.5	A			Overall		0.6	A			
East Market St and Old Furnace Rd	Unsignalized	HCM6	EBL	65	0.04	8.8	A		3	EBL	65	0.04	8.8	A		3
	Unsignalized	HCM6	EBT		0.00	0.0	NA		0	EBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBT		0.00	0.0	NA		0	WBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBR	175	0.00	0.0	NA		0	WBR	175	0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.27	14.0	B		28	SBLR		0.33	17.0	C		35
	Unsignalized	HCM6	Overall		2.3	A			Overall		2.8	A				
East Market St and Vine/Hawkins	Signalized	HCM2000	EBLTR		0.18	51.1	D	16	42	EBLTR		0.18	51.1	D	16	42
	Signalized	HCM2000	WBL	200	0.32	6.6	A	15	12	WBL	200	0.32	6.6	A	15	12
	Signalized	HCM2000	WBLTR	200	0.29	4.2	A	0	0	WBLTR	200	0.29	4.2	A	0	0
	Signalized	HCM2000	NBL	150	0.04	32.3	C	7	22	NBL	150	0.04	32.3	C	7	22
	Signalized	HCM2000	NBT		0.95	73.4	E	201	310	NBT		0.95	73.4	E	201	310
	Signalized	HCM2000	NBR	250	0.82	69.2	E	144	269	NBR	250	0.82	69.2	E	144	269
	Signalized	HCM2000	SBL		0.07	33.2	C	7	22	SBL	100	0.07	33.2	C	7	22
	Signalized	HCM2000	SBTR	100	0.39	43.3	D	74	112	SBTR		0.39	43.3	D	74	112
	Signalized	HCM2000	Overall		0.46	47.8	D			Overall		0.46	47.8	D		
Garbers Church Rd and West Market St (reconfiguration on Garbers Church Only)	Signalized	HCM2000	EBL	360	0.33	34.2	C	28	83	EBL	360	0.26	29.6	C	28	82
	Signalized	HCM2000	EBT		0.52	42.9	D	88	169	EBT		0.36	36.3	D	87	165
	Signalized	HCM2000	EBR	180	0.01	36.5	D	0	0	EBR	180	0.01	32.3	C	0	0
	Signalized	HCM2000	WBL	450	0.87	52.6	D	238	564	WBL	450	0.97	76.9	E	266	619
	Signalized	HCM2000	WBT		0.13	20.9	C	39	89	WBT		0.12	19.2	B	40	89
	Signalized	HCM2000	WBR	140	0.01	19.7	B	0	0	WBR		0.01	18.2	B	0	0
	Signalized	HCM2000	NBLT		0.39	41.5	D	51	94	NBLT		0.46	45.9	D	54	99
	Signalized	HCM2000	NBR		0.19	39.6	D	0	66	NBR	200	0.19	32.9	C	0	80
	Signalized	HCM2000	SBLT		0.73	51.3	D	116	277	SBLT		0.76	56.0	E	124	292
	Signalized	HCM2000	SBR	100	0.03	37.6	D	0	0	SBR	100	0.03	39.6	D	0	0
	Signalized	HCM2000	Overall		0.67	42.3	D			Overall		0.66	46.3	D		
Garbers Church Rd and West Market St (reconfiguration on West Market Only)	Signalized	HCM2000	EBL	360	0.33	34.2	C	28	83	EBL	360	0.28	32.1	C	28	82
	Signalized	HCM2000	EBT		0.52	42.9	D	88	169	EBT		0.78	56.5	E	185	444
	Signalized	HCM2000	EBR	180	0.01	36.5	D	0	0	EBR	180	0.01	34.9	C	0	0
	Signalized	HCM2000	WBL	450	0.87	52.6	D	238	564	WBL	450					

Table 17: Detailed analysis results – PM Peak

Intersection	Control	Reporting	PM Peak													
			No Build							Alternative						
			Mvmt	Storage Length (ft)	V/C	Delay (sec)	LOS	50th %ile Queue	95th %ile Queue	Mvmt	Storage Length (ft)	V/C	Delay (sec)	LOS	50th %ile Queue	95th %ile Queue
Garbers Church Rd and Erickson Ave	Signalized	HCM6	EBL	150	0.07	24.7	C	3	12	EBL	150	0.07	24.7	C	3	12
	Signalized	HCM6	EBTR		0.48	23.2	C	158	290	EBTR		0.48	23.2	C	158	290
	Signalized	HCM6	WBL	150	0.01	17.5	B	2	8	WBL	150	0.01	17.5	B	2	8
	Signalized	HCM6	WBTR		0.91	45.3	D	347	678	WBTR		0.91	45.3	D	347	678
	Signalized	HCM6	NBL	75	0.26	29.2	C	40	90	NBL	75	0.26	29.2	C	40	90
	Signalized	HCM6	NBTR		0.87	73.6	E	117	256	NBTR		0.87	73.6	E	117	256
	Signalized	HCM6	SBL	550	0.84	48.0	D	152	304	SBL	400	0.84	48.0	D	152	304
	Signalized	HCM6	SBTR		0.35	35.2	D	81	159	SBTR		0.35	35.2	D	81	159
	Signalized	HCM6	Overall			42.4	D			Overall			42.4	D		
Garbers Church Rd and HHS south entrance (signalized)	Signalized	HCM2000	EBL		0.28	34.5	C	11	34	EBL		0.28	34.5	C	11	34
	Signalized	HCM2000	EBR		0.02	32.6	C	0	24	EBR		0.02	32.6	C	0	24
	Signalized	HCM2000	NBL	200	0.02	2.6	A	2	6	NBL	200	0.02	2.6	A	2	6
	Signalized	HCM2000	NBT		0.14	2.6	A	22	35	NBT		0.27	3.2	A	47	81
	Signalized	HCM2000	SBTR		0.18	5.7	A	23	73	SBTR		0.33	7.0	A	50	168
	Signalized	HCM2000	Overall		0.20	6.4	A			Overall		0.35	7.3	A		
Garbers Church Rd and HHS inbound unsignalized entrance	Unsignalized	HCM2000	NBL	350	0.01	8.0	A		1	NBL	350	0.01	8.1	A		1
	Unsignalized	HCM2000	NBT		0.12	0.0	NA		0	NBT		0.23	0.0	NA		0
	Unsignalized	HCM2000	SBTR	300	0.15	0.0	NA		0	SBTR	300	0.23	0.0	NA		0
	Unsignalized	HCM2000	Overall			0.1	A			Overall			0.1	A		
Garbers Church Rd and HHS north entrance (signalized)	Signalized	HCM6	EBL		0.52	34.4	C	38	77	EBL		0.56	38.7	D	42	83
	Signalized	HCM6	EBR		0.51	34.5	C	0	16	EBR		0.55	38.9	D	0	15
	Signalized	HCM6	NBL	300	0.06	4.8	A	5	15	NBL	300	0.62	47.2	D	21	51
	Signalized	HCM6	NBT	300	0.17	3.4	A	30	51	NBT	300	0.31	4.0	A	68	120
	Signalized	HCM6	SBL	80	0.00	0.0	NA	0	0	SBL		0.28	7.6	A	85	153
	Signalized	HCM6	SBTR		0.19	7.4	A	44	73	SBR	200	0.07	6.2	A	0	5
	Signalized	HCM6	Overall			9.8	A			Overall			12.4	B		
Garbers Church Rd and Bluestone ES inbound entrance	Unsignalized	HCM2000	NBTR		0.18	0.0	NA		0	NBTR		0.27	0.0	NA		0
	Unsignalized	HCM2000	SBLT		0.14	0.5	A		0	SBL	100	0.01	8.3	A		0
	Unsignalized	HCM2000	-							SBT		0.22	0.0	NA		0
	Unsignalized	HCM2000	Overall			0.1	A			Overall			0.1	A		
Garbers Church Rd and Heritage Center Way/Elementary School/Golf course	Unsignalized	HCM6	EBLTR		0.01	9.3	A		0	EBLTR		0.01	10.0	A		0
	Unsignalized	HCM6	WBLTR		0.26	14.7	B		25	WBLTR		0.32	17.7	C		33
	Unsignalized	HCM6	NBL	90	0.00	7.9	A		0	NBLTR	90	0.00	7.9	A		0
	Unsignalized	HCM6	NBTR		0.00	0.0	NA		0							
	Unsignalized	HCM6	SBL	125	0.03	8.4	A		3	SBL	125	0.03	8.4	A		3
	Unsignalized	HCM6	SBTR		0.00	0.0	NA		0	SBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	Overall			2.4	A			Overall			2.8	A		
Garbers Church Rd and Heritage Estates	Unsignalized	HCM6	WBLR		0.03	13.5	B		3	WBLR		0.03	15.0	B		3
	Unsignalized	HCM6	NBTR		0.00	0.0	NA		0	NBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLT		0.00	8.5	A		0	SBLT		0.00	8.5	A		0
	Unsignalized	HCM6	Overall			0.2	A			Overall			0.2	A		
Garbers Church Rd and Park Lawn Dr	Unsignalized	HCM6	WBLR		0.06	13.7	B		5	WBLR		0.07	15.1	C		5
	Unsignalized	HCM6	NBTR		0.00	0.0	NA		0	NBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLT		0.00	0.0	NA		0	SBLT		0.00	0.0	NA		0
	Unsignalized	HCM6	Overall			0.4	A			Overall			0.5	A		
Garbers Church Rd and Rhianon Ln	Unsignalized	HCM6	EBLR		0.03	11.2	B		3	EBLR		0.03	12.6	B		3
	Unsignalized	HCM6	NBLT		0.01	7.9	A		0	NBLT		0.01	7.9	A		0
	Unsignalized	HCM6	SBTR		0.00	0.0	NA		0	SBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	Overall			0.4	A			Overall			0.4	A		
Garbers Church Rd and Lendale Ln	Unsignalized	HCM6	WBLR		0.02	12.8	B		3	WBLR		0.02	14.0	B		3
	Unsignalized	HCM6	NBTR		0.00	0.0	NA		0	NBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLT		0.00	0.0	NA		0	SBLT		0.00	0.0	NA		0
	Unsignalized	HCM6	Overall			0.2	A			Overall			0.2	A		
Garbers Church Rd and West Market St (both reconfigured)	Signalized	HCM2000	EBL	360	0.17	22.2	C	16	58	EBL	360	0.16	20.6	C	16	58
	Signalized	HCM2000	EBT		0.34	28.6	C	74	166	EBT		0.59	33.1	C	148	369
	Signalized	HCM2000	EBR	180	0.02	25.3	C	0	0	EBR	180	0.02	23.7	C	0	0
	Signalized	HCM2000	WBL	450	0.64	43.4	D	83	187	WBL	450	0.77	56.3	E	84	259
	Signalized	HCM2000	WBT		0.29	21.7	C	77	170	WBT		0.56	27.1	C	165	406
	Signalized	HCM2000	WBR	140	0.02	19.1	B	0	0	WBR		0.02	19.2	B	0	0
	Signalized	HCM2000	NBLT		0.48	36.4	D	71	129	NBLT		0.48	36.3	D	69	126
	Signalized	HCM2000	NBR		0.15	33.4	C	0	50	NBR	200	0.14	37.2	D	0	78
	Signalized	HCM2000	SBLT		0.42	40.3	D	43	108	SBLT		0.42	40.3	D	41	106
	Signalized	HCM2000	SBR	100	0.05	37.4	D	0	0	SBR	100	0.05	37.4	D	0	0
	Signalized	HCM2000	Overall		0.45	30.5	C			Overall		0.61	34.6	C		
West Market St and Stoneleigh Dr	Unsignalized	HCM6	EBT		0.00	0.0	NA		0	EBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	EBR	100	0.00	0.0	NA		0							
	Unsignalized	HCM6	WBL	260	0.05	8.7	A		3	WBL	260	0.05	8.7	A		3
	Unsignalized	HCM6	WBT		0.00	0.0	NA		0	WBT		0.00	0.0	NA		0
	Unsignalized	HCM6	NBLR		0.06	10.6	B		5	NBLR		0.08	12.7	B		4
	Unsignalized	HCM6	Overall			0.7	A			Overall			0.8	A		
West Market St and THMS/Westfield Ct	Signalized	HCM6	EBL	250	0.23	9.7	A	25	99	EBL	250	0.78	39.6	D	53	171
	Signalized	HCM6	EBT		0.30	11.0	B	52	206	EBT		0.67	23.7	C	115	539
	Signalized	HCM6	EBR	225	0.02	9.3	A	0	0	EBR	225	0.03	14.3	B	0	0
	Signalized	HCM6	WBL	500	0.07	8.5	A	7	36	WBL	500	0.55	41.0	D	15	57
	Signalized	HCM6	WBTR		0.36	14.4	B	85	220	WBTR		0.87	40.7	D	210	613
	Signalized	HCM6	NBLT		0.08	21.3	C	11	46	NBLT		0.16	30.4	C	11	46
	Signalized	HCM6	NBR		0.29	22.5	C	0	0	NBR		0.48	33.4	C	0	0
	Signalized	HCM6	SBLTR		0.48	24.3	C	0	17	SBLTR		0.74	35.3	D	0	17
	Signalized	HCM6	Overall			14.2	B			Overall			33.3	C		
West Market St and Brickstone Ct	Unsignalized	HCM6	EBL	100	0.00	9.2	A		0	EBL	100	0.00	9.2	A		0
	Unsignalized	HCM6	EBT		0.00	0.0	NA		0	EBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBTR		0.00	0.0	NA		0	WBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.29	25.5	D		30	SBLR		0.39	36.1	E		43
	Unsignalized	HCM6	Overall			1.4	A			Overall			1.9	A		
West Market St and Waterman Dr	Signalized	HCM6	EBL	150	0.28	10.6	B	22	90	EBL	150	0.78	53.5	D	50	200
	Signalized	HCM6	EBTR		0.23	5.8	A	60	185	EBTR		0.42	7.2	A	107	405
	Signalized	HCM6	WBLT		0.52	15.2	B	162	430	WBLT		0.92	35.3	D	344	1002
	Signalized	HCM6														

Table 18: Detailed analysis results – PM Peak (cont.)

Intersection	Control	Reporting	PM Peak													
			No Build							Alternative						
			Mvmt	Storage Length (ft)	V/C	Delay (sec)	LOS	50th %ile Queue	95th %ile Queue	Mvmt	Storage Length (ft)	V/C	Delay (sec)	LOS	50th %ile Queue	95th %ile Queue
West Market St and Dogwood Dr	Signalized	HCM6	EBLTR		0.38	7.4	A	100	268	EBL	100	0.06	13.7	B	5	33
	Signalized	HCM6	-							EBTR		0.70	12.0	B	236	760
	Signalized	HCM6	WBLTR		0.40	7.5	A	113	323	WBL	100	0.07	13.2	B	6	38
	Signalized	HCM6	-							WBLR		0.73	12.7	B	263	827
	Signalized	HCM6	NBLT		0.32	17.3	B	44	122	NBLT		0.32	17.3	B	44	122
	Signalized	HCM6	NBR	125	0.21	16.6	B	0	0	NBR	125	0.21	16.6	B	0	0
	Signalized	HCM6	SBLTR		0.15	16.4	B	10	44	SBLTR		0.15	16.4	B	10	44
West Market St and Willow St	Signalized	HCM6	Overall		8.6	A				Overall		13.0	B			
	Unsignalized	HCM6	EBLTR		0.01	9.1	A		0	EBL	100	0.01	9.1	A		0
	Unsignalized	HCM6	-							EBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	WBLTR		0.03	8.9	A		3	WBL	100	0.03	8.9	A		3
	Unsignalized	HCM6	-							WBLR		0.00	0.0	NA		0
	Unsignalized	HCM6	NBLTR		0.35	38.6	E		35	NBLTR		0.42	50.5	F		45
	Unsignalized	HCM6	SBLTR		0.26	28.6	D		25	SBLTR		0.31	34.4	D		30
West Market St and High St	Unsignalized	HCM6	Overall		2.9	A				Overall		3.4	A			
	Signalized	HCM6	EBL		0.60	36.3	D	105	166	EBL	200	0.60	36.3	D	105	166
	Signalized	HCM6	EBTR		0.94	71.7	E	264	431	EBTR		0.94	71.7	E	264	431
	Signalized	HCM6	WBL		0.46	40.2	D	36	68	WBL		0.46	40.2	D	36	68
	Signalized	HCM6	WBTR	320	0.67	49.1	D	172	263	WBTR	320	0.67	49.1	D	172	263
	Signalized	HCM6	NBL	150	0.93	59.1	E	200	380	NBL	150	0.93	59.1	E	200	380
	Signalized	HCM6	NBTR		0.84	46.2	D	432	540	NBTR		0.84	46.8	D	432	540
East Market St and Mason St	Signalized	HCM6	SBL	130	0.83	51.1	D	97	246	SBL	130	0.83	51.1	D	97	246
	Signalized	HCM6	SBTR		0.84	51.9	D	362	475	SBTR		0.84	51.9	D	362	475
	Signalized	HCM6	Overall		51.5	D				Overall		51.5	D			
	Signalized	HCM6	EBTR		0.33	29.4	C	71	113	EBTR		0.58	33.3	C	146	267
	Signalized	HCM6	WBL		0.44	20.2	C	58	82	WBL		0.55	22.3	C	58	85
	Signalized	HCM6	WBTR		0.78	16.2	B	138	182	WBTR		0.31	7.7	A	73	107
	Signalized	HCM6	WBR							WBR		0.47	9.3	A	93	135
East Market St and Broad St	Signalized	HCM6	NBL		0.06	21.0	C	8	22	NBL		0.06	21.0	C	8	22
	Signalized	HCM6	NBTR		0.86	47.9	D	151	230	NBTR		0.86	47.9	D	151	230
	Signalized	HCM6	SBL		0.98	71.4	E	137	195	SBL		0.98	71.4	E	137	195
	Signalized	HCM6	SBTR		0.24	24.1	C	45	101	SBTR		0.24	24.1	C	45	101
	Signalized	HCM6	Overall		34.2	C				Overall		32.6	C			
	Unsignalized	HCM6	EBLT		0.02	9.6	A		3	EBL	100	0.02	9.6	A		3
	Unsignalized	HCM6	EBT							EBT		0.00	0.0	NA		0
East Market St and Ott St	Unsignalized	HCM6	WBTR		0.00	0.0	NA		0	WBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.41	36.4	E		45	SBLR		0.60	67.1	F		75
	Unsignalized	HCM6	Overall		1.8	A				Overall		3.2	A			
	Unsignalized	HCM6	EBTR		0.00	0.0	NA		0	EBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	WBLT		0.04	9.9	A		3	WBL	100	0.04	9.9	A		3
	Unsignalized	HCM6	WBT							WBT		0.00	0.0	NA		0
	Unsignalized	HCM6	NBLR		0.23	16.0	C		23	NBLR		0.37	25.8	D		40
East Market St and Myrtle St	Unsignalized	HCM6	Overall		1.2	A				Overall		1.5	A			
	Unsignalized	HCM6	EBLT		0.02	9.9	A		3	EBL	100	0.02	9.9	A		3
	Unsignalized	HCM6	EBT							EBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBTR		0.00	0.0	NA		0	WBTR		0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.08	22.6	C		8	SBLR		0.13	35.0	D		10
	Unsignalized	HCM6	Overall		0.4	A				Overall		0.4	A			
	Signalized	HCM2000	EBLTR		0.73	26.0	C	177	305	EBLT		0.92	41.8	D	374	566
East Market St and Reservoir/Sterling	Signalized	HCM2000	EBR							EBR		0.27	39.2	D	56	105
	Signalized	HCM2000	WBLTR		0.44	21.8	C	126	174	WBLTR		0.78	32.9	C	285	466
	Signalized	HCM2000	NBLTR		0.93	55.5	E	259	445	NBLTR		0.93	55.5	E	259	445
	Signalized	HCM2000	SBLTR		0.73	48.9	D	90	176	SBLTR		0.69	44.9	D	90	156
	Signalized	HCM2000	Overall		0.80	33.3	C			Overall		0.89	42.5	D		
	Unsignalized	HCM6	EBLT		0.01	8.7	A		0	EBLT		0.01	8.7	A		0
	Unsignalized	HCM6	WBTR		0.00	0.0	NA		0	WBTR		0.00	0.0	NA		0
East Market St and Hill St	Unsignalized	HCM6	SBLR		0.27	24.1	C		28	SBLR		0.40	38.2	E		45
	Unsignalized	HCM6	Overall		1.3	A				Overall		2.0	A			
	Unsignalized	HCM6	EBL	65	0.15	9.6	A		13	EBL	65	0.15	9.6	A		13
	Unsignalized	HCM6	EBT		0.00	0.0	NA		0	EBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBT		0.00	0.0	NA		0	WBT		0.00	0.0	NA		0
	Unsignalized	HCM6	WBR	175	0.00	0.0	NA		0	WBR	175	0.00	0.0	NA		0
	Unsignalized	HCM6	SBLR		0.69	47.2	E		113	SBLR		0.97	113.6	F		190
East Market St and Vine/Hawkins	Unsignalized	HCM6	Overall		5.6	A				Overall		12.4	B			
	Signalized	HCM2000	EBLTR		0.82	115.9	F	75	174	EBLTR		0.82	115.9	F	75	174
	Signalized	HCM2000	WBL	200	0.40	3.3	A	14	13	WBL	200	0.40	3.3	A	14	13
	Signalized	HCM2000	WBLTR	200	0.38	1.8	A	0	0	WBLTR	200	0.38	1.8	A	0	0
	Signalized	HCM2000	NBL	150	0.17	43.5	D	18	42	NBL	150	0.17	43.5	D	18	42
	Signalized	HCM2000	NBT		0.82	65.0	E	256	326	NBT		0.82	65.0	E	256	326
	Signalized	HCM2000	NBR	250	0.99	106.8	F	275	469	NBR	250	0.99	106.8	F	275	469
Garbers Church Rd and West Market St (reconfiguration on Garbers Church Only)	Signalized	HCM2000	SBL		0.03	40.4	D	4	15	SBL	100	0.03	40.4	D	4	15
	Signalized	HCM2000	SBTR	100	1.01	93.0	F	323	458	SBTR		1.01	93.0	F	323	458
	Signalized	HCM2000	Overall		64.1	E				Overall		64.1	E			
	Signalized	HCM2000	EBL	360	0.17	22.2	C	16	58	EBL	360	0.16	20.6	C	16	58
	Signalized	HCM2000	EBT		0.34	28.6	C	74	166	EBT		0.31	26.6	C	71	154
	Signalized	HCM2000	EBR	180	0.02	25.3	C	0	0	EBR	180	0.02	23.7	C	0	0
	Signalized	HCM2000	WBL	450	0.64	43.4	D	83	187	WBL	450	0.77	56.3	E	84	259
Garbers Church Rd and West Market St (reconfiguration on West Market Only)	Signalized	HCM2000	WBTR		0.29	21.7	C	77	170	WBTR		0.56	27.1	C	165	406
	Signalized	HCM2000	WBR	140	0.02	19.1	B	0	0	WBR		0.02	19.2	B	0	0
	Signalized	HCM2000	NBLT		0.48	36.4	D	71	129	NBLT		0.48	36.3	D	69	126
	Signalized	HCM2000	NBR		0.15	33.4	C	0	50	NBR	200	0.14	37.2	D	0	78
	Signalized	HCM2000	SBLT		0.42	40.3	D	43	108	SBLT		0.42	40.3	D	41	106
	Signalized	HCM2000	SBR	100	0.05	37.4	D	0	0	SBR	100	0.05	37.4	D	0	0
	Signalized	HCM2000	Overall		0.45	30.5	C			Overall		0.46	31.9	C		
Garbers Church Rd and West Market St (reconfiguration on West Market Only)	Signalized	HCM2000	EBL	360	0.17	22.2	C	16	58	EBL	360	0.16	20.6	C	16	58
	Signalized	HCM2000	EBT		0.34	28.6	C	74	166	EBT		0.59	33.1	C	148	369
	Signalized	HCM2000	EBR	180	0.02	25.3	C	0	0	EBR	180	0.02	23.7	C	0	0
	Signalized	HCM2000	WBL	450	0.64	43.4	D	83	187	WBL	450	0.77	56.3	E	84	259
	Signalized	HCM2000	WBTR		0.29	21.7	C	77	170	WBTR		0.56	27.1	C	165	406
	Signalized	HCM2000														



Synchro Reports

Lanes, Volumes, Timings
1: Garbers Church Rd & Erickson Ave

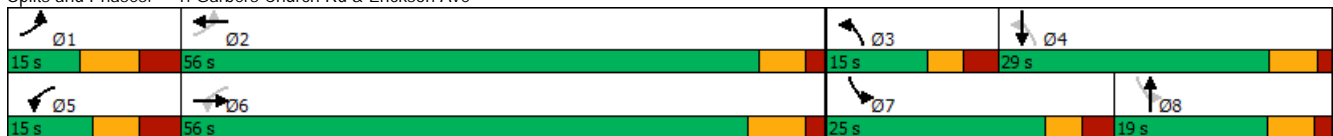
2040 No Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	412	85	5	99	321	19	65	29	241	85	3
Future Volume (vph)	18	412	85	5	99	321	19	65	29	241	85	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	75		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		561			838			552			1501	
Travel Time (s)		10.9			16.3			10.8			29.2	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	678	0	7	573	0	26	129	0	329	120	0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	2			6			4			8		
Detector Phase	1	6		5	2		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	13.7	13.9		12.6	12.8		11.3	12.7		11.3	12.5	
Total Split (s)	15.0	56.0		15.0	56.0		15.0	19.0		25.0	29.0	
Total Split (%)	13.0%	48.7%		13.0%	48.7%		13.0%	16.5%		21.7%	25.2%	
Yellow Time (s)	5.1	5.1		4.0	4.0		3.2	4.1		3.2	4.1	
All-Red Time (s)	3.6	1.8		3.6	1.8		3.1	1.6		2.8	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max		None	Max		None	None		None	None	
v/c Ratio	0.08	0.71		0.03	0.65		0.07	0.65		0.81	0.25	
Control Delay	13.2	25.4		12.0	19.5		26.8	56.9		47.8	36.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.2	25.4		12.0	19.5		26.8	56.9		47.8	36.4	
Queue Length 50th (ft)	8	326		2	231		13	80		199	74	
Queue Length 95th (ft)	21	#597		9	354		33	142		#308	127	
Internal Link Dist (ft)		481			758			472			1421	
Turn Bay Length (ft)	150			150			75					
Base Capacity (vph)	309	956		293	886		413	240		430	483	
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	0.08	0.71		0.02	0.65		0.06	0.54		0.77	0.25	

Intersection Summary	
Area Type:	Other
Cycle Length:	115
Actuated Cycle Length:	105.6
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Garbers Church Rd & Erickson Ave



HCM Signalized Intersection Capacity Analysis
1: Garbers Church Rd & Erickson Ave

2040 No Build
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	18	412	85	5	99	321	19	65	29	241	85	3	
Future Volume (vph)	18	412	85	5	99	321	19	65	29	241	85	3	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5		
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Fr't	1.00	0.97		1.00	0.89		1.00	0.95		1.00	0.99		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1770	1815		1770	1649		1770	1776		1770	1853		
Flt Permitted	0.26	1.00		0.20	1.00		0.66	1.00		0.57	1.00		
Satd. Flow (perm)	475	1815		365	1649		1234	1776		1070	1853		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	25	562	116	7	135	438	26	89	40	329	116	4	
RTOR Reduction (vph)	0	6	0	0	97	0	0	14	0	0	1	0	
Lane Group Flow (vph)	25	672	0	7	476	0	26	115	0	329	119	0	
Turn Type	D,P+P	NA		D,P+P	NA		D,P+P	NA		D,P+P	NA		
Protected Phases	1	6		5	2		3	8		7	4		
Permitted Phases	2			6			4			8			
Actuated Green, G (s)	56.5	55.4		56.5	53.0		31.6	13.9		31.7	27.5		
Effective Green, g (s)	56.5	55.4		56.5	53.0		31.6	13.9		31.7	27.5		
Actuated g/C Ratio	0.49	0.48		0.49	0.46		0.28	0.12		0.28	0.24		
Clearance Time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	274	878		193	763		360	215		405	445		
v/s Ratio Prot	c0.00	c0.37		0.00	0.29		0.00	0.06		c0.13	0.06		
v/s Ratio Perm	0.04			0.02			0.02			c0.10			
v/c Ratio	0.09	0.77		0.04	0.62		0.07	0.53		0.81	0.27		
Uniform Delay, d1	17.2	24.2		18.4	23.2		30.4	47.2		36.9	35.3		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.1	6.3		0.1	3.8		0.1	2.5		11.8	0.3		
Delay (s)	17.4	30.5		18.4	27.0		30.5	49.8		48.6	35.6		
Level of Service	B	C		B	C		C	D		D	D		
Approach Delay (s)		30.0			26.9			46.5			45.1		
Approach LOS		C			C			D			D		
Intersection Summary													
HCM 2000 Control Delay			34.0									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.78										
Actuated Cycle Length (s)			114.4									Sum of lost time (s)	26.3
Intersection Capacity Utilization			65.2%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: Garbers Church Rd & Erickson Ave

2040 No Build
 Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	412	85	5	99	321	19	65	29	241	85	3
Future Volume (veh/h)	18	412	85	5	99	321	19	65	29	241	85	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	25	562	116	7	135	438	26	89	40	329	116	4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	731	151	218	178	578	346	111	50	401	427	15
Arrive On Green	0.02	0.49	0.49	0.01	0.46	0.46	0.02	0.09	0.09	0.17	0.24	0.24
Sat Flow, veh/h	1781	1504	310	1781	387	1257	1781	1222	549	1781	1797	62
Grp Volume(v), veh/h	25	0	678	7	0	573	26	0	129	329	0	120
Grp Sat Flow(s),veh/h/ln	1781	0	1814	1781	0	1644	1781	0	1771	1781	0	1859
Q Serve(g_s), s	0.8	0.0	33.5	0.2	0.0	31.5	1.2	0.0	7.8	18.2	0.0	5.7
Cycle Q Clear(g_c), s	0.8	0.0	33.5	0.2	0.0	31.5	1.2	0.0	7.8	18.2	0.0	5.7
Prop In Lane	1.00		0.17	1.00		0.76	1.00		0.31	1.00		0.03
Lane Grp Cap(c), veh/h	253	0	881	218	0	756	346	0	162	401	0	442
V/C Ratio(X)	0.10	0.00	0.77	0.03	0.00	0.76	0.08	0.00	0.80	0.82	0.00	0.27
Avail Cap(c_a), veh/h	313	0	881	323	0	756	443	0	216	401	0	442
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	23.0	19.2	0.0	24.4	30.3	0.0	48.6	36.5	0.0	33.9
Incr Delay (d2), s/veh	0.2	0.0	6.4	0.1	0.0	7.0	0.1	0.0	14.1	12.7	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	15.1	0.1	0.0	13.1	0.5	0.0	4.0	9.1	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.6	0.0	29.4	19.2	0.0	31.4	30.3	0.0	62.7	49.2	0.0	34.2
LnGrp LOS	B	A	C	B	A	C	C	A	E	D	A	C
Approach Vol, veh/h		703			580			155			449	
Approach Delay, s/veh		29.1			31.2			57.3			45.2	
Approach LOS		C			C			E			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.4	57.1	9.0	31.6	8.6	59.9	25.0	15.7				
Change Period (Y+Rc), s	8.7	* 6.9	* 6.3	* 5.7	7.6	* 6.9	6.0	* 5.7				
Max Green Setting (Gmax), s	6.3	* 50	* 8.7	* 24	7.4	* 49	19.0	* 13				
Max Q Clear Time (g_c+I1), s	2.8	33.5	3.2	7.7	2.2	35.5	20.2	9.8				
Green Ext Time (p_c), s	0.0	3.7	0.0	0.5	0.0	3.9	0.0	0.2				

Intersection Summary												
HCM 6th Ctrl Delay			35.9									
HCM 6th LOS			D									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Garbers Church Rd & HHS South Entrance

2040 No Build
 Timing Plan: AM Peak

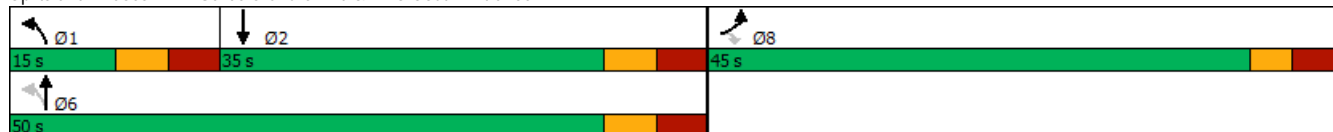


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	21	63	362	281	35
Future Volume (vph)	15	21	63	362	281	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	80	200			0
Storage Lanes	1	1	1			0
Taper Length (ft)	0		0			
Right Turn on Red		Yes				Yes
Link Speed (mph)	25			35	35	
Link Distance (ft)	684			1501	825	
Travel Time (s)	18.7			29.2	16.1	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	29	86	494	431	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	8		1	6	2	
Permitted Phases		8	6			
Detector Phase	8	8	1	6	2	
Switch Phase						
Minimum Initial (s)	7.0	7.0	10.0	10.0	10.0	
Minimum Split (s)	32.1	32.1	17.4	17.4	40.4	
Total Split (s)	45.0	45.0	15.0	50.0	35.0	
Total Split (%)	47.4%	47.4%	15.8%	52.6%	36.8%	
Yellow Time (s)	3.0	3.0	3.8	3.8	3.8	
All-Red Time (s)	3.1	3.1	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.1	6.1	7.4	7.4	7.4	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Max	Max	
v/c Ratio	0.10	0.15	0.12	0.17	0.20	
Control Delay	29.2	13.7	3.4	2.8	8.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.2	13.7	3.4	2.8	8.8	
Queue Length 50th (ft)	8	0	9	30	51	
Queue Length 95th (ft)	26	21	20	44	76	
Internal Link Dist (ft)	604			1421	745	
Turn Bay Length (ft)		80	200			
Base Capacity (vph)	1062	961	716	2899	2113	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.03	0.12	0.17	0.20	

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 65.3
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Garbers Church Rd & HHS South Entrance



HCM Signalized Intersection Capacity Analysis
 2: Garbers Church Rd & HHS South Entrance

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	21	63	362	281	35
Future Volume (vph)	15	21	63	362	281	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	7.4	7.4	7.4	7.4
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1768	3539	3470	
Flt Permitted	0.95	1.00	0.42	1.00	1.00	
Satd. Flow (perm)	1770	1583	781	3539	3470	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	20	29	86	494	383	48
RTOR Reduction (vph)	0	27	0	0	6	0
Lane Group Flow (vph)	20	2	86	494	425	0
Confl. Peds. (#/hr)			5			5
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	8		1	6	2	
Permitted Phases		8	6			
Actuated Green, G (s)	4.1	4.1	51.7	51.7	38.2	
Effective Green, g (s)	4.1	4.1	51.7	51.7	38.2	
Actuated g/C Ratio	0.06	0.06	0.75	0.75	0.55	
Clearance Time (s)	6.1	6.1	7.4	7.4	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	104	93	669	2640	1912	
v/s Ratio Prot	c0.01		0.01	c0.14	c0.12	
v/s Ratio Perm		0.00	0.08			
v/c Ratio	0.19	0.02	0.13	0.19	0.22	
Uniform Delay, d1	31.0	30.7	2.8	2.6	8.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.1	0.1	0.2	0.3	
Delay (s)	31.9	30.8	2.9	2.8	8.2	
Level of Service	C	C	A	A	A	
Approach Delay (s)	31.3			2.8	8.2	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			6.3	HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio			0.23			
Actuated Cycle Length (s)			69.3	Sum of lost time (s)		20.9
Intersection Capacity Utilization			59.1%	ICU Level of Service		B
Analysis Period (min)			15			

c Critical Lane Group

Min green cannot be greater than Max Green.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	81	296	262	54
Future Volume (vph)	0	0	81	296	262	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	350			0
Storage Lanes	0	0	1			0
Taper Length (ft)	0		0			
Link Speed (mph)	25			35	35	
Link Distance (ft)	351			825	318	
Travel Time (s)	9.6			16.1	6.2	
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	110	404	431	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 3: Garbers Church Rd & HHS inbound Entrance

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↘	↕	↕	↘
Traffic Volume (veh/h)	0	0	81	296	262	54
Future Volume (Veh/h)	0	0	81	296	262	54
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	110	404	357	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage veh						
Upstream signal (ft)			825	318		
pX, platoon unblocked						
vC, conflicting volume	816	216	431			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	816	216	431			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	90			
cM capacity (veh/h)	284	789	1125			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	110	202	202	238	193	
Volume Left	110	0	0	0	0	
Volume Right	0	0	0	0	74	
cSH	1125	1700	1700	1700	1700	
Volume to Capacity	0.10	0.12	0.12	0.14	0.11	
Queue Length 95th (ft)	8	0	0	0	0	
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	1.8			0.0		
Approach LOS						
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			22.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Garbers Church Rd & HHS North Entrance/Driveway

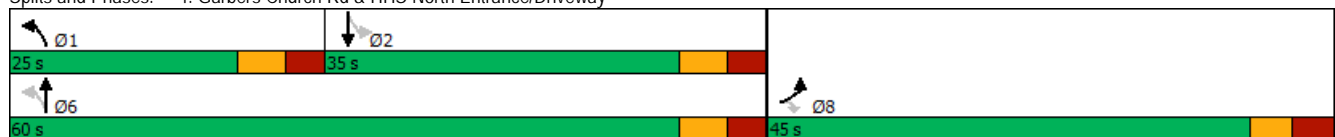
2040 No Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↗				↖	↗		↖	↗	
Traffic Volume (vph)	87	0	49	0	0	0	155	228	0	0	267	253
Future Volume (vph)	87	0	49	0	0	0	155	228	0	0	267	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	0		0	0		0	80		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		424			255			318			726	
Travel Time (s)		11.6			7.0			6.2			14.1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	0	67	0	0	0	211	311	0	0	709	0
Turn Type	Prot		Perm				pm+pt	NA		Perm	NA	
Protected Phases	8						1	6			2	
Permitted Phases			8				6			2		
Detector Phase	8		8				1	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0		7.0				5.0	10.0		10.0	10.0	
Minimum Split (s)	34.7		34.7				12.0	22.5		34.0	34.0	
Total Split (s)	45.0		45.0				25.0	60.0		35.0	35.0	
Total Split (%)	42.9%		42.9%				23.8%	57.1%		33.3%	33.3%	
Yellow Time (s)	3.3		3.3				3.8	3.8		3.8	3.8	
All-Red Time (s)	3.4		3.4				3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0		0.0				0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.7		6.7				7.0	7.0		7.0	7.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None		None				None	Max		Max	Max	
v/c Ratio	0.50		0.21				0.41	0.13			0.42	
Control Delay	38.2		3.5				7.2	4.6			10.1	
Queue Delay	0.0		0.0				0.0	0.0			0.0	
Total Delay	38.2		3.5				7.2	4.6			10.1	
Queue Length 50th (ft)	54		0				30	22			70	
Queue Length 95th (ft)	100		10				61	41			127	
Internal Link Dist (ft)		344			175			238			646	
Turn Bay Length (ft)	50											
Base Capacity (vph)	878		843				658	2431			1691	
Starvation Cap Reductn	0		0				0	0			0	
Spillback Cap Reductn	0		0				0	0			0	
Storage Cap Reductn	0		0				0	0			0	
Reduced v/c Ratio	0.14		0.08				0.32	0.13			0.42	

Intersection Summary	
Area Type:	Other
Cycle Length:	105
Actuated Cycle Length:	77.2
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated

Splits and Phases: 4: Garbers Church Rd & HHS North Entrance/Driveway



HCM Signalized Intersection Capacity Analysis
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔	↕		↔	↕	
Traffic Volume (vph)	87	0	49	0	0	0	155	228	0	0	267	253
Future Volume (vph)	87	0	49	0	0	0	155	228	0	0	267	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7		6.7				7.0	7.0			7.0	
Lane Util. Factor	1.00		1.00				1.00	0.95			0.95	
Fr't	1.00		0.85				1.00	1.00			0.93	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1770		1583				1770	3539			3281	
Flt Permitted	0.95		1.00				0.29	1.00			1.00	
Satd. Flow (perm)	1770		1583				542	3539			3281	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	119	0	67	0	0	0	211	311	0	0	364	345
RTOR Reduction (vph)	0	0	58	0	0	0	0	0	0	0	116	0
Lane Group Flow (vph)	119	0	9	0	0	0	211	311	0	0	593	0
Turn Type	Prot		Perm				pm+pt	NA		Perm	NA	
Protected Phases	8						1	6			2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	10.4		10.4				53.1	53.1			37.1	
Effective Green, g (s)	10.4		10.4				53.1	53.1			37.1	
Actuated g/C Ratio	0.13		0.13				0.69	0.69			0.48	
Clearance Time (s)	6.7		6.7				7.0	7.0			7.0	
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	238		213				515	2434			1576	
v/s Ratio Prot	c0.07						c0.05	0.09			0.18	
v/s Ratio Perm			0.01				c0.23					
v/c Ratio	0.50		0.04				0.41	0.13			0.38	
Uniform Delay, d1	31.0		29.1				5.3	4.1			12.7	
Progression Factor	1.00		1.00				1.00	1.00			1.00	
Incremental Delay, d2	1.7		0.1				0.5	0.1			0.7	
Delay (s)	32.6		29.1				5.8	4.2			13.4	
Level of Service	C		C				A	A			B	
Approach Delay (s)		31.4			0.0			4.9			13.4	
Approach LOS		C			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			12.6				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			77.2				Sum of lost time (s)			20.7		
Intersection Capacity Utilization			49.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔	↕		↔	↕	
Traffic Volume (veh/h)	87	0	49	0	0	0	155	228	0	0	267	253
Future Volume (veh/h)	87	0	49	0	0	0	155	228	0	0	267	253
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/hln	1870	0	1870				1870	1870	0	1870	1870	1870
Adj Flow Rate, veh/h	119	0	67				211	311	0	0	364	345
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	0	2				2	2	0	2	2	2
Cap, veh/h	173	0	154				547	2549	0	97	966	861
Arrive On Green	0.10	0.00	0.10				0.08	0.72	0.00	0.00	0.54	0.54
Sat Flow, veh/h	1781	0	1585				1781	3647	0	1068	1777	1585
Grp Volume(v), veh/h	119	0	67				211	311	0	0	364	345
Grp Sat Flow(s),veh/h/ln	1781	0	1585				1781	1777	0	1068	1777	1585
Q Serve(g_s), s	4.8	0.0	2.9				3.5	2.0	0.0	0.0	8.7	9.4
Cycle Q Clear(g_c), s	4.8	0.0	2.9				3.5	2.0	0.0	0.0	8.7	9.4
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	173	0	154				547	2549	0	97	966	861
V/C Ratio(X)	0.69	0.00	0.44				0.39	0.12	0.00	0.00	0.38	0.40
Avail Cap(c_a), veh/h	923	0	822				840	2549	0	97	966	861
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	32.3	0.0	31.4				6.4	3.2	0.0	0.0	9.7	9.8
Incr Delay (d2), s/veh	4.8	0.0	1.9				0.4	0.1	0.0	0.0	1.1	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	1.2				1.0	0.5	0.0	0.0	3.2	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	0.0	33.4				6.8	3.3	0.0	0.0	10.8	11.2
LnGrp LOS	D	A	C				A	A	A	A	B	B
Approach Vol, veh/h		186						522			709	
Approach Delay, s/veh		35.7						4.7			11.0	
Approach LOS		D						A			B	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	12.9	47.1				60.0		13.9				
Change Period (Y+Rc), s	7.0	7.0				7.0		6.7				
Max Green Setting (Gmax), s	18.0	28.0				53.0		38.3				
Max Q Clear Time (g_c+I1), s	5.5	11.4				4.0		6.8				
Green Ext Time (p_c), s	0.5	4.1				2.1		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			11.9									
HCM 6th LOS			B									

Lanes, Volumes, Timings
 5: Garbers Church Rd & Bluestone ES inbound Entrance

2040 No Build
 Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑			↑↑
Traffic Volume (vph)	0	0	268	15	19	493
Future Volume (vph)	0	0	268	15	19	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	382		726			625
Travel Time (s)	10.4		14.1			12.2
Confl. Bikes (#/hr)		5				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	385	0	0	698
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 5: Garbers Church Rd & Bluestone ES inbound Entrance

2040 No Build
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↓			↑↓
Traffic Volume (veh/h)	0	0	268	15	19	493
Future Volume (Veh/h)	0	0	268	15	19	493
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	365	20	26	672
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			726			
pX, platoon unblocked						
vC, conflicting volume	763	192			385	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	763	192			385	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	333	817			1170	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	243	142	250	448		
Volume Left	0	0	26	0		
Volume Right	0	20	0	0		
cSH	1700	1700	1170	1700		
Volume to Capacity	0.14	0.08	0.02	0.26		
Queue Length 95th (ft)	0	0	2	0		
Control Delay (s)	0.0	0.0	1.0	0.0		
Lane LOS			A			
Approach Delay (s)	0.0		0.4			
Approach LOS						
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			33.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 6: Garbers Church Rd & Heritage Center Way/Bluestone ES/Golf Course

2040 No Build
 Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	0	0	1	0	5	0	253	25	22	506	0
Future Volume (vph)	0	0	0	1	0	5	0	253	25	22	506	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	90		0	125		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	0			0			0			0		
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		466			549			625			794	
Travel Time (s)		12.7			15.0			12.2			15.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	8	0	0	379	0	30	690	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM Unsignalized Intersection Capacity Analysis
 6: Garbers Church Rd & Heritage Center Way/Bluestone ES/Golf Course

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	0	0	0	1	0	5	0	253	25	22	506	0
Future Volume (Veh/h)	0	0	0	1	0	5	0	253	25	22	506	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	0	1	0	7	0	345	34	30	690	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	930	1129	345	767	1112	190	690			379		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	930	1129	345	767	1112	190	690			379		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (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	99	100			97		
cM capacity (veh/h)	216	197	651	286	202	820	900			1176		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	0	8	0	230	149	30	345	345				
Volume Left	0	1	0	0	0	30	0	0				
Volume Right	0	7	0	0	34	0	0	0				
cSH	1700	665	1700	1700	1700	1176	1700	1700				
Volume to Capacity	0.00	0.01	0.00	0.14	0.09	0.03	0.20	0.20				
Queue Length 95th (ft)	0	1	0	0	0	2	0	0				
Control Delay (s)	0.0	10.5	0.0	0.0	0.0	8.1	0.0	0.0				
Lane LOS	A	B				A						
Approach Delay (s)	0.0	10.5	0.0			0.3						
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			31.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	0	0	0	1	0	5	0	253	25	22	506	0
Future Vol, veh/h	0	0	0	1	0	5	0	253	25	22	506	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	90	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	1	0	7	0	345	34	30	690	0

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	923	1129	345	767	1112	190	690	0	0	379	0	0
Stage 1	750	750	-	362	362	-	-	-	-	-	-	-
Stage 2	173	379	-	405	750	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	225	203	651	292	207	820	900	-	-	1176	-	0
Stage 1	369	417	-	629	624	-	-	-	-	-	-	0
Stage 2	812	613	-	593	417	-	-	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	219	198	651	286	202	820	900	-	-	1176	-	-
Mov Cap-2 Maneuver	219	198	-	286	202	-	-	-	-	-	-	-
Stage 1	369	406	-	629	624	-	-	-	-	-	-	-
Stage 2	805	613	-	578	406	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	10.8	0	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	900	-	-	-	625	1176	-
HCM Lane V/C Ratio	-	-	-	-	0.013	0.026	-
HCM Control Delay (s)	0	-	-	0	10.8	8.1	-
HCM Lane LOS	A	-	-	A	B	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0.1	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T	R		T
Traffic Volume (vph)	2	0	259	0	0	522
Future Volume (vph)	2	0	259	0	0	522
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	372		794			1342
Travel Time (s)	10.1		15.5			26.1
Confl. Peds. (#/hr)				3	3	
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	353	0	0	712
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 7: Garbers Church Rd & Heritage Estates Circle

2040 No Build
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	2	0	259	0	0	522
Future Volume (Veh/h)	2	0	259	0	0	522
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	0	353	0	0	712
Pedestrians	3					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	712	180			356	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	712	180			356	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	366	830			1196	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	3	235	118	237	475	
Volume Left	3	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	366	1700	1700	1196	1700	
Volume to Capacity	0.01	0.14	0.07	0.00	0.28	
Queue Length 95th (ft)	1	0	0	0	0	
Control Delay (s)	14.9	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	14.9	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			27.3%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	2	0	259	0	0	522
Future Vol, veh/h	2	0	259	0	0	522
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	0	353	0	0	712

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	712	180	0	0	356
Stage 1	356	-	-	-	-
Stage 2	356	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	367	832	-	-	1199
Stage 1	680	-	-	-	-
Stage 2	680	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	366	830	-	-	1196
Mov Cap-2 Maneuver	366	-	-	-	-
Stage 1	678	-	-	-	-
Stage 2	680	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	366	1196	-
HCM Lane V/C Ratio	-	-	0.007	-	-
HCM Control Delay (s)	-	-	14.9	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	3	246	13	1	487
Future Volume (vph)	35	3	246	13	1	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	452		1342			264
Travel Time (s)	12.3		26.1			5.1
Confl. Bikes (#/hr)		4				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	353	0	0	665
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 8: Garbers Church Rd & Park Lawn Dr

2040 No Build
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	35	3	246	13	1	487
Future Volume (Veh/h)	35	3	246	13	1	487
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	48	4	335	18	1	664
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	678	176			353	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	678	176			353	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	100			100	
cM capacity (veh/h)	385	836			1202	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	52	223	130	222	443	
Volume Left	48	0	0	1	0	
Volume Right	4	0	18	0	0	
cSH	402	1700	1700	1202	1700	
Volume to Capacity	0.13	0.13	0.08	0.00	0.26	
Queue Length 95th (ft)	11	0	0	0	0	
Control Delay (s)	15.3	0.0	0.0	0.0	0.0	
Lane LOS	C			A		
Approach Delay (s)	15.3	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			27.0%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	35	3	246	13	1	487
Future Vol, veh/h	35	3	246	13	1	487
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	4	335	18	1	664

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	678	177	0	0	353
Stage 1	344	-	-	-	-
Stage 2	334	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	386	835	-	-	1202
Stage 1	689	-	-	-	-
Stage 2	697	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	386	835	-	-	1202
Mov Cap-2 Maneuver	386	-	-	-	-
Stage 1	689	-	-	-	-
Stage 2	696	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	403	1202	-
HCM Lane V/C Ratio	-	-	0.129	0.001	-
HCM Control Delay (s)	-	-	15.2	8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	10	10	3	246	478	4
Future Volume (vph)	10	10	3	246	478	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			35	35	
Link Distance (ft)	364			264	633	
Travel Time (s)	9.9			5.1	12.3	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	0	339	657	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 9: Garbers Church Rd & Rhianon Ln

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑↑	
Traffic Volume (veh/h)	10	10	3	246	478	4
Future Volume (Veh/h)	10	10	3	246	478	4
Sign Control	Stop			Free		Free
Grade	0%			0%		0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	14	14	4	335	652	5
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	830	328	657			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	830	328	657			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	98	100			
cM capacity (veh/h)	307	667	926			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	28	116	223	435	222	
Volume Left	14	4	0	0	0	
Volume Right	14	0	0	0	5	
cSH	421	926	1700	1700	1700	
Volume to Capacity	0.07	0.00	0.13	0.26	0.13	
Queue Length 95th (ft)	5	0	0	0	0	
Control Delay (s)	14.2	0.3	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	14.2	0.1		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			26.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑↑	
Traffic Vol, veh/h	10	10	3	246	478	4
Future Vol, veh/h	10	10	3	246	478	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	14	4	335	652	5

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	831	329	657	0	0
Stage 1	655	-	-	-	-
Stage 2	176	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-
Pot Cap-1 Maneuver	308	667	926	-	-
Stage 1	479	-	-	-	-
Stage 2	837	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	306	667	926	-	-
Mov Cap-2 Maneuver	306	-	-	-	-
Stage 1	477	-	-	-	-
Stage 2	837	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	926	-	420	-	-
HCM Lane V/C Ratio	0.004	-	0.065	-	-
HCM Control Delay (s)	8.9	0	14.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	3	240	7	0	452
Future Volume (vph)	22	3	240	7	0	452
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	417		633			767
Travel Time (s)	11.4		12.3			14.9
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	337	0	0	616
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 10: Garbers Church Rd & Lendale Ln

2040 No Build
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Volume (veh/h)	22	3	240	7	0	452
Future Volume (Veh/h)	22	3	240	7	0	452
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	30	4	327	10	0	616
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						767
pX, platoon unblocked						
vC, conflicting volume	640	168			337	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	640	168			337	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			100	
cM capacity (veh/h)	408	846			1219	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	34	218	119	205	411	
Volume Left	30	0	0	0	0	
Volume Right	4	0	10	0	0	
cSH	434	1700	1700	1219	1700	
Volume to Capacity	0.08	0.13	0.07	0.00	0.24	
Queue Length 95th (ft)	6	0	0	0	0	
Control Delay (s)	14.0	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	14.0	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			25.0%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	22	3	240	7	0	452
Future Vol, veh/h	22	3	240	7	0	452
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	4	327	10	0	616

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	640	169	0	0	337
Stage 1	332	-	-	-	-
Stage 2	308	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	408	845	-	-	1219
Stage 1	699	-	-	-	-
Stage 2	719	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	408	845	-	-	1219
Mov Cap-2 Maneuver	408	-	-	-	-
Stage 1	699	-	-	-	-
Stage 2	719	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	435	1219	-
HCM Lane V/C Ratio	-	-	0.078	-	-
HCM Control Delay (s)	-	-	14	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Lanes, Volumes, Timings
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 No Build
 Timing Plan: AM Peak

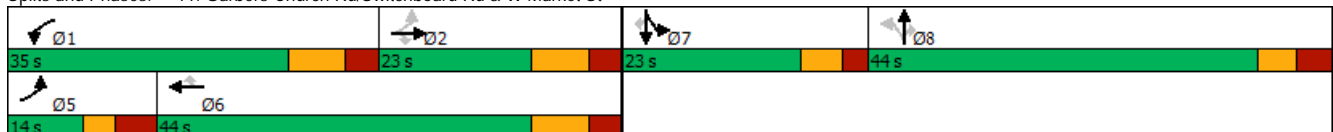


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Future Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	360		180	0		140	0		0	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1555			455			767			1017	
Travel Time (s)		30.3			8.9			14.9			19.8	
Confl. Peds. (#/hr)	1		1	1		1			1	1		
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	288	18	403	181	12	0	85	293	0	197	55
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6			8		7	7	
Permitted Phases	2		2			6	8		8			7
Detector Phase	5	2	2	1	6	6	8	8	8	7	7	7
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.9	22.5	22.5	15.6	31.6	31.6	44.1	44.1	44.1	22.5	22.5	22.5
Total Split (s)	14.0	23.0	23.0	35.0	44.0	44.0	44.0	44.0	44.0	23.0	23.0	23.0
Total Split (%)	11.2%	18.4%	18.4%	28.0%	35.2%	35.2%	35.2%	35.2%	35.2%	18.4%	18.4%	18.4%
Yellow Time (s)	3.0	5.4	5.4	5.4	5.4	5.4	3.7	3.7	3.7	3.9	3.9	3.9
All-Red Time (s)	3.9	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.4	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.29	0.56	0.04	0.86	0.13	0.02		0.38	0.63		0.72	0.12
Control Delay	22.7	47.3	0.2	56.6	24.5	0.1		43.6	10.5		58.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	22.7	47.3	0.2	56.6	24.5	0.1		43.6	10.5		58.4	0.6
Queue Length 50th (ft)	28	88	0	238	39	0		51	0		116	0
Queue Length 95th (ft)	83	169	0	#564	89	0		94	66		#277	0
Internal Link Dist (ft)		1475			375			687			937	
Turn Bay Length (ft)	360		180			140						100
Base Capacity (vph)	316	510	417	467	1365	689		595	762		311	470
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.29	0.56	0.04	0.86	0.13	0.02		0.14	0.38		0.63	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 125
 Actuated Cycle Length: 101.2
 Natural Cycle: 125
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Garbers Church Rd/Switchboard Rd & W Market St



HCM Signalized Intersection Capacity Analysis
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↗	↖	↕	↗		↕	↗		↖	↗	
Traffic Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42	
Future Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98		1.00	0.99		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	1.00	
Satd. Flow (prot)	1768	3539	1561	1770	3539	1548		1841	1563		1851	1583	
Flt Permitted	0.64	1.00	1.00	0.95	1.00	1.00		0.87	1.00		0.99	1.00	
Satd. Flow (perm)	1187	3539	1561	1770	3539	1548		1612	1563		1851	1583	
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	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	93	288	18	403	181	12	20	65	293	26	171	55	
RTOR Reduction (vph)	0	0	15	0	0	7	0	0	253	0	0	47	
Lane Group Flow (vph)	93	288	3	403	181	5	0	85	40	0	197	8	
Confl. Peds. (#/hr)	1		1	1		1			1	1			
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Split	NA	Perm	
Protected Phases	5	2		1	6			8		7	7		
Permitted Phases	2		2			6	8		8			7	
Actuated Green, G (s)	21.8	16.2	16.2	26.8	39.1	39.1		14.0	14.0		15.0	15.0	
Effective Green, g (s)	21.8	16.2	16.2	26.8	39.1	39.1		14.0	14.0		15.0	15.0	
Actuated g/C Ratio	0.21	0.16	0.16	0.26	0.38	0.38		0.14	0.14		0.15	0.15	
Clearance Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	559	246	462	1349	590		220	213		270	231	
v/s Ratio Prot	0.02	c0.08		c0.23	0.05						c0.11		
v/s Ratio Perm	0.05		0.00			0.00		c0.05	0.03			0.01	
v/c Ratio	0.33	0.52	0.01	0.87	0.13	0.01		0.39	0.19		0.73	0.03	
Uniform Delay, d1	33.5	39.6	36.4	36.2	20.7	19.7		40.3	39.2		41.8	37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	3.4	0.1	16.4	0.2	0.0		1.1	0.4		9.5	0.1	
Delay (s)	34.2	42.9	36.5	52.6	20.9	19.7		41.5	39.6		51.3	37.6	
Level of Service	C	D	D	D	C	B		D	D		D	D	
Approach Delay (s)		40.6			42.3			40.1			48.3		
Approach LOS		D			D			D			D		
Intersection Summary													
HCM 2000 Control Delay			42.3		HCM 2000 Level of Service							D	
HCM 2000 Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			102.5		Sum of lost time (s)						30.5		
Intersection Capacity Utilization			68.3%		ICU Level of Service						C		
Analysis Period (min)			15										

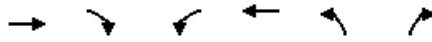
c Critical Lane Group

HCM 6th Edition methodology expects strict NEMA phasing.

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	463	3	31	453	4	35
Future Volume (vph)	463	3	31	453	4	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		100	260		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)			0		0	
Link Speed (mph)	35			35	25	
Link Distance (ft)	455			1297	501	
Travel Time (s)	8.9			25.3	13.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	604	4	40	591	51	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis
 12: Stoneleigh Dr & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑	
Traffic Volume (veh/h)	463	3	31	453	4	35	
Future Volume (Veh/h)	463	3	31	453	4	35	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	604	4	40	591	5	46	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (ft)	455			1297			
pX, platoon unblocked			0.93		0.96	0.93	
vC, conflicting volume			608		980	302	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			436		645	108	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			96		99	95	
cM capacity (veh/h)			1045		374	863	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	302	302	4	40	296	296	51
Volume Left	0	0	0	40	0	0	5
Volume Right	0	0	4	0	0	0	46
cSH	1700	1700	1700	1045	1700	1700	765
Volume to Capacity	0.18	0.18	0.00	0.04	0.17	0.17	0.07
Queue Length 95th (ft)	0	0	0	3	0	0	5
Control Delay (s)	0.0	0.0	0.0	8.6	0.0	0.0	10.0
Lane LOS				A	B		
Approach Delay (s)	0.0			0.5	10.0		
Approach LOS					B		
Intersection Summary							
Average Delay	0.7						
Intersection Capacity Utilization	32.0%			ICU Level of Service	A		
Analysis Period (min)	15						

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑	
Traffic Vol, veh/h	463	3	31	453	4	35
Future Vol, veh/h	463	3	31	453	4	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	260	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	604	4	40	591	5	46

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	608	0	980	302
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	376	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	966	-	247	694
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	664	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	966	-	237	694
Mov Cap-2 Maneuver	-	-	-	-	237	-
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	637	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	579	-	-	966	-
HCM Lane V/C Ratio	0.088	-	-	0.042	-
HCM Control Delay (s)	11.8	-	-	8.9	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Lanes, Volumes, Timings
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 No Build
 Timing Plan: AM Peak

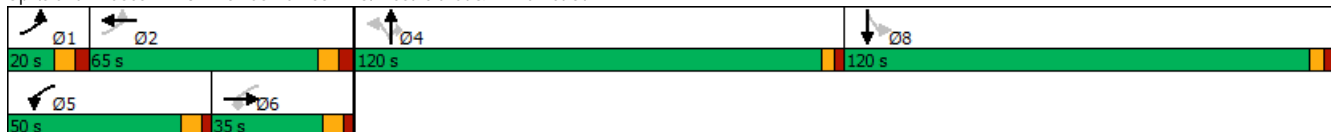


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗			↖	↗		↘	↙
Traffic Volume (vph)	29	391	80	160	360	21	36	5	123	65	10	91
Future Volume (vph)	29	391	80	160	360	21	36	5	123	65	10	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		225	500		0	0		175	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1297			1215			527			419	
Travel Time (s)		25.3			23.7			14.4			11.4	
Confl. Peds. (#/hr)			5	5					7	7		
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	510	104	209	497	0	0	54	160	0	217	0
Turn Type	D,P+P	NA	Perm	D,P+P	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	2		6	6			4		4	8		
Detector Phase	1	6	6	5	2		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	13.7	37.7	37.7	12.7	31.7		40.5	40.5	40.5	44.8	44.8	
Total Split (s)	20.0	35.0	35.0	50.0	65.0		120.0	120.0	120.0	120.0	120.0	
Total Split (%)	6.2%	10.8%	10.8%	15.4%	20.0%		36.9%	36.9%	36.9%	36.9%	36.9%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.2	3.2	3.2	3.6	3.6	
All-Red Time (s)	3.7	2.7	2.7	2.7	3.7		2.3	2.3	2.3	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Lead/Lag	Lead	Lag	Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max		None	None	None	None	None	
v/c Ratio	0.08	0.41	0.18	0.42	0.32			0.59	0.51		0.73	
Control Delay	18.1	36.1	12.2	20.4	27.3			84.7	14.2		60.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	18.1	36.1	12.2	20.4	27.3			84.7	14.2		60.2	
Queue Length 50th (ft)	14	166	11	85	144			44	0		160	
Queue Length 95th (ft)	43	294	66	179	248			102	69		270	
Internal Link Dist (ft)		1217			1135			447			339	
Turn Bay Length (ft)	250		225	500					175			
Base Capacity (vph)	498	1239	582	742	1549			707	1357		1265	
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	0.08	0.41	0.18	0.28	0.32			0.08	0.12		0.17	

Intersection Summary

Area Type: Other
 Cycle Length: 325
 Actuated Cycle Length: 130.2
 Natural Cycle: 140
 Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Thomas Harrison MS/Westfield Ct & W Market St



HCM Signalized Intersection Capacity Analysis
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗			↖	↗		↘	↙
Traffic Volume (vph)	29	391	80	160	360	21	36	5	123	65	10	91
Future Volume (vph)	29	391	80	160	360	21	36	5	123	65	10	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1770	3539	1535	1767	3510			1785	1552		1687	
Flt Permitted	0.44	1.00	1.00	0.40	1.00			0.44	1.00		0.85	
Satd. Flow (perm)	815	3539	1535	736	3510			812	1552		1459	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	38	510	104	209	470	27	47	7	160	85	13	119
RTOR Reduction (vph)	0	0	53	0	1	0	0	0	142	0	17	0
Lane Group Flow (vph)	38	510	51	209	496	0	0	54	18	0	200	0
Confl. Peds. (#/hr)			5	5					7	7		
Turn Type	D,P+P	NA	Perm	D,P+P	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	2		6	6			4		4	8		
Actuated Green, G (s)	63.2	47.7	47.7	65.2	57.4			14.7	14.7		25.2	
Effective Green, g (s)	63.2	47.7	47.7	65.2	57.4			14.7	14.7		25.2	
Actuated g/C Ratio	0.48	0.36	0.36	0.49	0.44			0.11	0.11		0.19	
Clearance Time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	432	1280	555	500	1528			90	173		278	
v/s Ratio Prot	0.00	0.14		c0.06	c0.14							
v/s Ratio Perm	0.04		0.03	c0.15				c0.07	0.01		c0.14	
v/c Ratio	0.09	0.40	0.09	0.42	0.32			0.60	0.10		0.72	
Uniform Delay, d1	18.3	31.4	27.8	19.3	24.5			55.8	52.6		50.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.9	0.3	0.6	0.6			10.3	0.3		8.6	
Delay (s)	18.4	32.3	28.1	19.9	25.0			66.1	52.9		58.6	
Level of Service	B	C	C	B	C			E	D		E	
Approach Delay (s)		30.8			23.5			56.2			58.6	
Approach LOS		C			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			34.3			HCM 2000 Level of Service					C	
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			131.8			Sum of lost time (s)					28.7	
Intersection Capacity Utilization			71.6%			ICU Level of Service					C	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (veh/h)	29	391	80	160	360	21	36	5	123	65	10	91
Future Volume (veh/h)	29	391	80	160	360	21	36	5	123	65	10	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	510	104	209	470	27	47	7	160	85	13	119
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	530	1730	768	536	1801	103	258	34	351	145	37	164
Arrive On Green	0.03	0.49	0.49	0.08	0.53	0.53	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1781	3554	1577	1781	3415	196	869	153	1570	438	166	733
Grp Volume(v), veh/h	38	510	104	209	244	253	54	0	160	217	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1577	1781	1777	1834	1022	0	1570	1337	0	0
Q Serve(g_s), s	1.0	9.2	3.9	6.1	8.0	8.1	0.0	0.0	9.4	11.5	0.0	0.0
Cycle Q Clear(g_c), s	1.0	9.2	3.9	6.1	8.0	8.1	5.1	0.0	9.4	16.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.11	0.87		1.00	0.39		0.55
Lane Grp Cap(c), veh/h	530	1730	768	536	937	967	292	0	351	346	0	0
V/C Ratio(X)	0.07	0.29	0.14	0.39	0.26	0.26	0.19	0.00	0.46	0.63	0.00	0.00
Avail Cap(c_a), veh/h	662	1730	768	1097	937	967	1402	0	1684	1546	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.9	16.4	15.0	11.8	13.8	13.8	34.0	0.0	35.8	38.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.5	0.7	0.7	0.3	0.0	0.9	1.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.7	1.4	2.4	3.3	3.4	1.2	0.0	3.7	5.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.0	16.8	15.4	12.3	14.5	14.5	34.3	0.0	36.7	40.7	0.0	0.0
LnGrp LOS	B	B	B	B	B	B	C	A	D	D	A	A
Approach Vol, veh/h		652			706			214			217	
Approach Delay, s/veh		16.3			13.8			36.1			40.7	
Approach LOS		B			B			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.1	65.0		29.7	16.4	60.7		29.7				
Change Period (Y+Rc), s	* 8.7	* 8.7		* 5.8	* 7.7	* 8.7		* 5.8				
Max Green Setting (Gmax), s	* 11	* 56		* 1.1E2	* 42	* 27		* 1.1E2				
Max Q Clear Time (g_c+I1), s	3.0	10.1		11.4	8.1	11.2		18.6				
Green Ext Time (p_c), s	0.0	3.1		0.9	0.6	3.3		1.7				

Intersection Summary

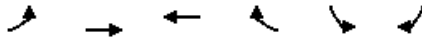
HCM 6th Ctrl Delay 20.7
 HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 14: W Market St & Brickstone Ct

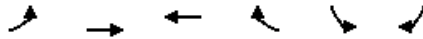
2040 No Build
 Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	562	542	30	74	0
Future Volume (vph)	5	562	542	30	74	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		25	
Link Distance (ft)		1215	613		545	
Travel Time (s)		23.7	11.9		14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	733	746	0	97	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis
 14: W Market St & Brickstone Ct

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	2	2		2	
Traffic Volume (veh/h)	5	562	542	30	74	0
Future Volume (Veh/h)	5	562	542	30	74	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	733	707	39	97	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		1215				
pX, platoon unblocked					0.91	
vC, conflicting volume	746				1107	373
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	746				920	373
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				60	100
cM capacity (veh/h)	858				244	624
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	7	366	366	471	275	97
Volume Left	7	0	0	0	0	97
Volume Right	0	0	0	0	39	0
cSH	858	1700	1700	1700	1700	244
Volume to Capacity	0.01	0.22	0.22	0.28	0.16	0.40
Queue Length 95th (ft)	1	0	0	0	0	45
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	29.2
Lane LOS	A					D
Approach Delay (s)	0.1			0.0		29.2
Approach LOS						D
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			30.7%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑		↑↑	
Traffic Vol, veh/h	5	562	542	30	74	0
Future Vol, veh/h	5	562	542	30	74	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	733	707	39	97	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	746	0	-	0	1108 373
Stage 1	-	-	-	-	727 -
Stage 2	-	-	-	-	381 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	858	-	-	-	204 624
Stage 1	-	-	-	-	439 -
Stage 2	-	-	-	-	660 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	858	-	-	-	202 624
Mov Cap-2 Maneuver	-	-	-	-	202 -
Stage 1	-	-	-	-	435 -
Stage 2	-	-	-	-	660 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	38.1
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	858	-	-	-	202
HCM Lane V/C Ratio	0.008	-	-	-	0.478
HCM Control Delay (s)	9.2	-	-	-	38.1
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	2.3

Lanes, Volumes, Timings
15: W Market St & Waterman Dr

2040 No Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕			↕	↕		↕		↔	↕	
Traffic Volume (vph)	101	538	0	2	456	59	0	1	0	56	0	130
Future Volume (vph)	101	538	0	2	456	59	0	1	0	56	0	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		175	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			25	
Link Distance (ft)		1173			1415			219			571	
Travel Time (s)		22.9			27.6			4.3			15.6	
Confl. Peds. (#/hr)			2	2					2	2		
Confl. Bikes (#/hr)									7			
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	702	0	0	598	77	0	1	0	73	170	0
Turn Type	D.P+P	NA		Perm	NA	Perm		NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	6			6	6	6	8	8		4		4
Detector Phase	5	2		6	6	6	8	8		4		4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	26.7		36.7	36.7	36.7	36.6	36.6		23.7	23.7	
Total Split (s)	20.0	50.0		30.0	30.0	30.0	25.0	25.0		25.0	25.0	
Total Split (%)	20.0%	50.0%		30.0%	30.0%	30.0%	25.0%	25.0%		25.0%	25.0%	
Yellow Time (s)	4.3	4.3		4.3	4.3	4.3	3.2	3.2		3.0	3.0	
All-Red Time (s)	4.4	4.4		4.4	4.4	4.4	2.4	2.4		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.7	8.7		8.7	8.7	8.7	5.6	5.6		5.7	5.7	
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	Max		Max	Max	Max	None	None		None	None	
v/c Ratio	0.33	0.37		0.53	0.12		0.00			0.85	0.20	
Control Delay	15.9	14.3		27.9	0.4		33.0			100.6	0.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0			0.0	0.0	
Total Delay	15.9	14.3		27.9	0.4		33.0			100.6	0.5	
Queue Length 50th (ft)	27	88		118	0		0			34	0	
Queue Length 95th (ft)	108	262		291	0		5			#167	0	
Internal Link Dist (ft)		1093		1335			139				491	
Turn Bay Length (ft)	150					175				100		
Base Capacity (vph)	463	1896		1124	652		467			86	867	
Starvation Cap Reductn	0	0		0	0		0			0	0	
Spillback Cap Reductn	0	0		0	0		0			0	0	
Storage Cap Reductn	0	0		0	0		0			0	0	
Reduced v/c Ratio	0.29	0.37		0.53	0.12		0.00			0.85	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 86.2

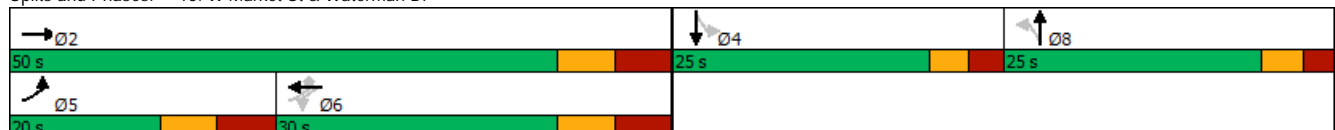
Natural Cycle: 115

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 15: W Market St & Waterman Dr



HCM Signalized Intersection Capacity Analysis
 15: W Market St & Waterman Dr

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	538	0	2	456	59	0	1	0	56	0	130
Future Volume (vph)	101	538	0	2	456	59	0	1	0	56	0	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	8.7			8.7	8.7		5.6		5.7	5.7	
Lane Util. Factor	1.00	0.95			0.95	1.00		1.00		1.00	1.00	
Frbp, ped/bikes	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	
Frt	1.00	1.00			1.00	0.85		1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539			3538	1583		1863		1768	1583	
Flt Permitted	0.36	1.00			0.95	1.00		1.00		0.20	1.00	
Satd. Flow (perm)	675	3539			3365	1583		1863		376	1583	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	132	702	0	3	595	77	0	1	0	73	0	170
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	0	0	133	0
Lane Group Flow (vph)	132	702	0	0	598	25	0	1	0	73	37	0
Confl. Peds. (#/hr)			2	2						2	2	
Confl. Bikes (#/hr)										7		
Turn Type	D.P+P	NA		Perm	NA	Perm		NA		Perm	NA	
Protected Phases	5	2			6			8				4
Permitted Phases	6			6		6	8			4		
Actuated Green, G (s)	37.5	46.2			29.0	29.0		4.5		19.8	19.8	
Effective Green, g (s)	37.5	46.2			29.0	29.0		4.5		19.8	19.8	
Actuated g/C Ratio	0.41	0.51			0.32	0.32		0.05		0.22	0.22	
Clearance Time (s)	8.7	8.7			8.7	8.7		5.6		5.7	5.7	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	382	1806			1078	507		92		82	346	
v/s Ratio Prot	0.03	c0.20						c0.00			0.02	
v/s Ratio Perm	0.11				c0.18	0.02				c0.19		
v/c Ratio	0.35	0.39			0.55	0.05		0.01		0.89	0.11	
Uniform Delay, d1	16.9	13.5			25.4	21.2		40.9		34.3	28.3	
Progression Factor	1.00	1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.6			2.1	0.2		0.0		63.9	0.1	
Delay (s)	17.4	14.2			27.5	21.4		40.9		98.2	28.4	
Level of Service	B	B			C	C		D		F	C	
Approach Delay (s)		14.7			26.8			40.9			49.4	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			24.2				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			90.5				Sum of lost time (s)			28.7		
Intersection Capacity Utilization			62.7%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
15: W Market St & Waterman Dr

2040 No Build
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↖	↗		↕		↖	↗	
Traffic Volume (veh/h)	101	538	0	2	456	59	0	1	0	56	0	130
Future Volume (veh/h)	101	538	0	2	456	59	0	1	0	56	0	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	132	702	0	3	595	77	0	1	0	73	0	170
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	474	2251	0	57	1497	680	0	273	0	315	0	230
Arrive On Green	0.07	0.63	0.00	0.43	0.43	0.43	0.00	0.15	0.00	0.15	0.00	0.15
Sat Flow, veh/h	1781	3647	0	3	3480	1581	0	1870	0	1410	0	1579
Grp Volume(v), veh/h	132	702	0	320	278	77	0	1	0	73	0	170
Grp Sat Flow(s),veh/h/ln	1781	1777	0	1866	1617	1581	0	1870	0	1410	0	1579
Q Serve(g_s), s	2.6	5.9	0.0	0.0	7.7	1.9	0.0	0.0	0.0	3.0	0.0	6.7
Cycle Q Clear(g_c), s	2.6	5.9	0.0	7.7	7.7	1.9	0.0	0.0	0.0	3.1	0.0	6.7
Prop In Lane	1.00		0.00	0.01		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	474	2251	0	859	696	680	0	273	0	315	0	230
V/C Ratio(X)	0.28	0.31	0.00	0.37	0.40	0.11	0.00	0.00	0.00	0.23	0.00	0.74
Avail Cap(c_a), veh/h	658	2251	0	859	696	680	0	556	0	527	0	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	5.5	0.0	12.8	12.8	11.1	0.0	23.8	0.0	25.1	0.0	26.7
Incr Delay (d2), s/veh	0.3	0.4	0.0	1.2	1.7	0.3	0.0	0.0	0.0	0.4	0.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.7	0.0	3.1	2.7	0.6	0.0	0.0	0.0	1.0	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	5.8	0.0	14.0	14.5	11.5	0.0	23.8	0.0	25.5	0.0	31.3
LnGrp LOS	A	A	A	B	B	B	A	C	A	C	A	C
Approach Vol, veh/h		834			675			1				243
Approach Delay, s/veh		6.4			13.9			23.8				29.5
Approach LOS		A			B			C				C
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.0		15.2	13.2	36.8		15.2				
Change Period (Y+Rc), s		* 8.7		* 5.7	* 8.7	* 8.7		* 5.7				
Max Green Setting (Gmax), s		* 41		* 19	* 11	* 21		* 19				
Max Q Clear Time (g_c+I1), s		7.9		8.7	4.6	9.7		2.0				
Green Ext Time (p_c), s		5.3		0.9	0.2	2.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	12.5
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
16: Dogwood Dr & W Market St

2040 No Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕	↗		↕↕	
Traffic Volume (vph)	9	500	71	3	380	6	107	8	18	15	14	32
Future Volume (vph)	9	500	71	3	380	6	107	8	18	15	14	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		125	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1415			398			379			366	
Travel Time (s)		27.6			7.8			10.3			10.0	
Confl. Peds. (#/hr)	6					6	2					2
Confl. Bikes (#/hr)			7			1			1			6
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	757	0	0	508	0	0	150	23	0	80	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8		8	4	4
Permitted Phases	6			2			8		8	4		
Detector Phase	6	6		2	2		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	32.7	32.7		31.7	31.7		38.1	38.1	38.1	37.7	37.7	
Total Split (s)	30.0	30.0		30.0	30.0		25.0	25.0	25.0	25.0	25.0	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		31.3%	31.3%	31.3%	31.3%	31.3%	
Yellow Time (s)	4.7	4.7		4.7	4.7		3.3	3.3	3.3	3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.8	3.8	3.8	2.2	2.2	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.7			6.7			7.1	7.1		5.7	
Lead/Lag							Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.56			0.37			0.67	0.06		0.80	
Control Delay		22.8			20.4			45.8	0.3		65.9	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		22.8			20.4			45.8	0.3		65.9	
Queue Length 50th (ft)		132			82			60	0		16	
Queue Length 95th (ft)		#316			190			#162	0		#82	
Internal Link Dist (ft)		1335			318			299			286	
Turn Bay Length (ft)									125			
Base Capacity (vph)		1347			1370			315	484		134	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.56			0.37			0.48	0.05		0.60	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 73.9

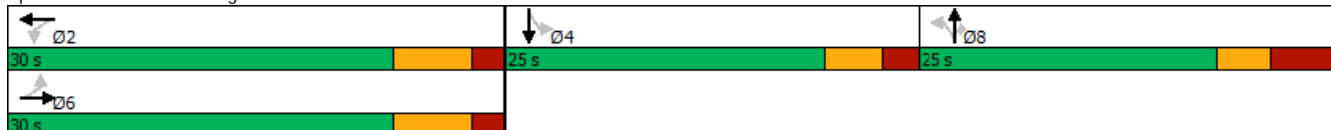
Natural Cycle: 110

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.

Splits and Phases: 16: Dogwood Dr & W Market St



HCM Signalized Intersection Capacity Analysis
 16: Dogwood Dr & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕	↗		↕	
Traffic Volume (vph)	9	500	71	3	380	6	107	8	18	15	14	32
Future Volume (vph)	9	500	71	3	380	6	107	8	18	15	14	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7			6.7			7.1	7.1			5.7
Lane Util. Factor		0.95			0.95			1.00	1.00			1.00
Frbp, ped/bikes		1.00			1.00			1.00	0.99			0.99
Flpb, ped/bikes		1.00			1.00			1.00	1.00			1.00
Frt		0.98			1.00			1.00	0.85			0.93
Flt Protected		1.00			1.00			0.96	1.00			0.99
Satd. Flow (prot)		3460			3528			1778	1562			1690
Flt Permitted		0.94			0.95			0.68	1.00			0.21
Satd. Flow (perm)		3267			3349			1270	1562			356
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	12	652	93	4	496	8	140	10	23	20	18	42
RTOR Reduction (vph)	0	11	0	0	1	0	0	0	19	0	35	0
Lane Group Flow (vph)	0	746	0	0	507	0	0	150	4	0	45	0
Confl. Peds. (#/hr)	6					6	2					2
Confl. Bikes (#/hr)			7			1			1			6
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)		30.2			30.2			13.0	13.0			12.0
Effective Green, g (s)		30.2			30.2			13.0	13.0			12.0
Actuated g/C Ratio		0.40			0.40			0.17	0.17			0.16
Clearance Time (s)		6.7			6.7			7.1	7.1			5.7
Vehicle Extension (s)		3.0			3.0			3.0	3.0			3.0
Lane Grp Cap (vph)		1320			1353			221	271			57
v/s Ratio Prot												
v/s Ratio Perm		c0.23			0.15			c0.12	0.00			c0.13
v/c Ratio		0.56			0.37			0.68	0.01			0.79
Uniform Delay, d1		17.2			15.6			28.9	25.5			30.1
Progression Factor		1.00			1.00			1.00	1.00			1.00
Incremental Delay, d2		1.8			0.8			8.0	0.0			49.7
Delay (s)		18.9			16.4			36.9	25.6			79.8
Level of Service		B			B			D	C			E
Approach Delay (s)		18.9			16.4			35.4				79.8
Approach LOS		B			B			D				E
Intersection Summary												
HCM 2000 Control Delay			23.2			HCM 2000 Level of Service						C
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			74.7			Sum of lost time (s)			19.5			
Intersection Capacity Utilization			52.9%			ICU Level of Service						A
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 16: Dogwood Dr & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑	↗		↘	
Traffic Volume (veh/h)	9	500	71	3	380	6	107	8	18	15	14	32
Future Volume (veh/h)	9	500	71	3	380	6	107	8	18	15	14	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	652	93	4	496	8	140	10	23	20	18	42
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	92	1597	225	86	1845	30	390	17	247	134	81	125
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	15	3022	426	5	3491	56	1465	105	1558	200	512	787
Grp Volume(v), veh/h	405	0	352	266	0	242	150	0	23	80	0	0
Grp Sat Flow(s),veh/h/ln	1854	0	1610	1862	0	1690	1570	0	1558	1499	0	0
Q Serve(g_s), s	0.0	0.0	5.8	0.0	0.0	3.5	0.0	0.0	0.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.8	0.0	5.8	3.5	0.0	3.5	3.4	0.0	0.6	3.4	0.0	0.0
Prop In Lane	0.03		0.26	0.02		0.03	0.93		1.00	0.25		0.52
Lane Grp Cap(c), veh/h	1063	0	851	1067	0	893	407	0	247	340	0	0
V/C Ratio(X)	0.38	0.00	0.41	0.25	0.00	0.27	0.37	0.00	0.09	0.24	0.00	0.00
Avail Cap(c_a), veh/h	1063	0	851	1067	0	893	744	0	632	775	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.3	0.0	6.3	5.7	0.0	5.7	17.0	0.0	15.8	16.4	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	1.5	0.6	0.0	0.7	0.6	0.0	0.2	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.5	1.0	0.0	0.9	1.3	0.0	0.2	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	0.0	7.8	6.3	0.0	6.5	17.6	0.0	16.0	16.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h		757			508			173			80	
Approach Delay, s/veh		7.5			6.4			17.4			16.7	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		14.1		30.0		14.1				
Change Period (Y+Rc), s		6.7		* 7.1		6.7		7.1				
Max Green Setting (Gmax), s		23.3		* 19		23.3		17.9				
Max Q Clear Time (g_c+I1), s		5.5		5.4		7.8		5.4				
Green Ext Time (p_c), s		2.7		0.3		4.2		0.7				

Intersection Summary

HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
17: Willow St & W Market St

2040 No Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	16	504	12	8	364	4	13	7	11	4	7	15
Future Volume (vph)	16	504	12	8	364	4	13	7	11	4	7	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		398			1372			267			334	
Travel Time (s)		7.8			26.7			7.3			9.1	
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)						1			1			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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	694	0	0	490	0	0	40	0	0	34	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 17: Willow St & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Volume (veh/h)	16	504	12	8	364	4	13	7	11	4	7	15
Future Volume (Veh/h)	16	504	12	8	364	4	13	7	11	4	7	15
Sign Control		Free			Free			Stop			Stop	
Grade		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)	21	657	16	10	475	5	17	9	14	5	9	20
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					0							
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		398										
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	480			673			989	1207	338	888	1212	240
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	480			270			641	897	0	523	903	240
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			94	96	98	99	96	97
cM capacity (veh/h)	1079			1100			283	230	923	347	228	761
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	350	344	248	242	40	34						
Volume Left	21	0	10	0	17	5						
Volume Right	0	16	0	5	14	20						
cSH	1079	1700	1100	1700	350	424						
Volume to Capacity	0.02	0.20	0.01	0.14	0.11	0.08						
Queue Length 95th (ft)	1	0	1	0	10	6						
Control Delay (s)	0.7	0.0	0.4	0.0	16.6	14.2						
Lane LOS	A		A		C	B						
Approach Delay (s)	0.4		0.2		16.6	14.2						
Approach LOS					C	B						
Intersection Summary												
Average Delay				1.2								
Intersection Capacity Utilization			43.1%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	504	12	8	364	4	13	7	11	4	7	15
Future Vol, veh/h	16	504	12	8	364	4	13	7	11	4	7	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	657	16	10	475	5	17	9	14	5	9	20

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	480	0	0	673
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.14	-	-	4.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.22	-	-	2.22
Pot Cap-1 Maneuver	1079	-	-	914
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1079	-	-	914
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	22.5	17.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	246	1079	-	-	914	-	-	332
HCM Lane V/C Ratio	0.164	0.019	-	-	0.011	-	-	0.102
HCM Control Delay (s)	22.5	8.4	0.1	-	9	0.1	-	17.1
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.3

Lanes, Volumes, Timings
 18: S High St/N High St & W Market St

2040 No Build
 Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	138	189	27	145	3	122	559	30	17	703	113
Future Volume (vph)	183	138	189	27	145	3	122	559	30	17	703	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		320	150		0	130		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			25			35			35	
Link Distance (ft)		1372			628			780			700	
Travel Time (s)		26.7			17.1			15.2			13.6	
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	239	427	0	35	193	0	159	768	0	22	1064	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		D.P+P	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			2		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	13.4	43.4		13.4	43.4		12.3	33.3		12.3	41.3	
Total Split (s)	20.0	35.0		14.0	29.0		14.0	37.0		14.0	37.0	
Total Split (%)	20.0%	35.0%		14.0%	29.0%		14.0%	37.0%		14.0%	37.0%	
Yellow Time (s)	4.3	4.3		4.3	4.3		3.9	3.9		3.9	3.9	
All-Red Time (s)	4.1	4.1		4.1	4.1		3.4	3.4		3.4	3.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
v/c Ratio	0.61	0.81		0.16	0.61		0.73	0.52		0.08	0.94	
Control Delay	29.6	41.7		21.4	46.0		41.7	25.6		16.8	49.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.6	41.7		21.4	46.0		41.7	25.6		16.8	49.3	
Queue Length 50th (ft)	103	221		13	109		61	179		8	-376	
Queue Length 95th (ft)	164	#391		33	180		#175	298		22	#508	
Internal Link Dist (ft)		1292			548			700			620	
Turn Bay Length (ft)							150			130		
Base Capacity (vph)	395	530		214	383		217	1474		285	1135	
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	0.61	0.81		0.16	0.50		0.73	0.52		0.08	0.94	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 6.9 (7%), Referenced to phase 2:NBSB and 6:SBT, Start of Yellow

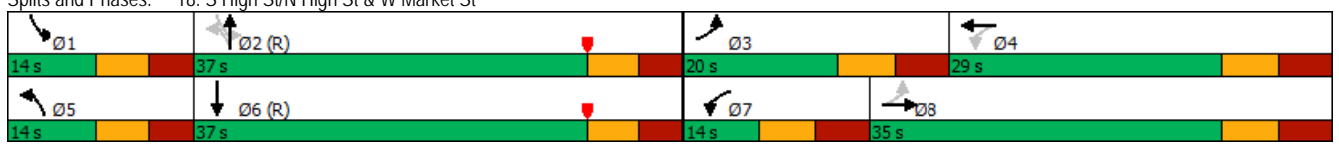
Natural Cycle: 115

Control Type: Actuated-Coordinated

~ 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.

Splits and Phases: 18: S High St/N High St & W Market St



HCM Signalized Intersection Capacity Analysis
 18: S High St/N High St & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	183	138	189	27	145	3	122	559	30	17	703	113
Future Volume (vph)	183	138	189	27	145	3	122	559	30	17	703	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Fr't	1.00	0.91		1.00	1.00		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1701		1770	1857		1770	3512		1770	3466	
Flt Permitted	0.43	1.00		0.37	1.00		0.12	1.00		0.24	1.00	
Satd. Flow (perm)	803	1701		682	1857		219	3512		440	3466	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	239	180	247	35	189	4	159	729	39	22	917	147
RTOR Reduction (vph)	0	48	0	0	1	0	0	3	0	0	13	0
Lane Group Flow (vph)	239	379	0	35	192	0	159	765	0	22	1051	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		D,P+P	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			2		
Actuated Green, G (s)	39.8	28.4		23.8	20.4		41.9	34.1		36.8	29.0	
Effective Green, g (s)	39.8	28.4		23.8	20.4		41.9	34.1		36.8	29.0	
Actuated g/C Ratio	0.40	0.28		0.24	0.20		0.42	0.34		0.37	0.29	
Clearance Time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	483		199	378		212	1197		197	1005	
v/s Ratio Prot	c0.06	c0.22		0.01	0.10		c0.06	c0.22		0.00	c0.30	
v/s Ratio Perm	0.16			0.04			0.26			0.04		
v/c Ratio	0.56	0.78		0.18	0.51		0.75	0.64		0.11	1.05	
Uniform Delay, d1	21.5	33.0		29.8	35.3		23.4	27.8		20.9	35.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	8.2		0.4	1.1		13.8	2.6		0.3	41.2	
Delay (s)	23.0	41.2		30.2	36.4		37.3	30.4		21.2	76.7	
Level of Service	C	D		C	D		D	C		C	E	
Approach Delay (s)		34.7			35.5			31.6			75.5	
Approach LOS		C			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	49.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	31.4
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 18: S High St/N High St & W Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	183	138	189	27	145	3	122	559	30	17	703	113
Future Volume (veh/h)	183	138	189	27	145	3	122	559	30	17	703	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	239	180	247	35	189	4	159	729	39	22	917	147
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	382	190	261	145	330	7	209	1256	67	249	987	158
Arrive On Green	0.12	0.27	0.27	0.03	0.18	0.18	0.07	0.37	0.37	0.02	0.32	0.32
Sat Flow, veh/h	1781	714	980	1781	1825	39	1781	3431	183	1781	3067	492
Grp Volume(v), veh/h	239	0	427	35	0	193	159	377	391	22	531	533
Grp Sat Flow(s),veh/h/ln	1781	0	1694	1781	0	1863	1781	1777	1837	1781	1777	1782
Q Serve(g_s), s	10.6	0.0	24.7	1.6	0.0	9.5	6.0	17.1	17.1	0.8	28.9	28.9
Cycle Q Clear(g_c), s	10.6	0.0	24.7	1.6	0.0	9.5	6.0	17.1	17.1	0.8	28.9	28.9
Prop In Lane	1.00		0.58	1.00		0.02	1.00		0.10	1.00		0.28
Lane Grp Cap(c), veh/h	382	0	451	145	0	337	209	650	673	249	572	574
V/C Ratio(X)	0.63	0.00	0.95	0.24	0.00	0.57	0.76	0.58	0.58	0.09	0.93	0.93
Avail Cap(c_a), veh/h	382	0	451	190	0	384	209	650	673	328	572	574
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.8	0.0	36.0	33.0	0.0	37.4	25.5	25.5	25.5	20.4	32.8	32.8
Incr Delay (d2), s/veh	3.2	0.0	29.5	0.8	0.0	1.6	15.2	3.8	3.6	0.2	23.6	23.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	13.5	0.7	0.0	4.5	3.3	7.6	7.9	0.3	15.7	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	0.0	65.5	33.9	0.0	39.0	40.7	29.3	29.2	20.6	56.4	56.4
LnGrp LOS	C	A	E	C	A	D	D	C	C	C	E	E
Approach Vol, veh/h		666			228			927			1086	
Approach Delay, s/veh		53.1			38.2			31.2			55.7	
Approach LOS		D			D			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.6	43.9	20.0	26.5	14.0	39.5	11.5	35.0				
Change Period (Y+Rc), s	7.3	7.3	* 8.4	* 8.4	7.3	7.3	* 8.4	* 8.4				
Max Green Setting (Gmax), s	6.7	29.7	* 12	* 21	6.7	29.7	* 5.6	* 27				
Max Q Clear Time (g_c+I1), s	2.8	19.1	12.6	11.5	8.0	30.9	3.6	26.7				
Green Ext Time (p_c), s	0.0	3.4	0.0	0.7	0.0	0.0	0.0	0.0				

Intersection Summary												
HCM 6th Ctrl Delay			45.9									
HCM 6th LOS			D									

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 19: S Mason St/N Mason St & E Market St

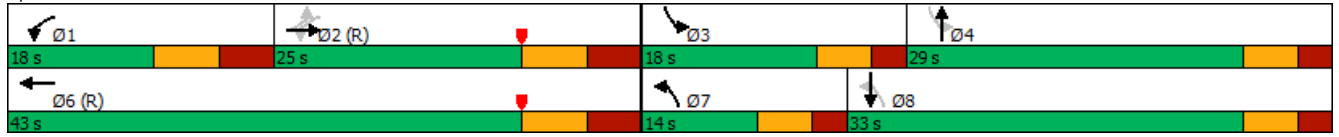
2040 No Build
 Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↖		↖	↖		↖	↖	
Traffic Volume (vph)	1	113	3	166	152	196	1	48	18	137	60	6
Future Volume (vph)	1	113	3	166	152	196	1	48	18	137	60	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	0		0	0		0	0	0	0
Storage Lanes	0		1	1		0	1		0	1	1	0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			No			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		530			595			372			335	
Travel Time (s)		14.5			16.2			10.1			9.1	
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	152	0	217	454	0	1	86	0	179	86	0
Turn Type	Perm	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	27.1	27.1		13.1	37.1		11.1	29.1		11.1	23.1	
Total Split (s)	25.0	25.0		18.0	43.0		14.0	29.0		18.0	33.0	
Total Split (%)	27.8%	27.8%		20.0%	47.8%		15.6%	32.2%		20.0%	36.7%	
Yellow Time (s)	4.5	4.5		4.5	4.5		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.6	3.6		3.6	3.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		8.1		8.1	8.1		6.1	6.1		6.1	6.1	
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
v/c Ratio		0.13		0.33	0.45		0.00	0.44		0.52	0.19	
Control Delay		23.4		11.9	7.6		20.0	43.9		30.6	24.8	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		23.4		11.9	7.6		20.0	43.9		30.6	24.8	
Queue Length 50th (ft)		31		39	61		0	47		78	33	
Queue Length 95th (ft)		62		60	87		4	89		125	77	
Internal Link Dist (ft)		450			515			292			255	
Turn Bay Length (ft)												
Base Capacity (vph)		1188		669	1007		384	454		357	566	
Starvation Cap Reductn		0		0	0		0	0		0	0	
Spillback Cap Reductn		0		0	0		0	0		0	0	
Storage Cap Reductn		0		0	0		0	0		0	0	
Reduced v/c Ratio		0.13		0.32	0.45		0.00	0.19		0.50	0.15	

Intersection Summary
 Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 21 (23%), Referenced to phase 2:EBWB and 6:WBT, Start of Yellow
 Natural Cycle: 85
 Control Type: Actuated-Coordinated

Splits and Phases: 19: S Mason St/N Mason St & E Market St



HCM Signalized Intersection Capacity Analysis
 19: S Mason St/N Mason St & E Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	1	113	3	166	152	196	1	48	18	137	60	6
Future Volume (vph)	1	113	3	166	152	196	1	48	18	137	60	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.1		8.1	8.1		6.1	6.1		6.1	6.1	
Lane Util. Factor		0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Fr't		1.00		1.00	0.92		1.00	0.96		1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3524		1770	1705		1770	1788		1770	1837	
Flt Permitted		0.95		0.66	1.00		0.70	1.00		0.70	1.00	
Satd. Flow (perm)		3357		1221	1705		1306	1788		1306	1837	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	1	147	4	217	198	256	1	63	23	179	78	8
RTOR Reduction (vph)	0	2	0	0	41	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	150	0	217	413	0	1	86	0	179	81	0
Turn Type	Perm	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases	2			2			8			4		
Actuated Green, G (s)		26.9		38.3	46.4		23.3	12.2		23.3	22.1	
Effective Green, g (s)		26.9		38.3	46.4		23.3	12.2		23.3	22.1	
Actuated g/C Ratio		0.30		0.43	0.52		0.26	0.14		0.26	0.25	
Clearance Time (s)		8.1		8.1	8.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1003		589	879		344	242		395	451	
v/s Ratio Prot				0.05	c0.24		0.00	0.05		c0.06	0.04	
v/s Ratio Perm		0.04		0.11			0.00			c0.06		
v/c Ratio		0.15		0.37	0.47		0.00	0.36		0.45	0.18	
Uniform Delay, d1		23.2		16.9	13.9		24.7	35.3		27.5	26.8	
Progression Factor		1.00		0.89	0.58		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3		0.4	1.7		0.0	0.9		0.8	0.2	
Delay (s)		23.5		15.5	9.9		24.7	36.2		28.3	27.0	
Level of Service		C		B	A		C	D		C	C	
Approach Delay (s)		23.5			11.7			36.1			27.9	
Approach LOS		C			B			D			C	
Intersection Summary												
HCM 2000 Control Delay			18.7			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			28.4			
Intersection Capacity Utilization			66.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 19: S Mason St/N Mason St & E Market St

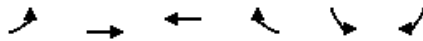
2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↓		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	1	113	3	166	152	196	1	48	18	137	60	6
Future Volume (veh/h)	1	113	3	166	152	196	1	48	18	137	60	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	147	4	217	198	256	1	63	23	179	78	8
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	1385	37	711	433	560	277	100	37	320	313	32
Arrive On Green	0.40	0.40	0.40	0.16	0.98	0.98	0.00	0.08	0.08	0.11	0.19	0.19
Sat Flow, veh/h	3	3457	93	1781	741	957	1781	1307	477	1781	1668	171
Grp Volume(v), veh/h	80	0	72	217	0	454	1	0	86	179	0	86
Grp Sat Flow(s),veh/h/ln	1868	0	1685	1781	0	1698	1781	0	1784	1781	0	1840
Q Serve(g_s), s	0.0	0.0	2.4	6.5	0.0	1.0	0.0	0.0	4.2	8.2	0.0	3.6
Cycle Q Clear(g_c), s	2.4	0.0	2.4	6.5	0.0	1.0	0.0	0.0	4.2	8.2	0.0	3.6
Prop In Lane	0.01		0.06	1.00		0.56	1.00		0.27	1.00		0.09
Lane Grp Cap(c), veh/h	789	0	675	711	0	994	277	0	137	320	0	345
V/C Ratio(X)	0.10	0.00	0.11	0.31	0.00	0.46	0.00	0.00	0.63	0.56	0.00	0.25
Avail Cap(c_a), veh/h	789	0	675	738	0	994	430	0	454	355	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.9	0.0	16.9	12.2	0.0	0.4	29.7	0.0	40.3	33.0	0.0	31.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.2	0.0	1.5	0.0	0.0	4.7	1.6	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.0	2.3	0.0	0.6	0.0	0.0	2.0	3.6	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	0.0	17.2	12.5	0.0	1.9	29.7	0.0	45.0	34.6	0.0	31.5
LnGrp LOS	B	A	B	B	A	A	C	A	D	C	A	C
Approach Vol, veh/h		152			671			87			265	
Approach Delay, s/veh		17.2			5.3			44.8			33.6	
Approach LOS		B			A			D			C	
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	16.6	44.2	16.2	13.0		60.8	6.2	23.0				
Change Period (Y+Rc), s	* 8.1	* 8.1	* 6.1	* 6.1		* 8.1	* 6.1	* 6.1				
Max Green Setting (Gmax), s	* 9.9	* 17	* 12	* 23		* 35	* 7.9	* 27				
Max Q Clear Time (g_c+I1), s	8.5	4.4	10.2	6.2		3.0	2.0	5.6				
Green Ext Time (p_c), s	0.1	0.6	0.1	0.3		3.6	0.0	0.4				

Intersection Summary												
HCM 6th Ctrl Delay				16.2								
HCM 6th LOS				B								

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

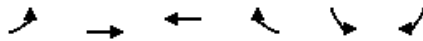


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	278	524	51	18	5
Future Volume (vph)	2	278	524	51	18	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35	35		35	
Link Distance (ft)		595	279		366	
Travel Time (s)		11.6	5.4		7.1	
Confl. Peds. (#/hr)	2			2	1	2
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	362	742	0	29	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 20: E Market St & Broad St

2040 No Build
 Timing Plan: AM Peak



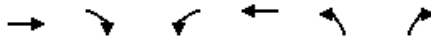
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	2	278	524	51	18	5
Future Volume (Veh/h)	2	278	524	51	18	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	3	359	676	66	23	6
Pedestrians		2	1		2	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		595	1010			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	744				898	375
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	581				745	185
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				93	99
cM capacity (veh/h)	921				324	767
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	123	239	451	291	29	
Volume Left	3	0	0	0	23	
Volume Right	0	0	0	66	6	
cSH	921	1700	1700	1700	368	
Volume to Capacity	0.00	0.14	0.27	0.17	0.08	
Queue Length 95th (ft)	0	0	0	0	6	
Control Delay (s)	0.2	0.0	0.0	0.0	15.6	
Lane LOS	A				C	
Approach Delay (s)	0.1		0.0		15.6	
Approach LOS					C	
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			30.0%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Vol, veh/h	2	278	524	51	18	5
Future Vol, veh/h	2	278	524	51	18	5
Conflicting Peds, #/hr	2	0	0	2	1	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	359	676	66	23	6

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	744	0	-	0	898 375
Stage 1	-	-	-	-	711 -
Stage 2	-	-	-	-	187 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	859	-	-	-	279 623
Stage 1	-	-	-	-	448 -
Stage 2	-	-	-	-	826 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	857	-	-	-	277 621
Mov Cap-2 Maneuver	-	-	-	-	277 -
Stage 1	-	-	-	-	445 -
Stage 2	-	-	-	-	824 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	17.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	857	-	-	-	315
HCM Lane V/C Ratio	0.003	-	-	-	0.094
HCM Control Delay (s)	9.2	0	-	-	17.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

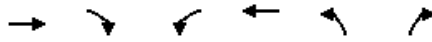


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (vph)	294	7	30	582	5	20
Future Volume (vph)	294	7	30	582	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	35			35	35	
Link Distance (ft)	279			280	613	
Travel Time (s)	5.4			5.5	11.9	
Confl. Peds. (#/hr)		2	2		2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	388	0	0	790	32	0
Sign Control	Free			Free	Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 21: Ott St & E Market St

2040 No Build
 Timing Plan: AM Peak



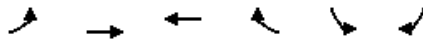
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Traffic Volume (veh/h)	294	7	30	582	5	20
Future Volume (Veh/h)	294	7	30	582	5	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	379	9	39	751	6	26
Pedestrians	2			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	3.5			3.5		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	874			731		
pX, platoon unblocked				0.91		
vC, conflicting volume				390	841	196
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				390	623	196
tC, single (s)				4.1	6.8	6.9
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				97	98	97
cM capacity (veh/h)				1163	366	811
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	253	135	289	501	32	
Volume Left	0	0	39	0	6	
Volume Right	0	9	0	0	26	
cSH	1700	1700	1163	1700	660	
Volume to Capacity	0.15	0.08	0.03	0.29	0.05	
Queue Length 95th (ft)	0	0	3	0	4	
Control Delay (s)	0.0	0.0	1.4	0.0	10.7	
Lane LOS	A			B		
Approach Delay (s)	0.0			10.7		
Approach LOS				B		
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	43.9%			ICU Level of Service	A	
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Vol, veh/h	294	7	30	582	5	20
Future Vol, veh/h	294	7	30	582	5	20
Conflicting Peds, #/hr	0	2	2	0	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	379	9	39	751	6	26

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	390	0	842
Stage 1	-	-	-	-	386
Stage 2	-	-	-	-	456
Critical Hdwy	-	-	4.14	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	-	-	2.22	-	3.52
Pot Cap-1 Maneuver	-	-	1165	-	303
Stage 1	-	-	-	-	656
Stage 2	-	-	-	-	605
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1163	-	284
Mov Cap-2 Maneuver	-	-	-	-	284
Stage 1	-	-	-	-	655
Stage 2	-	-	-	-	569

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	591	-	-	1163	-
HCM Lane V/C Ratio	0.055	-	-	0.033	-
HCM Control Delay (s)	11.4	-	-	8.2	0.2
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

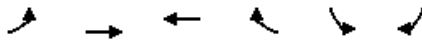


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	302	605	5	4	11
Future Volume (vph)	10	302	605	5	4	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35	35		35	
Link Distance (ft)		280	451		356	
Travel Time (s)		5.5	8.8		6.9	
Confl. Peds. (#/hr)	1			1	1	
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	399	778	0	19	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 22: E Market St & Myrtle St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	
Traffic Volume (veh/h)	10	302	605	5	4	11
Future Volume (Veh/h)	10	302	605	5	4	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	13	386	772	6	5	14
Pedestrians			1		1	
Lane Width (ft)			12.0		12.0	
Walking Speed (ft/s)			3.5		3.5	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1154	451			
pX, platoon unblocked	0.90				0.90	0.90
vC, conflicting volume	779				996	390
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	532				774	100
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	98
cM capacity (veh/h)	927				297	841
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	142	257	515	263	19	
Volume Left	13	0	0	0	5	
Volume Right	0	0	0	6	14	
cSH	927	1700	1700	1700	568	
Volume to Capacity	0.01	0.15	0.30	0.15	0.03	
Queue Length 95th (ft)	1	0	0	0	3	
Control Delay (s)	0.9	0.0	0.0	0.0	11.6	
Lane LOS	A				B	
Approach Delay (s)	0.3		0.0		11.6	
Approach LOS					B	
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			30.3%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Vol, veh/h	10	302	605	5	4	11
Future Vol, veh/h	10	302	605	5	4	11
Conflicting Peds, #/hr	1	0	0	1	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	386	772	6	5	14

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	779	0	-	0	996 390
Stage 1	-	-	-	-	776 -
Stage 2	-	-	-	-	220 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	834	-	-	-	241 609
Stage 1	-	-	-	-	414 -
Stage 2	-	-	-	-	795 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	833	-	-	-	236 608
Mov Cap-2 Maneuver	-	-	-	-	236 -
Stage 1	-	-	-	-	405 -
Stage 2	-	-	-	-	794 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	833	-	-	-	428
HCM Lane V/C Ratio	0.015	-	-	-	0.045
HCM Control Delay (s)	9.4	0.1	-	-	13.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings
23: Reservoir St/Sterling St & E Market St

2040 No Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	188	127	0	474	5	135	54	18	6	80	2
Future Volume (vph)	1	188	127	0	474	5	135	54	18	6	80	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		451			685			454			334	
Travel Time (s)		8.8			13.3			8.8			6.5	
Confl. Peds. (#/hr)	2		2	2		2						
Confl. Bikes (#/hr)						2						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	403	0	0	611	0	0	264	0	0	113	0
Turn Type	Perm	NA			NA		Split	NA		Perm	NA	
Protected Phases		2			2		3	3			1	
Permitted Phases	2									1		
Detector Phase	2	2			2		3	3		1	1	
Switch Phase												
Minimum Initial (s)	20.0	20.0			20.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	28.6	28.6			28.6		27.6	27.6		12.5	12.5	
Total Split (s)	39.0	39.0			39.0		32.0	32.0		19.0	19.0	
Total Split (%)	43.3%	43.3%			43.3%		35.6%	35.6%		21.1%	21.1%	
Yellow Time (s)	3.7	3.7			3.7		3.6	3.6		3.2	3.2	
All-Red Time (s)	2.9	2.9			2.9		2.0	2.0		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.6			6.6			5.6			5.5	
Lead/Lag	Lag	Lag			Lag					Lead	Lead	
Lead-Lag Optimize?	Yes	Yes			Yes					Yes	Yes	
Recall Mode	C-Max	C-Max			C-Max		None	None		None	None	
v/c Ratio		0.24			0.34			0.72			0.53	
Control Delay		5.1			16.1			43.6			45.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		5.1			16.1			43.6			45.8	
Queue Length 50th (ft)		32			110			138			61	
Queue Length 95th (ft)		60			183			202			111	
Internal Link Dist (ft)		371			605			374			254	
Turn Bay Length (ft)												
Base Capacity (vph)		1681			1801			525			270	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.24			0.34			0.50			0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 82 (91%), Referenced to phase 2:EBWB, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated

Splits and Phases: 23: Reservoir St/Sterling St & E Market St



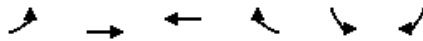
HCM Signalized Intersection Capacity Analysis
 23: Reservoir St/Sterling St & E Market St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Traffic Volume (vph)	1	188	127	0	474	5	135	54	18	6	80	2	
Future Volume (vph)	1	188	127	0	474	5	135	54	18	6	80	2	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		6.6			6.6			5.6			5.5		
Lane Util. Factor		0.95			0.95			1.00			1.00		
Frbp, ped/bikes		0.99			1.00			1.00			1.00		
Flpb, ped/bikes		1.00			1.00			1.00			1.00		
Frt		0.94			1.00			0.99			1.00		
Flt Protected		1.00			1.00			0.97			1.00		
Satd. Flow (prot)		3293			3533			1783			1850		
Flt Permitted		0.95			1.00			0.97			0.97		
Satd. Flow (perm)		3143			3533			1783			1800		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	1	240	162	0	605	6	172	69	23	8	102	3	
RTOR Reduction (vph)	0	81	0	0	1	0	0	4	0	0	1	0	
Lane Group Flow (vph)	0	322	0	0	610	0	0	260	0	0	112	0	
Confl. Peds. (#/hr)	2		2	2		2							
Confl. Bikes (#/hr)								2					
Turn Type	Perm	NA			NA		Split	NA		Perm	NA		
Protected Phases		2			2		3	3				1	
Permitted Phases	2									1			
Actuated Green, G (s)		44.8			44.8			18.3			9.2		
Effective Green, g (s)		44.8			44.8			18.3			9.2		
Actuated g/C Ratio		0.50			0.50			0.20			0.10		
Clearance Time (s)		6.6			6.6			5.6			5.5		
Vehicle Extension (s)		3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)		1564			1758			362			184		
v/s Ratio Prot					c0.17			c0.15					
v/s Ratio Perm		0.10									c0.06		
w/c Ratio		0.21			0.35			0.72			0.61		
Uniform Delay, d1		12.6			13.7			33.4			38.7		
Progression Factor		0.52			1.00			1.00			1.00		
Incremental Delay, d2		0.3			0.5			6.7			5.6		
Delay (s)		6.9			14.3			40.1			44.3		
Level of Service		A			B			D			D		
Approach Delay (s)		6.9			14.3			40.1			44.3		
Approach LOS		A			B			D			D		
Intersection Summary													
HCM 2000 Control Delay			19.5									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.47										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	17.7
Intersection Capacity Utilization			48.9%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Edition methodology does not support Non-NEMA phasing.

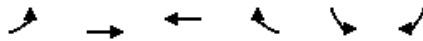


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	204	474	26	19	4
Future Volume (vph)	4	204	474	26	19	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35	35		35	
Link Distance (ft)		685	912		392	
Travel Time (s)		13.3	17.8		7.6	
Confl. Peds. (#/hr)	2			2		2
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	265	638	0	29	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

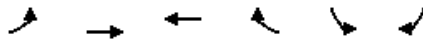
HCM Unsignalized Intersection Capacity Analysis
 24: E Market St & Hill St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	4	204	474	26	19	4
Future Volume (Veh/h)	4	204	474	26	19	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	260	605	33	24	5
Pedestrians		2			2	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		685				
pX, platoon unblocked						
vC, conflicting volume	640				764	323
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	640				764	323
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				93	99
cM capacity (veh/h)	938				338	670
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	92	173	403	235	29	
Volume Left	5	0	0	0	24	
Volume Right	0	0	0	33	5	
cSH	938	1700	1700	1700	369	
Volume to Capacity	0.01	0.10	0.24	0.14	0.08	
Queue Length 95th (ft)	0	0	0	0	6	
Control Delay (s)	0.5	0.0	0.0	0.0	15.6	
Lane LOS	A				C	
Approach Delay (s)	0.2		0.0		15.6	
Approach LOS					C	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			27.4%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Vol, veh/h	4	204	474	26	19	4
Future Vol, veh/h	4	204	474	26	19	4
Conflicting Peds, #/hr	2	0	0	2	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	260	605	33	24	5
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	640	0	-	0	764	323
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	140	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	940	-	-	-	340	673
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	872	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	938	-	-	-	337	670
Mov Cap-2 Maneuver	-	-	-	-	337	-
Stage 1	-	-	-	-	492	-
Stage 2	-	-	-	-	870	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.2	0	15.6			
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	938	-	-	-	369	
HCM Lane V/C Ratio	0.005	-	-	-	0.08	
HCM Control Delay (s)	8.9	0	-	-	15.6	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.3	



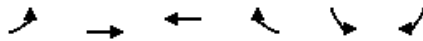
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	32	196	432	44	34	83
Future Volume (vph)	32	196	432	44	34	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	65			175	0	0
Storage Lanes	1			1	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		912	1324		234	
Travel Time (s)		17.8	25.8		4.6	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	245	540	55	147	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 25: E Market St & Old Furnace Rd

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↔	↕↕	↕↕	↔	↕↕		
Traffic Volume (veh/h)	32	196	432	44	34	83	
Future Volume (Veh/h)	32	196	432	44	34	83	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Hourly flow rate (vph)	40	245	540	55	42	104	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage veh							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	595			742	270		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	595			742	270		
tC, single (s)	4.1			6.8	6.9		
tC, 2 stage (s)							
tF (s)	2.2			3.5	3.3		
p0 queue free %	96			88	86		
cM capacity (veh/h)	977			337	728		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	40	122	122	270	270	55	146
Volume Left	40	0	0	0	0	0	42
Volume Right	0	0	0	0	0	55	104
cSH	977	1700	1700	1700	1700	1700	545
Volume to Capacity	0.04	0.07	0.07	0.16	0.16	0.03	0.27
Queue Length 95th (ft)	3	0	0	0	0	0	27
Control Delay (s)	8.8	0.0	0.0	0.0	0.0	0.0	14.0
Lane LOS	A						B
Approach Delay (s)	1.2			0.0			14.0
Approach LOS						B	
Intersection Summary							
Average Delay			2.3				
Intersection Capacity Utilization			36.1%	ICU Level of Service	A		
Analysis Period (min)			15				

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑	↘	↘	
Traffic Vol, veh/h	32	196	432	44	34	83
Future Vol, veh/h	32	196	432	44	34	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	65	-	-	175	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	245	540	55	43	104

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	595	0	-	0	743 270
Stage 1	-	-	-	-	540 -
Stage 2	-	-	-	-	203 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	977	-	-	-	351 728
Stage 1	-	-	-	-	548 -
Stage 2	-	-	-	-	811 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	977	-	-	-	337 728
Mov Cap-2 Maneuver	-	-	-	-	337 -
Stage 1	-	-	-	-	526 -
Stage 2	-	-	-	-	811 -

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	14
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	977	-	-	-	544
HCM Lane V/C Ratio	0.041	-	-	-	0.269
HCM Control Delay (s)	8.8	-	-	-	14
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1

Lanes, Volumes, Timings
26: E Market St & Hawkins St/Vine St

2040 No Build
Timing Plan: AM Peak

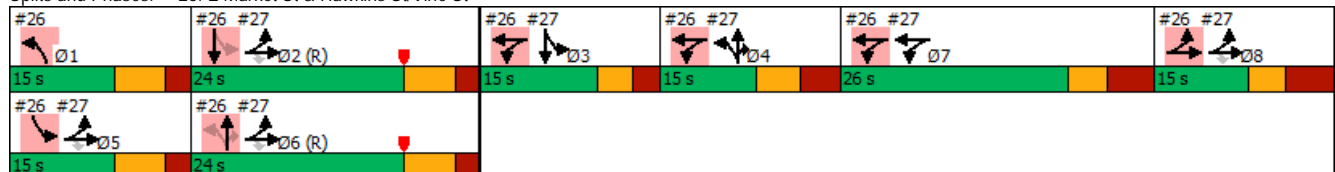


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3	Ø4
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕			
Traffic Volume (vph)	2	15	2	258	12	53	11	438	168	11	178	0		
Future Volume (vph)	2	15	2	258	12	53	11	438	168	11	178	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0	150		250	100		0		
Storage Lanes	0		0	1		0	1		1	1		0		
Taper Length (ft)	0			0			0			0				
Right Turn on Red			No			Yes			No			Yes		
Link Speed (mph)		35			35			35			35			
Link Distance (ft)		552			188			488			1324			
Travel Time (s)		10.8			3.7			9.5			25.8			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Shared Lane Traffic (%)				36%										
Lane Group Flow (vph)	0	23	0	204	196	0	14	542	208	14	220	0		
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA			
Protected Phases	8	8		3 4 7	3 4 7		1	6		5	2		3	4
Permitted Phases							6		6	2				
Minimum Split (s)	14.2	14.2					11.3	13.3	13.3	11.3	13.3		14.1	14.1
Total Split (s)	15.0	15.0					15.0	24.0	24.0	15.0	24.0		15.0	15.0
Total Split (%)	13.6%	13.6%					13.6%	21.8%	21.8%	13.6%	21.8%		14%	14%
Yellow Time (s)	3.1	3.1					4.2	4.2	4.2	4.2	4.2		3.0	3.7
All-Red Time (s)	4.1	4.1					2.1	2.1	2.1	2.1	2.1		2.3	3.4
Lost Time Adjust (s)		0.0					0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)		7.2					6.3	6.3	6.3	6.3	6.3			
Lead/Lag	Lag	Lag					Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes					Yes	Yes	Yes	Yes	Yes		Yes	Yes
v/c Ratio		0.18		0.26	0.26		0.04	0.95	0.82	0.07	0.39			
Control Delay		51.6		5.0	2.7		28.1	74.0	70.3	28.4	43.6			
Queue Delay		0.1		3.6	3.4		0.0	0.0	0.0	0.0	0.0			
Total Delay		51.7		8.6	6.1		28.1	74.0	70.3	28.4	43.6			
Queue Length 50th (ft)		16		15	0		7	201	144	7	74			
Queue Length 95th (ft)		42		m12	m0		22	#310	#269	22	112			
Internal Link Dist (ft)		472			108			408			1244			
Turn Bay Length (ft)							150		250	100				
Base Capacity (vph)		129		774	768		323	569	254	207	569			
Starvation Cap Reductn		0		477	475		0	0	0	0	0			
Spillback Cap Reductn		7		0	0		0	0	0	0	0			
Storage Cap Reductn		0		0	0		0	0	0	0	0			
Reduced v/c Ratio		0.19		0.69	0.67		0.04	0.95	0.82	0.07	0.39			

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow, Master Intersection
 Natural Cycle: 105
 Control Type: Pretimed
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: E Market St & Hawkins St/Vine St



Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Growth Factor	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Minimum Split (s)	14.2
Total Split (s)	26.0
Total Split (%)	24%
Yellow Time (s)	3.4
All-Red Time (s)	3.8
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis
 26: E Market St & Hawkins St/Vine St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	
Traffic Volume (vph)	2	15	2	258	12	53	11	438	168	11	178	0
Future Volume (vph)	2	15	2	258	12	53	11	438	168	11	178	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.2		5.3	5.3		6.3	6.3	6.3	6.3	6.3	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95	1.00	1.00	0.95	
Frt		0.99		1.00	0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1833		1681	1632		1770	3539	1583	1770	3539	
Flt Permitted		1.00		0.95	0.97		0.61	1.00	1.00	0.23	1.00	
Satd. Flow (perm)		1833		1681	1632		1141	3539	1583	421	3539	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	2	19	2	319	15	66	14	542	208	14	220	0
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	23	0	204	177	0	14	542	208	14	220	0
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	8	8		3 4 7	3 4 7		1	6		5	2	
Permitted Phases							6		6	2		
Actuated Green, G (s)		7.8		48.8	48.8		26.4	17.7	17.7	26.4	17.7	
Effective Green, g (s)		7.8		41.7	41.7		26.4	17.7	17.7	26.4	17.7	
Actuated g/C Ratio		0.07		0.38	0.38		0.24	0.16	0.16	0.24	0.16	
Clearance Time (s)		7.2					6.3	6.3	6.3	6.3	6.3	
Lane Grp Cap (vph)		129		637	618		323	569	254	207	569	
v/s Ratio Prot		c0.01		c0.12	0.11		0.00	c0.15		c0.01	0.06	
v/s Ratio Perm							0.01		0.13	0.01		
v/c Ratio		0.18		0.32	0.29		0.04	0.95	0.82	0.07	0.39	
Uniform Delay, d1		48.1		24.1	23.8		32.0	45.7	44.6	32.6	41.3	
Progression Factor		1.00		0.27	0.17		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		3.0		0.1	0.1		0.3	27.7	24.6	0.6	2.0	
Delay (s)		51.1		6.6	4.2		32.3	73.4	69.2	33.2	43.3	
Level of Service		D		A	A		C	E	E	C	D	
Approach Delay (s)		51.1			5.4			71.5			42.7	
Approach LOS		D			A			E			D	

Intersection Summary		
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.46	
Actuated Cycle Length (s)	110.0	Sum of lost time (s) 39.4
Intersection Capacity Utilization	41.8%	ICU Level of Service A
Analysis Period (min)	15	

c Critical Lane Group

HCM 6th Edition methodology does not support clustered intersections.

Lanes, Volumes, Timings
27: Country Club Rd & Vine St

2040 No Build
Timing Plan: AM Peak

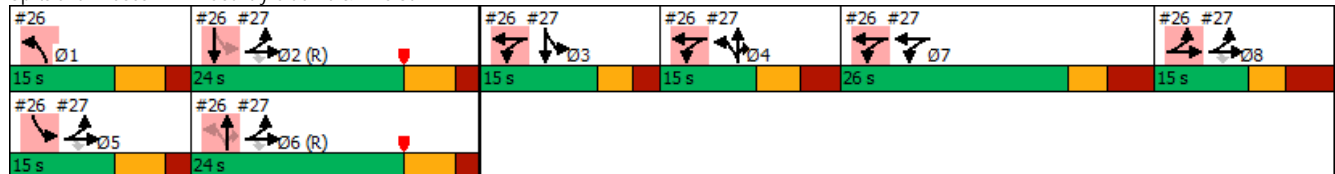


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2
Lane Configurations		↕	↕		↕↕			↕	↕		↕↕			
Traffic Volume (vph)	22	192	42	216	338	1	16	64	181	13	19	29		
Future Volume (vph)	22	192	42	216	338	1	16	64	181	13	19	29		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	230		0	200		0	0		0		
Storage Lanes	0		1	1		0	1		1	0		0		
Taper Length (ft)	0			0			0			0				
Right Turn on Red			No			Yes			Yes			Yes		
Link Speed (mph)		35			35			35			35			
Link Distance (ft)		188			552			389			193			
Travel Time (s)		3.7			10.8			7.6			3.8			
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		
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	279	55	0	724	0	0	104	236	0	80	0		
Turn Type	Split	NA	Perm	Split	NA		Split	NA	Prot	Split	NA			
Protected Phases	2 5 6 8	2 5 6 8		7	7		4	4	4	3	3		1	2
Permitted Phases			2 5 6 8											
Minimum Split (s)				14.2	14.2		14.1	14.1	14.1	14.1	14.1		11.3	13.3
Total Split (s)				26.0	26.0		15.0	15.0	15.0	15.0	15.0		15.0	24.0
Total Split (%)				23.6%	23.6%		13.6%	13.6%	13.6%	13.6%	13.6%		14%	22%
Yellow Time (s)				3.4	3.4		3.7	3.7	3.7	3.0	3.0		4.2	4.2
All-Red Time (s)				3.8	3.8		3.4	3.4	3.4	2.3	2.3		2.1	2.1
Lost Time Adjust (s)					0.0			0.0	0.0		0.0			
Total Lost Time (s)					7.2			7.1	7.1		5.3			
Lead/Lag				Lead	Lead		Lag	Lag	Lag	Lead	Lead		Lead	Lag
Lead-Lag Optimize?				Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes
v/c Ratio		0.35	0.08		1.22		0.79	0.62			0.44			
Control Delay		11.5	11.1		153.6		87.9	9.7			38.6			
Queue Delay		4.6	1.3		0.0		0.0	0.0			0.0			
Total Delay		16.1	12.3		153.6		87.9	9.7			38.6			
Queue Length 50th (ft)		37	7		-331		74	0			32			
Queue Length 95th (ft)		m80	m18		#451		#168	36			82			
Internal Link Dist (ft)		108			472		309				113			
Turn Bay Length (ft)														
Base Capacity (vph)		803	686		593		132	383			181			
Starvation Cap Reductn		443	506		0		0	0			0			
Spillback Cap Reductn		0	0		0		0	0			0			
Storage Cap Reductn		0	0		0		0	0			0			
Reduced v/c Ratio		0.78	0.31		1.22		0.79	0.62			0.44			

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow, Master Intersection
 Natural Cycle: 105
 Control Type: Pretimed
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Country Club Rd & Vine St



Lane Group	Ø5	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Right Turn on Red			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Growth Factor			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	5	6	8
Permitted Phases			
Minimum Split (s)	11.3	13.3	14.2
Total Split (s)	15.0	24.0	15.0
Total Split (%)	14%	22%	14%
Yellow Time (s)	4.2	4.2	3.1
All-Red Time (s)	2.1	2.1	4.1
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 27: Country Club Rd & Vine St

2040 No Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕↕			↕	↕		↕	
Traffic Volume (vph)	22	192	42	216	338	1	16	64	181	13	19	29
Future Volume (vph)	22	192	42	216	338	1	16	64	181	13	19	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3					7.1	7.1			5.3
Lane Util. Factor		1.00	1.00		0.95			1.00	1.00		1.00	
Fr't		1.00	0.85		1.00			1.00	0.85		0.94	
Flt Protected		0.99	1.00		0.98			0.99	1.00		0.99	
Satd. Flow (prot)		1853	1583		3471			1844	1583		1725	
Flt Permitted		0.99	1.00		0.98			0.99	1.00		0.99	
Satd. Flow (perm)		1853	1583		3471			1844	1583		1725	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	29	250	55	282	441	1	21	83	236	17	25	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	219	0	29	0
Lane Group Flow (vph)	0	279	55	0	724	0	0	104	17	0	51	0
Turn Type	Split	NA	Perm	Split	NA		Split	NA	Prot	Split	NA	
Protected Phases	2 5 6 8	2 5 6 8		7	7		4	4	4	3	3	
Permitted Phases			2 5 6 8									
Actuated Green, G (s)		47.7	47.7		18.8			7.9	7.9		9.7	
Effective Green, g (s)		40.5	40.5		18.8			7.9	7.9		9.7	
Actuated g/C Ratio		0.37	0.37		0.17			0.07	0.07		0.09	
Clearance Time (s)					7.2			7.1	7.1		5.3	
Lane Grp Cap (vph)		682	582		593			132	113		152	
v/s Ratio Prot		c0.15			c0.21			c0.06	0.01		c0.03	
v/s Ratio Perm			0.03									
v/c Ratio		0.41	0.09		1.22			0.79	0.15		0.33	
Uniform Delay, d1		25.8	22.7		45.6			50.2	47.9		47.1	
Progression Factor		0.49	0.58		1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.6	0.3		114.0			36.6	2.8		5.8	
Delay (s)		14.4	13.6		159.6			86.8	50.7		53.0	
Level of Service		B	B		F			F	D		D	
Approach Delay (s)		14.2			159.6			61.7			53.0	
Approach LOS		B			F			E			D	
Intersection Summary												
HCM 2000 Control Delay			98.5		HCM 2000 Level of Service				F			
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)				39.4			
Intersection Capacity Utilization			58.9%		ICU Level of Service				B			
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology does not support clustered intersections.

Lanes, Volumes, Timings
1: Garbers Church Rd & Erickson Ave

2040 Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	412	85	5	99	321	19	65	29	241	85	3
Future Volume (vph)	18	412	85	5	99	321	19	65	29	241	85	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	75		0	300		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		561			838			552			1501	
Travel Time (s)		10.9			16.3			10.8			29.2	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	678	0	7	573	0	26	129	0	329	120	0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	2			6			4			8		
Detector Phase	1	6		5	2		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	13.7	13.9		12.6	12.8		11.3	12.7		11.0	12.5	
Total Split (s)	15.0	56.0		15.0	56.0		15.0	19.0		25.0	29.0	
Total Split (%)	13.0%	48.7%		13.0%	48.7%		13.0%	16.5%		21.7%	25.2%	
Yellow Time (s)	5.1	5.1		4.0	4.0		3.2	4.1		3.2	4.1	
All-Red Time (s)	3.6	1.8		3.6	1.8		3.1	1.6		2.8	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max		None	Max		None	None		None	None	
v/c Ratio	0.08	0.71		0.03	0.65		0.07	0.65		0.81	0.25	
Control Delay	13.2	25.4		12.0	19.5		26.8	56.9		47.8	36.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.2	25.4		12.0	19.5		26.8	56.9		47.8	36.4	
Queue Length 50th (ft)	8	326		2	231		13	80		199	74	
Queue Length 95th (ft)	21	#597		9	354		33	142		#308	127	
Internal Link Dist (ft)		481			758			472			1421	
Turn Bay Length (ft)	150			150			75			300		
Base Capacity (vph)	309	956		293	886		413	240		430	483	
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	0.08	0.71		0.02	0.65		0.06	0.54		0.77	0.25	

Intersection Summary

Area Type: Other
 Cycle Length: 115
 Actuated Cycle Length: 105.6
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Garbers Church Rd & Erickson Ave



HCM Signalized Intersection Capacity Analysis
 1: Garbers Church Rd & Erickson Ave






















2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	18	412	85	5	99	321	19	65	29	241	85	3	
Future Volume (vph)	18	412	85	5	99	321	19	65	29	241	85	3	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5		
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Fr't	1.00	0.97		1.00	0.89		1.00	0.95		1.00	0.99		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1770	1815		1770	1649		1770	1776		1770	1853		
Flt Permitted	0.26	1.00		0.20	1.00		0.66	1.00		0.57	1.00		
Satd. Flow (perm)	475	1815		365	1649		1234	1776		1070	1853		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	25	562	116	7	135	438	26	89	40	329	116	4	
RTOR Reduction (vph)	0	6	0	0	97	0	0	14	0	0	1	0	
Lane Group Flow (vph)	25	672	0	7	476	0	26	115	0	329	119	0	
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA		
Protected Phases	1	6		5	2		3	8		7	4		
Permitted Phases	2			6			4			8			
Actuated Green, G (s)	56.5	55.4		56.5	53.0		31.6	13.9		31.7	27.5		
Effective Green, g (s)	56.5	55.4		56.5	53.0		31.6	13.9		31.7	27.5		
Actuated g/C Ratio	0.49	0.48		0.49	0.46		0.28	0.12		0.28	0.24		
Clearance Time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	274	878		193	763		360	215		405	445		
v/s Ratio Prot	c0.00	c0.37		0.00	0.29		0.00	0.06		c0.13	0.06		
v/s Ratio Perm	0.04			0.02			0.02			c0.10			
v/c Ratio	0.09	0.77		0.04	0.62		0.07	0.53		0.81	0.27		
Uniform Delay, d1	17.2	24.2		18.4	23.2		30.4	47.2		36.9	35.3		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.1	6.3		0.1	3.8		0.1	2.5		11.8	0.3		
Delay (s)	17.4	30.5		18.4	27.0		30.5	49.8		48.6	35.6		
Level of Service	B	C		B	C		C	D		D	D		
Approach Delay (s)		30.0			26.9			46.5			45.1		
Approach LOS		C			C			D			D		
Intersection Summary													
HCM 2000 Control Delay			34.0									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.78										
Actuated Cycle Length (s)			114.4									Sum of lost time (s)	26.3
Intersection Capacity Utilization			65.2%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: Garbers Church Rd & Erickson Ave

2040 Build
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	412	85	5	99	321	19	65	29	241	85	3
Future Volume (veh/h)	18	412	85	5	99	321	19	65	29	241	85	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	25	562	116	7	135	438	26	89	40	329	116	4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	731	151	218	178	578	355	111	50	401	390	13
Arrive On Green	0.02	0.49	0.49	0.01	0.46	0.46	0.05	0.09	0.09	0.17	0.22	0.22
Sat Flow, veh/h	1781	1504	310	1781	387	1257	1781	1222	549	1781	1797	62
Grp Volume(v), veh/h	25	0	678	7	0	573	26	0	129	329	0	120
Grp Sat Flow(s),veh/h/ln	1781	0	1814	1781	0	1644	1781	0	1771	1781	0	1859
Q Serve(g_s), s	0.8	0.0	33.5	0.2	0.0	31.5	1.2	0.0	7.8	18.2	0.0	5.9
Cycle Q Clear(g_c), s	0.8	0.0	33.5	0.2	0.0	31.5	1.2	0.0	7.8	18.2	0.0	5.9
Prop In Lane	1.00		0.17	1.00		0.76	1.00		0.31	1.00		0.03
Lane Grp Cap(c), veh/h	253	0	881	218	0	756	355	0	162	401	0	403
V/C Ratio(X)	0.10	0.00	0.77	0.03	0.00	0.76	0.07	0.00	0.80	0.82	0.00	0.30
Avail Cap(c_a), veh/h	313	0	881	323	0	756	415	0	216	401	0	403
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	23.0	19.2	0.0	24.4	30.3	0.0	48.6	36.5	0.0	35.8
Incr Delay (d2), s/veh	0.2	0.0	6.4	0.1	0.0	7.0	0.1	0.0	14.1	12.7	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	15.1	0.1	0.0	13.1	0.5	0.0	4.0	9.1	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.6	0.0	29.4	19.2	0.0	31.4	30.4	0.0	62.7	49.2	0.0	36.2
LnGrp LOS	B	A	C	B	A	C	C	A	E	D	A	D
Approach Vol, veh/h		703			580			155			449	
Approach Delay, s/veh		29.1			31.2			57.3			45.7	
Approach LOS		C			C			E			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.4	57.1	11.3	29.4	8.6	59.9	25.0	15.7				
Change Period (Y+Rc), s	8.7	* 6.9	* 6.3	* 5.7	7.6	* 6.9	6.0	* 5.7				
Max Green Setting (Gmax), s	6.3	* 50	* 8.7	* 24	7.4	* 49	19.0	* 13				
Max Q Clear Time (g_c+I1), s	2.8	33.5	3.2	7.9	2.2	35.5	20.2	9.8				
Green Ext Time (p_c), s	0.0	3.7	0.0	0.5	0.0	3.9	0.0	0.2				

Intersection Summary												
HCM 6th Ctrl Delay			36.0									
HCM 6th LOS			D									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Garbers Church Rd & HHS South Entrance

2040 Build
 Timing Plan: AM Peak

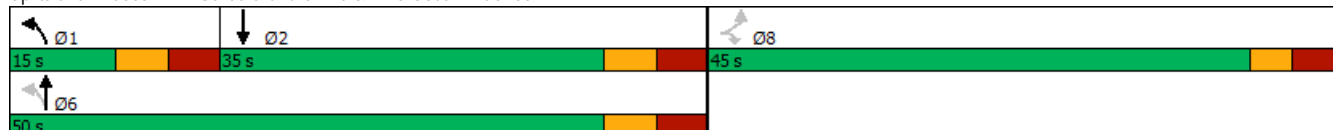


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	21	63	362	281	35
Future Volume (vph)	15	21	63	362	281	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	80	200			0
Storage Lanes	1	1	1			0
Taper Length (ft)	0		0			
Right Turn on Red		Yes				Yes
Link Speed (mph)	25			35	35	
Link Distance (ft)	684			1501	825	
Travel Time (s)	18.7			29.2	16.1	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	29	86	494	431	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases	8	8	6			
Detector Phase	8	8	1	6	2	
Switch Phase						
Minimum Initial (s)	7.0	7.0	10.0	10.0	10.0	
Minimum Split (s)	32.1	32.1	17.4	17.4	40.4	
Total Split (s)	45.0	45.0	15.0	50.0	35.0	
Total Split (%)	47.4%	47.4%	15.8%	52.6%	36.8%	
Yellow Time (s)	3.0	3.0	3.8	3.8	3.8	
All-Red Time (s)	3.1	3.1	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.1	6.1	7.4	7.4	7.4	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Max	Max	
v/c Ratio	0.10	0.15	0.12	0.32	0.39	
Control Delay	29.2	13.7	3.4	3.9	11.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.2	13.7	3.4	3.9	11.3	
Queue Length 50th (ft)	8	0	9	68	113	
Queue Length 95th (ft)	26	21	20	109	182	
Internal Link Dist (ft)	604			1421	745	
Turn Bay Length (ft)		80	200			
Base Capacity (vph)	1062	961	694	1526	1113	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.02	0.03	0.12	0.32	0.39	

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 65.3
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Garbers Church Rd & HHS South Entrance



HCM Signalized Intersection Capacity Analysis
 2: Garbers Church Rd & HHS South Entrance

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	21	63	362	281	35
Future Volume (vph)	15	21	63	362	281	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	7.4	7.4	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1768	1863	1830	
Flt Permitted	0.95	1.00	0.40	1.00	1.00	
Satd. Flow (perm)	1770	1583	748	1863	1830	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	20	29	86	494	383	48
RTOR Reduction (vph)	0	27	0	0	3	0
Lane Group Flow (vph)	20	2	86	494	428	0
Confl. Peds. (#/hr)			5			5
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases	8	8	6			
Actuated Green, G (s)	4.1	4.1	51.7	51.7	38.2	
Effective Green, g (s)	4.1	4.1	51.7	51.7	38.2	
Actuated g/C Ratio	0.06	0.06	0.75	0.75	0.55	
Clearance Time (s)	6.1	6.1	7.4	7.4	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	104	93	647	1389	1008	
v/s Ratio Prot			0.01	c0.27	c0.23	
v/s Ratio Perm	c0.01	0.00	0.09			
v/c Ratio	0.19	0.02	0.13	0.36	0.42	
Uniform Delay, d1	31.0	30.7	3.1	3.0	9.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.1	0.1	0.7	1.3	
Delay (s)	31.9	30.8	3.2	3.8	10.4	
Level of Service	C	C	A	A	B	
Approach Delay (s)	31.3			3.7	10.4	
Approach LOS	C			A	B	
Intersection Summary						
HCM 2000 Control Delay			7.7	HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio			0.43			
Actuated Cycle Length (s)			69.3	Sum of lost time (s)		20.9
Intersection Capacity Utilization			59.1%	ICU Level of Service		B
Analysis Period (min)			15			

c Critical Lane Group

HCM 6th Edition methodology does not support Non-NEMA phasing.

Lanes, Volumes, Timings
 3: Garbers Church Rd & HHS inbound Entrance

2040 Build
 Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	81	296	262	54
Future Volume (vph)	0	0	81	296	262	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	350			0
Storage Lanes	0	0	1			0
Taper Length (ft)	0		0			
Link Speed (mph)	25			35	35	
Link Distance (ft)	351			825	318	
Travel Time (s)	9.6			16.1	6.2	
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	110	404	431	0
Sign Control	Stop			Free	Free	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 3: Garbers Church Rd & HHS inbound Entrance

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↘	↑	↗	
Traffic Volume (veh/h)	0	0	81	296	262	54
Future Volume (Veh/h)	0	0	81	296	262	54
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	110	404	357	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (ft)			825	318		
pX, platoon unblocked	0.87	0.87	0.87			
vC, conflicting volume	1018	394	431			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	916	225	268			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	90			
cM capacity (veh/h)	238	706	1124			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	110	404	431			
Volume Left	110	0	0			
Volume Right	0	0	74			
cSH	1124	1700	1700			
Volume to Capacity	0.10	0.24	0.25			
Queue Length 95th (ft)	8	0	0			
Control Delay (s)	8.5	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	1.8	0.0				
Approach LOS						
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			32.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 Build
 Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔	↔			↔	↔
Traffic Volume (vph)	87	0	49	0	0	0	155	228	0	0	267	253
Future Volume (vph)	87	0	49	0	0	0	155	228	0	0	267	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	0		0	200		0	80		200
Storage Lanes	1		1	0		0	1		0	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		424			255			318			726	
Travel Time (s)		11.6			7.0			6.2			14.1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	0	67	0	0	0	211	311	0	0	364	345
Turn Type	Prot		Perm				Prot	NA			NA	Perm
Protected Phases	8						1	6			2	
Permitted Phases			8							2		2
Detector Phase	8		8				1	6		2	2	2
Switch Phase												
Minimum Initial (s)	7.0		7.0				5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	34.7		34.7				12.0	22.5		34.0	34.0	34.0
Total Split (s)	35.0		35.0				28.0	70.0		42.0	42.0	42.0
Total Split (%)	33.3%		33.3%				26.7%	66.7%		40.0%	40.0%	40.0%
Yellow Time (s)	3.3		3.3				3.8	3.8		3.8	3.8	3.8
All-Red Time (s)	3.4		3.4				3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0		0.0				0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.7		6.7				7.0	7.0		7.0	7.0	7.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None		None				None	Max		Max	Max	Max
v/c Ratio	0.53		0.22				0.69	0.23		0.42	0.38	
Control Delay	44.7		3.6				45.6	5.1		19.4	3.5	
Queue Delay	0.0		0.0				0.0	0.0		0.0	0.0	
Total Delay	44.7		3.6				45.6	5.1		19.4	3.5	
Queue Length 50th (ft)	63		0				111	49		130	0	
Queue Length 95th (ft)	113		10				175	91		239	49	
Internal Link Dist (ft)		344			175			238			646	
Turn Bay Length (ft)	50						200					200
Base Capacity (vph)	570		587				422	1336		862	918	
Starvation Cap Reductn	0		0				0	0		0	0	
Spillback Cap Reductn	0		0				0	0		0	0	
Storage Cap Reductn	0		0				0	0		0	0	
Reduced v/c Ratio	0.21		0.11				0.50	0.23		0.42	0.38	

Intersection Summary

Area Type: Other

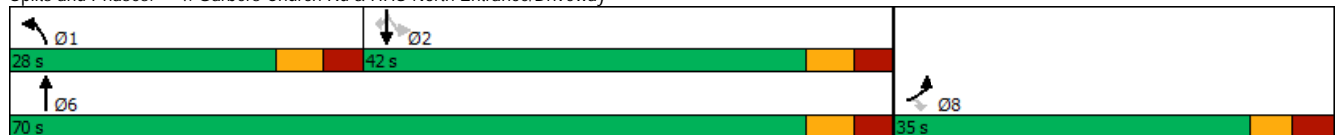
Cycle Length: 105

Actuated Cycle Length: 87.9

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Garbers Church Rd & HHS North Entrance/Driveway



HCM Signalized Intersection Capacity Analysis
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔	↔			↔	↔
Traffic Volume (vph)	87	0	49	0	0	0	155	228	0	0	267	253
Future Volume (vph)	87	0	49	0	0	0	155	228	0	0	267	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7		6.7				7.0	7.0			7.0	7.0
Lane Util. Factor	1.00		1.00				1.00	1.00			1.00	1.00
Fr't	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		1583				1770	1863			1863	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		1583				1770	1863			1863	1583
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	119	0	67	0	0	0	211	311	0	0	364	345
RTOR Reduction (vph)	0	0	58	0	0	0	0	0	0	0	0	185
Lane Group Flow (vph)	119	0	9	0	0	0	211	311	0	0	364	160
Turn Type	Prot		Perm				Prot	NA			NA	Perm
Protected Phases	8						1	6			2	
Permitted Phases			8							2		2
Actuated Green, G (s)	11.2		11.2				15.3	63.1			40.8	40.8
Effective Green, g (s)	11.2		11.2				15.3	63.1			40.8	40.8
Actuated g/C Ratio	0.13		0.13				0.17	0.72			0.46	0.46
Clearance Time (s)	6.7		6.7				7.0	7.0			7.0	7.0
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	225		201				307	1335			863	733
v/s Ratio Prot	c0.07						c0.12	0.17			c0.20	
v/s Ratio Perm			0.01									0.10
v/c Ratio	0.53		0.04				0.69	0.23			0.42	0.22
Uniform Delay, d1	35.9		33.7				34.1	4.2			15.7	14.1
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	2.2		0.1				6.3	0.4			1.5	0.7
Delay (s)	38.2		33.8				40.4	4.6			17.2	14.8
Level of Service	D		C				D	A			B	B
Approach Delay (s)		36.6			0.0			19.1			16.0	
Approach LOS		D			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.9				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			88.0				Sum of lost time (s)				20.7	
Intersection Capacity Utilization			52.0%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔	↔			↔	↔
Traffic Volume (veh/h)	87	0	49	0	0	0	155	228	0	0	267	253
Future Volume (veh/h)	87	0	49	0	0	0	155	228	0	0	267	253
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No			No		
Adj Sat Flow, veh/h/ln	1870	0	1870				1870	1870	0	1870	1870	1870
Adj Flow Rate, veh/h	119	0	67				211	311	0	0	364	345
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	0	2				2	2	0	2	2	2
Cap, veh/h	166	0	148				254	1393	0	0	972	824
Arrive On Green	0.09	0.00	0.09				0.14	0.74	0.00	0.00	0.52	0.52
Sat Flow, veh/h	1781	0	1585				1781	1870	0	0	1870	1585
Grp Volume(v), veh/h	119	0	67				211	311	0	0	364	345
Grp Sat Flow(s),veh/h/ln	1781	0	1585				1781	1870	0	0	1870	1585
Q Serve(g_s), s	5.5	0.0	3.4				9.7	4.3	0.0	0.0	9.8	11.3
Cycle Q Clear(g_c), s	5.5	0.0	3.4				9.7	4.3	0.0	0.0	9.8	11.3
Prop In Lane	1.00		1.00				1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	166	0	148				254	1393	0	0	972	824
V/C Ratio(X)	0.72	0.00	0.45				0.83	0.22	0.00	0.00	0.37	0.42
Avail Cap(c_a), veh/h	596	0	530				442	1393	0	0	972	824
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	37.3	0.0	36.3				35.3	3.3	0.0	0.0	12.1	12.5
Incr Delay (d2), s/veh	5.6	0.0	2.2				6.9	0.4	0.0	0.0	1.1	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	1.4				4.6	1.2	0.0	0.0	4.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.9	0.0	38.5				42.2	3.7	0.0	0.0	13.2	14.0
LnGrp LOS	D	A	D				D	A	A	A	B	B
Approach Vol, veh/h		186						522			709	
Approach Delay, s/veh		41.3						19.3			13.6	
Approach LOS		D						B			B	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	19.0	51.0				70.0		14.6				
Change Period (Y+Rc), s	7.0	7.0				7.0		6.7				
Max Green Setting (Gmax), s	21.0	35.0				63.0		28.3				
Max Q Clear Time (g_c+I1), s	11.7	13.3				6.3		7.5				
Green Ext Time (p_c), s	0.4	3.4				2.0		0.5				

Intersection Summary		
HCM 6th Ctrl Delay		19.3
HCM 6th LOS		B

Notes

User approved changes to right turn type.

Lanes, Volumes, Timings
 5: Garbers Church Rd & Bluestone ES inbound Entrance

2040 Build
 Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↕		↕	↕
Traffic Volume (vph)	0	0	268	15	19	493
Future Volume (vph)	0	0	268	15	19	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	0	0		0	1	
Taper Length (ft)	0				0	
Link Speed (mph)	25		35			35
Link Distance (ft)	382		726			625
Travel Time (s)	10.4		14.1			12.2
Confl. Bikes (#/hr)		5				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	385	0	26	672
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 5: Garbers Church Rd & Bluestone ES inbound Entrance

2040 Build
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↔		↔	↔
Traffic Volume (veh/h)	0	0	268	15	19	493
Future Volume (Veh/h)	0	0	268	15	19	493
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	365	20	26	672
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			726			
pX, platoon unblocked	0.98	0.98			0.98	
vC, conflicting volume	1099	375			385	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1092	355			365	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	228	677			1173	
Direction, Lane #	NB 1	SB 1	SB 2			
Volume Total	385	26	672			
Volume Left	0	26	0			
Volume Right	20	0	0			
cSH	1700	1173	1700			
Volume to Capacity	0.23	0.02	0.40			
Queue Length 95th (ft)	0	2	0			
Control Delay (s)	0.0	8.1	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.3				
Approach LOS						
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			34.5%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 6: Garbers Church Rd & Heritage Center Way/Bluestone ES/Golf Course

2040 Build
 Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↕	↕	
Traffic Volume (vph)	0	0	0	1	0	5	0	253	25	22	506	0
Future Volume (vph)	0	0	0	1	0	5	0	253	25	22	506	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	90		0	125		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	0			0			0			0		
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		466			549			625			794	
Travel Time (s)		12.7			15.0			12.2			15.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	8	0	0	379	0	30	690	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM Unsignalized Intersection Capacity Analysis
 6: Garbers Church Rd & Heritage Center Way/Bluestone ES/Golf Course

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↕	↕	
Traffic Volume (veh/h)	0	0	0	1	0	5	0	253	25	22	506	0
Future Volume (Veh/h)	0	0	0	1	0	5	0	253	25	22	506	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	0	1	0	7	0	345	34	30	690	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1119	1129	690	1112	1112	362	690			379		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1119	1129	690	1112	1112	362	690			379		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	99	100			97		
cM capacity (veh/h)	179	199	445	182	203	683	905			1179		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	0	8	379	30	690							
Volume Left	0	1	0	30	0							
Volume Right	0	7	34	0	0							
cSH	1700	508	905	1179	1700							
Volume to Capacity	0.00	0.02	0.00	0.03	0.41							
Queue Length 95th (ft)	0	1	0	2	0							
Control Delay (s)	0.0	12.2	0.0	8.1	0.0							
Lane LOS	A	B		A								
Approach Delay (s)	0.0	12.2	0.0	0.3								
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			42.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↕	↕	
Traffic Vol, veh/h	0	0	0	1	0	5	0	253	25	22	506	0
Future Vol, veh/h	0	0	0	1	0	5	0	253	25	22	506	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	1	0	7	0	345	34	30	690	0

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1116	1129	690	1112	1112	362	690	0	0	379	0	0
Stage 1	750	750	-	362	362	-	-	-	-	-	-	-
Stage 2	366	379	-	750	750	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	185	204	445	186	209	683	905	-	-	1179	-	-
Stage 1	403	419	-	657	625	-	-	-	-	-	-	-
Stage 2	653	615	-	403	419	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	180	199	445	182	204	683	905	-	-	1179	-	-
Mov Cap-2 Maneuver	180	199	-	182	204	-	-	-	-	-	-	-
Stage 1	403	409	-	657	625	-	-	-	-	-	-	-
Stage 2	646	615	-	393	409	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	12.8	0	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	905	-	-	-	468	1179	-	-
HCM Lane V/C Ratio	-	-	-	-	0.017	0.025	-	-
HCM Control Delay (s)	0	-	-	0	12.8	8.1	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0.1	-	-

Lanes, Volumes, Timings
 7: Garbers Church Rd & Heritage Estates Circle

2040 Build
 Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	0	259	0	0	522
Future Volume (vph)	2	0	259	0	0	522
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	372		794			1342
Travel Time (s)	10.1		15.5			26.1
Confl. Peds. (#/hr)				3	3	
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	353	0	0	712
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 7: Garbers Church Rd & Heritage Estates Circle

2040 Build
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			R
Traffic Volume (veh/h)	2	0	259	0	0	522
Future Volume (Veh/h)	2	0	259	0	0	522
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	0	353	0	0	712
Pedestrians	3					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1068	356			356	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1068	356			356	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	245	686			1199	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	3	353	712			
Volume Left	3	0	0			
Volume Right	0	0	0			
cSH	245	1700	1199			
Volume to Capacity	0.01	0.21	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	19.9	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	19.9	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		43.0%		ICU Level of Service		A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	2	0	259	0	0	522
Future Vol, veh/h	2	0	259	0	0	522
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	0	353	0	0	712

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	1068	356	0	0	356
Stage 1	356	-	-	-	-
Stage 2	712	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	245	688	-	-	1203
Stage 1	709	-	-	-	-
Stage 2	486	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	244	686	-	-	1200
Mov Cap-2 Maneuver	244	-	-	-	-
Stage 1	707	-	-	-	-
Stage 2	486	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	244	1200	-
HCM Lane V/C Ratio	-	-	0.011	-	-
HCM Control Delay (s)	-	-	19.9	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	3	246	13	1	487
Future Volume (vph)	35	3	246	13	1	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	452		1342			264
Travel Time (s)	12.3		26.1			5.1
Confl. Bikes (#/hr)		4				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	353	0	0	665
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 8: Garbers Church Rd & Park Lawn Dr

2040 Build
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Volume (veh/h)	35	3	246	13	1	487
Future Volume (Veh/h)	35	3	246	13	1	487
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	48	4	335	18	1	664
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1010	344			353	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1010	344			353	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	99			100	
cM capacity (veh/h)	266	699			1206	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	52	353	665			
Volume Left	48	0	1			
Volume Right	4	18	0			
cSH	279	1700	1206			
Volume to Capacity	0.19	0.21	0.00			
Queue Length 95th (ft)	17	0	0			
Control Delay (s)	20.8	0.0	0.0			
Lane LOS	C		A			
Approach Delay (s)	20.8	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization		41.7%		ICU Level of Service		A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	35	3	246	13	1	487
Future Vol, veh/h	35	3	246	13	1	487
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	4	335	18	1	664

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	1010	344	0	0	353
Stage 1	344	-	-	-	-
Stage 2	666	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	266	699	-	-	1206
Stage 1	718	-	-	-	-
Stage 2	511	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	266	699	-	-	1206
Mov Cap-2 Maneuver	266	-	-	-	-
Stage 1	718	-	-	-	-
Stage 2	510	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	280	1206	-
HCM Lane V/C Ratio	-	-	0.185	0.001	-
HCM Control Delay (s)	-	-	20.8	8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	10	10	3	246	478	4
Future Volume (vph)	10	10	3	246	478	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			35	35	
Link Distance (ft)	364			264	633	
Travel Time (s)	9.9			5.1	12.3	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	0	339	657	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 9: Garbers Church Rd & Rhianon Ln

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑	↑	
Traffic Volume (veh/h)	10	10	3	246	478	4
Future Volume (Veh/h)	10	10	3	246	478	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	14	14	4	335	652	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	998	654	657			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	998	654	657			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	100			
cM capacity (veh/h)	269	466	931			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	28	339	657			
Volume Left	14	4	0			
Volume Right	14	0	5			
cSH	341	931	1700			
Volume to Capacity	0.08	0.00	0.39			
Queue Length 95th (ft)	7	0	0			
Control Delay (s)	16.5	0.2	0.0			
Lane LOS	C	A				
Approach Delay (s)	16.5	0.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			40.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑		↓
Traffic Vol, veh/h	10	10	3	246	478	4
Future Vol, veh/h	10	10	3	246	478	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	14	4	335	652	5

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	998	655	657	0	0
Stage 1	655	-	-	-	-
Stage 2	343	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	270	466	931	-	-
Stage 1	517	-	-	-	-
Stage 2	719	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	269	466	931	-	-
Mov Cap-2 Maneuver	269	-	-	-	-
Stage 1	514	-	-	-	-
Stage 2	719	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.5	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	931	-	341	-	-
HCM Lane V/C Ratio	0.004	-	0.08	-	-
HCM Control Delay (s)	8.9	0	16.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	3	240	7	0	452
Future Volume (vph)	22	3	240	7	0	452
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	417		633			767
Travel Time (s)	11.4		12.3			14.9
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	337	0	0	616
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 10: Garbers Church Rd & Lendale Ln

2040 Build
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	R
Traffic Volume (veh/h)	22	3	240	7	0	452
Future Volume (Veh/h)	22	3	240	7	0	452
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	30	4	327	10	0	616
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						767
pX, platoon unblocked	0.92					
vC, conflicting volume	948	332			337	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	901	332			337	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	99			100	
cM capacity (veh/h)	284	710			1222	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	34	337	616			
Volume Left	30	0	0			
Volume Right	4	10	0			
cSH	306	1700	1222			
Volume to Capacity	0.11	0.20	0.00			
Queue Length 95th (ft)	9	0	0			
Control Delay (s)	18.2	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	18.2	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			38.5%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	22	3	240	7	0	452
Future Vol, veh/h	22	3	240	7	0	452
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	4	327	10	0	616

Major/Minor	Minor1	Major1	Major2	Major2	Major2	Major2
Conflicting Flow All	948	332	0	0	337	0
Stage 1	332	-	-	-	-	-
Stage 2	616	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	289	710	-	-	1222	-
Stage 1	727	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	289	710	-	-	1222	-
Mov Cap-2 Maneuver	289	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	539	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	311	1222	-
HCM Lane V/C Ratio	-	-	0.11	-	-
HCM Control Delay (s)	-	-	18	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Lanes, Volumes, Timings
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build
 Timing Plan: AM Peak

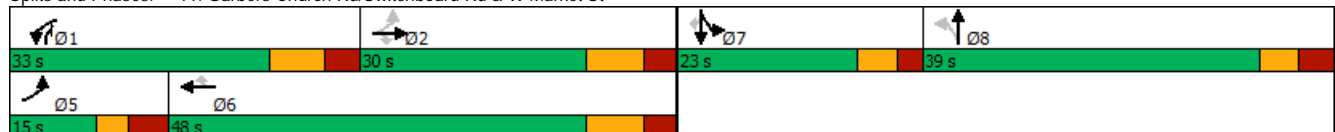


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Future Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	360		180	300		140	0		200	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1555			455			767			1017	
Travel Time (s)		30.3			8.9			14.9			19.8	
Confl. Peds. (#/hr)	1		1	1		1			1	1		
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	288	18	403	181	12	0	85	293	0	197	55
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6			8	1	7	7	
Permitted Phases	2		2			6	8					7
Detector Phase	5	2	2	1	6	6	8	8	1	7	7	7
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.9	22.5	22.5	15.6	31.6	31.6	44.1	44.1	15.6	22.5	22.5	22.5
Total Split (s)	15.0	30.0	30.0	33.0	48.0	48.0	39.0	39.0	33.0	23.0	23.0	23.0
Total Split (%)	12.0%	24.0%	24.0%	26.4%	38.4%	38.4%	31.2%	31.2%	26.4%	18.4%	18.4%	18.4%
Yellow Time (s)	3.0	5.4	5.4	5.4	5.4	5.4	3.7	3.7	5.4	3.9	3.9	3.9
All-Red Time (s)	3.9	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.2	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.23	0.73	0.04	0.95	0.23	0.02		0.39	0.49		0.74	0.12
Control Delay	19.9	53.3	0.1	73.6	25.9	0.0		46.3	7.8		61.7	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	19.9	53.3	0.1	73.6	25.9	0.0		46.3	7.8		61.7	0.6
Queue Length 50th (ft)	28	180	0	266	81	0		54	0		124	0
Queue Length 95th (ft)	82	#418	0	#619	183	0		99	80		#292	0
Internal Link Dist (ft)		1475			375			687			937	
Turn Bay Length (ft)	360		180	300		140			200			100
Base Capacity (vph)	414	394	504	426	799	749		517	604		307	468
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.22	0.73	0.04	0.95	0.23	0.02		0.16	0.49		0.64	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 125
 Actuated Cycle Length: 103.7
 Natural Cycle: 135
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Garbers Church Rd/Switchboard Rd & W Market St



HCM Signalized Intersection Capacity Analysis
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘		↖	↗		↖	↗
Traffic Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Future Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		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
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	1.00
Satd. Flow (prot)	1768	1863	1548	1770	1863	1548		1841	1583		1851	1583
Flt Permitted	0.64	1.00	1.00	0.95	1.00	1.00		0.86	1.00		0.99	1.00
Satd. Flow (perm)	1197	1863	1548	1770	1863	1548		1602	1583		1851	1583
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	93	288	18	403	181	12	20	65	293	26	171	55
RTOR Reduction (vph)	0	0	14	0	0	7	0	0	224	0	0	47
Lane Group Flow (vph)	93	288	4	403	181	5	0	85	69	0	197	8
Confl. Peds. (#/hr)	1		1	1		1			1	1		
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6			8	1	7	7	
Permitted Phases	2		2			6	8					7
Actuated Green, G (s)	29.8	23.8	23.8	25.0	44.5	44.5		12.3	25.0		15.0	15.0
Effective Green, g (s)	29.8	23.8	23.8	25.0	44.5	44.5		12.3	25.0		15.0	15.0
Actuated g/C Ratio	0.28	0.22	0.22	0.23	0.42	0.42		0.12	0.23		0.14	0.14
Clearance Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	366	415	345	415	777	646		184	371		260	222
v/s Ratio Prot	0.01	c0.15		c0.23	0.10				0.04		c0.11	
v/s Ratio Perm	0.06		0.00			0.00		c0.05				0.00
v/c Ratio	0.25	0.69	0.01	0.97	0.23	0.01		0.46	0.19		0.76	0.03
Uniform Delay, d1	29.2	38.1	32.2	40.4	20.0	18.1		44.1	32.6		44.1	39.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	9.2	0.1	36.5	0.7	0.0		1.8	0.2		11.9	0.1
Delay (s)	29.6	47.3	32.3	76.9	20.7	18.2		45.9	32.9		56.0	39.6
Level of Service	C	D	C	E	C	B		D	C		E	D
Approach Delay (s)		42.5			58.7			35.8			52.4	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			48.4	HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			106.6	Sum of lost time (s)				30.5				
Intersection Capacity Utilization			74.0%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology expects strict NEMA phasing.

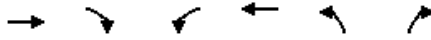
Lanes, Volumes, Timings
 12: Stoneleigh Dr & W Market St

2040 Build
 Timing Plan: AM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↑	↑	↑	↑
Traffic Volume (vph)	463	3	31	453	4	35
Future Volume (vph)	463	3	31	453	4	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		100	260		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			0		0	
Link Speed (mph)	35			35	25	
Link Distance (ft)	455			1297	501	
Travel Time (s)	8.9			25.3	13.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	608	0	40	591	51	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis
 12: Stoneleigh Dr & W Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (veh/h)	463	3	31	453	4	35
Future Volume (Veh/h)	463	3	31	453	4	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	604	4	40	591	5	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	455		1297			
pX, platoon unblocked			0.86		0.87	0.86
vC, conflicting volume			608		1277	606
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			460		878	457
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		98	91
cM capacity (veh/h)			944		267	517
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	608	40	591	51		
Volume Left	0	40	0	5		
Volume Right	4	0	0	46		
cSH	1700	944	1700	474		
Volume to Capacity	0.36	0.04	0.35	0.11		
Queue Length 95th (ft)	0	3	0	9		
Control Delay (s)	0.0	9.0	0.0	13.5		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.6		13.5		
Approach LOS				B		
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			40.9%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	
Traffic Vol, veh/h	463	3	31	453	4	35
Future Vol, veh/h	463	3	31	453	4	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	260	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	604	4	40	591	5	46

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	608	0	1277	606
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	671	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	970	-	184	497
Stage 1	-	-	-	-	545	-
Stage 2	-	-	-	-	508	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	970	-	176	497
Mov Cap-2 Maneuver	-	-	-	-	176	-
Stage 1	-	-	-	-	545	-
Stage 2	-	-	-	-	487	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	14.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	419	-	-	970	-
HCM Lane V/C Ratio	0.121	-	-	0.042	-
HCM Control Delay (s)	14.8	-	-	8.9	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Lanes, Volumes, Timings
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 Build
 Timing Plan: AM Peak

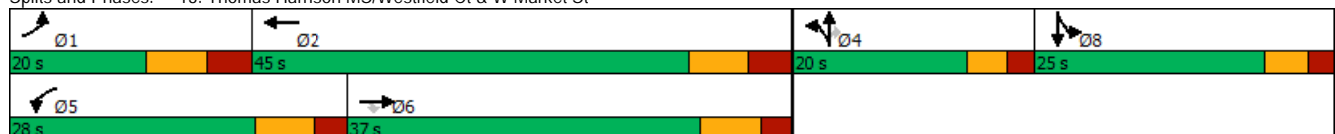


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	391	80	160	360	21	36	5	123	100	10	91
Future Volume (vph)	29	391	80	160	360	21	36	5	123	100	10	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		225	500		0	0		175	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1297			1215			527			419	
Travel Time (s)		25.3			23.7			14.4			11.4	
Confl. Peds. (#/hr)			5	5					7	7		
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	510	104	209	497	0	0	54	160	0	262	0
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases			6						4			
Detector Phase	1	6	6	5	2		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	13.7	37.7	37.7	12.7	31.7		40.5	40.5	40.5	44.8	44.8	
Total Split (s)	20.0	37.0	37.0	28.0	45.0		20.0	20.0	20.0	25.0	25.0	
Total Split (%)	18.2%	33.6%	33.6%	25.5%	40.9%		18.2%	18.2%	18.2%	22.7%	22.7%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.2	3.2	3.2	3.6	3.6	
All-Red Time (s)	3.7	2.7	2.7	2.7	3.7		2.3	2.3	2.3	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Lost Time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max		None	None	None	None	None	
v/c Ratio	0.28	0.93	0.17	0.75	0.63		0.35	0.41			0.72	
Control Delay	54.7	62.0	0.6	60.7	32.7		54.6	3.3			45.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	54.7	62.0	0.6	60.7	32.7		54.6	3.3			45.9	
Queue Length 50th (ft)	24	319	0	129	272		34	0			142	
Queue Length 95th (ft)	68	#728	0	#283	#620		86	0			243	
Internal Link Dist (ft)		1217			1135			447			339	
Turn Bay Length (ft)	250		225	500				175				
Base Capacity (vph)	197	550	627	354	783		255	456			401	
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	0.19	0.93	0.17	0.59	0.63		0.21	0.35			0.65	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 103.3
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: Thomas Harrison MS/Westfield Ct & W Market St



HCM Signalized Intersection Capacity Analysis
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	391	80	160	360	21	36	5	123	100	10	91
Future Volume (vph)	29	391	80	160	360	21	36	5	123	100	10	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1770	1863	1538	1770	1848			1785	1535		1706	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (perm)	1770	1863	1538	1770	1848			1785	1535		1706	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	38	510	104	209	470	27	47	7	160	130	13	119
RTOR Reduction (vph)	0	0	70	0	2	0	0	0	147	0	27	0
Lane Group Flow (vph)	38	510	34	209	495	0	0	54	13	0	235	0
Confl. Peds. (#/hr)			5	5					7	7		
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases			6						4			
Actuated Green, G (s)	5.1	34.6	34.6	16.2	43.7			9.0	9.0		20.3	
Effective Green, g (s)	5.1	34.6	34.6	16.2	43.7			9.0	9.0		20.3	
Actuated g/C Ratio	0.05	0.32	0.32	0.15	0.41			0.08	0.08		0.19	
Clearance Time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	84	603	498	268	756			150	129		324	
v/s Ratio Prot	0.02	c0.27		c0.12	c0.27			c0.03			c0.14	
v/s Ratio Perm			0.02						0.01			
v/c Ratio	0.45	0.85	0.07	0.78	0.66			0.36	0.10		0.73	
Uniform Delay, d1	49.5	33.6	25.0	43.6	25.5			46.2	45.2		40.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	3.8	13.7	0.3	13.4	4.4			1.5	0.4		7.9	
Delay (s)	53.3	47.3	25.2	57.0	29.9			47.7	45.5		48.5	
Level of Service	D	D	C	E	C			D	D		D	
Approach Delay (s)		44.1			37.9			46.1			48.5	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			42.6			HCM 2000 Level of Service					D	
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			106.8			Sum of lost time (s)			28.7			
Intersection Capacity Utilization			73.9%			ICU Level of Service					D	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 Build
 Timing Plan: AM Peak



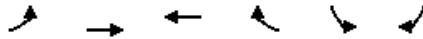
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	391	80	160	360	21	36	5	123	100	10	91
Future Volume (veh/h)	29	391	80	160	360	21	36	5	123	100	10	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	510	104	209	470	27	47	7	160	130	13	119
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	540	454	244	672	39	194	29	192	147	15	134
Arrive On Green	0.03	0.29	0.29	0.14	0.38	0.38	0.12	0.12	0.12	0.18	0.18	0.18
Sat Flow, veh/h	1781	1870	1571	1781	1751	101	1560	232	1541	831	83	760
Grp Volume(v), veh/h	38	510	104	209	0	497	54	0	160	262	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1571	1781	0	1851	1792	0	1541	1674	0	0
Q Serve(g_s), s	2.1	27.0	5.1	11.6	0.0	22.9	2.8	0.0	10.3	15.5	0.0	0.0
Cycle Q Clear(g_c), s	2.1	27.0	5.1	11.6	0.0	22.9	2.8	0.0	10.3	15.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	0.87		1.00	0.50		0.45
Lane Grp Cap(c), veh/h	58	540	454	244	0	710	223	0	192	295	0	0
V/C Ratio(X)	0.66	0.94	0.23	0.86	0.00	0.70	0.24	0.00	0.83	0.89	0.00	0.00
Avail Cap(c_a), veh/h	198	540	454	357	0	710	256	0	220	317	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	48.5	35.3	27.5	42.8	0.0	26.3	40.1	0.0	43.4	40.8	0.0	0.0
Incr Delay (d2), s/veh	12.0	27.1	1.2	12.9	0.0	5.7	0.6	0.0	21.0	23.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	15.9	2.0	5.9	0.0	10.8	1.3	0.0	5.0	8.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.6	62.3	28.6	55.6	0.0	32.0	40.6	0.0	64.4	64.6	0.0	0.0
LnGrp LOS	E	E	C	E	A	C	D	A	E	E	A	A
Approach Vol, veh/h		652			706			214			262	
Approach Delay, s/veh		56.8			39.0			58.4			64.6	
Approach LOS		E			D			E			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	47.6		18.1	21.6	38.0		23.7				
Change Period (Y+Rc), s	* 8.7	* 8.7		5.5	* 7.7	* 8.7		5.8				
Max Green Setting (Gmax), s	* 11	* 36		14.5	* 20	* 29		19.2				
Max Q Clear Time (g_c+I1), s	4.1	24.9		12.3	13.6	29.0		17.5				
Green Ext Time (p_c), s	0.0	2.3		0.2	0.3	0.1		0.3				

Intersection Summary												
HCM 6th Ctrl Delay			51.3									
HCM 6th LOS			D									

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 14: W Market St & Brickstone Ct

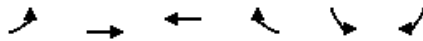
2040 Build
 Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	592	542	30	39	0
Future Volume (vph)	5	592	542	30	39	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		25	
Link Distance (ft)		1215	613		545	
Travel Time (s)		23.7	11.9		14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	772	746	0	51	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis
 14: W Market St & Brickstone Ct

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	1	1		1	
Traffic Volume (veh/h)	5	592	542	30	39	0
Future Volume (Veh/h)	5	592	542	30	39	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	772	707	39	51	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		1215				
pX, platoon unblocked					0.74	
vC, conflicting volume	746				1512	726
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	746				1517	726
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				47	100
cM capacity (veh/h)	862				96	424

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	7	772	746	51
Volume Left	7	0	0	51
Volume Right	0	0	39	0
cSH	862	1700	1700	96
Volume to Capacity	0.01	0.45	0.44	0.53
Queue Length 95th (ft)	1	0	0	60
Control Delay (s)	9.2	0.0	0.0	78.6
Lane LOS	A			F
Approach Delay (s)	0.1		0.0	78.6
Approach LOS				F

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization		47.4%	ICU Level of Service A
Analysis Period (min)		15	

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	1	1		1	
Traffic Vol, veh/h	5	592	542	30	39	0
Future Vol, veh/h	5	592	542	30	39	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	772	707	39	51	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	746	0	-	0	1513	727
Stage 1	-	-	-	-	727	-
Stage 2	-	-	-	-	786	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	862	-	-	-	132	424
Stage 1	-	-	-	-	478	-
Stage 2	-	-	-	-	449	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	862	-	-	-	131	424
Mov Cap-2 Maneuver	-	-	-	-	131	-
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	449	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.1	0	48.9			
HCM LOS	E					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	862	-	-	-	131	
HCM Lane V/C Ratio	0.008	-	-	-	0.388	
HCM Control Delay (s)	9.2	-	-	-	48.9	
HCM Lane LOS	A	-	-	-	E	
HCM 95th %tile Q(veh)	0	-	-	-	1.6	

Lanes, Volumes, Timings
15: W Market St & Waterman Dr

2040 Build
Timing Plan: AM Peak

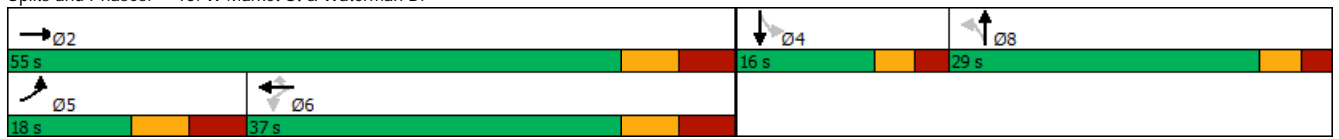


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	538	0	2	456	59	0	1	0	56	0	130
Future Volume (vph)	101	538	0	2	456	59	0	1	0	56	0	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		175	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			25	
Link Distance (ft)		1173			1415			219			571	
Travel Time (s)		22.9			27.6			4.3			15.6	
Confl. Peds. (#/hr)			2	2					2	2		
Confl. Bikes (#/hr)									7			
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	702	0	0	598	77	0	1	0	73	170	0
Turn Type	Prot	NA		Perm	NA	Perm		NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases												
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	26.7		36.7	36.7	36.7	36.6	36.6		23.7	23.7	
Total Split (s)	18.0	55.0		37.0	37.0	37.0	29.0	29.0		16.0	16.0	
Total Split (%)	18.0%	55.0%		37.0%	37.0%	37.0%	29.0%	29.0%		16.0%	16.0%	
Yellow Time (s)	4.3	4.3		4.3	4.3	4.3	3.2	3.2		3.0	3.0	
All-Red Time (s)	4.4	4.4		4.4	4.4	4.4	2.4	2.4		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	8.7	8.7			8.7	8.7		5.6		5.7	5.7	
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	Max		Max	Max	Max	None	None		None	None	
v/c Ratio	0.63	0.62			0.86	0.11		0.00		0.78	0.23	
Control Delay	50.3	16.3			39.4	0.3		28.0		84.7	0.7	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay	50.3	16.3			39.4	0.3		28.0		84.7	0.7	
Queue Length 50th (ft)	55	147			225	0		0		31	0	
Queue Length 95th (ft)	#202	#660			#726	0		5		#152	0	
Internal Link Dist (ft)		1093			1335			139			491	
Turn Bay Length (ft)	150					175				100		
Base Capacity (vph)	215	1131			694	708		598		94	745	
Starvation Cap Reductn	0	0			0	0		0		0	0	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.61	0.62			0.86	0.11		0.00		0.78	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 78.3
 Natural Cycle: 135
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 15: W Market St & Waterman Dr



HCM Signalized Intersection Capacity Analysis
 15: W Market St & Waterman Dr

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	538	0	2	456	59	0	1	0	56	0	130
Future Volume (vph)	101	538	0	2	456	59	0	1	0	56	0	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	8.7			8.7	8.7		5.6		5.7	5.7	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00		1.00	1.00	
Frbp, ped/bikes	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	
Frt	1.00	1.00			1.00	0.85		1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863			1862	1583		1863		1766	1583	
Flt Permitted	0.95	1.00			1.00	1.00		1.00		0.38	1.00	
Satd. Flow (perm)	1770	1863			1855	1583		1863		701	1583	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	132	702	0	3	595	77	0	1	0	73	0	170
RTOR Reduction (vph)	0	0	0	0	0	49	0	0	0	0	148	0
Lane Group Flow (vph)	132	702	0	0	598	28	0	1	0	73	22	0
Confl. Peds. (#/hr)			2	2						2	2	
Confl. Bikes (#/hr)										7		
Turn Type	Prot	NA		Perm	NA	Perm		NA		Perm	NA	
Protected Phases	5	2			6			8				4
Permitted Phases				6		6	8			4		
Actuated Green, G (s)	9.3	47.6			29.6	29.6		4.5		10.6	10.6	
Effective Green, g (s)	9.3	47.6			29.6	29.6		4.5		10.6	10.6	
Actuated g/C Ratio	0.11	0.58			0.36	0.36		0.05		0.13	0.13	
Clearance Time (s)	8.7	8.7			8.7	8.7		5.6		5.7	5.7	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	199	1072			663	566		101		89	202	
v/s Ratio Prot	0.07	c0.38						c0.00			0.01	
v/s Ratio Perm					c0.32	0.02				c0.10		
v/c Ratio	0.66	0.65			0.90	0.05		0.01		0.82	0.11	
Uniform Delay, d1	35.2	12.0			25.2	17.3		37.0		35.1	31.9	
Progression Factor	1.00	1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	8.1	3.1			17.8	0.2		0.0		42.9	0.2	
Delay (s)	43.3	15.1			43.0	17.5		37.0		78.0	32.1	
Level of Service	D	B			D	B		D		E	C	
Approach Delay (s)		19.5			40.1			37.0			45.9	
Approach LOS		B			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			31.1				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			82.7				Sum of lost time (s)			28.7		
Intersection Capacity Utilization			92.6%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
15: W Market St & Waterman Dr

2040 Build
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↔	↔		↔		↔	↔	
Traffic Volume (veh/h)	101	538	0	2	456	59	0	1	0	56	0	130
Future Volume (veh/h)	101	538	0	2	456	59	0	1	0	56	0	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	132	702	0	3	595	77	0	1	0	73	0	170
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	1236	0	52	826	700	0	251	0	290	0	211
Arrive On Green	0.09	0.66	0.00	0.44	0.44	0.44	0.00	0.13	0.00	0.13	0.00	0.13
Sat Flow, veh/h	1781	1870	0	2	1866	1581	0	1870	0	1406	0	1573
Grp Volume(v), veh/h	132	702	0	598	0	77	0	1	0	73	0	170
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1868	0	1581	0	1870	0	1406	0	1573
Q Serve(g_s), s	5.1	14.3	0.0	0.0	0.0	2.0	0.0	0.0	0.0	3.3	0.0	7.4
Cycle Q Clear(g_c), s	5.1	14.3	0.0	18.4	0.0	2.0	0.0	0.0	0.0	3.4	0.0	7.4
Prop In Lane	1.00		0.00	0.01		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	168	1236	0	878	0	700	0	251	0	290	0	211
V/C Ratio(X)	0.79	0.57	0.00	0.68	0.00	0.11	0.00	0.00	0.00	0.25	0.00	0.81
Avail Cap(c_a), veh/h	236	1236	0	878	0	700	0	624	0	309	0	231
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.1	6.5	0.0	16.0	0.0	11.5	0.0	26.3	0.0	27.8	0.0	29.5
Incr Delay (d2), s/veh	11.0	1.9	0.0	4.3	0.0	0.3	0.0	0.0	0.0	0.4	0.0	17.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	4.6	0.0	7.8	0.0	0.7	0.0	0.0	0.0	1.1	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	8.4	0.0	20.3	0.0	11.8	0.0	26.3	0.0	28.2	0.0	46.8
LnGrp LOS	D	A	A	C	A	B	A	C	A	C	A	D
Approach Vol, veh/h		834			675			1				243
Approach Delay, s/veh		13.7			19.3			26.3				41.2
Approach LOS		B			B			C				D
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		55.0		15.1	15.3	39.7		15.1				
Change Period (Y+Rc), s		* 8.7		* 5.7	* 8.7	* 8.7		* 5.7				
Max Green Setting (Gmax), s		* 46		* 10	* 9.3	* 28		* 23				
Max Q Clear Time (g_c+I1), s		16.3		9.4	7.1	20.4		2.0				
Green Ext Time (p_c), s		5.3		0.1	0.1	2.5		0.0				

Intersection Summary

HCM 6th Ctrl Delay	19.7
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
16: Dogwood Dr & W Market St

2040 Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	500	71	3	380	6	107	8	18	15	14	32
Future Volume (vph)	9	500	71	3	380	6	107	8	18	15	14	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		125	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1415			398			379			366	
Travel Time (s)		27.6			7.8			10.3			10.0	
Confl. Peds. (#/hr)	6					6	2					2
Confl. Bikes (#/hr)			7			1			1			6
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	745	0	4	504	0	0	150	23	0	80	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8		8	4	4
Permitted Phases	6			2			8		8	4		
Detector Phase	6	6		2	2		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	32.7	32.7		31.7	31.7		38.1	38.1	38.1	37.7	37.7	
Total Split (s)	30.0	30.0		30.0	30.0		23.0	23.0	23.0	27.0	27.0	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		28.8%	28.8%	28.8%	33.8%	33.8%	
Yellow Time (s)	4.7	4.7		4.7	4.7		3.3	3.3	3.3	3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.8	3.8	3.8	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.7	6.7		6.7	6.7			7.1	7.1		5.7	
Lead/Lag							Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio	0.05	0.99		0.04	0.66			0.69	0.06			0.79
Control Delay	21.8	57.7		23.0	27.8			47.8	0.3			63.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0			0.0
Total Delay	21.8	57.7		23.0	27.8			47.8	0.3			63.8
Queue Length 50th (ft)	3	-361		1	178			59	0			16
Queue Length 95th (ft)	19	#834		10	#502			#174	0			#74
Internal Link Dist (ft)		1335			318			299				286
Turn Bay Length (ft)	100			100					125			
Base Capacity (vph)	241	756		102	766			283	444			145
Starvation Cap Reductn	0	0		0	0			0	0			0
Spillback Cap Reductn	0	0		0	0			0	0			0
Storage Cap Reductn	0	0		0	0			0	0			0
Reduced v/c Ratio	0.05	0.99		0.04	0.66			0.53	0.05			0.55

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 73

Natural Cycle: 140

Control Type: Semi Act-Uncoord

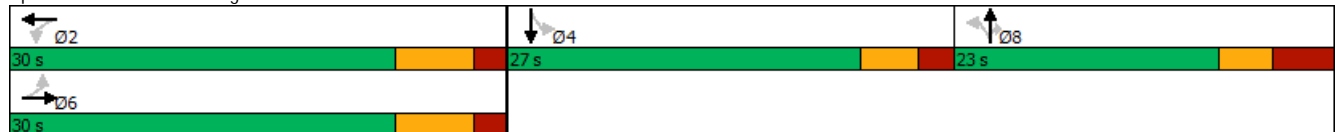
- Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 16: Dogwood Dr & W Market St



HCM Signalized Intersection Capacity Analysis
 16: Dogwood Dr & W Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	500	71	3	380	6	107	8	18	15	14	32
Future Volume (vph)	9	500	71	3	380	6	107	8	18	15	14	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7			7.1	7.1			5.7
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98			0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85			0.93
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00			0.99
Satd. Flow (prot)	1763	1822		1770	1857			1776	1548			1677
Flt Permitted	0.31	1.00		0.13	1.00			0.68	1.00			0.21
Satd. Flow (perm)	584	1822		248	1857			1269	1548			363
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	12	652	93	4	496	8	140	10	23	20	18	42
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	19	0	35	0
Lane Group Flow (vph)	12	740	0	4	503	0	0	150	4	0	45	0
Confl. Peds. (#/hr)	6					6	2					2
Confl. Bikes (#/hr)			7			1			1			6
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	Perm	NA
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	30.1	30.1		30.1	30.1			12.5	12.5			11.7
Effective Green, g (s)	30.1	30.1		30.1	30.1			12.5	12.5			11.7
Actuated g/C Ratio	0.41	0.41		0.41	0.41			0.17	0.17			0.16
Clearance Time (s)	6.7	6.7		6.7	6.7			7.1	7.1			5.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	238	743		101	757			214	262			57
v/s Ratio Prot		c0.41			0.27							
v/s Ratio Perm	0.02			0.02				c0.12	0.00			c0.12
v/c Ratio	0.05	1.00		0.04	0.67			0.70	0.01			0.78
Uniform Delay, d1	13.2	21.8		13.2	17.8			28.9	25.5			29.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.4	32.0		0.7	4.6			9.9	0.0			49.4
Delay (s)	13.6	53.7		13.9	22.3			38.8	25.5			79.3
Level of Service	B	D		B	C			D	C			E
Approach Delay (s)		53.1			22.3			37.0				79.3
Approach LOS		D			C			D				E
Intersection Summary												
HCM 2000 Control Delay			42.3			HCM 2000 Level of Service						D
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			73.8			Sum of lost time (s)			19.5			
Intersection Capacity Utilization			66.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 16: Dogwood Dr & W Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	500	71	3	380	6	107	8	18	15	14	32
Future Volume (veh/h)	9	500	71	3	380	6	107	8	18	15	14	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	652	93	4	496	8	140	10	23	20	18	42
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	478	841	120	307	968	16	391	17	246	134	81	125
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	893	1594	227	715	1835	30	1462	104	1540	199	510	783
Grp Volume(v), veh/h	12	0	745	4	0	504	150	0	23	80	0	0
Grp Sat Flow(s),veh/h/ln	893	0	1821	715	0	1864	1566	0	1540	1492	0	0
Q Serve(g_s), s	0.4	0.0	14.4	0.2	0.0	7.7	0.0	0.0	0.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.1	0.0	14.4	14.6	0.0	7.7	3.4	0.0	0.6	3.4	0.0	0.0
Prop In Lane	1.00		0.12	1.00		0.02	0.93		1.00	0.25		0.52
Lane Grp Cap(c), veh/h	478	0	961	307	0	984	408	0	246	340	0	0
V/C Ratio(X)	0.03	0.00	0.78	0.01	0.00	0.51	0.37	0.00	0.09	0.24	0.00	0.00
Avail Cap(c_a), veh/h	478	0	961	307	0	984	681	0	555	838	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.4	0.0	8.3	14.2	0.0	6.7	17.0	0.0	15.8	16.4	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	6.1	0.1	0.0	1.9	0.6	0.0	0.2	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	5.0	0.0	0.0	2.4	1.3	0.0	0.2	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.5	0.0	14.4	14.3	0.0	8.7	17.6	0.0	16.0	16.7	0.0	0.0
LnGrp LOS	A	A	B	B	A	A	B	A	B	B	A	A
Approach Vol, veh/h		757			508			173			80	
Approach Delay, s/veh		14.3			8.7			17.4			16.7	
Approach LOS		B			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		14.1		30.0		14.1				
Change Period (Y+Rc), s		6.7		* 7.1		6.7		7.1				
Max Green Setting (Gmax), s		23.3		* 21		23.3		15.9				
Max Q Clear Time (g_c+I1), s		16.6		5.4		16.4		5.4				
Green Ext Time (p_c), s		1.7		0.3		2.9		0.6				

Intersection Summary

HCM 6th Ctrl Delay	12.9
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
17: Willow St & W Market St

2040 Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	504	12	8	364	4	13	7	11	4	7	15
Future Volume (vph)	16	504	12	8	364	4	13	7	11	4	7	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	0			0			0			0		
Link Speed (mph)		35			35			25				25
Link Distance (ft)		398			1372			267				334
Travel Time (s)		7.8			26.7			7.3				9.1
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)						1			1			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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	673	0	10	480	0	0	40	0	0	34	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 17: Willow St & W Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	504	12	8	364	4	13	7	11	4	7	15
Future Volume (Veh/h)	16	504	12	8	364	4	13	7	11	4	7	15
Sign Control	Free			Free			Stop			Stop		
Grade	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)	21	657	16	10	475	5	17	9	14	5	9	20
Pedestrians	2											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	3.5											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	398											
pX, platoon unblocked				0.61				0.61	0.61	0.61	0.61	0.61
vC, conflicting volume	480			673			1226	1207	667	1217	1212	478
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	480			153			1055	1023	144	1039	1032	478
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			85	94	97	96	94	97
cM capacity (veh/h)	1082			876			112	140	554	116	139	588
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	21	673	10	480	40	34						
Volume Left	21	0	10	0	17	5						
Volume Right	0	16	0	5	14	20						
cSH	1082	1700	876	1700	166	239						
Volume to Capacity	0.02	0.40	0.01	0.28	0.24	0.14						
Queue Length 95th (ft)	1	0	1	0	23	12						
Control Delay (s)	8.4	0.0	9.2	0.0	33.4	22.5						
Lane LOS	A			A			D					
Approach Delay (s)	0.3			0.2			33.4					
Approach LOS							D					
Intersection Summary												
Average Delay			1.9									
Intersection Capacity Utilization			44.7%		ICU Level of Service				A			
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	504	12	8	364	4	13	7	11	4	7	15
Future Vol, veh/h	16	504	12	8	364	4	13	7	11	4	7	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	657	16	10	475	5	17	9	14	5	9	20
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	480	0	0	673	0	0	1219	1207	667	1219	1213	478
Stage 1	-	-	-	-	-	-	707	707	-	498	498	-
Stage 2	-	-	-	-	-	-	512	500	-	721	715	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1082	-	-	918	-	-	157	183	459	157	182	587
Stage 1	-	-	-	-	-	-	426	438	-	554	544	-
Stage 2	-	-	-	-	-	-	545	543	-	419	434	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1082	-	-	918	-	-	142	178	458	143	177	587
Mov Cap-2 Maneuver	-	-	-	-	-	-	142	178	-	143	177	-
Stage 1	-	-	-	-	-	-	418	430	-	543	538	-
Stage 2	-	-	-	-	-	-	512	537	-	389	426	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.2			27.5			19.7		
HCM LOS	D			D			D			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	200	1082	-	-	918	-	-	279				
HCM Lane V/C Ratio	0.202	0.019	-	-	0.011	-	-	0.122				
HCM Control Delay (s)	27.5	8.4	-	-	9	-	-	19.7				
HCM Lane LOS	D	A	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0	-	-	0.4				

Lanes, Volumes, Timings
18: S High St/N High St & W Market St

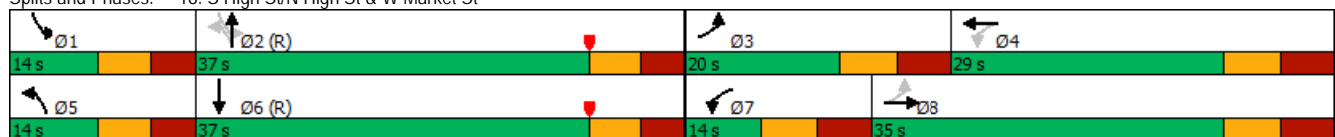
2040 Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	138	189	27	145	3	122	559	30	17	703	113
Future Volume (vph)	183	138	189	27	145	3	122	559	30	17	703	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	0		320	150		0	130		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			25			35			35	
Link Distance (ft)		1372			628			780			700	
Travel Time (s)		26.7			17.1			15.2			13.6	
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	239	427	0	35	193	0	159	768	0	22	1064	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		D.P+P	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			2		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	13.4	43.4		13.4	43.4		12.3	33.3		12.3	41.3	
Total Split (s)	20.0	35.0		14.0	29.0		14.0	37.0		14.0	37.0	
Total Split (%)	20.0%	35.0%		14.0%	29.0%		14.0%	37.0%		14.0%	37.0%	
Yellow Time (s)	4.3	4.3		4.3	4.3		3.9	3.9		3.9	3.9	
All-Red Time (s)	4.1	4.1		4.1	4.1		3.4	3.4		3.4	3.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
v/c Ratio	0.61	0.81		0.16	0.61		0.73	0.52		0.08	0.94	
Control Delay	29.6	41.7		21.4	46.0		41.7	25.6		16.8	49.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.6	41.7		21.4	46.0		41.7	25.6		16.8	49.3	
Queue Length 50th (ft)	103	221		13	109		61	179		8	-376	
Queue Length 95th (ft)	164	#391		33	180		#175	298		22	#508	
Internal Link Dist (ft)		1292			548			700			620	
Turn Bay Length (ft)	200						150			130		
Base Capacity (vph)	395	530		214	383		217	1474		285	1135	
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	0.61	0.81		0.16	0.50		0.73	0.52		0.08	0.94	

Intersection Summary
 Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 6.9 (7%), Referenced to phase 2:NBSB and 6:SBT, Start of Yellow
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 ~ 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.

Splits and Phases: 18: S High St/N High St & W Market St



HCM Signalized Intersection Capacity Analysis
 18: S High St/N High St & W Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	183	138	189	27	145	3	122	559	30	17	703	113
Future Volume (vph)	183	138	189	27	145	3	122	559	30	17	703	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Fr't	1.00	0.91		1.00	1.00		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1701		1770	1857		1770	3512		1770	3466	
Flt Permitted	0.43	1.00		0.37	1.00		0.12	1.00		0.24	1.00	
Satd. Flow (perm)	803	1701		682	1857		219	3512		440	3466	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	239	180	247	35	189	4	159	729	39	22	917	147
RTOR Reduction (vph)	0	48	0	0	1	0	0	3	0	0	13	0
Lane Group Flow (vph)	239	379	0	35	192	0	159	765	0	22	1051	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		D,P+P	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			2		
Actuated Green, G (s)	39.8	28.4		23.8	20.4		41.9	34.1		36.8	29.0	
Effective Green, g (s)	39.8	28.4		23.8	20.4		41.9	34.1		36.8	29.0	
Actuated g/C Ratio	0.40	0.28		0.24	0.20		0.42	0.34		0.37	0.29	
Clearance Time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	483		199	378		212	1197		197	1005	
v/s Ratio Prot	c0.06	c0.22		0.01	0.10		c0.06	c0.22		0.00	c0.30	
v/s Ratio Perm	0.16			0.04			0.26			0.04		
v/c Ratio	0.56	0.78		0.18	0.51		0.75	0.64		0.11	1.05	
Uniform Delay, d1	21.5	33.0		29.8	35.3		23.4	27.8		20.9	35.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	8.2		0.4	1.1		13.8	2.6		0.3	41.2	
Delay (s)	23.0	41.2		30.2	36.4		37.3	30.4		21.2	76.7	
Level of Service	C	D		C	D		D	C		C	E	
Approach Delay (s)		34.7			35.5			31.6			75.5	
Approach LOS		C			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	49.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	31.4
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 18: S High St/N High St & W Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	183	138	189	27	145	3	122	559	30	17	703	113
Future Volume (veh/h)	183	138	189	27	145	3	122	559	30	17	703	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	239	180	247	35	189	4	159	729	39	22	917	147
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	382	190	261	145	330	7	209	1256	67	249	987	158
Arrive On Green	0.12	0.27	0.27	0.03	0.18	0.18	0.07	0.37	0.37	0.02	0.32	0.32
Sat Flow, veh/h	1781	714	980	1781	1825	39	1781	3431	183	1781	3067	492
Grp Volume(v), veh/h	239	0	427	35	0	193	159	377	391	22	531	533
Grp Sat Flow(s),veh/h/ln	1781	0	1694	1781	0	1863	1781	1777	1837	1781	1777	1782
Q Serve(g_s), s	10.6	0.0	24.7	1.6	0.0	9.5	6.0	17.1	17.1	0.8	28.9	28.9
Cycle Q Clear(g_c), s	10.6	0.0	24.7	1.6	0.0	9.5	6.0	17.1	17.1	0.8	28.9	28.9
Prop In Lane	1.00		0.58	1.00		0.02	1.00		0.10	1.00		0.28
Lane Grp Cap(c), veh/h	382	0	451	145	0	337	209	650	673	249	572	574
V/C Ratio(X)	0.63	0.00	0.95	0.24	0.00	0.57	0.76	0.58	0.58	0.09	0.93	0.93
Avail Cap(c_a), veh/h	382	0	451	190	0	384	209	650	673	328	572	574
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.8	0.0	36.0	33.0	0.0	37.4	25.5	25.5	25.5	20.4	32.8	32.8
Incr Delay (d2), s/veh	3.2	0.0	29.5	0.8	0.0	1.6	15.2	3.8	3.6	0.2	23.6	23.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	13.5	0.7	0.0	4.5	3.3	7.6	7.9	0.3	15.7	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	0.0	65.5	33.9	0.0	39.0	40.7	29.3	29.2	20.6	56.4	56.4
LnGrp LOS	C	A	E	C	A	D	D	C	C	C	E	E
Approach Vol, veh/h		666			228			927			1086	
Approach Delay, s/veh		53.1			38.2			31.2			55.7	
Approach LOS		D			D			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.6	43.9	20.0	26.5	14.0	39.5	11.5	35.0				
Change Period (Y+Rc), s	7.3	7.3	* 8.4	* 8.4	7.3	7.3	* 8.4	* 8.4				
Max Green Setting (Gmax), s	6.7	29.7	* 12	* 21	6.7	29.7	* 5.6	* 27				
Max Q Clear Time (g_c+I1), s	2.8	19.1	12.6	11.5	8.0	30.9	3.6	26.7				
Green Ext Time (p_c), s	0.0	3.4	0.0	0.7	0.0	0.0	0.0	0.0				

Intersection Summary												
HCM 6th Ctrl Delay			45.9									
HCM 6th LOS			D									

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 19: S Mason St/N Mason St & E Market St

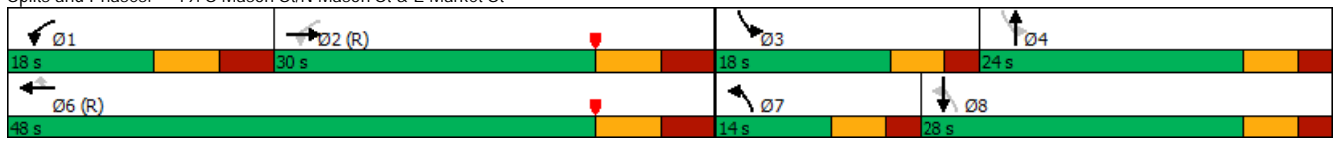
2040 Build
 Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔		↔	↔	
Traffic Volume (vph)	0	113	3	166	152	196	1	48	18	137	60	6
Future Volume (vph)	0	113	3	166	152	196	1	48	18	137	60	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	150		150	0		0	0	0	0
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		530			595			372			335	
Travel Time (s)		14.5			16.2			10.1			9.1	
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	151	0	217	198	256	1	86	0	179	86	0
Turn Type		NA		D.P+P	NA	Perm	D.P+P	NA		D.P+P	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases				2		6	8			4		
Detector Phase		2		1	6	6	7	4		3	8	
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0	10.0	5.0	7.0		5.0	7.0	
Minimum Split (s)		27.1		13.1	37.1	37.1	11.1	29.1		11.1	23.1	
Total Split (s)		30.0		18.0	48.0	48.0	14.0	24.0		18.0	28.0	
Total Split (%)		33.3%		20.0%	53.3%	53.3%	15.6%	26.7%		20.0%	31.1%	
Yellow Time (s)		4.5		4.5	4.5	4.5	3.7	3.7		3.7	3.7	
All-Red Time (s)		3.6		3.6	3.6	3.6	2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		8.1		8.1	8.1	8.1	6.1	6.1		6.1	6.1	
Lead/Lag		Lag		Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?		Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode		C-Max		None	C-Max	C-Max	None	None		None	None	
v/c Ratio		0.23		0.33	0.19	0.28	0.00	0.44		0.52	0.19	
Control Delay		25.0		7.6	5.7	6.6	20.0	43.9		30.7	25.1	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.0		7.6	5.7	6.6	20.0	43.9		30.7	25.1	
Queue Length 50th (ft)		63		38	33	51	0	47		78	33	
Queue Length 95th (ft)		125		43	m38	59	4	89		125	78	
Internal Link Dist (ft)		450			515			292			255	
Turn Bay Length (ft)				150		150						
Base Capacity (vph)		664		671	1062	902	383	355		356	516	
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		0.23		0.32	0.19	0.28	0.00	0.24		0.50	0.17	

Intersection Summary
 Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 21 (23%), Referenced to phase 2:EBWB and 6:WBT, Start of Yellow
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: S Mason St/N Mason St & E Market St



HCM Signalized Intersection Capacity Analysis
 19: S Mason St/N Mason St & E Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↔	↔	↔	↔	↔		↔	↔		
Traffic Volume (vph)	0	113	3	166	152	196	1	48	18	137	60	6	
Future Volume (vph)	0	113	3	166	152	196	1	48	18	137	60	6	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		8.1		8.1	8.1	8.1	6.1	6.1		6.1	6.1		
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Frt		1.00		1.00	1.00	0.85	1.00	0.96		1.00	0.99		
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1856		1770	1863	1583	1770	1788		1770	1837		
Flt Permitted		1.00		0.66	1.00	1.00	0.70	1.00		0.70	1.00		
Satd. Flow (perm)		1856		1231	1863	1583	1306	1788		1306	1837		
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	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	0	147	4	217	198	256	1	63	23	179	78	8	
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	4	0	
Lane Group Flow (vph)	0	150	0	217	198	256	1	86	0	179	82	0	
Turn Type		NA		D.P+P	NA	Perm	D.P+P	NA		D.P+P	NA		
Protected Phases		2		1	6		7	4		3	8		
Permitted Phases				2		6	8			4			
Actuated Green, G (s)		27.2		38.3	46.4	46.4	23.3	12.2		23.3	22.1		
Effective Green, g (s)		27.2		38.3	46.4	46.4	23.3	12.2		23.3	22.1		
Actuated g/C Ratio		0.30		0.43	0.52	0.52	0.26	0.14		0.26	0.25		
Clearance Time (s)		8.1		8.1	8.1	8.1	6.1	6.1		6.1	6.1		
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)		560		590	960	816	344	242		395	451		
v/s Ratio Prot		0.08		0.05	0.11	0.00	0.05	0.05		c0.06	0.04		
v/s Ratio Perm				c0.11		c0.16	0.00			c0.06			
v/c Ratio		0.27		0.37	0.21	0.31	0.00	0.36		0.45	0.18		
Uniform Delay, d1		23.8		16.9	11.8	12.6	24.7	35.3		27.5	26.8		
Progression Factor		1.00		0.55	0.49	0.50	1.00	1.00		1.00	1.00		
Incremental Delay, d2		1.2		0.3	0.4	0.8	0.0	0.9		0.8	0.2		
Delay (s)		25.0		9.7	6.1	7.1	24.7	36.2		28.3	27.0		
Level of Service		C		A	A	A	C	D		C	C		
Approach Delay (s)		25.0			7.6			36.1			27.9		
Approach LOS		C			A			D			C		
Intersection Summary													
HCM 2000 Control Delay			16.6									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.42										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	28.4
Intersection Capacity Utilization			53.7%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 19: S Mason St/N Mason St & E Market St

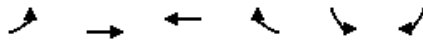
2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔		↔	↔	
Traffic Volume (veh/h)	0	113	3	166	152	196	1	48	18	137	60	6
Future Volume (veh/h)	0	113	3	166	152	196	1	48	18	137	60	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	147	4	217	198	256	1	63	23	179	78	8
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	726	20	678	1095	928	277	100	37	320	313	32
Arrive On Green	0.00	0.40	0.40	0.16	0.98	0.98	0.00	0.08	0.08	0.11	0.19	0.19
Sat Flow, veh/h	0	1812	49	1781	1870	1585	1781	1307	477	1781	1668	171
Grp Volume(v), veh/h	0	0	151	217	198	256	1	0	86	179	0	86
Grp Sat Flow(s),veh/h/ln	0	0	1861	1781	1870	1585	1781	0	1784	1781	0	1840
Q Serve(g_s), s	0.0	0.0	4.8	6.5	0.3	0.5	0.0	0.0	4.2	8.2	0.0	3.6
Cycle Q Clear(g_c), s	0.0	0.0	4.8	6.5	0.3	0.5	0.0	0.0	4.2	8.2	0.0	3.6
Prop In Lane	0.00		0.03	1.00		1.00	1.00		0.27	1.00		0.09
Lane Grp Cap(c), veh/h	0	0	746	678	1095	928	277	0	137	320	0	345
V/C Ratio(X)	0.00	0.00	0.20	0.32	0.18	0.28	0.00	0.00	0.63	0.56	0.00	0.25
Avail Cap(c_a), veh/h	0	0	746	706	1095	928	430	0	355	355	0	448
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	17.6	12.3	0.4	0.4	29.7	0.0	40.3	33.0	0.0	31.1
Incr Delay (d2), s/veh	0.0	0.0	0.6	0.3	0.4	0.7	0.0	0.0	4.7	1.6	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.2	2.3	0.2	0.3	0.0	0.0	2.0	3.6	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	18.2	12.6	0.8	1.2	29.7	0.0	45.0	34.6	0.0	31.5
LnGrp LOS	A	A	B	B	A	A	C	A	D	C	A	C
Approach Vol, veh/h		151			671			87			265	
Approach Delay, s/veh		18.2			4.7			44.8			33.6	
Approach LOS		B			A			D			C	
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	16.6	44.2	16.2	13.0		60.8	6.2	23.0				
Change Period (Y+Rc), s	* 8.1	* 8.1	* 6.1	* 6.1		* 8.1	* 6.1	* 6.1				
Max Green Setting (Gmax), s	* 9.9	* 22	* 12	* 18		* 40	* 7.9	* 22				
Max Q Clear Time (g_c+I1), s	8.5	6.8	10.2	6.2		2.5	2.0	5.6				
Green Ext Time (p_c), s	0.1	0.7	0.1	0.3		2.2	0.0	0.3				

Intersection Summary												
HCM 6th Ctrl Delay				16.0								
HCM 6th LOS				B								

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 User approved changes to right turn type.

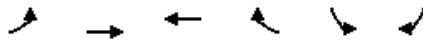


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	278	524	51	18	5
Future Volume (vph)	2	278	524	51	18	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		595	279		366	
Travel Time (s)		11.6	5.4		7.1	
Confl. Peds. (#/hr)	2			2	1	2
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	359	742	0	29	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 20: E Market St & Broad St

2040 Build
 Timing Plan: AM Peak



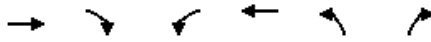
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↩	↑	↩		↩	
Traffic Volume (veh/h)	2	278	524	51	18	5
Future Volume (Veh/h)	2	278	524	51	18	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	3	359	676	66	23	6
Pedestrians		2	1		2	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		595	1010			
pX, platoon unblocked	0.75				0.82	0.75
vC, conflicting volume	744				1077	713
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	497				632	456
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	99
cM capacity (veh/h)	803				361	454
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	3	359	742	29		
Volume Left	3	0	0	23		
Volume Right	0	0	66	6		
cSH	803	1700	1700	377		
Volume to Capacity	0.00	0.21	0.44	0.08		
Queue Length 95th (ft)	0	0	0	6		
Control Delay (s)	9.5	0.0	0.0	15.4		
Lane LOS	A			C		
Approach Delay (s)	0.1		0.0	15.4		
Approach LOS				C		
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			47.5%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	1	1		1	
Traffic Vol, veh/h	2	278	524	51	18	5
Future Vol, veh/h	2	278	524	51	18	5
Conflicting Peds, #/hr	2	0	0	2	1	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	359	676	66	23	6

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	744	0	-	0	1077 713
Stage 1	-	-	-	-	711 -
Stage 2	-	-	-	-	366 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	864	-	-	-	242 432
Stage 1	-	-	-	-	487 -
Stage 2	-	-	-	-	702 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	862	-	-	-	240 430
Mov Cap-2 Maneuver	-	-	-	-	240 -
Stage 1	-	-	-	-	485 -
Stage 2	-	-	-	-	701 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	20.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	862	-	-	-	266
HCM Lane V/C Ratio	0.003	-	-	-	0.112
HCM Control Delay (s)	9.2	-	-	-	20.2
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4



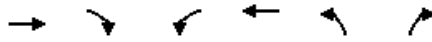
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (vph)	294	7	30	582	5	20
Future Volume (vph)	294	7	30	582	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	100		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			0		0	
Link Speed (mph)	35			35	35	
Link Distance (ft)	279			280	613	
Travel Time (s)	5.4			5.5	11.9	
Confl. Peds. (#/hr)		2	2		2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	388	0	39	751	32	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 21: Ott St & E Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (veh/h)	294	7	30	582	5	20
Future Volume (Veh/h)	294	7	30	582	5	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	379	9	39	751	6	26
Pedestrians	2			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	3.5			3.5		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	874			731		
pX, platoon unblocked				0.91	0.80	0.91
vC, conflicting volume				390	1216	386
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				274	876	269
tC, single (s)				4.1	6.4	6.2
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				97	98	96
cM capacity (veh/h)				1165	245	696
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	388	39	751	32		
Volume Left	0	39	0	6		
Volume Right	9	0	0	26		
cSH	1700	1165	1700	517		
Volume to Capacity	0.23	0.03	0.44	0.06		
Queue Length 95th (ft)	0	3	0	5		
Control Delay (s)	0.0	8.2	0.0	12.4		
Lane LOS	A			B		
Approach Delay (s)	0.0	0.4	12.4			
Approach LOS				B		
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	46.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↑	↘	↙
Traffic Vol, veh/h	294	7	30	582	5	20
Future Vol, veh/h	294	7	30	582	5	20
Conflicting Peds, #/hr	0	2	2	0	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	379	9	39	751	6	26

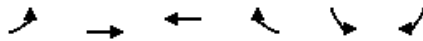
Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	390	0	1217
Stage 1	-	-	-	-	386
Stage 2	-	-	-	-	831
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1169	-	200
Stage 1	-	-	-	-	687
Stage 2	-	-	-	-	428
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1167	-	193
Mov Cap-2 Maneuver	-	-	-	-	193
Stage 1	-	-	-	-	686
Stage 2	-	-	-	-	413

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	445	-	-	1167	-
HCM Lane V/C Ratio	0.072	-	-	0.033	-
HCM Control Delay (s)	13.7	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lanes, Volumes, Timings
22: E Market St & Myrtle St

2040 Build
Timing Plan: AM Peak

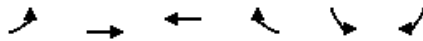


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	302	605	5	4	11
Future Volume (vph)	10	302	605	5	4	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		280	451		356	
Travel Time (s)		5.5	8.8		6.9	
Confl. Peds. (#/hr)	1			1	1	
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	386	778	0	19	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 22: E Market St & Myrtle St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↷	
Traffic Volume (veh/h)	10	302	605	5	4	11
Future Volume (Veh/h)	10	302	605	5	4	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	13	386	772	6	5	14
Pedestrians			1		1	
Lane Width (ft)			12.0		12.0	
Walking Speed (ft/s)			3.5		3.5	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1154	451			
pX, platoon unblocked	0.74				0.76	0.74
vC, conflicting volume	779				1189	776
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530				977	526
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	97
cM capacity (veh/h)	770				208	410
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	13	386	778	19		
Volume Left	13	0	0	5		
Volume Right	0	0	6	14		
cSH	770	1700	1700	327		
Volume to Capacity	0.02	0.23	0.46	0.06		
Queue Length 95th (ft)	1	0	0	5		
Control Delay (s)	9.8	0.0	0.0	16.7		
Lane LOS	A			C		
Approach Delay (s)	0.3		0.0	16.7		
Approach LOS				C		
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			48.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑		↑	↑
Traffic Vol, veh/h	10	302	605	5	4	11
Future Vol, veh/h	10	302	605	5	4	11
Conflicting Peds, #/hr	1	0	0	1	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	386	772	6	5	14

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	779	0	-	0	1189 776
Stage 1	-	-	-	-	776 -
Stage 2	-	-	-	-	413 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	838	-	-	-	208 397
Stage 1	-	-	-	-	454 -
Stage 2	-	-	-	-	668 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	837	-	-	-	204 397
Mov Cap-2 Maneuver	-	-	-	-	204 -
Stage 1	-	-	-	-	446 -
Stage 2	-	-	-	-	667 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	837	-	-	-	317
HCM Lane V/C Ratio	0.015	-	-	-	0.06
HCM Control Delay (s)	9.4	-	-	-	17.1
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lanes, Volumes, Timings
23: Reservoir St/Sterling St & E Market St

2040 Build
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑		↑			↑			↑	
Traffic Volume (vph)	0	188	127	0	474	5	135	54	18	6	80	2
Future Volume (vph)	0	188	127	0	474	5	135	54	18	6	80	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		451			685			454			334	
Travel Time (s)		8.8			13.3			8.8			6.5	
Confl. Peds. (#/hr)	2		2	2		2						
Confl. Bikes (#/hr)						2						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	240	162	0	611	0	0	264	0	0	113	0
Turn Type		NA	Over		NA		Split	NA		Split	NA	
Protected Phases		2	3		2		3	3		1	1	
Permitted Phases												
Detector Phase		2	3		2		3	3		1	1	
Switch Phase												
Minimum Initial (s)		20.0	7.0		20.0		7.0	7.0		7.0	7.0	
Minimum Split (s)		28.6	27.6		28.6		27.6	27.6		27.5	27.5	
Total Split (s)		34.0	28.0		34.0		28.0	28.0		28.0	28.0	
Total Split (%)		37.8%	31.1%		37.8%		31.1%	31.1%		31.1%	31.1%	
Yellow Time (s)		3.7	3.6		3.7		3.6	3.6		3.2	3.2	
All-Red Time (s)		2.9	2.0		2.9		2.0	2.0		2.3	2.3	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.6	5.6		6.6		5.6	5.6			5.5	
Lead/Lag		Lag		Lag					Lead	Lead		
Lead-Lag Optimize?		Yes		Yes					Yes	Yes		
Recall Mode		C-Max	None		C-Max		None	None		None	None	
v/c Ratio		0.25	0.36		0.64			0.74			0.51	
Control Delay		23.8	8.8		23.5			45.2			44.0	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		23.8	8.8		23.5			45.2			44.0	
Queue Length 50th (ft)		86	1		257			139			61	
Queue Length 95th (ft)		135	28		#502			211			108	
Internal Link Dist (ft)		371			605			374			254	
Turn Bay Length (ft)			200									
Base Capacity (vph)		952	515		951			447			462	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.25	0.31		0.64			0.59			0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 60 (67%), Referenced to phase 2:EBWB, Start of Yellow
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 23: Reservoir St/Sterling St & E Market St



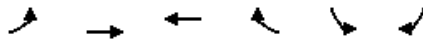
HCM Signalized Intersection Capacity Analysis
 23: Reservoir St/Sterling St & E Market St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↖			↕			↕	
Traffic Volume (vph)	0	188	127	0	474	5	135	54	18	6	80	2
Future Volume (vph)	0	188	127	0	474	5	135	54	18	6	80	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.6	5.6		6.6			5.6			5.5	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frbp, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Frt		1.00	0.85		1.00			0.99			1.00	
Flt Protected		1.00	1.00		1.00			0.97			1.00	
Satd. Flow (prot)		1863	1583		1860			1783			1850	
Flt Permitted		1.00	1.00		1.00			0.97			1.00	
Satd. Flow (perm)		1863	1583		1860			1783			1850	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	240	162	0	605	6	172	69	23	8	102	3
RTOR Reduction (vph)	0	0	130	0	1	0	0	4	0	0	1	0
Lane Group Flow (vph)	0	240	32	0	610	0	0	260	0	0	112	0
Confl. Peds. (#/hr)	2		2	2		2						
Confl. Bikes (#/hr)						2						
Turn Type		NA	Over		NA		Split	NA		Split	NA	
Protected Phases		2	3		2		3	3		1	1	
Permitted Phases												
Actuated Green, G (s)		44.9	17.9		44.9			17.9			9.5	
Effective Green, g (s)		44.9	17.9		44.9			17.9			9.5	
Actuated g/C Ratio		0.50	0.20		0.50			0.20			0.11	
Clearance Time (s)		6.6	5.6		6.6			5.6			5.5	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		929	314		927			354			195	
v/s Ratio Prot		0.13	0.02		c0.33			c0.15			c0.06	
v/s Ratio Perm												
w/c Ratio		0.26	0.10		0.66			0.73			0.57	
Uniform Delay, d1		13.0	29.5		16.8			33.8			38.3	
Progression Factor		1.49	1.34		1.00			1.00			1.00	
Incremental Delay, d2		0.7	0.1		3.7			7.7			4.1	
Delay (s)		20.0	39.8		20.5			41.5			42.4	
Level of Service		B	D		C			D			D	
Approach Delay (s)		27.9			20.5			41.5			42.4	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			28.4									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			90.0								17.7	
Intersection Capacity Utilization			60.8%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support Non-NEMA phasing.

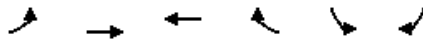


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	204	474	26	19	4
Future Volume (vph)	4	204	474	26	19	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		685	912		392	
Travel Time (s)		13.3	17.8		7.6	
Confl. Peds. (#/hr)	2			2		2
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	260	638	0	29	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 24: E Market St & Hill St

2040 Build
 Timing Plan: AM Peak

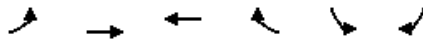


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	204	474	26	19	4
Future Volume (Veh/h)	4	204	474	26	19	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	260	605	33	24	5
Pedestrians		2			2	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		685				
pX, platoon unblocked					0.94	
vC, conflicting volume	640				894	626
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	640				858	626
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				92	99
cM capacity (veh/h)	942				307	483
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	5	260	638	29		
Volume Left	5	0	0	24		
Volume Right	0	0	33	5		
cSH	942	1700	1700	327		
Volume to Capacity	0.01	0.15	0.38	0.09		
Queue Length 95th (ft)	0	0	0	7		
Control Delay (s)	8.8	0.0	0.0	17.1		
Lane LOS	A			C		
Approach Delay (s)	0.2		0.0	17.1		
Approach LOS				C		
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			42.5%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑		↑	↑
Traffic Vol, veh/h	4	204	474	26	19	4
Future Vol, veh/h	4	204	474	26	19	4
Conflicting Peds, #/hr	2	0	0	2	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	260	605	33	24	5
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	640	0	-	0	894	626
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	270	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	944	-	-	-	312	484
Stage 1	-	-	-	-	534	-
Stage 2	-	-	-	-	775	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	942	-	-	-	309	482
Mov Cap-2 Maneuver	-	-	-	-	309	-
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	773	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.2	0	17			
HCM LOS						C
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	942	-	-	-	330	
HCM Lane V/C Ratio	0.005	-	-	-	0.089	
HCM Control Delay (s)	8.8	-	-	-	17	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.3	

Lanes, Volumes, Timings
 25: E Market St & Old Furnace Rd

2040 Build
 Timing Plan: AM Peak



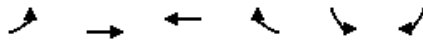
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	32	196	432	44	34	83
Future Volume (vph)	32	196	432	44	34	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	65			175	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		912	1324		234	
Travel Time (s)		17.8	25.8		4.6	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	245	540	55	147	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 25: E Market St & Old Furnace Rd

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	32	196	432	44	34	83
Future Volume (Veh/h)	32	196	432	44	34	83
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	40	245	540	55	42	104
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	595				865	540
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	595				865	540
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				86	81
cM capacity (veh/h)	981				311	542
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	40	245	540	55	146	
Volume Left	40	0	0	0	42	
Volume Right	0	0	0	55	104	
cSH	981	1700	1700	1700	446	
Volume to Capacity	0.04	0.14	0.32	0.03	0.33	
Queue Length 95th (ft)	3	0	0	0	35	
Control Delay (s)	8.8	0.0	0.0	0.0	16.9	
Lane LOS	A				C	
Approach Delay (s)	1.2		0.0		16.9	
Approach LOS					C	
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			47.0%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	32	196	432	44	34	83
Future Vol, veh/h	32	196	432	44	34	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	65	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	245	540	55	43	104

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	595	0	-	0	865 540
Stage 1	-	-	-	-	540 -
Stage 2	-	-	-	-	325 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	981	-	-	-	324 542
Stage 1	-	-	-	-	584 -
Stage 2	-	-	-	-	732 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	981	-	-	-	311 542
Mov Cap-2 Maneuver	-	-	-	-	311 -
Stage 1	-	-	-	-	560 -
Stage 2	-	-	-	-	732 -

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	17
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	981	-	-	-	446
HCM Lane V/C Ratio	0.041	-	-	-	0.328
HCM Control Delay (s)	8.8	-	-	-	17
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.4

Lanes, Volumes, Timings
26: E Market St & Hawkins St/Vine St

2040 Build
Timing Plan: AM Peak

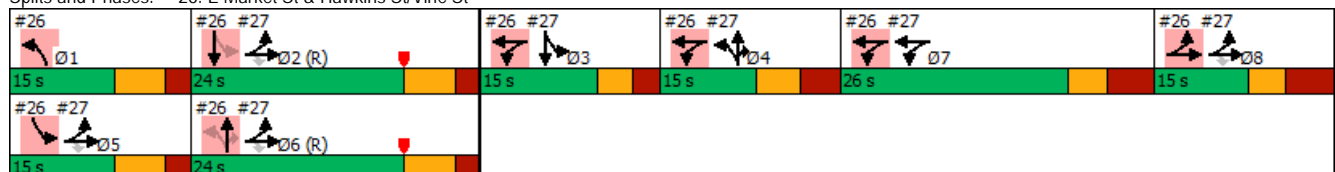


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3	Ø4
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕			
Traffic Volume (vph)	2	15	2	258	12	53	11	438	168	11	178	0		
Future Volume (vph)	2	15	2	258	12	53	11	438	168	11	178	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0	150		250	100		350		
Storage Lanes	0		0	1		0	1		1	1		1		
Taper Length (ft)	0			0			0			0				
Right Turn on Red			No			Yes			No			Yes		
Link Speed (mph)		35			35			35			35			
Link Distance (ft)		552			188			488			1324			
Travel Time (s)		10.8			3.7			9.5			25.8			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Shared Lane Traffic (%)				36%										
Lane Group Flow (vph)	0	23	0	204	196	0	14	542	208	14	220	0		
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA			
Protected Phases	8	8		3 4 7	3 4 7		1	6		5	2		3	4
Permitted Phases							6		6	2				
Minimum Split (s)	14.2	14.2					11.3	13.3	13.3	11.3	13.3		14.1	14.1
Total Split (s)	15.0	15.0					15.0	24.0	24.0	15.0	24.0		15.0	15.0
Total Split (%)	13.6%	13.6%					13.6%	21.8%	21.8%	13.6%	21.8%		14%	14%
Yellow Time (s)	3.1	3.1					4.2	4.2	4.2	4.2	4.2		3.0	3.7
All-Red Time (s)	4.1	4.1					2.1	2.1	2.1	2.1	2.1		2.3	3.4
Lost Time Adjust (s)		0.0					0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)		7.2					6.3	6.3	6.3	6.3	6.3			
Lead/Lag	Lag	Lag					Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes					Yes	Yes	Yes	Yes	Yes		Yes	Yes
v/c Ratio		0.18		0.26	0.26		0.04	0.95	0.82	0.07	0.39			
Control Delay		51.6		5.0	2.7		28.1	74.0	70.3	28.4	43.6			
Queue Delay		0.1		3.6	3.4		0.0	0.0	0.0	0.0	0.0			
Total Delay		51.7		8.6	6.1		28.1	74.0	70.3	28.4	43.6			
Queue Length 50th (ft)		16		15	0		7	201	144	7	74			
Queue Length 95th (ft)		42		m12	m0		22	#310	#269	22	112			
Internal Link Dist (ft)		472			108			408			1244			
Turn Bay Length (ft)							150		250	100				
Base Capacity (vph)		129		774	768		323	569	254	207	569			
Starvation Cap Reductn		0		477	475		0	0	0	0	0			
Spillback Cap Reductn		7		0	0		0	0	0	0	0			
Storage Cap Reductn		0		0	0		0	0	0	0	0			
Reduced v/c Ratio		0.19		0.69	0.67		0.04	0.95	0.82	0.07	0.39			

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow, Master Intersection
 Natural Cycle: 105
 Control Type: Pretimed
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: E Market St & Hawkins St/Vine St



Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Growth Factor	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Minimum Split (s)	14.2
Total Split (s)	26.0
Total Split (%)	24%
Yellow Time (s)	3.4
All-Red Time (s)	3.8
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis
 26: E Market St & Hawkins St/Vine St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	
Traffic Volume (vph)	2	15	2	258	12	53	11	438	168	11	178	0
Future Volume (vph)	2	15	2	258	12	53	11	438	168	11	178	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.2		5.3	5.3		6.3	6.3	6.3	6.3	6.3	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95	1.00	1.00	0.95	
Frt		0.99		1.00	0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1833		1681	1632		1770	3539	1583	1770	3539	
Flt Permitted		1.00		0.95	0.97		0.61	1.00	1.00	0.23	1.00	
Satd. Flow (perm)		1833		1681	1632		1141	3539	1583	421	3539	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	2	19	2	319	15	66	14	542	208	14	220	0
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	23	0	204	177	0	14	542	208	14	220	0
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	8	8		3 4 7	3 4 7		1	6		5	2	
Permitted Phases							6		6	2		
Actuated Green, G (s)		7.8		48.8	48.8		26.4	17.7	17.7	26.4	17.7	
Effective Green, g (s)		7.8		41.7	41.7		26.4	17.7	17.7	26.4	17.7	
Actuated g/C Ratio		0.07		0.38	0.38		0.24	0.16	0.16	0.24	0.16	
Clearance Time (s)		7.2					6.3	6.3	6.3	6.3	6.3	
Lane Grp Cap (vph)		129		637	618		323	569	254	207	569	
v/s Ratio Prot		c0.01		c0.12	0.11		0.00	c0.15		c0.01	0.06	
v/s Ratio Perm							0.01		0.13	0.01		
v/c Ratio		0.18		0.32	0.29		0.04	0.95	0.82	0.07	0.39	
Uniform Delay, d1		48.1		24.1	23.8		32.0	45.7	44.6	32.6	41.3	
Progression Factor		1.00		0.27	0.17		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		3.0		0.1	0.1		0.3	27.7	24.6	0.6	2.0	
Delay (s)		51.1		6.6	4.2		32.3	73.4	69.2	33.2	43.3	
Level of Service		D		A	A		C	E	E	C	D	
Approach Delay (s)		51.1			5.4			71.5			42.7	
Approach LOS		D			A			E			D	
Intersection Summary												
HCM 2000 Control Delay			47.8				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)				39.4	
Intersection Capacity Utilization			41.8%				ICU Level of Service				A	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology does not support clustered intersections.

Lanes, Volumes, Timings
27: Country Club Rd & Vine St

2040 Build
Timing Plan: AM Peak

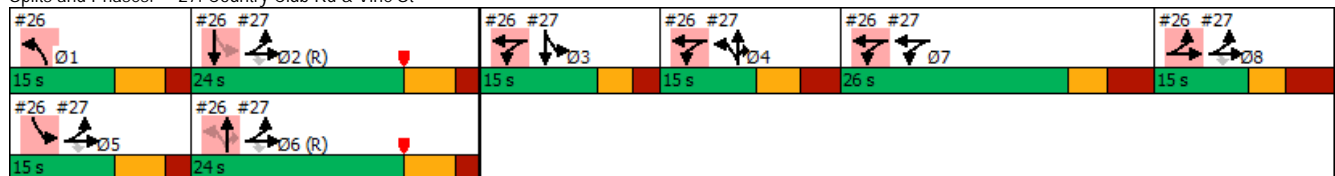


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2
Lane Configurations		↕	↕		↕↕			↕	↕		↕↕			
Traffic Volume (vph)	22	192	42	216	338	1	16	64	181	13	19	29		
Future Volume (vph)	22	192	42	216	338	1	16	64	181	13	19	29		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	230		0	200		0	0		0		
Storage Lanes	0		1	1		0	1		1	0		0		
Taper Length (ft)	0			0			0			0				
Right Turn on Red			No			Yes			Yes			Yes		
Link Speed (mph)		35			35			35			35			
Link Distance (ft)		188			552			389			193			
Travel Time (s)		3.7			10.8			7.6			3.8			
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		
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	279	55	0	724	0	0	104	236	0	80	0		
Turn Type	Split	NA	Perm	Split	NA		Split	NA	Prot	Split	NA			
Protected Phases	2 5 6 8	2 5 6 8		7	7		4	4	4	3	3		1	2
Permitted Phases			2 5 6 8											
Minimum Split (s)				14.2	14.2		14.1	14.1	14.1	14.1	14.1		11.3	13.3
Total Split (s)				26.0	26.0		15.0	15.0	15.0	15.0	15.0		15.0	24.0
Total Split (%)				23.6%	23.6%		13.6%	13.6%	13.6%	13.6%	13.6%		14%	22%
Yellow Time (s)				3.4	3.4		3.7	3.7	3.7	3.0	3.0		4.2	4.2
All-Red Time (s)				3.8	3.8		3.4	3.4	3.4	2.3	2.3		2.1	2.1
Lost Time Adjust (s)					0.0			0.0	0.0		0.0			
Total Lost Time (s)					7.2			7.1	7.1		5.3			
Lead/Lag				Lead	Lead		Lag	Lag	Lag	Lead	Lead		Lead	Lag
Lead-Lag Optimize?				Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes
v/c Ratio		0.35	0.08		1.22		0.79	0.62			0.44			
Control Delay		11.5	11.1		153.6		87.9	9.7			38.6			
Queue Delay		4.6	1.3		0.0		0.0	0.0			0.0			
Total Delay		16.1	12.3		153.6		87.9	9.7			38.6			
Queue Length 50th (ft)		37	7		-331		74	0			32			
Queue Length 95th (ft)		m80	m18		#451		#168	36			82			
Internal Link Dist (ft)		108			472		309				113			
Turn Bay Length (ft)														
Base Capacity (vph)		803	686		593		132	383			181			
Starvation Cap Reductn		443	506		0		0	0			0			
Spillback Cap Reductn		0	0		0		0	0			0			
Storage Cap Reductn		0	0		0		0	0			0			
Reduced v/c Ratio		0.78	0.31		1.22		0.79	0.62			0.44			

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow, Master Intersection
 Natural Cycle: 105
 Control Type: Pretimed
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Country Club Rd & Vine St



Lane Group	Ø5	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Right Turn on Red			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Growth Factor			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	5	6	8
Permitted Phases			
Minimum Split (s)	11.3	13.3	14.2
Total Split (s)	15.0	24.0	15.0
Total Split (%)	14%	22%	14%
Yellow Time (s)	4.2	4.2	3.1
All-Red Time (s)	2.1	2.1	4.1
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 27: Country Club Rd & Vine St

2040 Build
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕↕			↕	↕		↕↕	
Traffic Volume (vph)	22	192	42	216	338	1	16	64	181	13	19	29
Future Volume (vph)	22	192	42	216	338	1	16	64	181	13	19	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3					7.1	7.1			5.3
Lane Util. Factor		1.00	1.00		0.95			1.00	1.00		1.00	
Fr't		1.00	0.85		1.00			1.00	0.85		0.94	
Flt Protected		0.99	1.00		0.98			0.99	1.00		0.99	
Satd. Flow (prot)		1853	1583		3471			1844	1583		1725	
Flt Permitted		0.99	1.00		0.98			0.99	1.00		0.99	
Satd. Flow (perm)		1853	1583		3471			1844	1583		1725	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	29	250	55	282	441	1	21	83	236	17	25	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	219	0	29	0
Lane Group Flow (vph)	0	279	55	0	724	0	0	104	17	0	51	0
Turn Type	Split	NA	Perm	Split	NA		Split	NA	Prot	Split	NA	
Protected Phases	2 5 6 8	2 5 6 8		7	7		4	4	4	3	3	
Permitted Phases			2 5 6 8									
Actuated Green, G (s)		47.7	47.7		18.8			7.9	7.9		9.7	
Effective Green, g (s)		40.5	40.5		18.8			7.9	7.9		9.7	
Actuated g/C Ratio		0.37	0.37		0.17			0.07	0.07		0.09	
Clearance Time (s)					7.2			7.1	7.1		5.3	
Lane Grp Cap (vph)		682	582		593			132	113		152	
v/s Ratio Prot		c0.15			c0.21			c0.06	0.01		c0.03	
v/s Ratio Perm			0.03									
v/c Ratio		0.41	0.09		1.22			0.79	0.15		0.33	
Uniform Delay, d1		25.8	22.7		45.6			50.2	47.9		47.1	
Progression Factor		0.49	0.58		1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.6	0.3		114.0			36.6	2.8		5.8	
Delay (s)		14.4	13.6		159.6			86.8	50.7		53.0	
Level of Service		B	B		F			F	D		D	
Approach Delay (s)		14.2			159.6			61.7			53.0	
Approach LOS		B			F			E			D	

Intersection Summary

HCM 2000 Control Delay	98.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	39.4
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Edition methodology does not support clustered intersections.

Lanes, Volumes, Timings
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build - Garbers Church only
 Timing Plan: AM Peak

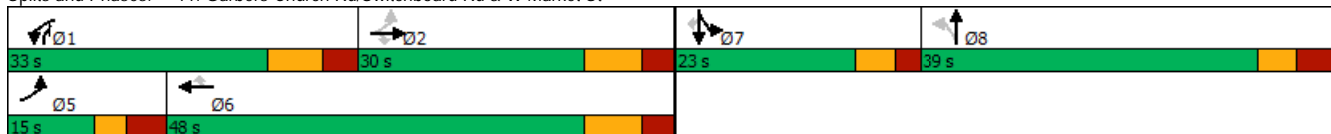


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕	↗	↖	↕	↗		↖	↗		↖	↗
Traffic Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Future Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	360		180	300		140	0		200	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1555			455			767			1017	
Travel Time (s)		30.3			8.9			14.9			19.8	
Confl. Peds. (#/hr)	1		1	1		1			1	1		
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	288	18	403	181	12	0	85	293	0	197	55
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6			8	1	7	7	
Permitted Phases	2		2			6	8					7
Detector Phase	5	2	2	1	6	6	8	8	1	7	7	7
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.9	22.5	22.5	15.6	31.6	31.6	44.1	44.1	15.6	22.5	22.5	22.5
Total Split (s)	15.0	30.0	30.0	33.0	48.0	48.0	39.0	39.0	33.0	23.0	23.0	23.0
Total Split (%)	12.0%	24.0%	24.0%	26.4%	38.4%	38.4%	31.2%	31.2%	26.4%	18.4%	18.4%	18.4%
Yellow Time (s)	3.0	5.4	5.4	5.4	5.4	5.4	3.7	3.7	5.4	3.9	3.9	3.9
All-Red Time (s)	3.9	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.2	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.23	0.39	0.04	0.95	0.12	0.02		0.39	0.49		0.74	0.12
Control Delay	19.9	40.1	0.1	73.6	23.8	0.0		46.3	7.8		61.7	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	19.9	40.1	0.1	73.6	23.8	0.0		46.3	7.8		61.7	0.6
Queue Length 50th (ft)	28	87	0	266	40	0		54	0		124	0
Queue Length 95th (ft)	82	165	0	#619	89	0		99	80		#292	0
Internal Link Dist (ft)		1475			375			687			937	
Turn Bay Length (ft)	360		180	300		140			200			100
Base Capacity (vph)	412	748	504	426	1518	749		517	604		307	468
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.23	0.39	0.04	0.95	0.12	0.02		0.16	0.49		0.64	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 125
 Actuated Cycle Length: 103.7
 Natural Cycle: 125
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Garbers Church Rd/Switchboard Rd & W Market St



HCM Signalized Intersection Capacity Analysis
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build - Garbers Church only
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘		↖	↗		↖	↗
Traffic Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Future Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		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
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	1.00
Satd. Flow (prot)	1768	3539	1548	1770	3539	1548		1841	1583		1851	1583
Flt Permitted	0.64	1.00	1.00	0.95	1.00	1.00		0.86	1.00		0.99	1.00
Satd. Flow (perm)	1186	3539	1548	1770	3539	1548		1602	1583		1851	1583
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	93	288	18	403	181	12	20	65	293	26	171	55
RTOR Reduction (vph)	0	0	14	0	0	7	0	0	224	0	0	47
Lane Group Flow (vph)	93	288	4	403	181	5	0	85	69	0	197	8
Confl. Peds. (#/hr)	1		1	1		1			1	1		
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6			8	1	7	7	
Permitted Phases	2		2			6	8					7
Actuated Green, G (s)	29.8	23.8	23.8	25.0	44.5	44.5		12.3	25.0		15.0	15.0
Effective Green, g (s)	29.8	23.8	23.8	25.0	44.5	44.5		12.3	25.0		15.0	15.0
Actuated g/C Ratio	0.28	0.22	0.22	0.23	0.42	0.42		0.12	0.23		0.14	0.14
Clearance Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	364	790	345	415	1477	646		184	371		260	222
v/s Ratio Prot	0.01	c0.08		c0.23	0.05				0.04		c0.11	
v/s Ratio Perm	0.06		0.00			0.00		c0.05				0.00
v/c Ratio	0.26	0.36	0.01	0.97	0.12	0.01		0.46	0.19		0.76	0.03
Uniform Delay, d1	29.2	35.0	32.2	40.4	19.1	18.1		44.1	32.6		44.1	39.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	1.3	0.1	36.5	0.2	0.0		1.8	0.2		11.9	0.1
Delay (s)	29.6	36.3	32.3	76.9	19.2	18.2		45.9	32.9		56.0	39.6
Level of Service	C	D	C	E	B	B		D	C		E	D
Approach Delay (s)		34.6			58.2			35.8			52.4	
Approach LOS		C			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			46.3	HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			106.6	Sum of lost time (s)				30.5				
Intersection Capacity Utilization			68.3%	ICU Level of Service				C				
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology expects strict NEMA phasing.

Lanes, Volumes, Timings
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build - W Market only
 Timing Plan: AM Peak

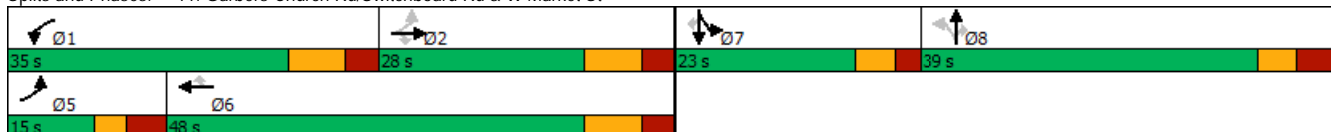


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Future Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	360		180	300		140	0		200	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1555			455			767			1017	
Travel Time (s)		30.3			8.9			14.9			19.8	
Confl. Peds. (#/hr)	1		1	1		1			1	1		
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	288	18	403	181	12	0	85	293	0	197	55
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6			8		7	7	
Permitted Phases	2		2			6	8		8			7
Detector Phase	5	2	2	1	6	6	8	8	8	7	7	7
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.9	22.5	22.5	15.6	31.6	31.6	44.1	44.1	44.1	22.5	22.5	22.5
Total Split (s)	15.0	28.0	28.0	35.0	48.0	48.0	39.0	39.0	39.0	23.0	23.0	23.0
Total Split (%)	12.0%	22.4%	22.4%	28.0%	38.4%	38.4%	31.2%	31.2%	31.2%	18.4%	18.4%	18.4%
Yellow Time (s)	3.0	5.4	5.4	5.4	5.4	5.4	3.7	3.7	3.7	3.9	3.9	3.9
All-Red Time (s)	3.9	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.4	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.25	0.84	0.04	0.91	0.24	0.02		0.40	0.64		0.75	0.13
Control Delay	20.7	65.6	0.2	66.2	26.1	0.0		46.6	11.1		63.3	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	20.7	65.6	0.2	66.2	26.1	0.0		46.6	11.1		63.3	0.6
Queue Length 50th (ft)	28	185	0	258	81	0		54	0		124	0
Queue Length 95th (ft)	82	#444	0	#595	183	0		99	69		#292	0
Internal Link Dist (ft)		1475			375			687			937	
Turn Bay Length (ft)	360		180	300		140			200			100
Base Capacity (vph)	375	342	468	443	759	719		500	683		294	459
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.25	0.84	0.04	0.91	0.24	0.02		0.17	0.43		0.67	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 125
 Actuated Cycle Length: 106.6
 Natural Cycle: 135
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Garbers Church Rd/Switchboard Rd & W Market St



HCM Signalized Intersection Capacity Analysis
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build - W Market only
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↗	↖	↑	↗		↖	↗		↖	↗
Traffic Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Future Volume (vph)	71	221	14	309	139	9	15	50	225	20	131	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		1.00	0.98		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
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	1.00
Satd. Flow (prot)	1768	1863	1548	1770	1863	1548		1841	1549		1851	1583
Flt Permitted	0.64	1.00	1.00	0.95	1.00	1.00		0.86	1.00		0.99	1.00
Satd. Flow (perm)	1197	1863	1548	1770	1863	1548		1611	1549		1851	1583
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	93	288	18	403	181	12	20	65	293	26	171	55
RTOR Reduction (vph)	0	0	14	0	0	7	0	0	254	0	0	47
Lane Group Flow (vph)	93	288	4	403	181	5	0	85	39	0	197	8
Confl. Peds. (#/hr)	1		1	1		1			1	1		
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6			8		7	7	
Permitted Phases	2		2			6	8		8			7
Actuated Green, G (s)	27.5	21.3	21.3	26.7	43.5	43.5		14.2	14.2		15.2	15.2
Effective Green, g (s)	27.5	21.3	21.3	26.7	43.5	43.5		14.2	14.2		15.2	15.2
Actuated g/C Ratio	0.25	0.20	0.20	0.25	0.40	0.40		0.13	0.13		0.14	0.14
Clearance Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	337	367	305	437	751	624		212	203		260	222
v/s Ratio Prot	0.02	c0.15		c0.23	0.10						c0.11	
v/s Ratio Perm	0.05		0.00			0.00		c0.05	0.02			0.00
v/c Ratio	0.28	0.78	0.01	0.92	0.24	0.01		0.40	0.19		0.76	0.03
Uniform Delay, d1	31.6	41.1	34.8	39.6	21.3	19.3		43.0	41.7		44.6	40.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	15.4	0.1	24.9	0.8	0.0		1.2	0.5		11.9	0.1
Delay (s)	32.1	56.5	34.9	64.5	22.0	19.3		44.2	42.2		56.5	40.1
Level of Service	C	E	C	E	C	B		D	D		E	D
Approach Delay (s)		49.9			50.7			42.6			52.9	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			49.0	HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			107.9	Sum of lost time (s)				30.5				
Intersection Capacity Utilization			74.0%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Edition methodology expects strict NEMA phasing.

Lanes, Volumes, Timings
1: Garbers Church Rd & Erickson Ave

2040 No Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	234	56	4	328	182	73	106	44	241	107	9
Future Volume (vph)	7	234	56	4	328	182	73	106	44	241	107	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	75		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		561			838			552			1501	
Travel Time (s)		10.9			16.3			10.8			29.2	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	395	0	5	695	0	100	205	0	329	158	0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	2			6			4			8		
Detector Phase	1	6		5	2		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	13.7	13.9		12.6	12.8		11.3	12.7		11.0	12.5	
Total Split (s)	15.0	54.0		15.0	54.0		15.0	21.0		25.0	31.0	
Total Split (%)	13.0%	47.0%		13.0%	47.0%		13.0%	18.3%		21.7%	27.0%	
Yellow Time (s)	5.1	5.1		4.0	4.0		3.2	4.1		3.2	4.1	
All-Red Time (s)	3.6	1.8		3.6	1.8		3.1	1.6		2.8	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max		None	Max		None	None		None	None	
v/c Ratio	0.05	0.46		0.01	0.81		0.24	0.77		0.79	0.32	
Control Delay	14.8	20.9		13.8	31.9		23.7	60.1		40.9	33.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.8	20.9		13.8	31.9		23.7	60.1		40.9	33.8	
Queue Length 50th (ft)	3	158		2	347		40	117		152	81	
Queue Length 95th (ft)	12	290		8	#678		90	#256		#304	159	
Internal Link Dist (ft)		481			758			472			1421	
Turn Bay Length (ft)	150			150			75					
Base Capacity (vph)	206	856		441	858		422	283		430	496	
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	0.05	0.46		0.01	0.81		0.24	0.72		0.77	0.32	

Intersection Summary												
Area Type:	Other											
Cycle Length:	115											
Actuated Cycle Length:	101.3											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Splits and Phases: 1: Garbers Church Rd & Erickson Ave



HCM Signalized Intersection Capacity Analysis
1: Garbers Church Rd & Erickson Ave

2040 No Build
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	234	56	4	328	182	73	106	44	241	107	9
Future Volume (vph)	7	234	56	4	328	182	73	106	44	241	107	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr't	1.00	0.97		1.00	0.95		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1809		1770	1763		1770	1781		1770	1842	
Flt Permitted	0.13	1.00		0.42	1.00		0.60	1.00		0.37	1.00	
Satd. Flow (perm)	241	1809		775	1763		1114	1781		696	1842	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	10	319	76	5	447	248	100	145	60	329	146	12
RTOR Reduction (vph)	0	7	0	0	17	0	0	13	0	0	2	0
Lane Group Flow (vph)	10	388	0	5	678	0	100	192	0	329	156	0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	49.5	48.4		49.5	48.4		33.9	15.7		34.0	27.2	
Effective Green, g (s)	49.5	48.4		49.5	48.4		33.9	15.7		34.0	27.2	
Actuated g/C Ratio	0.45	0.44		0.45	0.44		0.31	0.14		0.31	0.25	
Clearance Time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	124	798		359	777		384	254		394	456	
v/s Ratio Prot	c0.00	0.21		0.00	c0.38		0.02	0.11		c0.14	0.08	
v/s Ratio Perm	0.04			0.01			0.06			c0.12		
v/c Ratio	0.08	0.49		0.01	0.87		0.26	0.76		0.84	0.34	
Uniform Delay, d1	21.6	21.8		17.1	27.9		27.8	45.2		32.3	33.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	2.1		0.0	13.0		0.4	12.1		14.1	0.4	
Delay (s)	21.8	23.9		17.1	40.8		28.1	57.3		46.5	34.3	
Level of Service	C	C		B	D		C	E		D	C	
Approach Delay (s)		23.9			40.7			47.7			42.5	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			38.7			HCM 2000 Level of Service					D	
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			109.7			Sum of lost time (s)			26.3			
Intersection Capacity Utilization			74.1%			ICU Level of Service					D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Garbers Church Rd & Erickson Ave

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	234	56	4	328	182	73	106	44	241	107	9
Future Volume (veh/h)	7	234	56	4	328	182	73	106	44	241	107	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	319	76	5	447	248	100	145	60	329	146	12
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	660	157	372	494	274	381	166	69	394	412	34
Arrive On Green	0.01	0.45	0.45	0.01	0.44	0.44	0.06	0.13	0.13	0.17	0.24	0.24
Sat Flow, veh/h	1781	1460	348	1781	1130	627	1781	1257	520	1781	1705	140
Grp Volume(v), veh/h	10	0	395	5	0	695	100	0	205	329	0	158
Grp Sat Flow(s),veh/h/ln	1781	0	1808	1781	0	1757	1781	0	1777	1781	0	1845
Q Serve(g_s), s	0.3	0.0	16.9	0.2	0.0	40.7	4.6	0.0	12.5	17.4	0.0	7.8
Cycle Q Clear(g_c), s	0.3	0.0	16.9	0.2	0.0	40.7	4.6	0.0	12.5	17.4	0.0	7.8
Prop In Lane	1.00		0.19	1.00		0.36	1.00		0.29	1.00		0.08
Lane Grp Cap(c), veh/h	138	0	817	372	0	767	381	0	235	394	0	445
V/C Ratio(X)	0.07	0.00	0.48	0.01	0.00	0.91	0.26	0.00	0.87	0.84	0.00	0.35
Avail Cap(c_a), veh/h	218	0	817	480	0	767	415	0	246	394	0	445
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.5	0.0	21.2	17.5	0.0	29.0	28.8	0.0	47.0	33.7	0.0	34.7
Incr Delay (d2), s/veh	0.2	0.0	2.0	0.0	0.0	16.3	0.4	0.0	26.6	14.4	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	7.4	0.1	0.0	19.8	2.0	0.0	7.2	8.9	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	0.0	23.2	17.5	0.0	45.3	29.2	0.0	73.6	48.0	0.0	35.2
LnGrp LOS	C	A	C	B	A	D	C	A	E	D	A	D
Approach Vol, veh/h		405			700			305			487	
Approach Delay, s/veh		23.3			45.1			59.1			43.9	
Approach LOS		C			D			E			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	55.1	12.9	32.4	8.3	56.8	25.0	20.3				
Change Period (Y+Rc), s	8.7	* 6.9	* 6.3	* 5.7	7.6	* 6.9	6.0	* 5.7				
Max Green Setting (Gmax), s	6.3	* 48	* 8.7	* 26	7.4	* 47	19.0	* 15				
Max Q Clear Time (g_c+I1), s	2.3	42.7	6.6	9.8	2.2	18.9	19.4	14.5				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.7	0.0	2.5	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	42.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Garbers Church Rd & HHS South Entrance

2040 No Build
 Timing Plan: PM Peak

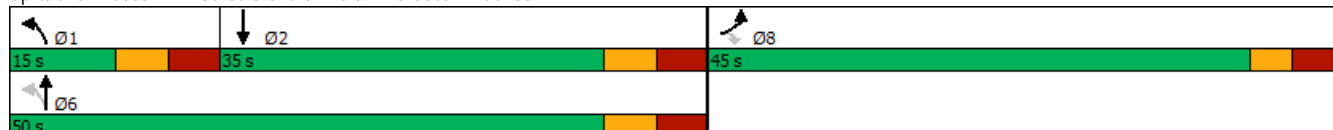


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	22	27	12	274	279	11
Future Volume (vph)	22	27	12	274	279	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	80	200			0
Storage Lanes	1	1	1			0
Taper Length (ft)	0		0			
Right Turn on Red		Yes				Yes
Link Speed (mph)	25			35	35	
Link Distance (ft)	684			1501	825	
Travel Time (s)	18.7			29.2	16.1	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	30	37	16	374	395	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	8		1	6	2	
Permitted Phases		8	6			
Detector Phase	8	8	1	6	2	
Switch Phase						
Minimum Initial (s)	7.0	7.0	10.0	10.0	10.0	
Minimum Split (s)	32.1	32.1	17.4	17.4	40.4	
Total Split (s)	45.0	45.0	15.0	50.0	35.0	
Total Split (%)	47.4%	47.4%	15.8%	52.6%	36.8%	
Yellow Time (s)	3.0	3.0	3.8	3.8	3.8	
All-Red Time (s)	3.1	3.1	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.1	6.1	7.4	7.4	7.4	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Max	Max	
v/c Ratio	0.15	0.18	0.02	0.13	0.15	
Control Delay	28.5	12.5	3.5	3.0	5.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.5	12.5	3.5	3.0	5.1	
Queue Length 50th (ft)	11	0	2	22	23	
Queue Length 95th (ft)	34	24	6	35	73	
Internal Link Dist (ft)	604			1421	745	
Turn Bay Length (ft)		80	200			
Base Capacity (vph)	1057	960	744	2857	2687	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.03	0.04	0.02	0.13	0.15	

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 65.2
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Garbers Church Rd & HHS South Entrance



HCM Signalized Intersection Capacity Analysis
 2: Garbers Church Rd & HHS South Entrance

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	22	27	12	274	279	11
Future Volume (vph)	22	27	12	274	279	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	7.4	7.4	7.4	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1769	3539	3516	
Flt Permitted	0.95	1.00	0.45	1.00	1.00	
Satd. Flow (perm)	1770	1583	835	3539	3516	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	30	37	16	374	380	15
RTOR Reduction (vph)	0	35	0	0	1	0
Lane Group Flow (vph)	30	2	16	374	394	0
Confl. Peds. (#/hr)			1			1
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	8		1	6	2	
Permitted Phases		8	6			
Actuated Green, G (s)	4.5	4.5	55.7	55.7	46.9	
Effective Green, g (s)	4.5	4.5	55.7	55.7	46.9	
Actuated g/C Ratio	0.06	0.06	0.76	0.76	0.64	
Clearance Time (s)	6.1	6.1	7.4	7.4	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	108	96	648	2674	2237	
v/s Ratio Prot	c0.02		0.00	c0.11	c0.11	
v/s Ratio Perm		0.00	0.02			
v/c Ratio	0.28	0.02	0.02	0.14	0.18	
Uniform Delay, d1	33.0	32.5	2.6	2.5	5.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.1	0.0	0.1	0.2	
Delay (s)	34.5	32.6	2.6	2.6	5.7	
Level of Service	C	C	A	A	A	
Approach Delay (s)	33.4			2.6	5.7	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	20.9
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Min green cannot be greater than Max Green.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	6	290	283	7
Future Volume (vph)	0	0	6	290	283	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	350			0
Storage Lanes	0	0	1			0
Taper Length (ft)	0		0			
Link Speed (mph)	25			35	35	
Link Distance (ft)	351			825	318	
Travel Time (s)	9.6			16.1	6.2	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	8	395	396	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 3: Garbers Church Rd & HHS inbound Entrance

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↶	↷	↷	
Traffic Volume (veh/h)	0	0	6	290	283	7
Future Volume (Veh/h)	0	0	6	290	283	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	8	395	386	10
Pedestrians	2					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				825	318	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	606	200	398			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542	124	328			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	455	879	1196			
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	8	198	198	257	139	
Volume Left	8	0	0	0	0	
Volume Right	0	0	0	0	10	
cSH	1196	1700	1700	1700	1700	
Volume to Capacity	0.01	0.12	0.12	0.15	0.08	
Queue Length 95th (ft)	1	0	0	0	0	
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.2			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			13.2%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Garbers Church Rd & HHS North Entrance/Driveway

2040 No Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↗				↖	↕		↖	↕	
Traffic Volume (vph)	62	0	54	0	0	0	31	321	0	0	236	47
Future Volume (vph)	62	0	54	0	0	0	31	321	0	0	236	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50									80		
Storage Lanes	1		1				1			1		
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		424			255			318			726	
Travel Time (s)		11.6			7.0			6.2			14.1	
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			3									
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	0	74	0	0	0	42	438	0	0	386	0
Turn Type	Prot		Perm				pm+pt	NA		Perm	NA	
Protected Phases	8						1	6			2	
Permitted Phases			8				6			2		
Detector Phase	8		8				1	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0		7.0				5.0	10.0		10.0	10.0	
Minimum Split (s)	34.7		34.7				12.0	22.5		34.0	34.0	
Total Split (s)	45.0		45.0				25.0	60.0		35.0	35.0	
Total Split (%)	42.9%		42.9%				23.8%	57.1%		33.3%	33.3%	
Yellow Time (s)	3.3		3.3				3.8	3.8		3.8	3.8	
All-Red Time (s)	3.4		3.4				3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0		0.0				0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.7		6.7				7.0	7.0		7.0	7.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Recall Mode	None		None				None	Max		Max	Max	
v/c Ratio	0.40		0.26				0.06	0.16			0.17	
Control Delay	36.5		4.9				4.1	3.9			8.0	
Queue Delay	0.0		0.0				0.0	0.0			0.0	
Total Delay	36.5		4.9				4.1	3.9			8.0	
Queue Length 50th (ft)	38		0				5	30			44	
Queue Length 95th (ft)	77		16				15	51			73	
Internal Link Dist (ft)		344			175			238			646	
Turn Bay Length (ft)	50											
Base Capacity (vph)	890		842				843	2672			2245	
Starvation Cap Reductn	0		0				0	0			0	
Spillback Cap Reductn	0		0				0	0			0	
Storage Cap Reductn	0		0				0	0			0	
Reduced v/c Ratio	0.10		0.09				0.05	0.16			0.17	

Intersection Summary

Area Type: Other

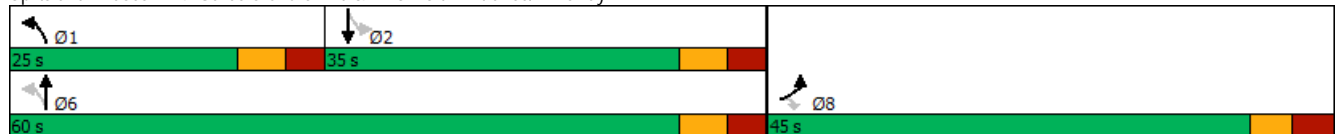
Cycle Length: 105

Actuated Cycle Length: 76.1

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Garbers Church Rd & HHS North Entrance/Driveway



HCM Signalized Intersection Capacity Analysis
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔	↕		↔	↕	
Traffic Volume (vph)	62	0	54	0	0	0	31	321	0	0	236	47
Future Volume (vph)	62	0	54	0	0	0	31	321	0	0	236	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7		6.7				7.0	7.0			7.0	
Lane Util. Factor	1.00		1.00				1.00	0.95			0.95	
Frbp, ped/bikes	1.00		0.98				1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00				1.00	1.00			1.00	
Frt	1.00		0.85				1.00	1.00			0.98	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1770		1553				1768	3539			3438	
Flt Permitted	0.95		1.00				0.46	1.00			1.00	
Satd. Flow (perm)	1770		1553				851	3539			3438	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	85	0	74	0	0	0	42	438	0	0	322	64
RTOR Reduction (vph)	0	0	67	0	0	0	0	0	0	0	9	0
Lane Group Flow (vph)	85	0	7	0	0	0	42	438	0	0	377	0
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			3									
Turn Type	Prot		Perm				pm+pt	NA		Perm		NA
Protected Phases	8						1	6				2
Permitted Phases			8				6			2		
Actuated Green, G (s)	7.7		7.7				58.9	58.9			48.1	
Effective Green, g (s)	7.7		7.7				58.9	58.9			48.1	
Actuated g/C Ratio	0.10		0.10				0.73	0.73			0.60	
Clearance Time (s)	6.7		6.7				7.0	7.0			7.0	
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	169		148				667	2595			2059	
v/s Ratio Prot	c0.05						0.00	c0.12			c0.11	
v/s Ratio Perm			0.00				0.04					
v/c Ratio	0.50		0.05				0.06	0.17			0.18	
Uniform Delay, d1	34.5		33.0				3.2	3.3			7.3	
Progression Factor	1.00		1.00				1.00	1.00			1.00	
Incremental Delay, d2	2.3		0.1				0.0	0.1			0.2	
Delay (s)	36.8		33.1				3.3	3.4			7.4	
Level of Service	D		C				A	A			A	
Approach Delay (s)		35.1			0.0			3.4			7.4	
Approach LOS		D			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8				HCM 2000 Level of Service				A	
HCM 2000 Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			80.3				Sum of lost time (s)				20.7	
Intersection Capacity Utilization			44.2%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔	↕		↔	↕	
Traffic Volume (veh/h)	62	0	54	0	0	0	31	321	0	0	236	47
Future Volume (veh/h)	62	0	54	0	0	0	31	321	0	0	236	47
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	0	1870				1870	1870	0	1870	1870	1870
Adj Flow Rate, veh/h	85	0	74				42	438	0	0	322	64
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	0	2				2	2	0	2	2	2
Cap, veh/h	163	0	145				702	2565	0	98	1739	341
Arrive On Green	0.09	0.00	0.09				0.04	0.72	0.00	0.00	0.59	0.59
Sat Flow, veh/h	1781	0	1585				1781	3647	0	951	2960	581
Grp Volume(v), veh/h	85	0	74				42	438	0	0	192	194
Grp Sat Flow(s),veh/h/ln	1781	0	1585				1781	1777	0	951	1777	1765
Q Serve(g_s), s	3.3	0.0	3.3				0.6	2.9	0.0	0.0	3.7	3.8
Cycle Q Clear(g_c), s	3.3	0.0	3.3				0.6	2.9	0.0	0.0	3.7	3.8
Prop In Lane	1.00		1.00				1.00		0.00	1.00		0.33
Lane Grp Cap(c), veh/h	163	0	145				702	2565	0	98	1044	1036
V/C Ratio(X)	0.52	0.00	0.51				0.06	0.17	0.00	0.00	0.18	0.19
Avail Cap(c_a), veh/h	929	0	827				1069	2565	0	98	1044	1036
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	31.8	0.0	31.8				4.7	3.2	0.0	0.0	7.0	7.0
Incr Delay (d2), s/veh	2.6	0.0	2.7				0.0	0.1	0.0	0.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.3				0.2	0.7	0.0	0.0	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	0.0	34.5				4.8	3.4	0.0	0.0	7.4	7.4
LnGrp LOS	C	A	C				A	A	A	A	A	A
Approach Vol, veh/h		159						480			386	
Approach Delay, s/veh		34.4						3.5			7.4	
Approach LOS		C						A			A	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	9.9	50.1				60.0		13.4				
Change Period (Y+Rc), s	7.0	7.0				7.0		6.7				
Max Green Setting (Gmax), s	18.0	28.0				53.0		38.3				
Max Q Clear Time (g_c+I1), s	2.6	5.8				4.9		5.3				
Green Ext Time (p_c), s	0.1	2.2				3.1		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			9.8									
HCM 6th LOS			A									

Lanes, Volumes, Timings
 5: Garbers Church Rd & Bluestone ES inbound Entrance

2040 No Build
 Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↓			↑↓
Traffic Volume (vph)	0	0	330	3	5	270
Future Volume (vph)	0	0	330	3	5	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	382		726			625
Travel Time (s)	10.4		14.1			12.2
Confl. Peds. (#/hr)	3			4	4	
Confl. Bikes (#/hr)		3		1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	454	0	0	375
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 5: Garbers Church Rd & Bluestone ES inbound Entrance

2040 No Build
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↓			↑↓
Traffic Volume (veh/h)	0	0	330	3	5	270
Future Volume (Veh/h)	0	0	330	3	5	270
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	450	4	7	368
Pedestrians	4		3			
Lane Width (ft)	0.0		12.0			
Walking Speed (ft/s)	3.5		3.5			
Percent Blockage	0		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			726			
pX, platoon unblocked						
vC, conflicting volume	657	231			458	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	657	231			458	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			99	
cM capacity (veh/h)	394	771			1099	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	300	154	130	245		
Volume Left	0	0	7	0		
Volume Right	0	4	0	0		
cSH	1700	1700	1099	1700		
Volume to Capacity	0.18	0.09	0.01	0.14		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.5	0.0		
Lane LOS			A			
Approach Delay (s)	0.0		0.2			
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			16.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 6: Garbers Church Rd & Heritage Center Way/Bluestone ES/Golf Course

2040 No Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	0	6	40	0	56	2	314	20	20	218	2
Future Volume (vph)	0	0	6	40	0	56	2	314	20	20	218	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	90		0	125		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	0			0			0			0		
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		466			549			625			794	
Travel Time (s)		12.7			15.0			12.2			15.5	
Confl. Peds. (#/hr)							8		7	7		8
Confl. Bikes (#/hr)						1			1			2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	131	0	3	455	0	27	300	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 6: Garbers Church Rd & Heritage Center Way/Bluestone ES/Golf Course

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	0	0	6	40	0	56	2	314	20	20	218	2
Future Volume (Veh/h)	0	0	6	40	0	56	2	314	20	20	218	2
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	8	55	0	76	3	428	27	27	297	3
Pedestrians	8			7								
Lane Width (ft)	12.0			12.0								
Walking Speed (ft/s)	3.5			3.5								
Percent Blockage	1			1								
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	656	828	158	665	816	234	308				462	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	656	828	158	665	816	234	308				462	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	99	83	100	90	100				98	
cM capacity (veh/h)	303	292	853	329	297	762	1240				1088	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	8	131	3	285	170	27	198	102				
Volume Left	0	55	3	0	0	27	0	0				
Volume Right	8	76	0	0	27	0	0	3				
cSH	853	491	1240	1700	1700	1088	1700	1700				
Volume to Capacity	0.01	0.27	0.00	0.17	0.10	0.02	0.12	0.06				
Queue Length 95th (ft)	1	27	0	0	0	2	0	0				
Control Delay (s)	9.3	15.0	7.9	0.0	0.0	8.4	0.0	0.0				
Lane LOS	A	B	A				A					
Approach Delay (s)	9.3	15.0	0.1				0.7					
Approach LOS	A	B										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			38.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	0	0	6	40	0	56	2	314	20	20	218	2
Future Vol, veh/h	0	0	6	40	0	56	2	314	20	20	218	2
Conflicting Peds, #/hr	0	0	0	0	0	0	8	0	7	7	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	90	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	8	55	0	76	3	428	27	27	297	3

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	581	829	158	658	817	235	308	0	0	462	0	0
Stage 1	361	361	-	455	455	-	-	-	-	-	-	-
Stage 2	220	468	-	203	362	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	397	305	859	350	309	767	1249	-	-	1095	-	-
Stage 1	630	624	-	554	567	-	-	-	-	-	-	-
Stage 2	762	560	-	780	624	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	347	292	852	337	296	762	1239	-	-	1088	-	-
Mov Cap-2 Maneuver	347	292	-	337	296	-	-	-	-	-	-	-
Stage 1	624	603	-	549	562	-	-	-	-	-	-	-
Stage 2	684	555	-	753	603	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	14.7	0	0.7
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1239	-	-	852	500	1088	-	-
HCM Lane V/C Ratio	0.002	-	-	0.01	0.262	0.025	-	-
HCM Control Delay (s)	7.9	-	-	9.3	14.7	8.4	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	1	0.1	-	-

Lanes, Volumes, Timings
 7: Garbers Church Rd & Heritage Estates Circle

2040 No Build
 Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	2	370	3	2	231
Future Volume (vph)	6	2	370	3	2	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	372		794			1342
Travel Time (s)	10.1		15.5			26.1
Confl. Peds. (#/hr)				7	7	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	509	0	0	318
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 7: Garbers Church Rd & Heritage Estates Circle

2040 No Build
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	6	2	370	3	2	231
Future Volume (Veh/h)	6	2	370	3	2	231
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	8	3	505	4	3	315
Pedestrians	7					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	678	262			516	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	678	262			516	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	382	732			1039	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	11	337	172	108	210	
Volume Left	8	0	0	3	0	
Volume Right	3	0	4	0	0	
cSH	440	1700	1700	1039	1700	
Volume to Capacity	0.03	0.20	0.10	0.00	0.12	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	13.4	0.0	0.0	0.3	0.0	
Lane LOS	B			A		
Approach Delay (s)	13.4	0.0		0.1		
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			22.6%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	6	2	370	3	2	231
Future Vol, veh/h	6	2	370	3	2	231
Conflicting Peds, #/hr	0	0	0	7	7	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	3	505	4	3	315

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	678	262	0	0	516
Stage 1	514	-	-	-	-
Stage 2	164	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	386	737	-	-	1046
Stage 1	565	-	-	-	-
Stage 2	848	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	382	732	-	-	1039
Mov Cap-2 Maneuver	382	-	-	-	-
Stage 1	561	-	-	-	-
Stage 2	845	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	434	1039	-
HCM Lane V/C Ratio	-	-	0.025	0.003	-
HCM Control Delay (s)	-	-	13.5	8.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	3	335	37	0	215
Future Volume (vph)	16	3	335	37	0	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	452		1342			264
Travel Time (s)	12.3		26.1			5.1
Confl. Peds. (#/hr)				8	8	
Confl. Bikes (#/hr)		1		2		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	0	507	0	0	293
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 8: Garbers Church Rd & Park Lawn Dr

2040 No Build
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	T	L	L
Traffic Volume (veh/h)	16	3	335	37	0	215
Future Volume (Veh/h)	16	3	335	37	0	215
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	22	4	457	50	0	293
Pedestrians	8					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	636	262			515	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	636	262			515	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	99			100	
cM capacity (veh/h)	407	732			1039	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	26	305	202	98	195	
Volume Left	22	0	0	0	0	
Volume Right	4	0	50	0	0	
cSH	437	1700	1700	1039	1700	
Volume to Capacity	0.06	0.18	0.12	0.00	0.11	
Queue Length 95th (ft)	5	0	0	0	0	
Control Delay (s)	13.8	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	13.8	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			22.8%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	16	3	335	37	0	215
Future Vol, veh/h	16	3	335	37	0	215
Conflicting Peds, #/hr	0	0	0	8	8	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	4	457	50	0	293

Major/Minor	Minor1	Major1	Major2	Major3	Major4	Major5
Conflicting Flow All	637	262	0	0	515	0
Stage 1	490	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	410	737	-	-	1047	-
Stage 1	581	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	407	731	-	-	1039	-
Mov Cap-2 Maneuver	407	-	-	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	438	1039	-
HCM Lane V/C Ratio	-	-	0.059	-	-
HCM Control Delay (s)	-	-	13.7	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	6	9	329	209	7
Future Volume (vph)	6	6	9	329	209	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			35	35	
Link Distance (ft)	364			264	633	
Travel Time (s)	9.9			5.1	12.3	
Confl. Peds. (#/hr)		2	3			3
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	461	295	0
Sign Control	Stop			Free	Free	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 9: Garbers Church Rd & Rhianon Ln

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑↑	
Traffic Volume (veh/h)	6	6	9	329	209	7
Future Volume (Veh/h)	6	6	9	329	209	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	8	8	12	449	285	10
Pedestrians	3			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	3.5			3.5		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	542	152	298			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542	152	298			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	465	862	1257			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	162	299	190	105	
Volume Left	8	12	0	0	0	
Volume Right	8	0	0	0	10	
cSH	604	1257	1700	1700	1700	
Volume to Capacity	0.03	0.01	0.18	0.11	0.06	
Queue Length 95th (ft)	2	1	0	0	0	
Control Delay (s)	11.1	0.7	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.1	0.2		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			29.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑↑	
Traffic Vol, veh/h	6	6	9	329	209	7
Future Vol, veh/h	6	6	9	329	209	7
Conflicting Peds, #/hr	0	2	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	8	12	449	285	10

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	542	153	298	0	0
Stage 1	293	-	-	-	-
Stage 2	249	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-
Pot Cap-1 Maneuver	470	866	1260	-	-
Stage 1	731	-	-	-	-
Stage 2	769	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	461	862	1256	-	-
Mov Cap-2 Maneuver	461	-	-	-	-
Stage 1	719	-	-	-	-
Stage 2	767	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1256	-	601	-	-
HCM Lane V/C Ratio	0.01	-	0.027	-	-
HCM Control Delay (s)	7.9	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	1	325	2	0	208
Future Volume (vph)	6	1	325	2	0	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	417		633			767
Travel Time (s)	11.4		12.3			14.9
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	0	446	0	0	284
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 10: Garbers Church Rd & Lendale Ln

2040 No Build
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T	T		T
Traffic Volume (veh/h)	6	1	325	2	0	208
Future Volume (Veh/h)	6	1	325	2	0	208
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	8	1	443	3	0	284
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						767
pX, platoon unblocked						
vC, conflicting volume	588	224			447	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	588	224			447	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	440	779			1109	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	9	295	151	95	189	
Volume Left	8	0	0	0	0	
Volume Right	1	0	3	0	0	
cSH	462	1700	1700	1109	1700	
Volume to Capacity	0.02	0.17	0.09	0.00	0.11	
Queue Length 95th (ft)	1	0	0	0	0	
Control Delay (s)	12.9	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	12.9	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			20.9%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	6	1	325	2	0	208
Future Vol, veh/h	6	1	325	2	0	208
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	1	443	3	0	284

Major/Minor	Minor1	Major1	Major2	Major2	Major2	Major2
Conflicting Flow All	588	224	0	0	447	0
Stage 1	446	-	-	-	-	-
Stage 2	142	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	440	779	-	-	1110	-
Stage 1	612	-	-	-	-	-
Stage 2	870	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	440	778	-	-	1109	-
Mov Cap-2 Maneuver	440	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	870	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	469	1109	-
HCM Lane V/C Ratio	-	-	0.02	-	-
HCM Control Delay (s)	-	-	12.8	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lanes, Volumes, Timings
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 No Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Future Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	360		180	0		140	0		0	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1555			455			767			1017	
Travel Time (s)		30.3			8.9			14.9			19.8	
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)						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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	316	30	157	373	29	0	134	227	0	80	81
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6			8		7	7	
Permitted Phases	2		2		6	8		8				7
Detector Phase	5	2	2	1	6	6	8	8	8	7	7	7
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.9	22.5	22.5	15.6	31.6	31.6	44.1	44.1	44.1	22.5	22.5	22.5
Total Split (s)	14.0	28.0	28.0	26.0	40.0	40.0	45.0	45.0	45.0	26.0	26.0	26.0
Total Split (%)	11.2%	22.4%	22.4%	20.8%	32.0%	32.0%	36.0%	36.0%	36.0%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	5.4	5.4	5.4	5.4	5.4	3.7	3.7	3.7	3.9	3.9	3.9
All-Red Time (s)	3.9	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.4	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.15	0.36	0.05	0.64	0.29	0.04		0.48	0.50		0.41	0.21
Control Delay	17.7	33.1	0.2	51.7	24.9	0.1		40.1	7.6		48.4	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	17.7	33.1	0.2	51.7	24.9	0.1		40.1	7.6		48.4	1.2
Queue Length 50th (ft)	16	74	0	83	77	0		71	0		43	0
Queue Length 95th (ft)	58	166	0	187	170	0		129	50		108	0
Internal Link Dist (ft)		1475			375			687			937	
Turn Bay Length (ft)	360		180			140						100
Base Capacity (vph)	403	873	555	344	1292	660		724	800		407	542
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.15	0.36	0.05	0.46	0.29	0.04		0.19	0.28		0.20	0.15

Intersection Summary

Area Type: Other

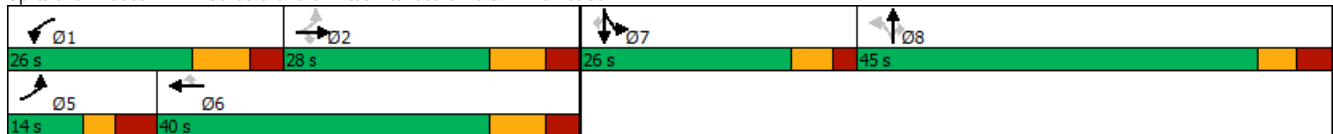
Cycle Length: 125

Actuated Cycle Length: 91.5

Natural Cycle: 115

Control Type: Actuated-Uncoordinated

Splits and Phases: 11: Garbers Church Rd/Switchboard Rd & W Market St



HCM Signalized Intersection Capacity Analysis
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 No Build
 Timing Plan: PM Peak



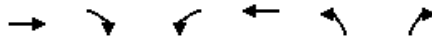
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↗	↖	↕	↗		↖	↗		↖	↗
Traffic Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Future Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98		1.00	0.99		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
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	1.00
Satd. Flow (prot)	1770	3539	1563	1770	3539	1548		1845	1563		1839	1583
Flt Permitted	0.53	1.00	1.00	0.95	1.00	1.00		0.92	1.00		0.99	1.00
Satd. Flow (perm)	987	3539	1563	1770	3539	1548		1706	1563		1839	1583
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	61	316	30	157	373	29	26	108	227	21	59	81
RTOR Reduction (vph)	0	0	22	0	0	19	0	0	190	0	0	73
Lane Group Flow (vph)	61	316	8	157	373	10	0	134	37	0	80	8
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)						2						
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6			8		7	7	
Permitted Phases	2		2			6	8		8			7
Actuated Green, G (s)	29.9	24.4	24.4	12.8	33.4	33.4		15.2	15.2		9.7	9.7
Effective Green, g (s)	29.9	24.4	24.4	12.8	33.4	33.4		15.2	15.2		9.7	9.7
Actuated g/C Ratio	0.32	0.26	0.26	0.14	0.36	0.36		0.16	0.16		0.10	0.10
Clearance Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	365	932	411	244	1276	558		280	256		192	165
v/s Ratio Prot	0.01	c0.09		c0.09	c0.11						c0.04	
v/s Ratio Perm	0.04		0.01			0.01		c0.08	0.02			0.01
w/c Ratio	0.17	0.34	0.02	0.64	0.29	0.02		0.48	0.15		0.42	0.05
Uniform Delay, d1	22.0	27.6	25.2	37.7	21.2	19.1		35.1	33.1		38.8	37.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	1.0	0.1	5.7	0.6	0.1		1.3	0.3		1.5	0.1
Delay (s)	22.2	28.6	25.3	43.4	21.7	19.1		36.4	33.4		40.3	37.4
Level of Service	C	C	C	D	C	B		D	C		D	D
Approach Delay (s)		27.4			27.7			34.5			38.8	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			30.5		HCM 2000 Level of Service						C	
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			92.6		Sum of lost time (s)				30.5			
Intersection Capacity Utilization			50.4%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology expects strict NEMA phasing.

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	425	7	36	427	1	29
Future Volume (vph)	425	7	36	427	1	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		100	260		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)			0		0	
Link Speed (mph)	35			35	25	
Link Distance (ft)	455			1297	501	
Travel Time (s)	8.9			25.3	13.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	548	9	46	551	38	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis
 12: Stoneleigh Dr & W Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑	
Traffic Volume (veh/h)	425	7	36	427	1	29	
Future Volume (Veh/h)	425	7	36	427	1	29	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Hourly flow rate (vph)	548	9	46	551	1	37	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (ft)	455			1297			
pX, platoon unblocked			0.94		0.94	0.94	
vC, conflicting volume			557		916	274	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			397		779	96	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			96		100	96	
cM capacity (veh/h)			1087		299	884	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	274	274	9	46	276	276	38
Volume Left	0	0	0	46	0	0	1
Volume Right	0	0	9	0	0	0	37
cSH	1700	1700	1700	1087	1700	1700	841
Volume to Capacity	0.16	0.16	0.01	0.04	0.16	0.16	0.05
Queue Length 95th (ft)	0	0	0	3	0	0	4
Control Delay (s)	0.0	0.0	0.0	8.5	0.0	0.0	9.5
Lane LOS				A			
Approach Delay (s)	0.0			0.7	9.5		
Approach LOS					A		
Intersection Summary							
Average Delay			0.6				
Intersection Capacity Utilization			30.8%	ICU Level of Service		A	
Analysis Period (min)			15				

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	425	7	36	427	1	29
Future Vol, veh/h	425	7	36	427	1	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	260	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	548	9	46	551	1	37

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	557	0	916
Stage 1	-	-	-	-	548
Stage 2	-	-	-	-	368
Critical Hdwy	-	-	4.14	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	-	-	2.22	-	3.52
Pot Cap-1 Maneuver	-	-	1010	-	272
Stage 1	-	-	-	-	543
Stage 2	-	-	-	-	670
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1010	-	259
Mov Cap-2 Maneuver	-	-	-	-	259
Stage 1	-	-	-	-	543
Stage 2	-	-	-	-	639

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	683	-	-	1010	-
HCM Lane V/C Ratio	0.057	-	-	0.046	-
HCM Control Delay (s)	10.6	-	-	8.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lanes, Volumes, Timings
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 No Build
 Timing Plan: PM Peak

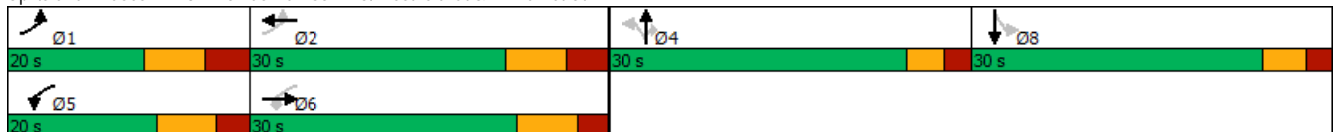


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	353	12	26	299	68	17	2	49	52	0	60
Future Volume (vph)	91	353	12	26	299	68	17	2	49	52	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		225	500		0	0		175	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1297			1215			527			419	
Travel Time (s)		25.3			23.7			14.4			11.4	
Confl. Peds. (#/hr)			2	2			1					1
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	460	16	34	479	0	0	25	64	0	146	0
Turn Type	D,P+P	NA	Perm	D,P+P	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	2		6	6			4		4	8		
Detector Phase	1	6	6	5	2		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	13.7	37.7	37.7	12.7	31.7		40.5	40.5	40.5	44.8	44.8	
Total Split (s)	20.0	30.0	30.0	20.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	18.2%	27.3%	27.3%	18.2%	27.3%		27.3%	27.3%	27.3%	27.3%	27.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.2	3.2	3.2	3.6	3.6	
All-Red Time (s)	3.7	2.7	2.7	2.7	3.7		2.3	2.3	2.3	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max		None	None	None	None	None	
v/c Ratio	0.24	0.27	0.02	0.06	0.38			0.23	0.19			0.39
Control Delay	15.5	18.6	0.1	14.1	24.4			44.5	1.2			4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0			0.0
Total Delay	15.5	18.6	0.1	14.1	24.4			44.5	1.2			4.3
Queue Length 50th (ft)	25	52	0	7	85			11	0			0
Queue Length 95th (ft)	99	206	0	36	220			46	0			17
Internal Link Dist (ft)		1217			1135			447				339
Turn Bay Length (ft)	250		225	500					175			
Base Capacity (vph)	552	1708	833	622	1273			352	639			618
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	0.22	0.27	0.02	0.05	0.38			0.07	0.10			0.24

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 80.5
 Natural Cycle: 140
 Control Type: Actuated-Uncoordinated

Splits and Phases: 13: Thomas Harrison MS/Westfield Ct & W Market St



HCM Signalized Intersection Capacity Analysis
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↗	↖	↕			↕	↗		↕	
Traffic Volume (vph)	91	353	12	26	299	68	17	2	49	52	0	60
Future Volume (vph)	91	353	12	26	299	68	17	2	49	52	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	1.00		0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.97			1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1770	3539	1547	1768	3441			1783	1583		1678	
Flt Permitted	0.48	1.00	1.00	0.49	1.00			0.60	1.00		0.84	
Satd. Flow (perm)	891	3539	1547	907	3441			1111	1583		1440	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	119	460	16	34	390	89	22	3	64	68	0	78
RTOR Reduction (vph)	0	0	9	0	14	0	0	0	59	0	126	0
Lane Group Flow (vph)	119	460	7	34	465	0	0	25	5	0	20	0
Confl. Peds. (#/hr)			2	2			1					1
Turn Type	D,P+P	NA	Perm	D,P+P	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	2		6	6			4		4	8		
Actuated Green, G (s)	39.4	38.9	38.9	41.4	32.7			6.3	6.3		11.8	
Effective Green, g (s)	39.4	38.9	38.9	41.4	32.7			6.3	6.3		11.8	
Actuated g/C Ratio	0.46	0.45	0.45	0.48	0.38			0.07	0.07		0.14	
Clearance Time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	475	1597	698	460	1305			81	115		197	
v/s Ratio Prot	c0.02	c0.13		0.00	c0.14							
v/s Ratio Perm	0.09		0.00	0.03				c0.02	0.00		c0.01	
v/c Ratio	0.25	0.29	0.01	0.07	0.36			0.31	0.04		0.10	
Uniform Delay, d1	13.6	14.9	13.0	11.9	19.2			37.9	37.1		32.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.5	0.0	0.1	0.8			2.2	0.1		0.2	
Delay (s)	13.9	15.4	13.1	11.9	20.0			40.1	37.3		32.8	
Level of Service	B	B	B	B	B			D	D		C	
Approach Delay (s)		15.0			19.4			38.1			32.8	
Approach LOS		B			B			D			C	
Intersection Summary												
HCM 2000 Control Delay			20.2		HCM 2000 Level of Service						C	
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			86.2		Sum of lost time (s)						28.7	
Intersection Capacity Utilization			62.0%		ICU Level of Service						B	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 No Build
 Timing Plan: PM Peak



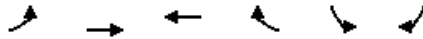
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↗	↖	↕	↕		↕	↗		↕	
Traffic Volume (veh/h)	91	353	12	26	299	68	17	2	49	52	0	60
Future Volume (veh/h)	91	353	12	26	299	68	17	2	49	52	0	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	119	460	16	34	390	89	22	3	64	68	0	78
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	513	1532	682	510	1080	244	297	33	223	174	18	113
Arrive On Green	0.07	0.43	0.43	0.04	0.38	0.38	0.14	0.14	0.14	0.14	0.00	0.14
Sat Flow, veh/h	1781	3554	1581	1781	2878	650	1259	235	1582	571	125	798
Grp Volume(v), veh/h	119	460	16	34	239	240	25	0	64	146	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1581	1781	1777	1751	1495	0	1582	1494	0	0
Q Serve(g_s), s	2.2	4.8	0.3	0.6	5.5	5.6	0.0	0.0	2.1	3.9	0.0	0.0
Cycle Q Clear(g_c), s	2.2	4.8	0.3	0.6	5.5	5.6	0.7	0.0	2.1	5.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.37	0.88		1.00	0.47		0.53
Lane Grp Cap(c), veh/h	513	1532	682	510	667	657	330	0	223	304	0	0
V/C Ratio(X)	0.23	0.30	0.02	0.07	0.36	0.36	0.08	0.00	0.29	0.48	0.00	0.00
Avail Cap(c_a), veh/h	734	1532	682	831	667	657	728	0	683	719	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.5	10.5	9.3	8.4	12.8	12.8	21.2	0.0	21.8	23.1	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.5	0.1	0.1	1.5	1.6	0.1	0.0	0.7	1.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.7	0.1	0.2	2.1	2.2	0.3	0.0	0.8	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	11.0	9.3	8.5	14.3	14.4	21.3	0.0	22.5	24.3	0.0	0.0
LnGrp LOS	A	B	A	A	B	B	C	A	C	C	A	A
Approach Vol, veh/h		595			513			89			146	
Approach Delay, s/veh		10.7			13.9			22.2			24.3	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.9	30.0		13.8	9.8	33.2		13.8				
Change Period (Y+Rc), s	* 8.7	* 8.7		* 5.8	* 7.7	* 8.7		* 5.8				
Max Green Setting (Gmax), s	* 11	* 21		* 25	* 12	* 22		* 24				
Max Q Clear Time (g_c+I1), s	4.2	7.6		4.1	2.6	6.8		7.2				
Green Ext Time (p_c), s	0.1	2.3		0.3	0.0	2.6		0.7				

Intersection Summary												
HCM 6th Ctrl Delay					14.2							
HCM 6th LOS					B							

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 14: W Market St & Brickstone Ct

2040 No Build
 Timing Plan: PM Peak

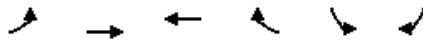


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	454	488	93	57	0
Future Volume (vph)	3	454	488	93	57	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		25	
Link Distance (ft)		1215	613		545	
Travel Time (s)		23.7	11.9		14.9	
Confl. Peds. (#/hr)	3			3		
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	573	733	0	72	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 14: W Market St & Brickstone Ct

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↔	
Traffic Volume (veh/h)	3	454	488	93	57	0
Future Volume (Veh/h)	3	454	488	93	57	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	573	616	117	72	0
Pedestrians					3	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1215				
pX, platoon unblocked					0.97	
vC, conflicting volume	736				972	370
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736				918	370
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				72	100
cM capacity (veh/h)	863				262	626
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	4	286	286	411	322	72
Volume Left	4	0	0	0	0	72
Volume Right	0	0	0	0	117	0
cSH	863	1700	1700	1700	1700	262
Volume to Capacity	0.00	0.17	0.17	0.24	0.19	0.28
Queue Length 95th (ft)	0	0	0	0	0	27
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	23.9
Lane LOS	A					C
Approach Delay (s)	0.1			0.0		23.9
Approach LOS						C
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			30.3%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑		↑↑	
Traffic Vol, veh/h	3	454	488	93	57	0
Future Vol, veh/h	3	454	488	93	57	0
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	573	616	117	72	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	736	0	-	0	973 370
Stage 1	-	-	-	-	678 -
Stage 2	-	-	-	-	295 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	865	-	-	-	250 627
Stage 1	-	-	-	-	466 -
Stage 2	-	-	-	-	730 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	863	-	-	-	247 625
Mov Cap-2 Maneuver	-	-	-	-	247 -
Stage 1	-	-	-	-	462 -
Stage 2	-	-	-	-	728 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	25.5
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	863	-	-	-	247
HCM Lane V/C Ratio	0.004	-	-	-	0.291
HCM Control Delay (s)	9.2	-	-	-	25.5
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	1.2

Lanes, Volumes, Timings
15: W Market St & Waterman Dr

2040 No Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	397	0	0	607	85	0	0	0	89	0	145
Future Volume (vph)	83	397	0	0	607	85	0	0	0	89	0	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		175	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			25	
Link Distance (ft)		1173			1415			219			571	
Travel Time (s)		22.9			27.6			4.3			15.6	
Confl. Peds. (#/hr)			2	2					3	3		
Confl. Bikes (#/hr)			1			1			3			1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	512	0	0	783	110	0	0	0	115	187	0
Turn Type	D.P+P	NA			NA	Perm				Perm	NA	
Protected Phases	5	2			6	6	8	8		4	4	
Permitted Phases	6				6	6	8	8		4		
Detector Phase	5	2			6	6	6	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	26.7		36.7	36.7	36.7	36.6	36.6		23.7	23.7	
Total Split (s)	20.0	50.0		30.0	30.0	30.0	25.0	25.0		25.0	25.0	
Total Split (%)	20.0%	50.0%		30.0%	30.0%	30.0%	25.0%	25.0%		25.0%	25.0%	
Yellow Time (s)	4.3	4.3		4.3	4.3	4.3	3.2	3.2		3.0	3.0	
All-Red Time (s)	4.4	4.4		4.4	4.4	4.4	2.4	2.4		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	8.7	8.7			8.7	8.7		5.6		5.7	5.7	
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	Max		Max	Max	Max	None	None		None	None	
v/c Ratio	0.32	0.27			0.59	0.16				1.32	0.22	
Control Delay	16.2	13.4			27.8	0.5				239.8	0.6	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	16.2	13.4			27.8	0.5				239.8	0.6	
Queue Length 50th (ft)	22	60			162	0				-71	0	
Queue Length 95th (ft)	90	185			#430	0				#255	0	
Internal Link Dist (ft)		1093			1335			139			491	
Turn Bay Length (ft)	150					175				100		
Base Capacity (vph)	403	1882			1319	693				87	859	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.27	0.27			0.59	0.16				1.32	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 85.5

Natural Cycle: 115

Control Type: Actuated-Uncoordinated

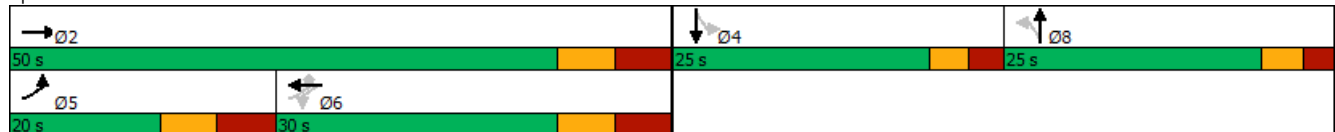
- Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 15: W Market St & Waterman Dr



HCM Signalized Intersection Capacity Analysis
 15: W Market St & Waterman Dr

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↖	↗		↕		↖	↗	
Traffic Volume (vph)	83	397	0	0	607	85	0	0	0	89	0	145
Future Volume (vph)	83	397	0	0	607	85	0	0	0	89	0	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	8.7			8.7	8.7				5.7	5.7	
Lane Util. Factor	1.00	0.95			0.95	1.00				1.00	1.00	
Frbp, ped/bikes	1.00	1.00			1.00	0.98				1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00				1.00	1.00	
Frt	1.00	1.00			1.00	0.85				1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	
Satd. Flow (prot)	1770	3539			3539	1550				1766	1563	
Flt Permitted	0.25	1.00			1.00	1.00				0.20	1.00	
Satd. Flow (perm)	475	3539			3539	1550				374	1563	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	107	512	0	0	783	110	0	0	0	115	0	187
RTOR Reduction (vph)	0	0	0	0	0	72	0	0	0	0	146	0
Lane Group Flow (vph)	107	512	0	0	783	38	0	0	0	115	41	0
Confl. Peds. (#/hr)			2	2						3	3	
Confl. Bikes (#/hr)			1	1		1				3	3	1
Turn Type	D.P+P	NA			NA	Perm				Perm	NA	
Protected Phases	5	2			6			8				4
Permitted Phases	6			6		6	8			4		
Actuated Green, G (s)	38.5	47.2			31.9	31.9				19.9	19.9	
Effective Green, g (s)	38.5	47.2			31.9	31.9				19.9	19.9	
Actuated g/C Ratio	0.42	0.52			0.35	0.35				0.22	0.22	
Clearance Time (s)	8.7	8.7			8.7	8.7				5.7	5.7	
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	292	1823			1232	539				81	339	
v/s Ratio Prot	0.03	c0.14			c0.22							0.03
v/s Ratio Perm	0.13					0.02				c0.31		
w/c Ratio	0.37	0.28			0.64	0.07				1.42	0.12	
Uniform Delay, d1	16.9	12.6			25.0	19.9				35.8	28.8	
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	
Incremental Delay, d2	0.8	0.4			2.5	0.3				246.5	0.2	
Delay (s)	17.7	13.0			27.5	20.2				282.3	29.0	
Level of Service	B	B			C	C				F	C	
Approach Delay (s)		13.8			26.6		0.0				125.5	
Approach LOS		B			C		A				F	
Intersection Summary												
HCM 2000 Control Delay			38.7				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			91.6				Sum of lost time (s)			28.7		
Intersection Capacity Utilization			63.3%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 15: W Market St & Waterman Dr

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕			↕	↕		↕		↔	↕	
Traffic Volume (veh/h)	83	397	0	0	607	85	0	0	0	89	0	145
Future Volume (veh/h)	83	397	0	0	607	85	0	0	0	89	0	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	107	512	0	0	783	110	0	0	0	115	0	187
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	389	2213	0	0	1516	661	0	300	0	392	0	249
Arrive On Green	0.06	0.62	0.00	0.00	0.43	0.43	0.00	0.00	0.00	0.16	0.00	0.16
Sat Flow, veh/h	1781	3647	0	0	3647	1548	0	1870	0	1771	0	1555
Grp Volume(v), veh/h	107	512	0	0	783	110	0	0	0	115	0	187
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	1548	0	1870	0	1771	0	1555
Q Serve(g_s), s	2.2	4.2	0.0	0.0	10.7	2.9	0.0	0.0	0.0	3.9	0.0	7.6
Cycle Q Clear(g_c), s	2.2	4.2	0.0	0.0	10.7	2.9	0.0	0.0	0.0	3.9	0.0	7.6
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	389	2213	0	0	1516	661	0	300	0	392	0	249
V/C Ratio(X)	0.28	0.23	0.00	0.00	0.52	0.17	0.00	0.00	0.00	0.29	0.00	0.75
Avail Cap(c_a), veh/h	577	2213	0	0	1516	661	0	547	0	624	0	453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.2	5.5	0.0	0.0	14.0	11.7	0.0	0.0	0.0	25.0	0.0	26.6
Incr Delay (d2), s/veh	0.4	0.2	0.0	0.0	1.3	0.5	0.0	0.0	0.0	0.4	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	1.2	0.0	0.0	4.0	1.0	0.0	0.0	0.0	1.6	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.6	5.8	0.0	0.0	15.2	12.3	0.0	0.0	0.0	25.4	0.0	31.1
LnGrp LOS	B	A	A	A	B	B	A	A	A	C	A	C
Approach Vol, veh/h		619			893			0			302	
Approach Delay, s/veh		6.6			14.9			0.0			28.9	
Approach LOS		A			B						C	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.0		16.3	13.0	37.0		16.3				
Change Period (Y+Rc), s		* 8.7		* 5.7	* 8.7	* 8.7		* 5.7				
Max Green Setting (Gmax), s		* 41		* 19	* 11	* 21		* 19				
Max Q Clear Time (g_c+I1), s		6.2		9.6	4.2	12.7		0.0				
Green Ext Time (p_c), s		3.6		1.1	0.1	3.6		0.0				

Intersection Summary

HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
16: Dogwood Dr & W Market St

2040 No Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↔			↕↔			↕	↗		↕↔	
Traffic Volume (vph)	16	443	77	20	544	10	67	26	38	7	14	21
Future Volume (vph)	16	443	77	20	544	10	67	26	38	7	14	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		125	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1415			398			379			366	
Travel Time (s)		27.6			7.8			10.3			10.0	
Confl. Peds. (#/hr)	2					2	2					2
Confl. Bikes (#/hr)						1			1			6
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	699	0	0	749	0	0	121	50	0	54	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8		8	4	4
Permitted Phases	6			2			8		8	4		4
Detector Phase	6	6		2	2		8	8	8	4		4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	32.7	32.7		31.7	31.7		38.1	38.1	38.1	37.7	37.7	
Total Split (s)	30.0	30.0		30.0	30.0		25.0	25.0	25.0	25.0	25.0	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		31.3%	31.3%	31.3%	31.3%	31.3%	
Yellow Time (s)	4.7	4.7		4.7	4.7		3.3	3.3	3.3	3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.8	3.8	3.8	2.2	2.2	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0	
Total Lost Time (s)		6.7			6.7			7.1	7.1		5.7	
Lead/Lag							Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio		0.42			0.45			0.50	0.13		0.48	
Control Delay		17.8			18.9			35.9	0.7		30.3	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		17.8			18.9			35.9	0.7		30.3	
Queue Length 50th (ft)		100			113			44	0		10	
Queue Length 95th (ft)		268			#323			122	0		44	
Internal Link Dist (ft)		1335			318			299			286	
Turn Bay Length (ft)									125			
Base Capacity (vph)		1668			1677			412	551		192	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.42			0.45			0.29	0.09		0.28	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 64.8

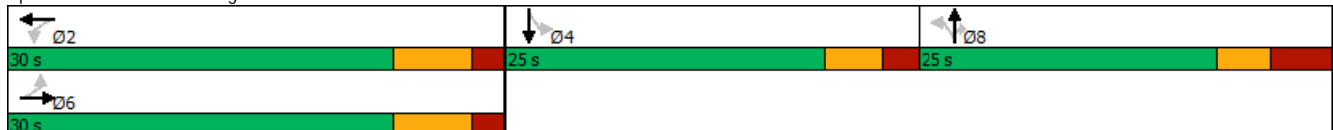
Natural Cycle: 110

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.

Splits and Phases: 16: Dogwood Dr & W Market St



HCM Signalized Intersection Capacity Analysis
 16: Dogwood Dr & W Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↕	↗		↕		
Traffic Volume (vph)	16	443	77	20	544	10	67	26	38	7	14	21	
Future Volume (vph)	16	443	77	20	544	10	67	26	38	7	14	21	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		6.7			6.7			7.1	7.1			5.7	
Lane Util. Factor		0.95			0.95			1.00	1.00			1.00	
Frbp, ped/bikes		1.00			1.00			1.00	0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00			1.00	
Frt		0.98			1.00			1.00	0.85			0.93	
Flt Protected		1.00			1.00			0.97	1.00			0.99	
Satd. Flow (prot)		3458			3522			1797	1562			1701	
Flt Permitted		0.92			0.91			0.75	1.00			0.30	
Satd. Flow (perm)		3182			3221			1401	1562			507	
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	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	21	578	100	26	710	13	87	34	50	9	18	27	
RTOR Reduction (vph)	0	13	0	0	1	0	0	0	43	0	24	0	
Lane Group Flow (vph)	0	686	0	0	748	0	0	121	7	0	30	0	
Confl. Peds. (#/hr)	2						2	2				2	
Confl. Bikes (#/hr)						1			1			6	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		6			2			8				4	
Permitted Phases	6			2			8		8	4			
Actuated Green, G (s)		31.9			31.9			9.2	9.2			7.9	
Effective Green, g (s)		31.9			31.9			9.2	9.2			7.9	
Actuated g/C Ratio		0.47			0.47			0.13	0.13			0.12	
Clearance Time (s)		6.7			6.7			7.1	7.1			5.7	
Vehicle Extension (s)		3.0			3.0			3.0	3.0			3.0	
Lane Grp Cap (vph)		1481			1499			188	209			58	
v/s Ratio Prot													
v/s Ratio Perm		0.22			c0.23			c0.09	0.00			c0.06	
v/c Ratio		0.46			0.50			0.64	0.03			0.52	
Uniform Delay, d1		12.5			12.7			28.1	25.8			28.5	
Progression Factor		1.00			1.00			1.00	1.00			1.00	
Incremental Delay, d2		1.0			1.2			7.3	0.1			7.6	
Delay (s)		13.5			13.9			35.4	25.8			36.2	
Level of Service		B			B			D	C			D	
Approach Delay (s)		13.5			13.9			32.6				36.2	
Approach LOS		B			B			C				D	
Intersection Summary													
HCM 2000 Control Delay			16.4									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53										
Actuated Cycle Length (s)			68.5							19.5			
Intersection Capacity Utilization			60.2%										B
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 16: Dogwood Dr & W Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑	↗		↘	
Traffic Volume (veh/h)	16	443	77	20	544	10	67	26	38	7	14	21
Future Volume (veh/h)	16	443	77	20	544	10	67	26	38	7	14	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	578	100	26	710	13	87	34	50	9	18	27
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	106	1537	260	112	1794	32	291	90	243	116	108	128
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	36	2900	491	46	3385	61	961	575	1558	128	693	822
Grp Volume(v), veh/h	371	0	328	388	0	361	121	0	50	54	0	0
Grp Sat Flow(s),veh/h/ln	1814	0	1613	1803	0	1689	1536	0	1558	1644	0	0
Q Serve(g_s), s	0.0	0.0	5.3	0.0	0.0	5.6	1.8	0.0	1.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.1	0.0	5.3	5.4	0.0	5.6	3.0	0.0	1.2	1.2	0.0	0.0
Prop In Lane	0.06		0.30	0.07		0.04	0.72		1.00	0.17		0.50
Lane Grp Cap(c), veh/h	1048	0	855	1043	0	895	381	0	243	352	0	0
V/C Ratio(X)	0.35	0.00	0.38	0.37	0.00	0.40	0.32	0.00	0.21	0.15	0.00	0.00
Avail Cap(c_a), veh/h	1048	0	855	1043	0	895	750	0	634	802	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.1	0.0	6.1	6.1	0.0	6.2	16.8	0.0	16.2	16.2	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	1.3	1.0	0.0	1.4	0.5	0.0	0.4	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.4	1.6	0.0	1.5	1.0	0.0	0.4	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.0	0.0	7.4	7.1	0.0	7.5	17.3	0.0	16.6	16.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h		699			749			171			54	
Approach Delay, s/veh		7.2			7.3			17.1			16.4	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		14.0		30.0		14.0				
Change Period (Y+Rc), s		6.7		* 7.1		6.7		7.1				
Max Green Setting (Gmax), s		23.3		* 19		23.3		17.9				
Max Q Clear Time (g_c+I1), s		7.6		3.2		7.3		5.0				
Green Ext Time (p_c), s		4.2		0.2		3.9		0.6				

Intersection Summary

HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
17: Willow St & W Market St

2040 No Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	9	472	9	19	540	7	15	19	9	7	15	19
Future Volume (vph)	9	472	9	19	540	7	15	19	9	7	15	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		398			1372			267			334	
Travel Time (s)		7.8			26.7			7.3			9.1	
Confl. Peds. (#/hr)									3	3		
Confl. Bikes (#/hr)									3			
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	640	0	0	738	0	0	57	0	0	54	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 17: Willow St & W Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (veh/h)	9	472	9	19	540	7	15	19	9	7	15	19
Future Volume (Veh/h)	9	472	9	19	540	7	15	19	9	7	15	19
Sign Control		Free			Free			Stop			Stop	
Grade		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)	12	616	12	25	704	9	20	25	12	9	20	25
Pedestrians					3							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					0							
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		398										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	713			628			1083	1409	317	1118	1410	356
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	713			342			852	1217	0	891	1219	356
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			89	84	99	95	87	96
cM capacity (veh/h)	883			1083			190	154	965	178	154	640
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	320	320	377	361	57	54						
Volume Left	12	0	25	0	20	9						
Volume Right	0	12	0	9	12	25						
cSH	883	1700	1083	1700	204	246						
Volume to Capacity	0.01	0.19	0.02	0.21	0.28	0.22						
Queue Length 95th (ft)	1	0	2	0	27	20						
Control Delay (s)	0.5	0.0	0.8	0.0	29.4	23.7						
Lane LOS	A		A		D	C						
Approach Delay (s)	0.2		0.4		29.4	23.7						
Approach LOS					D	C						
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			47.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	472	9	19	540	7	15	19	9	7	15	19
Future Vol, veh/h	9	472	9	19	540	7	15	19	9	7	15	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	616	12	25	704	9	20	25	12	9	20	25

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	713	0	0	628
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.14	-	-	4.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.22	-	-	2.22
Pot Cap-1 Maneuver	883	-	-	950
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	883	-	-	950
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	38.6	28.6
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	162	883	-	-	950	-	-	205
HCM Lane V/C Ratio	0.346	0.013	-	-	0.026	-	-	0.261
HCM Control Delay (s)	38.6	9.1	0.1	-	8.9	0.2	-	28.6
HCM Lane LOS	E	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	1

Lanes, Volumes, Timings
 18: S High St/N High St & W Market St

2040 No Build
 Timing Plan: PM Peak

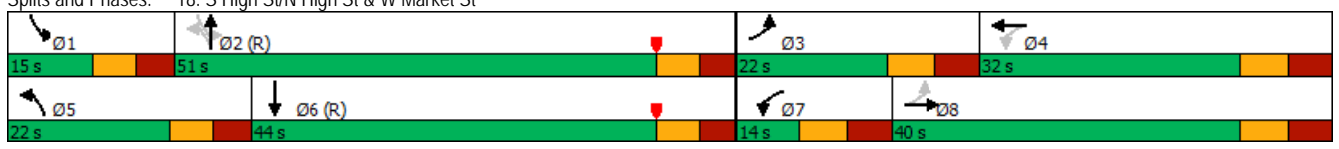


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	145	187	59	187	10	242	896	35	148	678	95
Future Volume (vph)	161	145	187	59	187	10	242	896	35	148	678	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		320	150		0	130		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			25			35			35	
Link Distance (ft)		1372			628			780			700	
Travel Time (s)		26.7			17.1			15.2			13.6	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	197	407	0	72	241	0	296	1140	0	181	946	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		D.P+P	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			2		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	13.4	43.4		13.4	43.4		12.3	33.3		12.3	41.3	
Total Split (s)	22.0	40.0		14.0	32.0		22.0	51.0		15.0	44.0	
Total Split (%)	18.3%	33.3%		11.7%	26.7%		18.3%	42.5%		12.5%	36.7%	
Yellow Time (s)	4.3	4.3		4.3	4.3		3.9	3.9		3.9	3.9	
All-Red Time (s)	4.1	4.1		4.1	4.1		3.4	3.4		3.4	3.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
v/c Ratio	0.60	0.85		0.39	0.74		0.92	0.87		0.85	0.87	
Control Delay	35.4	54.2		32.9	60.6		66.2	43.9		59.6	48.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.4	54.2		32.9	60.6		66.2	43.9		59.6	48.8	
Queue Length 50th (ft)	105	264		36	172		-200	432		-97	362	
Queue Length 95th (ft)	166	#431		68	263		#380	#540		#246	#475	
Internal Link Dist (ft)		1292			548			700			620	
Turn Bay Length (ft)							150			130		
Base Capacity (vph)	338	490		183	365		322	1307		214	1086	
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	0.58	0.83		0.39	0.66		0.92	0.87		0.85	0.87	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 100.9 (84%), Referenced to phase 2:NBSB and 6:SBT, Start of Yellow
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 ~ 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.

Splits and Phases: 18: S High St/N High St & W Market St



HCM Signalized Intersection Capacity Analysis
 18: S High St/N High St & W Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	161	145	187	59	187	10	242	896	35	148	678	95
Future Volume (vph)	161	145	187	59	187	10	242	896	35	148	678	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Fr't	1.00	0.92		1.00	0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1706		1770	1849		1770	3519		1770	3474	
Flt Permitted	0.31	1.00		0.31	1.00		0.09	1.00		0.09	1.00	
Satd. Flow (perm)	586	1706		581	1849		174	3519		174	3474	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	197	178	229	72	229	12	296	1097	43	181	830	116
RTOR Reduction (vph)	0	39	0	0	2	0	0	3	0	0	9	0
Lane Group Flow (vph)	197	368	0	72	239	0	296	1137	0	181	937	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		D,P+P	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			2		
Actuated Green, G (s)	44.0	31.1		27.2	22.7		60.3	42.8		53.0	35.5	
Effective Green, g (s)	44.0	31.1		27.2	22.7		60.3	42.8		53.0	35.5	
Actuated g/C Ratio	0.37	0.26		0.23	0.19		0.50	0.36		0.44	0.30	
Clearance Time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	342	442		176	349		320	1255		212	1027	
v/s Ratio Prot	c0.06	c0.22		0.02	0.13		c0.13	c0.32		0.07	0.27	
v/s Ratio Perm	0.15			0.08			c0.33			0.30		
v/c Ratio	0.58	0.83		0.41	0.69		0.93	0.91		0.85	0.91	
Uniform Delay, d1	28.2	42.0		37.8	45.3		35.2	36.7		27.5	40.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	12.7		1.5	5.5		31.4	11.0		26.8	13.6	
Delay (s)	30.6	54.7		39.3	50.8		66.5	47.7		54.3	54.3	
Level of Service	C	D		D	D		E	D		D	D	
Approach Delay (s)		46.8			48.2			51.6			54.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	31.4
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 18: S High St/N High St & W Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	145	187	59	187	10	242	896	35	148	678	95
Future Volume (veh/h)	161	145	187	59	187	10	242	896	35	148	678	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	197	178	229	72	229	12	296	1097	43	181	830	116
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	330	189	243	158	344	18	320	1308	51	218	992	139
Arrive On Green	0.10	0.25	0.25	0.04	0.20	0.20	0.12	0.38	0.38	0.06	0.32	0.32
Sat Flow, veh/h	1781	743	956	1781	1761	92	1781	3486	137	1781	3131	438
Grp Volume(v), veh/h	197	0	407	72	0	241	296	559	581	181	471	475
Grp Sat Flow(s),veh/h/ln	1781	0	1698	1781	0	1854	1781	1777	1846	1781	1777	1792
Q Serve(g_s), s	10.4	0.0	28.2	3.8	0.0	14.4	13.1	34.4	34.4	7.6	29.6	29.6
Cycle Q Clear(g_c), s	10.4	0.0	28.2	3.8	0.0	14.4	13.1	34.4	34.4	7.6	29.6	29.6
Prop In Lane	1.00		0.56	1.00		0.05	1.00		0.07	1.00		0.24
Lane Grp Cap(c), veh/h	330	0	432	158	0	362	320	667	693	218	563	568
V/C Ratio(X)	0.60	0.00	0.94	0.46	0.00	0.67	0.93	0.84	0.84	0.83	0.84	0.84
Avail Cap(c_a), veh/h	347	0	447	162	0	365	320	667	693	218	563	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	0.0	43.8	38.1	0.0	44.6	27.5	34.2	34.2	28.2	38.1	38.1
Incr Delay (d2), s/veh	2.6	0.0	27.9	2.0	0.0	4.5	31.6	12.0	11.7	22.9	13.8	13.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	15.0	1.8	0.0	7.1	8.2	16.7	17.3	4.5	14.8	14.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.3	0.0	71.7	40.2	0.0	49.1	59.1	46.2	45.8	51.1	51.9	51.8
LnGrp LOS	D	A	E	D	A	D	E	D	D	D	D	D
Approach Vol, veh/h		604			313			1436			1127	
Approach Delay, s/veh		60.2			47.1			48.7			51.7	
Approach LOS		E			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	52.3	20.8	31.8	22.0	45.3	13.7	39.0				
Change Period (Y+Rc), s	7.3	7.3	* 8.4	* 8.4	7.3	7.3	* 8.4	* 8.4				
Max Green Setting (Gmax), s	7.7	43.7	* 14	* 24	14.7	36.7	* 5.6	* 32				
Max Q Clear Time (g_c+I1), s	9.6	36.4	12.4	16.4	15.1	31.6	5.8	30.2				
Green Ext Time (p_c), s	0.0	4.0	0.1	0.8	0.0	2.6	0.0	0.4				

Intersection Summary												
HCM 6th Ctrl Delay				51.5								
HCM 6th LOS				D								

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

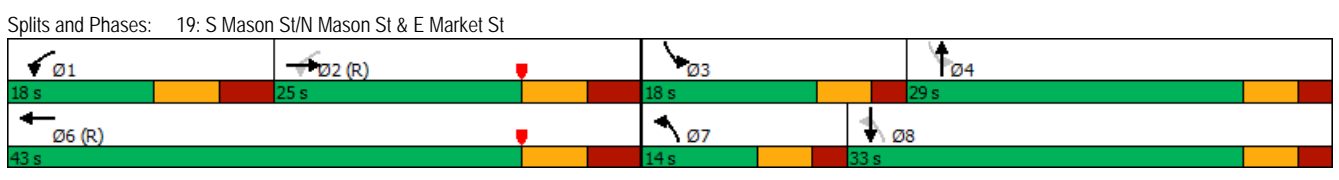
Lanes, Volumes, Timings
 19: S Mason St/N Mason St & E Market St

2040 No Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	200	22	161	202	254	20	98	119	264	96	8
Future Volume (vph)	0	200	22	161	202	254	20	98	119	264	96	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	0		0	0		0	0	0	0
Storage Lanes	0		1	1		0	1		0	1	1	0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			No			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		530			595			372			335	
Travel Time (s)		14.5			16.2			10.1			9.1	
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	290	0	210	594	0	26	283	0	344	135	0
Turn Type		NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases				2			8			4		
Detector Phase		2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0		5.0	7.0		5.0	7.0	
Minimum Split (s)		27.1		13.1	37.1		11.1	29.1		11.1	23.1	
Total Split (s)		25.0		18.0	43.0		14.0	29.0		18.0	33.0	
Total Split (%)		27.8%		20.0%	47.8%		15.6%	32.2%		20.0%	36.7%	
Yellow Time (s)		4.5		4.5	4.5		3.7	3.7		3.7	3.7	
All-Red Time (s)		3.6		3.6	3.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		8.1		8.1	8.1		6.1	6.1		6.1	6.1	
Lead/Lag		Lag		Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?		Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode		C-Max		None	C-Max		None	None		None	None	
v/c Ratio		0.35		0.48	0.76		0.05	0.78		0.86	0.21	
Control Delay		30.3		19.4	21.3		14.7	48.2		42.4	21.4	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		30.3		19.4	21.3		14.7	48.2		42.4	21.4	
Queue Length 50th (ft)		71		58	138		8	151		137	45	
Queue Length 95th (ft)		113		m82	m#182		22	230		#195	101	
Internal Link Dist (ft)		450			515			292			255	
Turn Bay Length (ft)												
Base Capacity (vph)		824		444	779		532	435		400	655	
Starvation Cap Reductn		0		0	0		0	0		0	0	
Spillback Cap Reductn		0		0	0		0	0		0	0	
Storage Cap Reductn		0		0	0		0	0		0	0	
Reduced v/c Ratio		0.35		0.47	0.76		0.05	0.65		0.86	0.21	

Intersection Summary
 Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 21 (23%), Referenced to phase 2:EBWB and 6:WBT, Start of Yellow
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis
 19: S Mason St/N Mason St & E Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	200	22	161	202	254	20	98	119	264	96	8
Future Volume (vph)	0	200	22	161	202	254	20	98	119	264	96	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.1		8.1	8.1		6.1	6.1		6.1	6.1	
Lane Util. Factor		0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t		0.98		1.00	0.92		1.00	0.92		1.00	0.99	
Fl _t Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3486		1770	1707		1770	1710		1770	1842	
Fl _t Permitted		1.00		0.57	1.00		0.67	1.00		0.42	1.00	
Satd. Flow (perm)		3486		1070	1707		1249	1710		784	1842	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	261	29	210	263	331	26	128	155	344	125	10
RTOR Reduction (vph)	0	10	0	0	50	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	280	0	210	544	0	26	283	0	344	132	0
Turn Type		NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases				2			8			4		
Actuated Green, G (s)		17.4		26.9	35.0		34.7	22.8		34.7	31.9	
Effective Green, g (s)		17.4		26.9	35.0		34.7	22.8		34.7	31.9	
Actuated g/C Ratio		0.19		0.30	0.39		0.39	0.25		0.39	0.35	
Clearance Time (s)		8.1		8.1	8.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		673		393	663		497	433		432	652	
v/s Ratio Prot		0.08		0.06	c0.32		0.00	0.17		c0.11	0.07	
v/s Ratio Perm				0.10			0.02			c0.20		
v/c Ratio		0.42		0.53	0.82		0.05	0.65		0.80	0.20	
Uniform Delay, d1		31.8		25.1	24.7		17.2	30.1		22.1	20.2	
Progression Factor		1.00		0.86	0.73		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.9		1.1	9.0		0.0	3.5		9.8	0.2	
Delay (s)		33.7		22.7	27.1		17.3	33.6		31.9	20.4	
Level of Service		C		C	C		B	C		C	C	
Approach Delay (s)		33.7			25.9			32.2			28.6	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.9			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)		28.4				
Intersection Capacity Utilization			80.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 19: S Mason St/N Mason St & E Market St

2040 No Build
 Timing Plan: PM Peak



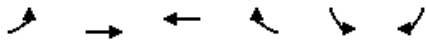
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↖		↖	↖		↖	↖	
Traffic Volume (veh/h)	0	200	22	161	202	254	20	98	119	264	96	8
Future Volume (veh/h)	0	200	22	161	202	254	20	98	119	264	96	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	261	29	210	263	331	26	128	155	344	125	10
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	810	89	473	338	425	433	149	180	351	511	41
Arrive On Green	0.00	0.25	0.25	0.18	0.75	0.75	0.03	0.19	0.19	0.13	0.30	0.30
Sat Flow, veh/h	0	3321	355	1781	753	947	1781	770	932	1781	1709	137
Grp Volume(v), veh/h	0	143	147	210	0	594	26	0	283	344	0	135
Grp Sat Flow(s),veh/h/ln	0	1777	1806	1781	0	1700	1781	0	1703	1781	0	1846
Q Serve(g_s), s	0.0	5.9	6.0	7.8	0.0	18.9	0.9	0.0	14.5	11.9	0.0	5.0
Cycle Q Clear(g_c), s	0.0	5.9	6.0	7.8	0.0	18.9	0.9	0.0	14.5	11.9	0.0	5.0
Prop In Lane	0.00		0.20	1.00		0.56	1.00		0.55	1.00		0.07
Lane Grp Cap(c), veh/h	0	446	453	473	0	763	433	0	329	351	0	552
V/C Ratio(X)	0.00	0.32	0.33	0.44	0.00	0.78	0.06	0.00	0.86	0.98	0.00	0.24
Avail Cap(c_a), veh/h	0	446	453	477	0	763	542	0	433	351	0	552
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	27.5	27.5	19.5	0.0	8.6	20.9	0.0	35.1	28.9	0.0	23.9
Incr Delay (d2), s/veh	0.0	1.9	1.9	0.7	0.0	7.7	0.1	0.0	12.8	42.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.7	2.8	3.0	0.0	5.2	0.4	0.0	7.1	5.9	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	29.3	29.4	20.2	0.0	16.2	21.0	0.0	47.9	71.4	0.0	24.1
LnGrp LOS	A	C	C	C	A	B	C	A	D	E	A	C
Approach Vol, veh/h		290			804			309			479	
Approach Delay, s/veh		29.4			17.3			45.6			58.1	
Approach LOS		C			B			D			E	
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	17.8	30.7	18.0	23.5		48.5	8.5	33.0				
Change Period (Y+Rc), s	* 8.1	* 8.1	* 6.1	* 6.1		* 8.1	* 6.1	* 6.1				
Max Green Setting (Gmax), s	* 9.9	* 17	* 12	* 23		* 35	* 7.9	* 27				
Max Q Clear Time (g_c+I1), s	9.8	8.0	13.9	16.5		20.9	2.9	7.0				
Green Ext Time (p_c), s	0.0	1.1	0.0	0.9		3.8	0.0	0.7				

Intersection Summary

HCM 6th Ctrl Delay	34.2
HCM 6th LOS	C

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

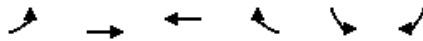


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	11	605	630	39	51	11
Future Volume (vph)	11	605	630	39	51	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35	35		35	
Link Distance (ft)		595	279		366	
Travel Time (s)		11.6	5.4		7.1	
Confl. Peds. (#/hr)	2			2		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	770	837	0	78	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 20: E Market St & Broad St

2040 No Build
 Timing Plan: PM Peak



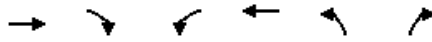
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	11	605	630	39	51	11
Future Volume (Veh/h)	11	605	630	39	51	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	14	756	788	49	64	14
Pedestrians		3			2	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		595	1010			
pX, platoon unblocked	0.93				0.95	0.93
vC, conflicting volume	839				1220	424
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	667				906	219
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				75	98
cM capacity (veh/h)	849				257	724
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	266	504	525	312	78	
Volume Left	14	0	0	0	64	
Volume Right	0	0	0	49	14	
cSH	849	1700	1700	1700	291	
Volume to Capacity	0.02	0.30	0.31	0.18	0.27	
Queue Length 95th (ft)	1	0	0	0	26	
Control Delay (s)	0.7	0.0	0.0	0.0	21.9	
Lane LOS	A				C	
Approach Delay (s)	0.2		0.0		21.9	
Approach LOS					C	
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			41.2%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Vol, veh/h	11	605	630	39	51	11
Future Vol, veh/h	11	605	630	39	51	11
Conflicting Peds, #/hr	2	0	0	2	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	756	788	49	64	14

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	839	0	-	0	1221 424
Stage 1	-	-	-	-	815 -
Stage 2	-	-	-	-	406 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	791	-	-	-	172 579
Stage 1	-	-	-	-	396 -
Stage 2	-	-	-	-	641 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	789	-	-	-	166 576
Mov Cap-2 Maneuver	-	-	-	-	166 -
Stage 1	-	-	-	-	383 -
Stage 2	-	-	-	-	640 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	36.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	789	-	-	-	190
HCM Lane V/C Ratio	0.017	-	-	-	0.408
HCM Control Delay (s)	9.6	0.1	-	-	36.4
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	1.8

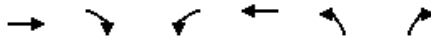


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (vph)	659	3	23	667	7	69
Future Volume (vph)	659	3	23	667	7	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	35			35	35	
Link Distance (ft)	279			280	613	
Travel Time (s)	5.4			5.5	11.9	
Confl. Peds. (#/hr)		6	6		3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	864	0	0	900	99	0
Sign Control	Free			Free	Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 21: Ott St & E Market St

2040 No Build
 Timing Plan: PM Peak



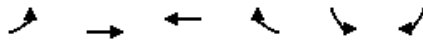
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↓	
Traffic Volume (veh/h)	659	3	23	667	7	69
Future Volume (Veh/h)	659	3	23	667	7	69
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	860	4	30	870	9	90
Pedestrians	3			6		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	3.5			3.5		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	874			731		
pX, platoon unblocked				0.98	0.91	0.98
vC, conflicting volume				870	1366	438
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				817	1087	374
tC, single (s)				4.1	6.8	6.9
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				96	95	85
cM capacity (veh/h)				783	183	605
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	573	291	320	580	99	
Volume Left	0	0	30	0	9	
Volume Right	0	4	0	0	90	
cSH	1700	1700	783	1700	500	
Volume to Capacity	0.34	0.17	0.04	0.34	0.20	
Queue Length 95th (ft)	0	0	3	0	18	
Control Delay (s)	0.0	0.0	1.3	0.0	14.0	
Lane LOS	A			B		
Approach Delay (s)	0.0			14.0		
Approach LOS				B		
Intersection Summary						
Average Delay				1.0		
Intersection Capacity Utilization	54.4%			ICU Level of Service		A
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Vol, veh/h	659	3	23	667	7	69
Future Vol, veh/h	659	3	23	667	7	69
Conflicting Peds, #/hr	0	6	6	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	860	4	30	870	9	90

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	870	0	1366	438
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	498	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	770	-	138	567
Stage 1	-	-	-	-	371	-
Stage 2	-	-	-	-	576	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	766	-	126	564
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	369	-
Stage 2	-	-	-	-	530	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	427	-	-	766	-
HCM Lane V/C Ratio	0.232	-	-	0.039	-
HCM Control Delay (s)	16	-	-	9.9	0.4
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

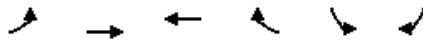


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	14	721	678	12	6	8
Future Volume (vph)	14	721	678	12	6	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35	35		35	
Link Distance (ft)		280	451		356	
Travel Time (s)		5.5	8.8		6.9	
Confl. Peds. (#/hr)	2			2		
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	958	900	0	18	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 22: E Market St & Myrtle St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	14	721	678	12	6	8
Future Volume (Veh/h)	14	721	678	12	6	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	940	884	16	8	10
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1154	451			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	902				1400	452
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	642				1202	136
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	99
cM capacity (veh/h)	833				154	788
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	331	627	589	311	18	
Volume Left	18	0	0	0	8	
Volume Right	0	0	0	16	10	
cSH	833	1700	1700	1700	278	
Volume to Capacity	0.02	0.37	0.35	0.18	0.06	
Queue Length 95th (ft)	2	0	0	0	5	
Control Delay (s)	0.7	0.0	0.0	0.0	18.8	
Lane LOS	A				C	
Approach Delay (s)	0.3		0.0		18.8	
Approach LOS					C	
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			45.9%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Vol, veh/h	14	721	678	12	6	8
Future Vol, veh/h	14	721	678	12	6	8
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	940	884	16	8	10

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	902	0	-	0	1400 452
Stage 1	-	-	-	-	894 -
Stage 2	-	-	-	-	506 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	749	-	-	-	131 555
Stage 1	-	-	-	-	360 -
Stage 2	-	-	-	-	571 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	748	-	-	-	124 554
Mov Cap-2 Maneuver	-	-	-	-	124 -
Stage 1	-	-	-	-	341 -
Stage 2	-	-	-	-	570 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	22.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	748	-	-	-	223
HCM Lane V/C Ratio	0.024	-	-	-	0.082
HCM Control Delay (s)	9.9	0.2	-	-	22.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
23: Reservoir St/Sterling St & E Market St

2040 No Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Volume (vph)	1	506	210	2	417	11	261	86	19	34	84	13
Future Volume (vph)	1	506	210	2	417	11	261	86	19	34	84	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		451			685			454			334	
Travel Time (s)		8.8			13.3			8.8			6.5	
Confl. Peds. (#/hr)	4		5	5		4			1	1		
Confl. Bikes (#/hr)			2									1
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	935	0	0	561	0	0	477	0	0	171	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Perm	NA	
Protected Phases		2			2		3	3			1	
Permitted Phases	2			2						1		
Detector Phase	2	2		2	2		3	3		1	1	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	28.6	28.6		28.6	28.6		27.6	27.6		12.5	12.5	
Total Split (s)	39.0	39.0		39.0	39.0		32.0	32.0		19.0	19.0	
Total Split (%)	43.3%	43.3%		43.3%	43.3%		35.6%	35.6%		21.1%	21.1%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.6	3.6		3.2	3.2	
All-Red Time (s)	2.9	2.9		2.9	2.9		2.0	2.0		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.6			6.6			5.6			5.5	
Lead/Lag	Lag	Lag		Lag	Lag					Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes					Yes	Yes	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
v/c Ratio		0.74			0.44			0.93			0.74	
Control Delay		25.0			22.5			58.7			55.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		25.0			22.5			58.7			55.8	
Queue Length 50th (ft)		177			126			259			90	
Queue Length 95th (ft)		m305			174			#445			#176	
Internal Link Dist (ft)		371			605			374			254	
Turn Bay Length (ft)												
Base Capacity (vph)		1269			1277			526			253	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.74			0.44			0.91			0.68	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 82 (91%), Referenced to phase 2:EBWB, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Reservoir St/Sterling St & E Market St



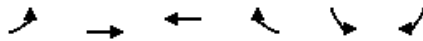
HCM Signalized Intersection Capacity Analysis
 23: Reservoir St/Sterling St & E Market St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	1	506	210	2	417	11	261	86	19	34	84	13
Future Volume (vph)	1	506	210	2	417	11	261	86	19	34	84	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.6			6.6			5.6			5.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frbp, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			1.00			0.99			0.99	
Flt Protected		1.00			1.00			0.97			0.99	
Satd. Flow (prot)		3352			3523			1785			1812	
Flt Permitted		0.95			0.95			0.97			0.91	
Satd. Flow (perm)		3200			3348			1785			1663	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	1	660	274	3	544	14	340	112	25	44	110	17
RTOR Reduction (vph)	0	49	0	0	2	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	886	0	0	559	0	0	475	0	0	167	0
Confl. Peds. (#/hr)	4		5	5		4			1	1		
Confl. Bikes (#/hr)			2									1
Turn Type	Perm	NA		Perm	NA		Split	NA		Perm	NA	
Protected Phases		2			2		3	3				1
Permitted Phases	2			2						1		
Actuated Green, G (s)		34.3			34.3			25.7			12.3	
Effective Green, g (s)		34.3			34.3			25.7			12.3	
Actuated g/C Ratio		0.38			0.38			0.29			0.14	
Clearance Time (s)		6.6			6.6			5.6			5.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1219			1275			509			227	
v/s Ratio Prot								c0.27				
v/s Ratio Perm		c0.28			0.17						c0.10	
v/c Ratio		0.73			0.44			0.93			0.73	
Uniform Delay, d1		23.8			20.7			31.3			37.3	
Progression Factor		0.95			1.00			1.00			1.00	
Incremental Delay, d2		3.4			1.1			24.2			11.6	
Delay (s)		26.0			21.8			55.5			48.9	
Level of Service		C			C			E			D	
Approach Delay (s)		26.0			21.8			55.5			48.9	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			33.3			HCM 2000 Level of Service					C	
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			17.7			
Intersection Capacity Utilization			66.9%			ICU Level of Service					C	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM 6th Edition methodology does not support Non-NEMA phasing.

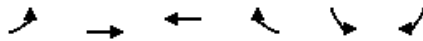


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	555	433	23	51	3
Future Volume (vph)	5	555	433	23	51	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35	35		35	
Link Distance (ft)		685	912		392	
Travel Time (s)		13.3	17.8		7.6	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	731	595	0	71	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 24: E Market St & Hill St

2040 No Build
 Timing Plan: PM Peak



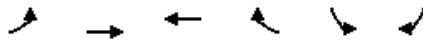
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	5	555	433	23	51	3
Future Volume (Veh/h)	5	555	433	23	51	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	724	565	30	67	4
Pedestrians					4	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		685				
pX, platoon unblocked					0.83	
vC, conflicting volume	599				960	302
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	599				547	302
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				83	99
cM capacity (veh/h)	970				384	692
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	248	483	377	218	71	
Volume Left	7	0	0	0	67	
Volume Right	0	0	0	30	4	
cSH	970	1700	1700	1700	394	
Volume to Capacity	0.01	0.28	0.22	0.13	0.18	
Queue Length 95th (ft)	1	0	0	0	16	
Control Delay (s)	0.3	0.0	0.0	0.0	16.1	
Lane LOS	A				C	
Approach Delay (s)	0.1		0.0		16.1	
Approach LOS					C	
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			32.9%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Vol, veh/h	5	555	433	23	51	3
Future Vol, veh/h	5	555	433	23	51	3
Conflicting Peds, #/hr	4	0	0	4	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	724	565	30	67	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	599	0	-	0	960 302
Stage 1	-	-	-	-	584 -
Stage 2	-	-	-	-	376 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	974	-	-	-	254 694
Stage 1	-	-	-	-	521 -
Stage 2	-	-	-	-	664 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	970	-	-	-	249 691
Mov Cap-2 Maneuver	-	-	-	-	249 -
Stage 1	-	-	-	-	513 -
Stage 2	-	-	-	-	661 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	24.1
HCM LOS			C

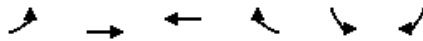
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	970	-	-	-	258
HCM Lane V/C Ratio	0.007	-	-	-	0.273
HCM Control Delay (s)	8.7	0.1	-	-	24.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	1.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	106	517	402	112	76	54
Future Volume (vph)	106	517	402	112	76	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	65			175	0	0
Storage Lanes	1			1	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		912	1324		234	
Travel Time (s)		17.8	25.8		4.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	138	674	524	146	169	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis
 25: E Market St & Old Furnace Rd

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↰	↕	↰	↕	↰	↕	
Traffic Volume (veh/h)	106	517	402	112	76	54	
Future Volume (Veh/h)	106	517	402	112	76	54	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	138	674	524	146	99	70	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage veh							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	670				1137	262	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	670				1137	262	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	85				40	90	
cM capacity (veh/h)	916				166	737	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	138	337	337	262	262	146	169
Volume Left	138	0	0	0	0	0	99
Volume Right	0	0	0	0	0	146	70
cSH	916	1700	1700	1700	1700	1700	244
Volume to Capacity	0.15	0.20	0.20	0.15	0.15	0.09	0.69
Queue Length 95th (ft)	13	0	0	0	0	0	114
Control Delay (s)	9.6	0.0	0.0	0.0	0.0	0.0	47.3
Lane LOS	A						E
Approach Delay (s)	1.6			0.0			47.3
Approach LOS							E
Intersection Summary							
Average Delay			5.6				
Intersection Capacity Utilization			39.4%		ICU Level of Service		A
Analysis Period (min)			15				

Intersection						
Int Delay, s/veh	5.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑	↘	↘	
Traffic Vol, veh/h	106	517	402	112	76	54
Future Vol, veh/h	106	517	402	112	76	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	65	-	-	175	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	138	674	524	146	99	70
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	670	0	-	0	1137	262
Stage 1	-	-	-	-	524	-
Stage 2	-	-	-	-	613	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	916	-	-	-	195	737
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	503	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	916	-	-	-	166	737
Mov Cap-2 Maneuver	-	-	-	-	166	-
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	503	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.6	0	47.2			
HCM LOS			E			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	916	-	-	-	245	
HCM Lane V/C Ratio	0.151	-	-	-	0.692	
HCM Control Delay (s)	9.6	-	-	-	47.2	
HCM Lane LOS	A	-	-	-	E	
HCM 95th %tile Q(veh)	0.5	-	-	-	4.5	

Lanes, Volumes, Timings
26: E Market St & Hawkins St/Vine St

2040 No Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3	Ø4
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕			
Traffic Volume (vph)	16	38	11	358	36	74	21	437	237	5	452	81		
Future Volume (vph)	16	38	11	358	36	74	21	437	237	5	452	81		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0	150		250	100		0		
Storage Lanes	0		0	1		0	1		1	1		0		
Taper Length (ft)	0			0			0			0				
Right Turn on Red			No			Yes			No			Yes		
Link Speed (mph)		35			35			35			35			
Link Distance (ft)		552			188			488			1324			
Travel Time (s)		10.8			3.7			9.5			25.8			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Shared Lane Traffic (%)				34%										
Lane Group Flow (vph)	0	82	0	298	292	0	27	552	299	6	673	0		
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA			
Protected Phases	8	8		3 4 7	3 4 7		1	6		5	2		3	4
Permitted Phases							6		6	2				
Minimum Split (s)	14.2	14.2					11.3	13.3	13.3	11.3	13.3		12.3	14.1
Total Split (s)	15.0	15.0					15.0	33.0	33.0	15.0	33.0		15.0	20.0
Total Split (%)	10.7%	10.7%					10.7%	23.6%	23.6%	10.7%	23.6%		11%	14%
Yellow Time (s)	3.1	3.1					4.2	4.2	4.2	4.2	4.2		3.0	3.7
All-Red Time (s)	4.1	4.1					2.1	2.1	2.1	2.1	2.1		2.3	3.4
Lost Time Adjust (s)		0.0					0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)		7.2					6.3	6.3	6.3	6.3	6.3			
Lead/Lag	Lag	Lag					Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?														
v/c Ratio		0.82		0.35	0.34		0.17	0.82	0.99	0.03	1.00			
Control Delay		115.4		2.6	1.3		37.7	65.3	106.2	35.3	90.7			
Queue Delay		64.3		4.4	4.2		0.0	0.0	0.0	0.0	0.0			
Total Delay		179.7		7.0	5.6		37.7	65.3	106.2	35.3	90.7			
Queue Length 50th (ft)		75		14	0		18	256	275	4	~323			
Queue Length 95th (ft)		#174		m13	m0		42	326	#469	15	#458			
Internal Link Dist (ft)		472			108			408			1244			
Turn Bay Length (ft)							150		250	100				
Base Capacity (vph)		100		860	852		163	674	301	176	670			
Starvation Cap Reductn		0		477	473		0	0	0	0	0			
Spillback Cap Reductn		25		0	0		0	0	0	0	0			
Storage Cap Reductn		0		0	0		0	0	0	0	0			
Reduced v/c Ratio		1.09		0.78	0.77		0.17	0.82	0.99	0.03	1.00			

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow, Master Intersection

Natural Cycle: 130

Control Type: Pretimed

- Volume exceeds capacity, queue is theoretically infinite.

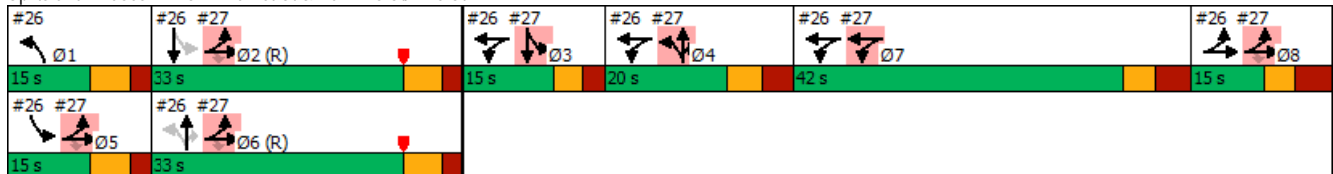
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: E Market St & Hawkins St/Vine St



Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Growth Factor	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Minimum Split (s)	14.2
Total Split (s)	42.0
Total Split (%)	30%
Yellow Time (s)	3.4
All-Red Time (s)	3.8
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis
 26: E Market St & Hawkins St/Vine St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	16	38	11	358	36	74	21	437	237	5	452	81
Future Volume (vph)	16	38	11	358	36	74	21	437	237	5	452	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.2		5.3	5.3		6.3	6.3	6.3	6.3	6.3	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95	1.00	1.00	0.95	
Frt		0.98		1.00	0.95		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.99		0.95	0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1798		1681	1642		1770	3539	1583	1770	3459	
Flt Permitted		0.99		0.95	0.97		0.15	1.00	1.00	0.19	1.00	
Satd. Flow (perm)		1798		1681	1642		279	3539	1583	348	3459	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	20	48	14	452	45	93	27	552	299	6	571	102
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	82	0	298	278	0	27	552	299	6	662	0
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	8	8		3 4 7	3 4 7		1	6		5	2	
Permitted Phases							6		6	2		
Actuated Green, G (s)		7.8		69.8	69.8		35.4	26.7	26.7	35.4	26.7	
Effective Green, g (s)		7.8		62.7	62.7		35.4	26.7	26.7	35.4	26.7	
Actuated g/C Ratio		0.06		0.45	0.45		0.25	0.19	0.19	0.25	0.19	
Clearance Time (s)		7.2					6.3	6.3	6.3	6.3	6.3	
Lane Grp Cap (vph)		100		752	735		163	674	301	176	659	
v/s Ratio Prot		c0.05		c0.18	0.17		c0.01	0.16		0.00	c0.19	
v/s Ratio Perm							0.03		0.19	0.01		
v/c Ratio		0.82		0.40	0.38		0.17	0.82	0.99	0.03	1.01	
Uniform Delay, d1		65.4		25.9	25.7		41.4	54.3	56.6	40.1	56.6	
Progression Factor		1.00		0.12	0.07		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		50.5		0.1	0.1		2.2	10.7	50.2	0.4	36.4	
Delay (s)		115.9		3.3	1.8		43.5	65.0	106.8	40.4	93.0	
Level of Service		F		A	A		D	E	F	D	F	
Approach Delay (s)		115.9			2.6			78.6			92.5	
Approach LOS		F			A			E			F	

Intersection Summary		
HCM 2000 Control Delay	64.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.59	E
Actuated Cycle Length (s)	140.0	Sum of lost time (s)
Intersection Capacity Utilization	53.0%	39.4
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM 6th Edition methodology does not support clustered intersections.

Lanes, Volumes, Timings
27: Country Club Rd & Vine St

2040 No Build
Timing Plan: PM Peak

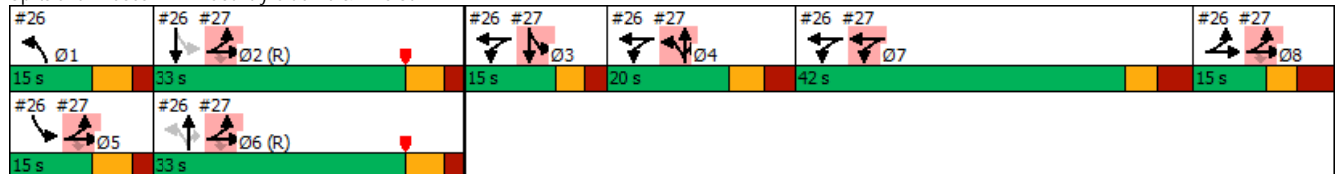


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2
Lane Configurations		↕	↕		↕↕			↕	↕		↕↕			
Traffic Volume (vph)	41	290	87	311	380	1	58	64	189	18	20	31		
Future Volume (vph)	41	290	87	311	380	1	58	64	189	18	20	31		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	230		0	200		0	0		0		
Storage Lanes	0		1	1		0	1		1	0		0		
Taper Length (ft)	0			0			0			0				
Right Turn on Red			No			Yes			Yes			Yes		
Link Speed (mph)		35			35			35			35			
Link Distance (ft)		188			552			389			193			
Travel Time (s)		3.7			10.8			7.6			3.8			
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		
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	431	113	0	903	0	0	159	247	0	89	0		
Turn Type	Split	NA	Perm	Split	NA		Split	NA	Prot	Split	NA			
Protected Phases	2 5 6 8	2 5 6 8		7	7		4	4	4	3	3		1	2
Permitted Phases			2 5 6 8											
Minimum Split (s)				14.2	14.2		14.1	14.1	14.1	12.3	12.3		11.3	13.3
Total Split (s)				42.0	42.0		20.0	20.0	20.0	15.0	15.0		15.0	33.0
Total Split (%)				30.0%	30.0%		14.3%	14.3%	14.3%	10.7%	10.7%		11%	24%
Yellow Time (s)				3.4	3.4		3.7	3.7	3.7	3.0	3.0		4.2	4.2
All-Red Time (s)				3.8	3.8		3.4	3.4	3.4	2.3	2.3		2.1	2.1
Lost Time Adjust (s)					0.0			0.0	0.0		0.0			
Total Lost Time (s)					7.2			7.1	7.1		5.3			
Lead/Lag				Lead	Lead		Lag	Lag	Lag	Lead	Lead		Lead	Lag
Lead-Lag Optimize?														
v/c Ratio		0.57	0.18		1.05			0.95	0.67		0.64			
Control Delay		17.7	14.7		94.8			120.5	16.4		67.3			
Queue Delay		55.8	4.5		0.0			0.0	0.0		0.0			
Total Delay		73.5	19.3		94.8			120.5	16.4		67.3			
Queue Length 50th (ft)		121	30		-470			146	0		59			
Queue Length 95th (ft)		m154	m39		#605			#291	87		#132			
Internal Link Dist (ft)		108			472			309			113			
Turn Bay Length (ft)														
Base Capacity (vph)		750	641		860			167	370		140			
Starvation Cap Reductn		358	459		0			0	0		0			
Spillback Cap Reductn		0	0		0			0	0		0			
Storage Cap Reductn		0	0		0			0	0		0			
Reduced v/c Ratio		1.10	0.62		1.05			0.95	0.67		0.64			

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow, Master Intersection
 Natural Cycle: 130
 Control Type: Pretimed
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Country Club Rd & Vine St



Lane Group	Ø5	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Right Turn on Red			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Growth Factor			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	5	6	8
Permitted Phases			
Minimum Split (s)	11.3	13.3	14.2
Total Split (s)	15.0	33.0	15.0
Total Split (%)	11%	24%	11%
Yellow Time (s)	4.2	4.2	3.1
All-Red Time (s)	2.1	2.1	4.1
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lag
Lead-Lag Optimize?			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 27: Country Club Rd & Vine St

2040 No Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕↕			↕	↕		↕	
Traffic Volume (vph)	41	290	87	311	380	1	58	64	189	18	20	31
Future Volume (vph)	41	290	87	311	380	1	58	64	189	18	20	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3		7.2			7.1	7.1		5.3	
Lane Util. Factor		1.00	1.00		0.95			1.00	1.00		1.00	
Fr't		1.00	0.85		1.00			1.00	0.85		0.94	
Flt Protected		0.99	1.00		0.98			0.98	1.00		0.99	
Satd. Flow (prot)		1851	1583		3461			1819	1583		1727	
Flt Permitted		0.99	1.00		0.98			0.98	1.00		0.99	
Satd. Flow (perm)		1851	1583		3461			1819	1583		1727	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	53	378	113	406	496	1	76	83	247	23	26	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	224	0	21	0
Lane Group Flow (vph)	0	431	113	0	903	0	0	159	23	0	68	0
Turn Type	Split	NA	Perm	Split	NA		Split	NA	Prot	Split	NA	
Protected Phases	2 5 6 8	2 5 6 8		7	7		4	4	4	3	3	
Permitted Phases			2 5 6 8									
Actuated Green, G (s)		56.7	56.7		34.8			12.9	12.9		9.7	
Effective Green, g (s)		49.5	49.5		34.8			12.9	12.9		9.7	
Actuated g/C Ratio		0.35	0.35		0.25			0.09	0.09		0.07	
Clearance Time (s)					7.2			7.1	7.1		5.3	
Lane Grp Cap (vph)		654	559		860			167	145		119	
v/s Ratio Prot		c0.23			c0.26			c0.09	0.01		c0.04	
v/s Ratio Perm			0.07									
v/c Ratio		0.66	0.20		1.05			0.95	0.16		0.57	
Uniform Delay, d1		38.1	31.5		52.6			63.2	58.5		63.1	
Progression Factor		0.46	0.53		1.00			1.00	1.00		1.00	
Incremental Delay, d2		4.1	0.6		44.6			58.0	2.3		18.2	
Delay (s)		21.7	17.2		97.2			121.3	60.8		81.3	
Level of Service		C	B		F			F	E		F	
Approach Delay (s)		20.8			97.2			84.5			81.3	
Approach LOS		C			F			F			F	

Intersection Summary		
HCM 2000 Control Delay	72.4	HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio	0.86	
Actuated Cycle Length (s)	140.0	Sum of lost time (s) 39.4
Intersection Capacity Utilization	75.7%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group

HCM 6th Edition methodology does not support clustered intersections.

Lanes, Volumes, Timings
1: Garbers Church Rd & Erickson Ave

2040 Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	234	56	4	328	182	73	106	44	241	107	9
Future Volume (vph)	7	234	56	4	328	182	73	106	44	241	107	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	75		0	300		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		561			838			552			1501	
Travel Time (s)		10.9			16.3			10.8			29.2	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	395	0	5	695	0	100	205	0	329	158	0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	2			6			4			8		
Detector Phase	1	6		5	2		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	13.7	13.9		12.6	12.8		11.3	12.7		11.0	12.5	
Total Split (s)	15.0	54.0		15.0	54.0		15.0	21.0		25.0	31.0	
Total Split (%)	13.0%	47.0%		13.0%	47.0%		13.0%	18.3%		21.7%	27.0%	
Yellow Time (s)	5.1	5.1		4.0	4.0		3.2	4.1		3.2	4.1	
All-Red Time (s)	3.6	1.8		3.6	1.8		3.1	1.6		2.8	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max		None	Max		None	None		None	None	
v/c Ratio	0.05	0.46		0.01	0.81		0.24	0.77		0.79	0.32	
Control Delay	14.8	20.9		13.8	31.9		23.7	60.1		40.9	33.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.8	20.9		13.8	31.9		23.7	60.1		40.9	33.8	
Queue Length 50th (ft)	3	158		2	347		40	117		152	81	
Queue Length 95th (ft)	12	290		8	#678		90	#256		#304	159	
Internal Link Dist (ft)		481			758			472			1421	
Turn Bay Length (ft)	150			150			75			300		
Base Capacity (vph)	206	856		441	858		422	283		430	496	
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	0.05	0.46		0.01	0.81		0.24	0.72		0.77	0.32	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 101.3

Natural Cycle: 90

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Garbers Church Rd & Erickson Ave



HCM Signalized Intersection Capacity Analysis
 1: Garbers Church Rd & Erickson Ave

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	234	56	4	328	182	73	106	44	241	107	9
Future Volume (vph)	7	234	56	4	328	182	73	106	44	241	107	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr't	1.00	0.97		1.00	0.95		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1809		1770	1763		1770	1781		1770	1842	
Flt Permitted	0.13	1.00		0.42	1.00		0.60	1.00		0.37	1.00	
Satd. Flow (perm)	241	1809		775	1763		1114	1781		696	1842	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	10	319	76	5	447	248	100	145	60	329	146	12
RTOR Reduction (vph)	0	7	0	0	17	0	0	13	0	0	2	0
Lane Group Flow (vph)	10	388	0	5	678	0	100	192	0	329	156	0
Turn Type	D,P+P	NA		D,P+P	NA		D,P+P	NA		D,P+P	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	49.5	48.4		49.5	48.4		33.9	15.7		34.0	27.2	
Effective Green, g (s)	49.5	48.4		49.5	48.4		33.9	15.7		34.0	27.2	
Actuated g/C Ratio	0.45	0.44		0.45	0.44		0.31	0.14		0.31	0.25	
Clearance Time (s)	8.7	6.9		7.6	5.8		6.3	5.7		6.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	124	798		359	777		384	254		394	456	
v/s Ratio Prot	c0.00	0.21		0.00	c0.38		0.02	0.11		c0.14	0.08	
v/s Ratio Perm	0.04			0.01			0.06			c0.12		
v/c Ratio	0.08	0.49		0.01	0.87		0.26	0.76		0.84	0.34	
Uniform Delay, d1	21.6	21.8		17.1	27.9		27.8	45.2		32.3	33.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	2.1		0.0	13.0		0.4	12.1		14.1	0.4	
Delay (s)	21.8	23.9		17.1	40.8		28.1	57.3		46.5	34.3	
Level of Service	C	C		B	D		C	E		D	C	
Approach Delay (s)		23.9			40.7			47.7			42.5	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			38.7				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			109.7				Sum of lost time (s)			26.3		
Intersection Capacity Utilization			74.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Garbers Church Rd & Erickson Ave

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	234	56	4	328	182	73	106	44	241	107	9
Future Volume (veh/h)	7	234	56	4	328	182	73	106	44	241	107	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	319	76	5	447	248	100	145	60	329	146	12
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	660	157	372	494	274	381	166	69	394	412	34
Arrive On Green	0.01	0.45	0.45	0.01	0.44	0.44	0.06	0.13	0.13	0.17	0.24	0.24
Sat Flow, veh/h	1781	1460	348	1781	1130	627	1781	1257	520	1781	1705	140
Grp Volume(v), veh/h	10	0	395	5	0	695	100	0	205	329	0	158
Grp Sat Flow(s),veh/h/ln	1781	0	1808	1781	0	1757	1781	0	1777	1781	0	1845
Q Serve(g_s), s	0.3	0.0	16.9	0.2	0.0	40.7	4.6	0.0	12.5	17.4	0.0	7.8
Cycle Q Clear(g_c), s	0.3	0.0	16.9	0.2	0.0	40.7	4.6	0.0	12.5	17.4	0.0	7.8
Prop In Lane	1.00		0.19	1.00		0.36	1.00		0.29	1.00		0.08
Lane Grp Cap(c), veh/h	138	0	817	372	0	767	381	0	235	394	0	445
V/C Ratio(X)	0.07	0.00	0.48	0.01	0.00	0.91	0.26	0.00	0.87	0.84	0.00	0.35
Avail Cap(c_a), veh/h	218	0	817	480	0	767	415	0	246	394	0	445
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.5	0.0	21.2	17.5	0.0	29.0	28.8	0.0	47.0	33.7	0.0	34.7
Incr Delay (d2), s/veh	0.2	0.0	2.0	0.0	0.0	16.3	0.4	0.0	26.6	14.4	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	7.4	0.1	0.0	19.8	2.0	0.0	7.2	8.9	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	0.0	23.2	17.5	0.0	45.3	29.2	0.0	73.6	48.0	0.0	35.2
LnGrp LOS	C	A	C	B	A	D	C	A	E	D	A	D
Approach Vol, veh/h		405			700			305			487	
Approach Delay, s/veh		23.3			45.1			59.1			43.9	
Approach LOS		C			D			E			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	55.1	12.9	32.4	8.3	56.8	25.0	20.3				
Change Period (Y+Rc), s	8.7	* 6.9	* 6.3	* 5.7	7.6	* 6.9	6.0	* 5.7				
Max Green Setting (Gmax), s	6.3	* 48	* 8.7	* 26	7.4	* 47	19.0	* 15				
Max Q Clear Time (g_c+I1), s	2.3	42.7	6.6	9.8	2.2	18.9	19.4	14.5				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.7	0.0	2.5	0.0	0.1				

Intersection Summary												
HCM 6th Ctrl Delay			42.4									
HCM 6th LOS			D									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 2: Garbers Church Rd & HHS South Entrance

2040 Build
 Timing Plan: PM Peak

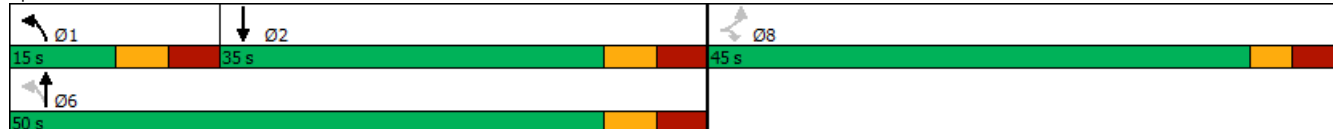


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	22	27	12	274	279	11
Future Volume (vph)	22	27	12	274	279	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	80	200			0
Storage Lanes	1	1	1			0
Taper Length (ft)	0		0			
Right Turn on Red		Yes				Yes
Link Speed (mph)	25			35	35	
Link Distance (ft)	684			1501	825	
Travel Time (s)	18.7			29.2	16.1	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	30	37	16	374	395	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases	8	8	6			
Detector Phase	8	8	1	6	2	
Switch Phase						
Minimum Initial (s)	7.0	7.0	10.0	10.0	10.0	
Minimum Split (s)	32.1	32.1	17.4	17.4	40.4	
Total Split (s)	45.0	45.0	15.0	50.0	35.0	
Total Split (%)	47.4%	47.4%	15.8%	52.6%	36.8%	
Yellow Time (s)	3.0	3.0	3.8	3.8	3.8	
All-Red Time (s)	3.1	3.1	3.6	3.6	3.6	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.1	6.1	7.4	7.4	7.4	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Max	Max	
v/c Ratio	0.15	0.18	0.02	0.25	0.28	
Control Delay	28.5	12.5	3.5	3.7	6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.5	12.5	3.5	3.7	6.5	
Queue Length 50th (ft)	11	0	2	47	50	
Queue Length 95th (ft)	34	24	6	81	168	
Internal Link Dist (ft)	604			1421	745	
Turn Bay Length (ft)		80	200			
Base Capacity (vph)	1057	960	754	1504	1416	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.03	0.04	0.02	0.25	0.28	

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 65.2
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Garbers Church Rd & HHS South Entrance



HCM Signalized Intersection Capacity Analysis
 2: Garbers Church Rd & HHS South Entrance

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	22	27	12	274	279	11
Future Volume (vph)	22	27	12	274	279	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	7.4	7.4	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1769	1863	1852	
Flt Permitted	0.95	1.00	0.46	1.00	1.00	
Satd. Flow (perm)	1770	1583	848	1863	1852	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	30	37	16	374	380	15
RTOR Reduction (vph)	0	35	0	0	1	0
Lane Group Flow (vph)	30	2	16	374	394	0
Confl. Peds. (#/hr)			1			1
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases	8	8	6			
Actuated Green, G (s)	4.5	4.5	55.7	55.7	46.9	
Effective Green, g (s)	4.5	4.5	55.7	55.7	46.9	
Actuated g/C Ratio	0.06	0.06	0.76	0.76	0.64	
Clearance Time (s)	6.1	6.1	7.4	7.4	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	108	96	658	1407	1178	
v/s Ratio Prot			0.00	c0.20	c0.21	
v/s Ratio Perm	c0.02	0.00	0.02			
v/c Ratio	0.28	0.02	0.02	0.27	0.33	
Uniform Delay, d1	33.0	32.5	2.6	2.8	6.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.1	0.0	0.5	0.8	
Delay (s)	34.5	32.6	2.6	3.2	7.0	
Level of Service	C	C	A	A	A	
Approach Delay (s)	33.4			3.2	7.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	20.9
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Edition methodology does not support Non-NEMA phasing.

Lanes, Volumes, Timings
 3: Garbers Church Rd & HHS inbound Entrance

2040 Build
 Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↙	↑	↘	
Traffic Volume (vph)	0	0	6	290	283	7
Future Volume (vph)	0	0	6	290	283	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	350			0
Storage Lanes	0	0	1			0
Taper Length (ft)	0		0			
Link Speed (mph)	25			35	35	
Link Distance (ft)	351			825	318	
Travel Time (s)	9.6			16.1	6.2	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	8	395	396	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 3: Garbers Church Rd & HHS inbound Entrance

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↘	↕	↗	
Traffic Volume (veh/h)	0	0	6	290	283	7
Future Volume (Veh/h)	0	0	6	290	283	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	8	395	386	10
Pedestrians	2					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				825	318	
pX, platoon unblocked	0.93	0.92	0.92			
vC, conflicting volume	804	393	398			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	715	296	302			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	366	683	1158			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	8	395	396			
Volume Left	8	0	0			
Volume Right	0	0	10			
cSH	1158	1700	1700			
Volume to Capacity	0.01	0.23	0.23			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.1	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.2		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			21.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↗				↖	↗			↖	↗
Traffic Volume (vph)	62	0	54	0	0	0	31	321	0	0	236	47
Future Volume (vph)	62	0	54	0	0	0	31	321	0	0	236	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50			0			200			80		200
Storage Lanes	1		1	0		0	1			0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		424			255			318			726	
Travel Time (s)		11.6			7.0			6.2			14.1	
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			3									
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	0	74	0	0	0	42	438	0	0	322	64
Turn Type	Prot		Perm				Prot	NA			NA	Perm
Protected Phases	8						1	6			2	
Permitted Phases			8							2		2
Detector Phase	8		8				1	6		2	2	2
Switch Phase												
Minimum Initial (s)	7.0		7.0				5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	34.7		34.7				12.0	22.5		34.0	34.0	34.0
Total Split (s)	38.0		38.0				17.0	67.0		50.0	50.0	50.0
Total Split (%)	36.2%		36.2%				16.2%	63.8%		47.6%	47.6%	47.6%
Yellow Time (s)	3.3		3.3				3.8	3.8		3.8	3.8	3.8
All-Red Time (s)	3.4		3.4				3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0		0.0				0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.7		6.7				7.0	7.0		7.0	7.0	7.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None		None				None	Max		Max	Max	Max
v/c Ratio	0.42		0.27				0.27	0.30		0.26	0.26	0.06
Control Delay	40.9		5.1				39.8	4.8		10.1	10.1	0.8
Queue Delay	0.0		0.0				0.0	0.0		0.0	0.0	0.0
Total Delay	40.9		5.1				39.8	4.8		10.1	10.1	0.8
Queue Length 50th (ft)	42		0				21	68		85	85	0
Queue Length 95th (ft)	83		15				51	120		153	153	5
Internal Link Dist (ft)		344			175			238			646	
Turn Bay Length (ft)	50						200					200
Base Capacity (vph)	664		651				211	1439		1235	1235	1062
Starvation Cap Reductn	0		0				0	0		0	0	0
Spillback Cap Reductn	0		0				0	0		0	0	0
Storage Cap Reductn	0		0				0	0		0	0	0
Reduced v/c Ratio	0.13		0.11				0.20	0.30		0.26	0.26	0.06

Intersection Summary

Area Type: Other

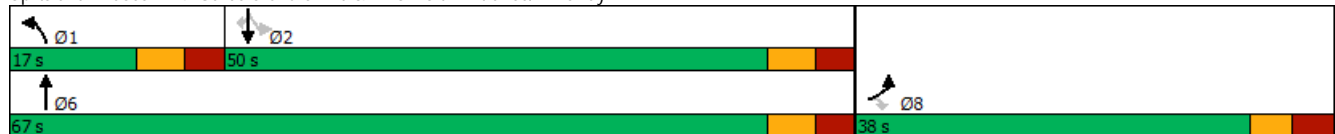
Cycle Length: 105

Actuated Cycle Length: 83.5

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Garbers Church Rd & HHS North Entrance/Driveway



HCM Signalized Intersection Capacity Analysis
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↗				↖	↗			↖	↗
Traffic Volume (vph)	62	0	54	0	0	0	31	321	0	0	236	47
Future Volume (vph)	62	0	54	0	0	0	31	321	0	0	236	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7		6.7				7.0	7.0			7.0	7.0
Lane Util. Factor	1.00		1.00				1.00	1.00			1.00	1.00
Frbp, ped/bikes	1.00		0.97				1.00	1.00			1.00	0.98
Flpb, ped/bikes	1.00		1.00				1.00	1.00			1.00	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		1533				1770	1863			1863	1547
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		1533				1770	1863			1863	1547
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	85	0	74	0	0	0	42	438	0	0	322	64
RTOR Reduction (vph)	0	0	67	0	0	0	0	0	0	0	0	25
Lane Group Flow (vph)	85	0	7	0	0	0	42	438	0	0	322	39
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			3									
Turn Type	Prot		Perm				Prot	NA			NA	Perm
Protected Phases	8						1	6			2	
Permitted Phases			8							2		2
Actuated Green, G (s)	8.1		8.1				5.0	65.9			53.9	53.9
Effective Green, g (s)	8.1		8.1				5.0	65.9			53.9	53.9
Actuated g/C Ratio	0.09		0.09				0.06	0.75			0.61	0.61
Clearance Time (s)	6.7		6.7				7.0	7.0			7.0	7.0
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	163		141				100	1399			1144	950
v/s Ratio Prot	c0.05						0.02	c0.24			0.17	
v/s Ratio Perm			0.00									0.03
v/c Ratio	0.52		0.05				0.42	0.31			0.28	0.04
Uniform Delay, d1	38.0		36.3				39.9	3.5			7.9	6.7
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	3.0		0.1				2.8	0.6			0.6	0.1
Delay (s)	40.9		36.4				42.8	4.1			8.5	6.8
Level of Service	D		D				D	A			A	A
Approach Delay (s)		38.8			0.0			7.5			8.2	
Approach LOS		D			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.6				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			87.7				Sum of lost time (s)				20.7	
Intersection Capacity Utilization			54.4%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 4: Garbers Church Rd & HHS North Entrance/Driveway

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↗				↖	↗			↖	↗
Traffic Volume (veh/h)	62	0	54	0	0	0	31	321	0	0	236	47
Future Volume (veh/h)	62	0	54	0	0	0	31	321	0	0	236	47
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	0	1870				1870	1870	0	1870	1870	1870
Adj Flow Rate, veh/h	85	0	74				42	438	0	0	322	64
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	0	2				2	2	0	2	2	2
Cap, veh/h	150	0	134				67	1394	0	0	1161	982
Arrive On Green	0.08	0.00	0.08				0.04	0.75	0.00	0.00	0.62	0.62
Sat Flow, veh/h	1781	0	1585				1781	1870	0	0	1870	1582
Grp Volume(v), veh/h	85	0	74				42	438	0	0	322	64
Grp Sat Flow(s),veh/h/ln	1781	0	1585				1781	1870	0	0	1870	1582
Q Serve(g_s), s	3.7	0.0	3.6				1.9	6.3	0.0	0.0	6.4	1.3
Cycle Q Clear(g_c), s	3.7	0.0	3.6				1.9	6.3	0.0	0.0	6.4	1.3
Prop In Lane	1.00		1.00				1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	150	0	134				67	1394	0	0	1161	982
V/C Ratio(X)	0.56	0.00	0.55				0.62	0.31	0.00	0.00	0.28	0.07
Avail Cap(c_a), veh/h	693	0	616				221	1394	0	0	1161	982
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	0.0	35.4				38.2	3.4	0.0	0.0	7.0	6.0
Incr Delay (d2), s/veh	3.3	0.0	3.5				9.1	0.6	0.0	0.0	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.5				1.0	1.7	0.0	0.0	2.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.7	0.0	38.9				47.2	4.0	0.0	0.0	7.6	6.2
LnGrp LOS	D	A	D				D	A	A	A	A	A
Approach Vol, veh/h		159						480			386	
Approach Delay, s/veh		38.8						7.8			7.4	
Approach LOS		D						A			A	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	10.0	57.0				67.0		13.5				
Change Period (Y+Rc), s	7.0	7.0				7.0		6.7				
Max Green Setting (Gmax), s	10.0	43.0				60.0		31.3				
Max Q Clear Time (g_c+I1), s	3.9	8.4				8.3		5.7				
Green Ext Time (p_c), s	0.0	2.2				2.9		0.5				

Intersection Summary

HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

User approved changes to right turn type.

Lanes, Volumes, Timings
 5: Garbers Church Rd & Bluestone ES inbound Entrance

2040 Build
 Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	330	3	5	270
Future Volume (vph)	0	0	330	3	5	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	0	0		0	1	
Taper Length (ft)	0				0	
Link Speed (mph)	25		35			35
Link Distance (ft)	382		726			625
Travel Time (s)	10.4		14.1			12.2
Confl. Peds. (#/hr)	3			4	4	
Confl. Bikes (#/hr)		3		1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	454	0	7	368
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 5: Garbers Church Rd & Bluestone ES inbound Entrance

2040 Build
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↔		↔	↔
Traffic Volume (veh/h)	0	0	330	3	5	270
Future Volume (Veh/h)	0	0	330	3	5	270
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	450	4	7	368
Pedestrians	4		3			
Lane Width (ft)	0.0		12.0			
Walking Speed (ft/s)	3.5		3.5			
Percent Blockage	0		0			
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			726			
pX, platoon unblocked	0.96	0.96			0.96	
vC, conflicting volume	841	456			458	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	810	408			410	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			99	
cM capacity (veh/h)	331	615			1098	
Direction, Lane #	NB 1	SB 1	SB 2			
Volume Total	454	7	368			
Volume Left	0	7	0			
Volume Right	4	0	0			
cSH	1700	1098	1700			
Volume to Capacity	0.27	0.01	0.22			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	8.3	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.2				
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			24.4%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
 6: Garbers Church Rd & Heritage Center Way/Bluestone ES/Golf Course

2040 Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↕	↕	
Traffic Volume (vph)	0	0	6	40	0	56	2	314	20	20	218	2
Future Volume (vph)	0	0	6	40	0	56	2	314	20	20	218	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	90		0	125		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	0			0			0			0		
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		466			549			625			794	
Travel Time (s)		12.7			15.0			12.2			15.5	
Confl. Peds. (#/hr)							8		7	7		8
Confl. Bikes (#/hr)						1			1			2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	131	0	0	458	0	27	300	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 6: Garbers Church Rd & Heritage Center Way/Bluestone ES/Golf Course

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (veh/h)	0	0	6	40	0	56	2	314	20	20	218	2
Future Volume (Veh/h)	0	0	6	40	0	56	2	314	20	20	218	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	8	55	0	76	3	428	27	27	297	3
Pedestrians		8			7							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	884	828	306	814	816	448	308			462		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	884	828	306	814	816	448	308			462		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	81	100	87	100			98		
cM capacity (veh/h)	224	294	728	282	298	606	1243			1092		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	8	131	458	27	300							
Volume Left	0	55	3	27	0							
Volume Right	8	76	27	0	3							
cSH	728	409	1243	1092	1700							
Volume to Capacity	0.01	0.32	0.00	0.02	0.18							
Queue Length 95th (ft)	1	34	0	2	0							
Control Delay (s)	10.0	17.9	0.1	8.4	0.0							
Lane LOS	B	C	A	A								
Approach Delay (s)	10.0	17.9	0.1	0.7								
Approach LOS	B	C										
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			43.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↕	↕	
Traffic Vol, veh/h	0	0	6	40	0	56	2	314	20	20	218	2
Future Vol, veh/h	0	0	6	40	0	56	2	314	20	20	218	2
Conflicting Peds, #/hr	0	0	0	0	0	0	8	0	7	7	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	8	55	0	76	3	428	27	27	297	3

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	847	829	307	812	817	449	308	0	0	462	0	0
Stage 1	361	361	-	455	455	-	-	-	-	-	-	-
Stage 2	486	468	-	357	362	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	282	306	733	298	311	610	1253	-	-	1099	-	-
Stage 1	657	626	-	585	569	-	-	-	-	-	-	-
Stage 2	563	561	-	661	625	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	239	293	727	286	298	606	1243	-	-	1092	-	-
Mov Cap-2 Maneuver	239	293	-	286	298	-	-	-	-	-	-	-
Stage 1	650	605	-	579	563	-	-	-	-	-	-	-
Stage 2	491	555	-	637	604	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	17.7	0	0.7
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1243	-	-	727	413	1092	-	-
HCM Lane V/C Ratio	0.002	-	-	0.011	0.317	0.025	-	-
HCM Control Delay (s)	7.9	0	-	10	17.7	8.4	-	-
HCM Lane LOS	A	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	1.3	0.1	-	-

Lanes, Volumes, Timings
 7: Garbers Church Rd & Heritage Estates Circle

2040 Build
 Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	2	370	3	2	231
Future Volume (vph)	6	2	370	3	2	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	372		794			1342
Travel Time (s)	10.1		15.5			26.1
Confl. Peds. (#/hr)				7	7	
Confl. Bikes (#/hr)				4		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	509	0	0	318
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 7: Garbers Church Rd & Heritage Estates Circle

2040 Build
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	R
Traffic Volume (veh/h)	6	2	370	3	2	231
Future Volume (Veh/h)	6	2	370	3	2	231
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	8	3	505	4	3	315
Pedestrians	7					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	835	514			516	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	835	514			516	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	334	557			1043	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	11	509	318			
Volume Left	8	0	3			
Volume Right	3	4	0			
cSH	375	1700	1043			
Volume to Capacity	0.03	0.30	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	14.9	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	14.9	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			33.6%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	6	2	370	3	2	231
Future Vol, veh/h	6	2	370	3	2	231
Conflicting Peds, #/hr	0	0	0	7	7	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	3	505	4	3	315

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	835	514	0	0	516
Stage 1	514	-	-	-	-
Stage 2	321	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	338	560	-	-	1050
Stage 1	600	-	-	-	-
Stage 2	735	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	335	556	-	-	1043
Mov Cap-2 Maneuver	335	-	-	-	-
Stage 1	596	-	-	-	-
Stage 2	733	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	372	1043	-
HCM Lane V/C Ratio	-	-	0.029	0.003	-
HCM Control Delay (s)	-	-	15	8.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	3	335	37	0	215
Future Volume (vph)	16	3	335	37	0	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	452		1342			264
Travel Time (s)	12.3		26.1			5.1
Confl. Peds. (#/hr)				8	8	
Confl. Bikes (#/hr)		1		2		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	0	507	0	0	293
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 8: Garbers Church Rd & Park Lawn Dr

2040 Build
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	16	3	335	37	0	215
Future Volume (Veh/h)	16	3	335	37	0	215
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	22	4	457	50	0	293
Pedestrians	8					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	783	490			515	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	783	490			515	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			100	
cM capacity (veh/h)	360	574			1043	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	26	507	293			
Volume Left	22	0	0			
Volume Right	4	50	0			
cSH	382	1700	1043			
Volume to Capacity	0.07	0.30	0.00			
Queue Length 95th (ft)	5	0	0			
Control Delay (s)	15.1	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	15.1	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			33.9%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	16	3	335	37	0	215
Future Vol, veh/h	16	3	335	37	0	215
Conflicting Peds, #/hr	0	0	0	8	8	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	4	457	50	0	293

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	783	490	0	0	515
Stage 1	490	-	-	-	-
Stage 2	293	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	362	578	-	-	1051
Stage 1	616	-	-	-	-
Stage 2	757	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	359	574	-	-	1043
Mov Cap-2 Maneuver	359	-	-	-	-
Stage 1	611	-	-	-	-
Stage 2	757	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	382	1043	-
HCM Lane V/C Ratio	-	-	0.068	-	-
HCM Control Delay (s)	-	-	15.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	6	9	329	209	7
Future Volume (vph)	6	6	9	329	209	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			35	35	
Link Distance (ft)	364			264	633	
Travel Time (s)	9.9			5.1	12.3	
Confl. Peds. (#/hr)		2	3			3
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	461	295	0
Sign Control	Stop			Free	Free	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 9: Garbers Church Rd & Rhianon Ln

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑	↓	
Traffic Volume (veh/h)	6	6	9	329	209	7
Future Volume (Veh/h)	6	6	9	329	209	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	8	8	12	449	285	10
Pedestrians	3			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	3.5			3.5		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	766	295	298			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766	295	298			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	366	741	1260			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	16	461	295			
Volume Left	8	12	0			
Volume Right	8	0	10			
cSH	490	1260	1700			
Volume to Capacity	0.03	0.01	0.17			
Queue Length 95th (ft)	3	1	0			
Control Delay (s)	12.6	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.6	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			40.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑		↓
Traffic Vol, veh/h	6	6	9	329	209	7
Future Vol, veh/h	6	6	9	329	209	7
Conflicting Peds, #/hr	0	2	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	8	12	449	285	10

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	766	295	298	0	0
Stage 1	293	-	-	-	-
Stage 2	473	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	371	744	1263	-	-
Stage 1	757	-	-	-	-
Stage 2	627	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	364	740	1259	-	-
Mov Cap-2 Maneuver	364	-	-	-	-
Stage 1	745	-	-	-	-
Stage 2	625	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1259	-	488	-	-
HCM Lane V/C Ratio	0.01	-	0.034	-	-
HCM Control Delay (s)	7.9	0	12.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	1	325	2	0	208
Future Volume (vph)	6	1	325	2	0	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	417		633			767
Travel Time (s)	11.4		12.3			14.9
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	0	446	0	0	284
Sign Control	Stop		Free			Free

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 10: Garbers Church Rd & Lendale Ln

2040 Build
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	6	1	325	2	0	208
Future Volume (Veh/h)	6	1	325	2	0	208
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	8	1	443	3	0	284
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						767
pX, platoon unblocked						
vC, conflicting volume	730	446			447	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	730	446			447	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	389	612			1112	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	9	446	284			
Volume Left	8	0	0			
Volume Right	1	3	0			
cSH	406	1700	1112			
Volume to Capacity	0.02	0.26	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	14.1	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	14.1	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			30.7%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	6	1	325	2	0	208
Future Vol, veh/h	6	1	325	2	0	208
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	1	443	3	0	284

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	730	446	0	0	447
Stage 1	446	-	-	-	-
Stage 2	284	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	389	612	-	-	1113
Stage 1	645	-	-	-	-
Stage 2	764	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	389	611	-	-	1112
Mov Cap-2 Maneuver	389	-	-	-	-
Stage 1	644	-	-	-	-
Stage 2	764	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	410	1112	-
HCM Lane V/C Ratio	-	-	0.023	-	-
HCM Control Delay (s)	-	-	14	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lanes, Volumes, Timings
 11: Garbers Church Rd/Switchboard Rd & W Market St

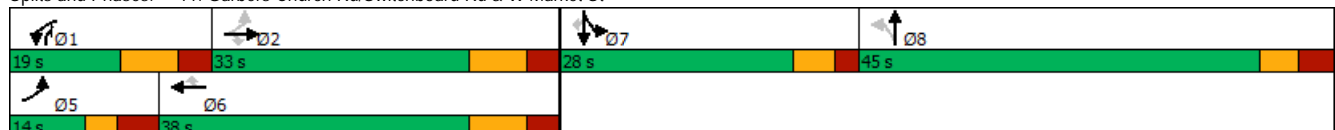
2040 Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Future Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	360		180	300		140	0		200	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1555			455			767			1017	
Travel Time (s)		30.3			8.9			14.9			19.8	
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)						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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	316	30	157	373	29	0	134	227	0	80	81
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6			8	1	7	7	
Permitted Phases	2		2		6	8						7
Detector Phase	5	2	2	1	6	6	8	8	1	7	7	7
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.9	22.5	22.5	15.6	31.6	31.6	44.1	44.1	15.6	22.5	22.5	22.5
Total Split (s)	14.0	33.0	33.0	19.0	38.0	38.0	45.0	45.0	19.0	28.0	28.0	28.0
Total Split (%)	11.2%	26.4%	26.4%	15.2%	30.4%	30.4%	36.0%	36.0%	15.2%	22.4%	22.4%	22.4%
Yellow Time (s)	3.0	5.4	5.4	5.4	5.4	5.4	3.7	3.7	5.4	3.9	3.9	3.9
All-Red Time (s)	3.9	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.2	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.14	0.62	0.06	0.77	0.55	0.04		0.47	0.59		0.41	0.25
Control Delay	17.1	38.1	0.2	66.2	31.3	0.1		39.2	13.2		47.4	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	17.1	38.1	0.2	66.2	31.3	0.1		39.2	13.2		47.4	1.9
Queue Length 50th (ft)	16	148	0	84	165	0		69	0		41	0
Queue Length 95th (ft)	58	#369	0	#259	#406	0		126	78		106	0
Internal Link Dist (ft)		1475			375			687			937	
Turn Bay Length (ft)	360		180	300		140			200			100
Base Capacity (vph)	430	507	530	205	677	657		721	384		447	514
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.14	0.62	0.06	0.77	0.55	0.04		0.19	0.59		0.18	0.16

Intersection Summary
 Area Type: Other
 Cycle Length: 125
 Actuated Cycle Length: 91.2
 Natural Cycle: 115
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 11: Garbers Church Rd/Switchboard Rd & W Market St



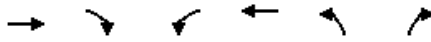
HCM Signalized Intersection Capacity Analysis
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↑	↗	↖	↑	↗		↖	↗		↖	↗	
Traffic Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62	
Future Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	1.00	
Satd. Flow (prot)	1770	1863	1549	1770	1863	1548		1845	1583		1839	1583	
Flt Permitted	0.54	1.00	1.00	0.95	1.00	1.00		0.92	1.00		0.99	1.00	
Satd. Flow (perm)	999	1863	1549	1770	1863	1548		1706	1583		1839	1583	
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	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	61	316	30	157	373	29	26	108	227	21	59	81	
RTOR Reduction (vph)	0	0	21	0	0	19	0	0	201	0	0	73	
Lane Group Flow (vph)	61	316	9	157	373	10	0	134	26	0	80	8	
Confl. Peds. (#/hr)			1	1					1	1			
Confl. Bikes (#/hr)					2								
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Over	Split	NA	Perm	
Protected Phases	5	2		1	6			8	1	7	7		
Permitted Phases	2		2			6	8					7	
Actuated Green, G (s)	32.1	26.5	26.5	10.6	33.2	33.2		15.2	10.6		9.6	9.6	
Effective Green, g (s)	32.1	26.5	26.5	10.6	33.2	33.2		15.2	10.6		9.6	9.6	
Actuated g/C Ratio	0.35	0.29	0.29	0.11	0.36	0.36		0.16	0.11		0.10	0.10	
Clearance Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	393	534	444	203	669	556		280	181		191	164	
v/s Ratio Prot	0.01	0.17		c0.09	c0.20				0.02		c0.04		
v/s Ratio Perm	0.04		0.01			0.01		c0.08				0.01	
w/c Ratio	0.16	0.59	0.02	0.77	0.56	0.02		0.48	0.14		0.42	0.05	
Uniform Delay, d1	20.4	28.3	23.6	39.7	23.7	19.1		35.0	36.8		38.8	37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	4.8	0.1	16.6	3.3	0.1		1.3	0.4		1.5	0.1	
Delay (s)	20.6	33.1	23.7	56.3	27.1	19.2		36.3	37.2		40.3	37.4	
Level of Service	C	C	C	E	C	B		D	D		D	D	
Approach Delay (s)		30.5			34.9			36.9			38.8		
Approach LOS		C			C			D			D		
Intersection Summary													
HCM 2000 Control Delay			34.6		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.61										
Actuated Cycle Length (s)			92.4		Sum of lost time (s)						30.5		
Intersection Capacity Utilization			57.3%		ICU Level of Service						B		
Analysis Period (min)			15										
c Critical Lane Group													

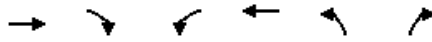
HCM 6th Edition methodology expects strict NEMA phasing.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↑	↑	↑	
Traffic Volume (vph)	425	7	36	427	1	29
Future Volume (vph)	425	7	36	427	1	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		100	260		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			0		0	
Link Speed (mph)	35			35	25	
Link Distance (ft)	455			1297	501	
Travel Time (s)	8.9			25.3	13.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	557	0	46	551	38	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis
 12: Stoneleigh Dr & W Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (veh/h)	425	7	36	427	1	29
Future Volume (Veh/h)	425	7	36	427	1	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	548	9	46	551	1	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	455			1297		
pX, platoon unblocked			0.85		0.93	0.85
vC, conflicting volume			557		1196	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			396		818	391
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	93
cM capacity (veh/h)			993		306	562
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	557	46	551	38		
Volume Left	0	46	0	1		
Volume Right	9	0	0	37		
cSH	1700	993	1700	550		
Volume to Capacity	0.33	0.05	0.32	0.07		
Queue Length 95th (ft)	0	4	0	6		
Control Delay (s)	0.0	8.8	0.0	12.0		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.7		12.0		
Approach LOS				B		
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			44.0%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↖	↗	↘
Traffic Vol, veh/h	425	7	36	427	1	29
Future Vol, veh/h	425	7	36	427	1	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	260	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	548	9	46	551	1	37

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	557	0	1196
Stage 1	-	-	-	-	553
Stage 2	-	-	-	-	643
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1014	-	206
Stage 1	-	-	-	-	576
Stage 2	-	-	-	-	523
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1014	-	197
Mov Cap-2 Maneuver	-	-	-	-	197
Stage 1	-	-	-	-	576
Stage 2	-	-	-	-	499

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	504	-	-	1014	-
HCM Lane V/C Ratio	0.077	-	-	0.046	-
HCM Control Delay (s)	12.7	-	-	8.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lanes, Volumes, Timings
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 Build
 Timing Plan: PM Peak

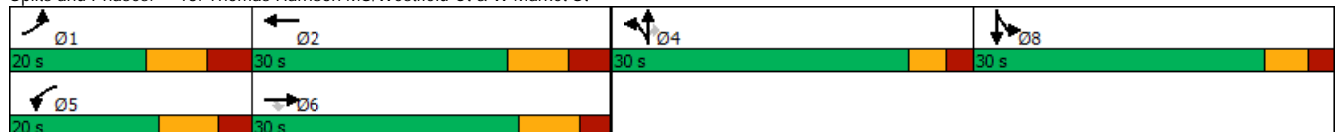


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	353	12	26	299	68	17	2	49	52	0	60
Future Volume (vph)	91	353	12	26	299	68	17	2	49	52	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		225	500		0	0		175	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1297			1215			527			419	
Travel Time (s)		25.3			23.7			14.4			11.4	
Confl. Peds. (#/hr)			2	2			1					1
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	460	16	34	479	0	0	25	64	0	146	0
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases			6						4			
Detector Phase	1	6	6	5	2		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	13.7	37.7	37.7	12.7	31.7		40.5	40.5	40.5	44.8	44.8	
Total Split (s)	20.0	30.0	30.0	20.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	18.2%	27.3%	27.3%	18.2%	27.3%		27.3%	27.3%	27.3%	27.3%	27.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.2	3.2	3.2	3.6	3.6	
All-Red Time (s)	3.7	2.7	2.7	2.7	3.7		2.3	2.3	2.3	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max		None	None	None	None	None	
v/c Ratio	0.54	0.51	0.02	0.21	0.85			0.15	0.19			0.36
Control Delay	47.7	23.7	0.1	43.0	45.1			42.4	1.3			3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0			0.0
Total Delay	47.7	23.7	0.1	43.0	45.1			42.4	1.3			3.7
Queue Length 50th (ft)	53	115	0	15	210			11	0			0
Queue Length 95th (ft)	#171	#539	0	57	#613			46	0			17
Internal Link Dist (ft)		1217			1135			447				339
Turn Bay Length (ft)	250		225	500					175			
Base Capacity (vph)	257	905	838	280	562			563	636			694
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	0.46	0.51	0.02	0.12	0.85			0.04	0.10			0.21

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 81.1
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: Thomas Harrison MS/Westfield Ct & W Market St



HCM Signalized Intersection Capacity Analysis
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	353	12	26	299	68	17	2	49	52	0	60
Future Volume (vph)	91	353	12	26	299	68	17	2	49	52	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	1.00		0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.97			1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1770	1863	1547	1770	1811			1784	1583		1670	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (perm)	1770	1863	1547	1770	1811			1784	1583		1670	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	119	460	16	34	390	89	22	3	64	68	0	78
RTOR Reduction (vph)	0	0	9	0	6	0	0	0	60	0	126	0
Lane Group Flow (vph)	119	460	7	34	473	0	0	25	4	0	20	0
Confl. Peds. (#/hr)			2	2			1					1
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases			6						4			
Actuated Green, G (s)	10.1	39.4	39.4	3.0	30.3			5.8	5.8		11.8	
Effective Green, g (s)	10.1	39.4	39.4	3.0	30.3			5.8	5.8		11.8	
Actuated g/C Ratio	0.12	0.45	0.45	0.03	0.35			0.07	0.07		0.14	
Clearance Time (s)	8.7	7.7	7.7	7.7	8.7			5.5	5.5		5.8	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	206	846	703	61	632			119	105		227	
v/s Ratio Prot	c0.07	c0.25		0.02	c0.26			c0.01			c0.01	
v/s Ratio Perm			0.00						0.00			
v/c Ratio	0.58	0.54	0.01	0.56	0.75			0.21	0.04		0.09	
Uniform Delay, d1	36.3	17.1	13.0	41.2	24.8			38.3	37.8		32.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	3.9	2.5	0.0	10.6	7.9			0.9	0.2		0.2	
Delay (s)	40.2	19.6	13.0	51.8	32.8			39.2	38.0		32.9	
Level of Service	D	B	B	D	C			D	D		C	
Approach Delay (s)		23.6			34.0			38.3			32.9	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			29.6			HCM 2000 Level of Service					C	
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			86.7			Sum of lost time (s)			28.7			
Intersection Capacity Utilization			64.4%			ICU Level of Service					C	
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 13: Thomas Harrison MS/Westfield Ct & W Market St

2040 Build
 Timing Plan: PM Peak



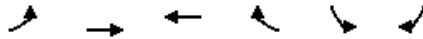
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	353	12	26	299	68	17	2	49	52	0	60
Future Volume (veh/h)	91	353	12	26	299	68	17	2	49	52	0	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	119	460	16	34	390	89	22	3	64	68	0	78
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	153	689	583	61	446	102	134	18	134	92	0	105
Arrive On Green	0.09	0.37	0.37	0.03	0.30	0.30	0.08	0.08	0.08	0.12	0.00	0.12
Sat Flow, veh/h	1781	1870	1581	1781	1473	336	1577	215	1577	776	0	890
Grp Volume(v), veh/h	119	460	16	34	0	479	25	0	64	146	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1581	1781	0	1809	1792	0	1577	1667	0	0
Q Serve(g_s), s	4.6	14.5	0.5	1.3	0.0	17.7	0.9	0.0	2.7	6.0	0.0	0.0
Cycle Q Clear(g_c), s	4.6	14.5	0.5	1.3	0.0	17.7	0.9	0.0	2.7	6.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.19	0.88		1.00	0.47		0.53
Lane Grp Cap(c), veh/h	153	689	583	61	0	548	152	0	134	197	0	0
V/C Ratio(X)	0.78	0.67	0.03	0.55	0.00	0.87	0.16	0.00	0.48	0.74	0.00	0.00
Avail Cap(c_a), veh/h	286	689	583	312	0	548	624	0	549	574	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	31.5	18.6	14.2	33.4	0.0	23.2	29.9	0.0	30.7	30.0	0.0	0.0
Incr Delay (d2), s/veh	8.2	5.1	0.1	7.6	0.0	17.5	0.5	0.0	2.6	5.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	6.6	0.2	0.7	0.0	9.5	0.4	0.0	1.1	2.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.6	23.7	14.3	41.0	0.0	40.7	30.4	0.0	33.4	35.3	0.0	0.0
LnGrp LOS	D	C	B	D	A	D	C	A	C	D	A	A
Approach Vol, veh/h		595			513			89			146	
Approach Delay, s/veh		26.6			40.7			32.5			35.3	
Approach LOS		C			D			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.7	30.0		11.5	10.1	34.6		14.1				
Change Period (Y+Rc), s	* 8.7	* 8.7		5.5	* 7.7	* 8.7		5.8				
Max Green Setting (Gmax), s	* 11	* 21		24.5	* 12	* 22		24.2				
Max Q Clear Time (g_c+I1), s	6.6	19.7		4.7	3.3	16.5		8.0				
Green Ext Time (p_c), s	0.1	0.5		0.3	0.0	1.4		0.7				

Intersection Summary		
HCM 6th Ctrl Delay		33.3
HCM 6th LOS		C

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 14: W Market St & Brickstone Ct

2040 Build
 Timing Plan: PM Peak

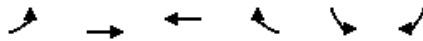


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑		↑	
Traffic Volume (vph)	3	454	488	93	57	0
Future Volume (vph)	3	454	488	93	57	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		25	
Link Distance (ft)		1215	613		545	
Travel Time (s)		23.7	11.9		14.9	
Confl. Peds. (#/hr)	3			3		
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	573	733	0	72	0
Sign Control		Free	Free		Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 14: W Market St & Brickstone Ct

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔		↔	
Traffic Volume (veh/h)	3	454	488	93	57	0
Future Volume (Veh/h)	3	454	488	93	57	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	573	616	117	72	0
Pedestrians					3	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		1215				
pX, platoon unblocked					0.83	
vC, conflicting volume	736				1258	678
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736				1208	678
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				57	100
cM capacity (veh/h)	867				166	451
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	4	573	733	72		
Volume Left	4	0	0	72		
Volume Right	0	0	117	0		
cSH	867	1700	1700	166		
Volume to Capacity	0.00	0.34	0.43	0.43		
Queue Length 95th (ft)	0	0	0	49		
Control Delay (s)	9.2	0.0	0.0	42.3		
Lane LOS	A			E		
Approach Delay (s)	0.1		0.0	42.3		
Approach LOS				E		
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			48.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	1	1		1	
Traffic Vol, veh/h	3	454	488	93	57	0
Future Vol, veh/h	3	454	488	93	57	0
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	573	616	117	72	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	736	0	-	0	1259	678
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	581	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	870	-	-	-	188	452
Stage 1	-	-	-	-	504	-
Stage 2	-	-	-	-	559	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	868	-	-	-	186	451
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	557	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.1	0	36.1			
HCM LOS	E					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	868	-	-	-	186	
HCM Lane V/C Ratio	0.004	-	-	-	0.387	
HCM Control Delay (s)	9.2	-	-	-	36.1	
HCM Lane LOS	A	-	-	-	E	
HCM 95th %tile Q(veh)	0	-	-	-	1.7	

Lanes, Volumes, Timings
15: W Market St & Waterman Dr

2040 Build
Timing Plan: PM Peak

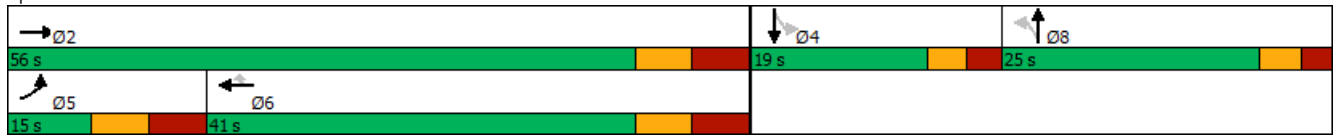


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↖	↗		↕		↖	↗	
Traffic Volume (vph)	83	397	0	0	607	85	0	0	0	89	0	145
Future Volume (vph)	83	397	0	0	607	85	0	0	0	89	0	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		175	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			25	
Link Distance (ft)		1173			1415			219			571	
Travel Time (s)		22.9			27.6			4.3			15.6	
Confl. Peds. (#/hr)			2	2					3	3		
Confl. Bikes (#/hr)			1			1			3			1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	512	0	0	783	110	0	0	0	115	187	0
Turn Type	Prot	NA			NA	Perm				Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases					6	6	8	8		4		4
Detector Phase	5	2			6	6	8	8		4		4
Switch Phase												
Minimum Initial (s)	5.0	10.0			10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	13.7	26.7			36.7	36.7	36.6	36.6		23.7	23.7	
Total Split (s)	15.0	56.0			41.0	41.0	25.0	25.0		19.0	19.0	
Total Split (%)	15.0%	56.0%			41.0%	41.0%	25.0%	25.0%		19.0%	19.0%	
Yellow Time (s)	4.3	4.3			4.3	4.3	3.2	3.2		3.0	3.0	
All-Red Time (s)	4.4	4.4			4.4	4.4	2.4	2.4		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	8.7	8.7			8.7	8.7		5.6		5.7	5.7	
Lead/Lag	Lead				Lag	Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	Max			Max	Max	None	None		None	None	
v/c Ratio	0.78	0.47			1.05	0.15				1.28	0.28	
Control Delay	75.0	14.3			72.1	0.5				221.6	1.0	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	75.0	14.3			72.1	0.5				221.6	1.0	
Queue Length 50th (ft)	50	107			344	0				-66	0	
Queue Length 95th (ft)	#200	405			#1002	1				#241	0	
Internal Link Dist (ft)		1093			1335			139			491	
Turn Bay Length (ft)	150					175				100		
Base Capacity (vph)	138	1097			749	734				90	679	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.78	0.47			1.05	0.15				1.28	0.28	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 82.3
 Natural Cycle: 125
 Control Type: Actuated-Uncoordinated
 ~ 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.

Splits and Phases: 15: W Market St & Waterman Dr



HCM Signalized Intersection Capacity Analysis
 15: W Market St & Waterman Dr

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	↖	↗			↖	↗		↕		↖	↗			
Traffic Volume (vph)	83	397	0	0	607	85	0	0	0	89	0	145		
Future Volume (vph)	83	397	0	0	607	85	0	0	0	89	0	145		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)	8.7	8.7			8.7	8.7				5.7	5.7			
Lane Util. Factor	1.00	1.00			1.00	1.00				1.00	1.00			
Frbp, ped/bikes	1.00	1.00			1.00	0.98				1.00	0.98			
Flpb, ped/bikes	1.00	1.00			1.00	1.00				1.00	1.00			
Frt	1.00	1.00			1.00	0.85				1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00			
Satd. Flow (prot)	1770	1863			1863	1550				1764	1548			
Flt Permitted	0.95	1.00			1.00	1.00				0.29	1.00			
Satd. Flow (perm)	1770	1863			1863	1550				546	1548			
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Adj. Flow (vph)	107	512	0	0	783	110	0	0	0	115	0	187		
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	0	0	158	0		
Lane Group Flow (vph)	107	512	0	0	783	42	0	0	0	115	29	0		
Confl. Peds. (#/hr)			2	2						3	3			
Confl. Bikes (#/hr)			1	1		1				3	3	1		
Turn Type	Prot	NA			NA	Perm				Perm	NA			
Protected Phases	5	2			6			8				4		
Permitted Phases						6	8			4				
Actuated Green, G (s)	6.5	48.5			33.3	33.3				13.6	13.6			
Effective Green, g (s)	6.5	48.5			33.3	33.3				13.6	13.6			
Actuated g/C Ratio	0.07	0.56			0.38	0.38				0.16	0.16			
Clearance Time (s)	8.7	8.7			8.7	8.7				5.7	5.7			
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0			
Lane Grp Cap (vph)	132	1042			715	595				85	242			
v/s Ratio Prot	0.06	c0.27			c0.42							0.02		
v/s Ratio Perm						0.03				c0.21				
w/c Ratio	0.81	0.49			1.10	0.07				1.35	0.12			
Uniform Delay, d1	39.5	11.6			26.7	16.9				36.6	31.4			
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00			
Incremental Delay, d2	30.0	1.7			62.6	0.2				218.0	0.2			
Delay (s)	69.5	13.3			89.3	17.1				254.5	31.6			
Level of Service	E	B			F	B				F	C			
Approach Delay (s)		23.0			80.4			0.0			116.5			
Approach LOS		C			F			A			F			
Intersection Summary														
HCM 2000 Control Delay			66.8									HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio			1.05											
Actuated Cycle Length (s)			86.7							28.7				
Intersection Capacity Utilization			73.9%										ICU Level of Service	D
Analysis Period (min)			15											
c Critical Lane Group														

HCM 6th Signalized Intersection Summary
 15: W Market St & Waterman Dr

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↑	↗		↕		↖	↖	
Traffic Volume (veh/h)	83	397	0	0	607	85	0	0	0	89	0	145
Future Volume (veh/h)	83	397	0	0	607	85	0	0	0	89	0	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No		No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	107	512	0	0	783	110	0	0	0	115	0	187
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	136	1218	0	0	851	706	0	282	0	365	0	231
Arrive On Green	0.08	0.65	0.00	0.00	0.45	0.45	0.00	0.00	0.00	0.15	0.00	0.15
Sat Flow, veh/h	1781	1870	0	0	1870	1552	0	1870	0	1764	0	1534
Grp Volume(v), veh/h	107	512	0	0	783	110	0	0	0	115	0	187
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1552	0	1870	0	1764	0	1534
Q Serve(g_s), s	4.3	9.6	0.0	0.0	28.5	3.0	0.0	0.0	0.0	4.3	0.0	8.6
Cycle Q Clear(g_c), s	4.3	9.6	0.0	0.0	28.5	3.0	0.0	0.0	0.0	4.3	0.0	8.6
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	136	1218	0	0	851	706	0	282	0	365	0	231
V/C Ratio(X)	0.78	0.42	0.00	0.00	0.92	0.16	0.00	0.00	0.00	0.32	0.00	0.81
Avail Cap(c_a), veh/h	154	1218	0	0	851	706	0	499	0	422	0	281
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.0	6.1	0.0	0.0	18.6	11.6	0.0	0.0	0.0	28.0	0.0	29.8
Incr Delay (d2), s/veh	20.6	1.1	0.0	0.0	16.7	0.5	0.0	0.0	0.0	0.5	0.0	13.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	3.1	0.0	0.0	14.6	1.0	0.0	0.0	0.0	1.8	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.5	7.2	0.0	0.0	35.3	12.1	0.0	0.0	0.0	28.5	0.0	43.4
LnGrp LOS	D	A	A	A	D	B	A	A	A	C	A	D
Approach Vol, veh/h		619			893			0			302	
Approach Delay, s/veh		15.2			32.4			0.0			37.7	
Approach LOS		B			C						D	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		56.0		16.6	14.3	41.7		16.6				
Change Period (Y+Rc), s		* 8.7		* 5.7	* 8.7	* 8.7		* 5.7				
Max Green Setting (Gmax), s		* 47		* 13	* 6.3	* 32		* 19				
Max Q Clear Time (g_c+I1), s		11.6		10.6	6.3	30.5		0.0				
Green Ext Time (p_c), s		3.5		0.4	0.0	1.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		27.4
HCM 6th LOS		C

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
16: Dogwood Dr & W Market St

2040 Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	443	77	20	544	10	67	26	38	7	14	21
Future Volume (vph)	16	443	77	20	544	10	67	26	38	7	14	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		125	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1415			398			379			366	
Travel Time (s)		27.6			7.8			10.3			10.0	
Confl. Peds. (#/hr)	2					2	2					2
Confl. Bikes (#/hr)						1			1			6
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	678	0	26	723	0	0	121	50	0	54	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			8		8	4	4
Permitted Phases	6			2			8		8	4		
Detector Phase	6	6		2	2		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	32.7	32.7		31.7	31.7		38.1	38.1	38.1	37.7	37.7	
Total Split (s)	30.0	30.0		30.0	30.0		25.0	25.0	25.0	25.0	25.0	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		31.3%	31.3%	31.3%	31.3%	31.3%	
Yellow Time (s)	4.7	4.7		4.7	4.7		3.3	3.3	3.3	3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.8	3.8	3.8	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.7	6.7		6.7	6.7			7.1	7.1		5.7	
Lead/Lag							Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
v/c Ratio	0.13	0.71		0.13	0.75		0.50	0.13			0.48	
Control Delay	23.8	27.4		22.8	29.1		35.9	0.8			30.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	23.8	27.4		22.8	29.1		35.9	0.8			30.3	
Queue Length 50th (ft)	5	236		6	263		44	0			10	
Queue Length 95th (ft)	33	#760		38	#827		122	0			44	
Internal Link Dist (ft)		1335			318		299				286	
Turn Bay Length (ft)	100			100				125				
Base Capacity (vph)	166	953		203	966		412	546			191	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.13	0.71		0.13	0.75		0.29	0.09			0.28	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 64.8

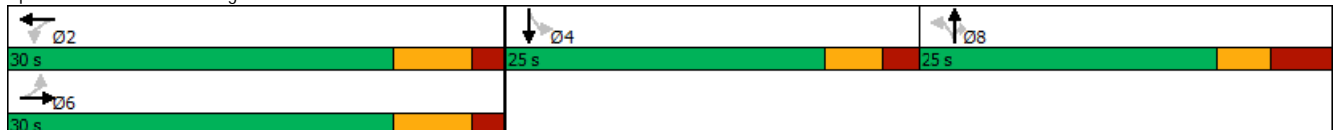
Natural Cycle: 130

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.

Splits and Phases: 16: Dogwood Dr & W Market St



HCM Signalized Intersection Capacity Analysis
 16: Dogwood Dr & W Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	443	77	20	544	10	67	26	38	7	14	21
Future Volume (vph)	16	443	77	20	544	10	67	26	38	7	14	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7			7.1	7.1			5.7
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98			0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85			0.93
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00			0.99
Satd. Flow (prot)	1768	1822		1770	1857			1796	1547			1687
Flt Permitted	0.17	1.00		0.21	1.00			0.75	1.00			0.30
Satd. Flow (perm)	320	1822		392	1857			1400	1547			502
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	21	578	100	26	710	13	87	34	50	9	18	27
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	43	0	24	0
Lane Group Flow (vph)	21	672	0	26	722	0	0	121	7	0	30	0
Confl. Peds. (#/hr)	2						2	2				2
Confl. Bikes (#/hr)						1			1			6
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	Perm	NA
Protected Phases		6			2			8				4
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	31.9	31.9		31.9	31.9			9.2	9.2			7.9
Effective Green, g (s)	31.9	31.9		31.9	31.9			9.2	9.2			7.9
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.13	0.13			0.12
Clearance Time (s)	6.7	6.7		6.7	6.7			7.1	7.1			5.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	149	848		182	864			188	207			57
v/s Ratio Prot		0.37			c0.39							
v/s Ratio Perm	0.07			0.07				c0.09	0.00			c0.06
v/c Ratio	0.14	0.79		0.14	0.84			0.64	0.03			0.53
Uniform Delay, d1	10.5	15.5		10.5	16.0			28.1	25.8			28.5
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	2.0	7.5		1.6	9.4			7.3	0.1			8.6
Delay (s)	12.4	23.0		12.1	25.4			35.4	25.8			37.1
Level of Service	B	C		B	C			D	C			D
Approach Delay (s)		22.7			25.0			32.6				37.1
Approach LOS		C			C			C				D
Intersection Summary												
HCM 2000 Control Delay			25.2			HCM 2000 Level of Service						C
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			68.5			Sum of lost time (s)			19.5			
Intersection Capacity Utilization			62.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 16: Dogwood Dr & W Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	443	77	20	544	10	67	26	38	7	14	21
Future Volume (veh/h)	16	443	77	20	544	10	67	26	38	7	14	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.99		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	578	100	26	710	13	87	34	50	9	18	27
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	333	823	142	355	970	18	291	90	240	115	107	127
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	730	1553	269	761	1830	34	960	575	1540	127	687	814
Grp Volume(v), veh/h	21	0	678	26	0	723	121	0	50	54	0	0
Grp Sat Flow(s),veh/h/ln	730	0	1821	761	0	1863	1535	0	1540	1629	0	0
Q Serve(g_s), s	1.0	0.0	12.3	1.2	0.0	13.1	1.8	0.0	1.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.1	0.0	12.3	13.4	0.0	13.1	3.0	0.0	1.2	1.2	0.0	0.0
Prop In Lane	1.00		0.15	1.00		0.02	0.72		1.00	0.17		0.50
Lane Grp Cap(c), veh/h	333	0	965	355	0	988	380	0	240	350	0	0
V/C Ratio(X)	0.06	0.00	0.70	0.07	0.00	0.73	0.32	0.00	0.21	0.15	0.00	0.00
Avail Cap(c_a), veh/h	333	0	965	355	0	988	749	0	627	796	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.4	0.0	7.7	12.8	0.0	7.9	16.8	0.0	16.2	16.2	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	4.3	0.4	0.0	4.8	0.5	0.0	0.4	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	4.0	0.2	0.0	4.4	1.0	0.0	0.4	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.7	0.0	12.0	13.2	0.0	12.7	17.3	0.0	16.6	16.4	0.0	0.0
LnGrp LOS	B	A	B	B	A	B	B	A	B	B	A	A
Approach Vol, veh/h		699			749			171			54	
Approach Delay, s/veh		12.1			12.7			17.1			16.4	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.0		14.0		30.0		14.0				
Change Period (Y+Rc), s		6.7		* 7.1		6.7		7.1				
Max Green Setting (Gmax), s		23.3		* 19		23.3		17.9				
Max Q Clear Time (g_c+I1), s		15.4		3.2		16.1		5.0				
Green Ext Time (p_c), s		3.1		0.2		2.7		0.6				

Intersection Summary		
HCM 6th Ctrl Delay		13.0
HCM 6th LOS		B

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
17: Willow St & W Market St

2040 Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	472	9	19	540	7	15	19	9	7	15	19
Future Volume (vph)	9	472	9	19	540	7	15	19	9	7	15	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	0			0			0			0		
Link Speed (mph)		35			35			25				25
Link Distance (ft)		398			1372			267				334
Travel Time (s)		7.8			26.7			7.3				9.1
Confl. Peds. (#/hr)									3	3		
Confl. Bikes (#/hr)									3			
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	628	0	25	713	0	0	57	0	0	54	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 17: Willow St & W Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Volume (veh/h)	9	472	9	19	540	7	15	19	9	7	15	19
Future Volume (Veh/h)	9	472	9	19	540	7	15	19	9	7	15	19
Sign Control	Free			Free			Stop			Stop		
Grade	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)	12	616	12	25	704	9	20	25	12	9	20	25
Pedestrians	3											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	3.5											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	398											
pX, platoon unblocked				0.69				0.69	0.69	0.69	0.69	0.69
vC, conflicting volume	713			628			1435	1409	625	1426	1410	708
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	713			244			1406	1369	239	1393	1371	708
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			68	74	98	86	79	94
cM capacity (veh/h)	887			918			62	98	553	63	97	434
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	12	628	25	713	57	54						
Volume Left	12	0	25	0	20	9						
Volume Right	0	12	0	9	12	25						
cSH	887	1700	918	1700	95	133						
Volume to Capacity	0.01	0.37	0.03	0.42	0.60	0.41						
Queue Length 95th (ft)	1	0	2	0	70	44						
Control Delay (s)	9.1	0.0	9.0	0.0	88.0	49.5						
Lane LOS	A			A			F					
Approach Delay (s)	0.2			0.3			88.0	49.5				
Approach LOS							F	E				
Intersection Summary												
Average Delay			5.4									
Intersection Capacity Utilization			47.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔			↔	
Traffic Vol, veh/h	9	472	9	19	540	7	15	19	9	7	15	19
Future Vol, veh/h	9	472	9	19	540	7	15	19	9	7	15	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	616	12	25	704	9	20	25	12	9	20	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	713	0	0	628	0	0	1427	1409	625	1427	1411	709
Stage 1	-	-	-	-	-	-	646	646	-	759	759	-
Stage 2	-	-	-	-	-	-	781	763	-	668	652	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	887	-	-	954	-	-	113	139	485	113	138	434
Stage 1	-	-	-	-	-	-	460	467	-	399	415	-
Stage 2	-	-	-	-	-	-	388	413	-	448	464	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	887	-	-	954	-	-	92	133	484	91	132	434
Mov Cap-2 Maneuver	-	-	-	-	-	-	92	133	-	91	132	-
Stage 1	-	-	-	-	-	-	454	460	-	393	404	-
Stage 2	-	-	-	-	-	-	339	402	-	407	458	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	50.5	34.4
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	133	887	-	-	954	-	-	175
HCM Lane V/C Ratio	0.422	0.013	-	-	0.026	-	-	0.306
HCM Control Delay (s)	50.5	9.1	-	-	8.9	-	-	34.4
HCM Lane LOS	F	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.8	0	-	-	0.1	-	-	1.2

Lanes, Volumes, Timings
 18: S High St/N High St & W Market St

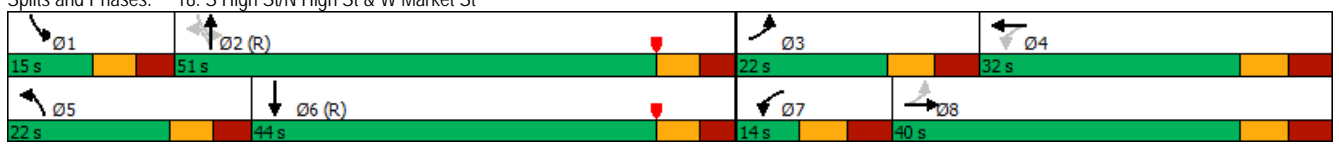
2040 Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	161	145	187	59	187	10	242	896	35	148	678	95
Future Volume (vph)	161	145	187	59	187	10	242	896	35	148	678	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	0		320	150		0	130		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			25			35			35	
Link Distance (ft)		1372			628			780			700	
Travel Time (s)		26.7			17.1			15.2			13.6	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	197	407	0	72	241	0	296	1140	0	181	946	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		D.P+P	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			2		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	13.4	43.4		13.4	43.4		12.3	33.3		12.3	41.3	
Total Split (s)	22.0	40.0		14.0	32.0		22.0	51.0		15.0	44.0	
Total Split (%)	18.3%	33.3%		11.7%	26.7%		18.3%	42.5%		12.5%	36.7%	
Yellow Time (s)	4.3	4.3		4.3	4.3		3.9	3.9		3.9	3.9	
All-Red Time (s)	4.1	4.1		4.1	4.1		3.4	3.4		3.4	3.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
v/c Ratio	0.60	0.85		0.39	0.74		0.92	0.87		0.85	0.87	
Control Delay	35.4	54.2		32.9	60.6		66.2	43.9		59.6	48.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.4	54.2		32.9	60.6		66.2	43.9		59.6	48.8	
Queue Length 50th (ft)	105	264		36	172		-200	432		-97	362	
Queue Length 95th (ft)	166	#431		68	263		#380	#540		#246	#475	
Internal Link Dist (ft)		1292			548			700			620	
Turn Bay Length (ft)	200						150			130		
Base Capacity (vph)	338	490		183	365		322	1307		214	1086	
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	0.58	0.83		0.39	0.66		0.92	0.87		0.85	0.87	

Intersection Summary
 Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 100.9 (84%), Referenced to phase 2:NBSB and 6:SBT, Start of Yellow
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 ~ 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.

Splits and Phases: 18: S High St/N High St & W Market St



HCM Signalized Intersection Capacity Analysis
 18: S High St/N High St & W Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	161	145	187	59	187	10	242	896	35	148	678	95
Future Volume (vph)	161	145	187	59	187	10	242	896	35	148	678	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Fr't	1.00	0.92		1.00	0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1706		1770	1849		1770	3519		1770	3474	
Flt Permitted	0.31	1.00		0.31	1.00		0.09	1.00		0.09	1.00	
Satd. Flow (perm)	586	1706		581	1849		174	3519		174	3474	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	197	178	229	72	229	12	296	1097	43	181	830	116
RTOR Reduction (vph)	0	39	0	0	2	0	0	3	0	0	9	0
Lane Group Flow (vph)	197	368	0	72	239	0	296	1137	0	181	937	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		D,P+P	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			2		
Actuated Green, G (s)	44.0	31.1		27.2	22.7		60.3	42.8		53.0	35.5	
Effective Green, g (s)	44.0	31.1		27.2	22.7		60.3	42.8		53.0	35.5	
Actuated g/C Ratio	0.37	0.26		0.23	0.19		0.50	0.36		0.44	0.30	
Clearance Time (s)	8.4	8.4		8.4	8.4		7.3	7.3		7.3	7.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	342	442		176	349		320	1255		212	1027	
v/s Ratio Prot	c0.06	c0.22		0.02	0.13		c0.13	c0.32		0.07	0.27	
v/s Ratio Perm	0.15			0.08			c0.33			0.30		
v/c Ratio	0.58	0.83		0.41	0.69		0.93	0.91		0.85	0.91	
Uniform Delay, d1	28.2	42.0		37.8	45.3		35.2	36.7		27.5	40.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	12.7		1.5	5.5		31.4	11.0		26.8	13.6	
Delay (s)	30.6	54.7		39.3	50.8		66.5	47.7		54.3	54.3	
Level of Service	C	D		D	D		E	D		D	D	
Approach Delay (s)		46.8			48.2			51.6			54.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	31.4
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
 18: S High St/N High St & W Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	161	145	187	59	187	10	242	896	35	148	678	95
Future Volume (veh/h)	161	145	187	59	187	10	242	896	35	148	678	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	197	178	229	72	229	12	296	1097	43	181	830	116
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	330	189	243	158	344	18	320	1308	51	218	992	139
Arrive On Green	0.10	0.25	0.25	0.04	0.20	0.20	0.12	0.38	0.38	0.06	0.32	0.32
Sat Flow, veh/h	1781	743	956	1781	1761	92	1781	3486	137	1781	3131	438
Grp Volume(v), veh/h	197	0	407	72	0	241	296	559	581	181	471	475
Grp Sat Flow(s),veh/h/ln	1781	0	1698	1781	0	1854	1781	1777	1846	1781	1777	1792
Q Serve(g_s), s	10.4	0.0	28.2	3.8	0.0	14.4	13.1	34.4	34.4	7.6	29.6	29.6
Cycle Q Clear(g_c), s	10.4	0.0	28.2	3.8	0.0	14.4	13.1	34.4	34.4	7.6	29.6	29.6
Prop In Lane	1.00		0.56	1.00		0.05	1.00		0.07	1.00		0.24
Lane Grp Cap(c), veh/h	330	0	432	158	0	362	320	667	693	218	563	568
V/C Ratio(X)	0.60	0.00	0.94	0.46	0.00	0.67	0.93	0.84	0.84	0.83	0.84	0.84
Avail Cap(c_a), veh/h	347	0	447	162	0	365	320	667	693	218	563	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	0.0	43.8	38.1	0.0	44.6	27.5	34.2	34.2	28.2	38.1	38.1
Incr Delay (d2), s/veh	2.6	0.0	27.9	2.0	0.0	4.5	31.6	12.0	11.7	22.9	13.8	13.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	15.0	1.8	0.0	7.1	8.2	16.7	17.3	4.5	14.8	14.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.3	0.0	71.7	40.2	0.0	49.1	59.1	46.2	45.8	51.1	51.9	51.8
LnGrp LOS	D	A	E	D	A	D	E	D	D	D	D	D
Approach Vol, veh/h		604			313			1436			1127	
Approach Delay, s/veh		60.2			47.1			48.7			51.7	
Approach LOS		E			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	52.3	20.8	31.8	22.0	45.3	13.7	39.0				
Change Period (Y+Rc), s	7.3	7.3	* 8.4	* 8.4	7.3	7.3	* 8.4	* 8.4				
Max Green Setting (Gmax), s	7.7	43.7	* 14	* 24	14.7	36.7	* 5.6	* 32				
Max Q Clear Time (g_c+I1), s	9.6	36.4	12.4	16.4	15.1	31.6	5.8	30.2				
Green Ext Time (p_c), s	0.0	4.0	0.1	0.8	0.0	2.6	0.0	0.4				

Intersection Summary

HCM 6th Ctrl Delay	51.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 19: S Mason St/N Mason St & E Market St

2040 Build
 Timing Plan: PM Peak

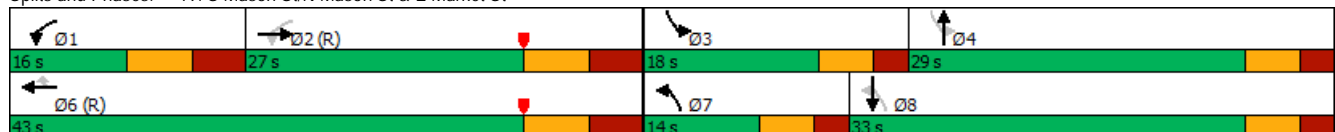


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	0	200	22	161	202	254	20	98	119	264	96	8
Future Volume (vph)	0	200	22	161	202	254	20	98	119	264	96	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	150		150	0		0	0		0
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			No			No			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		530			595			372			335	
Travel Time (s)		14.5			16.2			10.1			9.1	
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	290	0	210	263	331	26	283	0	344	135	0
Turn Type		NA		D.P+P	NA	Perm	D.P+P	NA		D.P+P	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases				2		6	8			4		
Detector Phase		2		1	6	6	7	4		3	8	
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0	10.0	5.0	7.0		5.0	7.0	
Minimum Split (s)		27.1		13.1	37.1	37.1	11.1	29.1		11.1	23.1	
Total Split (s)		27.0		16.0	43.0	43.0	14.0	29.0		18.0	33.0	
Total Split (%)		30.0%		17.8%	47.8%	47.8%	15.6%	32.2%		20.0%	36.7%	
Yellow Time (s)		4.5		4.5	4.5	4.5	3.7	3.7		3.7	3.7	
All-Red Time (s)		3.6		3.6	3.6	3.6	2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		8.1		8.1	8.1	8.1	6.1	6.1		6.1	6.1	
Lead/Lag		Lag		Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?		Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode		C-Max		None	C-Max	C-Max	None	None		None	None	
v/c Ratio		0.62		0.60	0.33	0.49	0.05	0.78		0.86	0.21	
Control Delay		37.7		22.2	17.0	18.7	14.7	48.2		42.4	21.4	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		37.7		22.2	17.0	18.7	14.7	48.2		42.4	21.4	
Queue Length 50th (ft)		146		58	73	93	8	151		137	45	
Queue Length 95th (ft)		#267		m85	m107	m135	22	230		#195	101	
Internal Link Dist (ft)		450			515			292			255	
Turn Bay Length (ft)				150		150						
Base Capacity (vph)		466		348	800	679	532	435		400	655	
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		0.62		0.60	0.33	0.49	0.05	0.65		0.86	0.21	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 21 (23%), Referenced to phase 2:EBWB and 6:WBT, Start of Yellow
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: S Mason St/N Mason St & E Market St



HCM Signalized Intersection Capacity Analysis
 19: S Mason St/N Mason St & E Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↔	↔	↔	↔	↔		↔	↔		
Traffic Volume (vph)	0	200	22	161	202	254	20	98	119	264	96	8	
Future Volume (vph)	0	200	22	161	202	254	20	98	119	264	96	8	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		8.1		8.1	8.1	8.1	6.1	6.1		6.1	6.1		
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Fr't		0.99		1.00	1.00	0.85	1.00	0.92		1.00	0.99		
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1838		1770	1863	1583	1770	1710		1770	1842		
Flt Permitted		1.00		0.41	1.00	1.00	0.67	1.00		0.42	1.00		
Satd. Flow (perm)		1838		769	1863	1583	1249	1710		784	1842		
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	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	0	261	29	210	263	331	26	128	155	344	125	10	
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	3	0	
Lane Group Flow (vph)	0	285	0	210	263	331	26	283	0	344	132	0	
Turn Type		NA		D.P+P	NA	Perm	D.P+P	NA		D.P+P	NA		
Protected Phases		2		1	6		7	4		3	8		
Permitted Phases				2		6	8			4			
Actuated Green, G (s)		19.0		26.9	35.0	35.0	34.7	22.8		34.7	31.9		
Effective Green, g (s)		19.0		26.9	35.0	35.0	34.7	22.8		34.7	31.9		
Actuated g/C Ratio		0.21		0.30	0.39	0.39	0.39	0.25		0.39	0.35		
Clearance Time (s)		8.1		8.1	8.1	8.1	6.1	6.1		6.1	6.1		
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)		388		317	724	615	497	433		432	652		
v/s Ratio Prot		c0.16		0.06	0.14	0.00	0.17			c0.11	0.07		
v/s Ratio Perm				0.14		c0.21	0.02			c0.20			
v/c Ratio		0.74		0.66	0.36	0.54	0.05	0.65		0.80	0.20		
Uniform Delay, d1		33.2		25.7	19.6	21.3	17.2	30.1		22.1	20.2		
Progression Factor		1.00		0.86	0.89	0.85	1.00	1.00		1.00	1.00		
Incremental Delay, d2		11.7		3.1	0.8	2.0	0.0	3.5		9.8	0.2		
Delay (s)		44.9		25.2	18.2	20.1	17.3	33.6		31.9	20.4		
Level of Service		D		C	B	C	B	C		C	C		
Approach Delay (s)		44.9			20.8			32.2			28.6		
Approach LOS		D			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			28.4									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.79										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	28.4
Intersection Capacity Utilization			81.1%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 19: S Mason St/N Mason St & E Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	200	22	161	202	254	20	98	119	264	96	8
Future Volume (veh/h)	0	200	22	161	202	254	20	98	119	264	96	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	261	29	210	263	331	26	128	155	344	125	10
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	449	50	383	840	712	433	149	180	351	511	41
Arrive On Green	0.00	0.27	0.27	0.15	0.75	0.75	0.03	0.19	0.19	0.13	0.30	0.30
Sat Flow, veh/h	0	1654	184	1781	1870	1585	1781	770	932	1781	1709	137
Grp Volume(v), veh/h	0	0	290	210	263	331	26	0	283	344	0	135
Grp Sat Flow(s),veh/h/ln	0	0	1837	1781	1870	1585	1781	0	1703	1781	0	1846
Q Serve(g_s), s	0.0	0.0	12.3	7.9	4.1	7.2	0.9	0.0	14.5	11.9	0.0	5.0
Cycle Q Clear(g_c), s	0.0	0.0	12.3	7.9	4.1	7.2	0.9	0.0	14.5	11.9	0.0	5.0
Prop In Lane	0.00		0.10	1.00		1.00	1.00		0.55	1.00		0.07
Lane Grp Cap(c), veh/h	0	0	498	383	840	712	433	0	329	351	0	552
V/C Ratio(X)	0.00	0.00	0.58	0.55	0.31	0.47	0.06	0.00	0.86	0.98	0.00	0.24
Avail Cap(c_a), veh/h	0	0	498	383	840	712	542	0	433	351	0	552
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	28.4	20.7	6.7	7.1	20.9	0.0	35.1	28.9	0.0	23.9
Incr Delay (d2), s/veh	0.0	0.0	4.9	1.7	1.0	2.2	0.1	0.0	12.8	42.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	6.0	3.1	1.6	2.3	0.4	0.0	7.1	5.9	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	33.3	22.3	7.7	9.3	21.0	0.0	47.9	71.4	0.0	24.1
LnGrp LOS	A	A	C	C	A	A	C	A	D	E	A	C
Approach Vol, veh/h		290			804			309			479	
Approach Delay, s/veh		33.3			12.2			45.6			58.1	
Approach LOS		C			B			D			E	
Timer - Assigned Phs	1	2	3	4	6	7	8					
Phs Duration (G+Y+Rc), s	16.0	32.5	18.0	23.5	48.5	8.5	33.0					
Change Period (Y+Rc), s	* 8.1	* 8.1	* 6.1	* 6.1	* 8.1	* 6.1	* 6.1					
Max Green Setting (Gmax), s	* 7.9	* 19	* 12	* 23	* 35	* 7.9	* 27					
Max Q Clear Time (g_c+I1), s	9.9	14.3	13.9	16.5	9.2	2.9	7.0					
Green Ext Time (p_c), s	0.0	0.7	0.0	0.9	2.9	0.0	0.7					

Intersection Summary

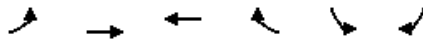
HCM 6th Ctrl Delay 32.6
 HCM 6th LOS C

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- User approved changes to right turn type.

Lanes, Volumes, Timings
20: E Market St & Broad St

2040 Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	605	630	39	51	11
Future Volume (vph)	11	605	630	39	51	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		595	279		366	
Travel Time (s)		11.6	5.4		7.1	
Confl. Peds. (#/hr)	2			2		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	756	837	0	78	0
Sign Control		Free	Free		Stop	

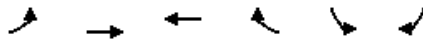
Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 20: E Market St & Broad St

2040 Build
 Timing Plan: PM Peak



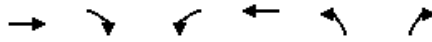
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	1	1		1	
Traffic Volume (veh/h)	11	605	630	39	51	11
Future Volume (Veh/h)	11	605	630	39	51	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	14	756	788	49	64	14
Pedestrians		3			2	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		595	1010			
pX, platoon unblocked	0.75				0.82	0.75
vC, conflicting volume	839				1598	818
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	614				924	585
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				73	96
cM capacity (veh/h)	719				240	379
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	14	756	837	78		
Volume Left	14	0	0	64		
Volume Right	0	0	49	14		
cSH	719	1700	1700	257		
Volume to Capacity	0.02	0.44	0.49	0.30		
Queue Length 95th (ft)	1	0	0	31		
Control Delay (s)	10.1	0.0	0.0	25.0		
Lane LOS	B			C		
Approach Delay (s)	0.2		0.0	25.0		
Approach LOS				C		
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			54.4%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	605	630	39	51	11
Future Vol, veh/h	11	605	630	39	51	11
Conflicting Peds, #/hr	2	0	0	2	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	756	788	49	64	14

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	839	0	-	0	1599 818
Stage 1	-	-	-	-	815 -
Stage 2	-	-	-	-	784 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	796	-	-	-	117 376
Stage 1	-	-	-	-	435 -
Stage 2	-	-	-	-	450 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	794	-	-	-	114 374
Mov Cap-2 Maneuver	-	-	-	-	114 -
Stage 1	-	-	-	-	426 -
Stage 2	-	-	-	-	449 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	67.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	794	-	-	-	130
HCM Lane V/C Ratio	0.017	-	-	-	0.596
HCM Control Delay (s)	9.6	-	-	-	67.1
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	3



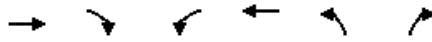
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (vph)	659	3	23	667	7	69
Future Volume (vph)	659	3	23	667	7	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	100		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			0		0	
Link Speed (mph)	35			35	35	
Link Distance (ft)	279			280	613	
Travel Time (s)	5.4			5.5	11.9	
Confl. Peds. (#/hr)		6	6		3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	864	0	30	870	99	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 21: Ott St & E Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (veh/h)	659	3	23	667	7	69
Future Volume (Veh/h)	659	3	23	667	7	69
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	860	4	30	870	9	90
Pedestrians	3				6	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	3.5				3.5	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	874			731		
pX, platoon unblocked			0.71		0.84	0.71
vC, conflicting volume			870		1801	868
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			611		1146	608
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		95	74
cM capacity (veh/h)			682		176	349
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	864	30	870	99		
Volume Left	0	30	0	9		
Volume Right	4	0	0	90		
cSH	1700	682	1700	321		
Volume to Capacity	0.51	0.04	0.51	0.31		
Queue Length 95th (ft)	0	3	0	32		
Control Delay (s)	0.0	10.5	0.0	21.2		
Lane LOS		B		C		
Approach Delay (s)	0.0	0.4		21.2		
Approach LOS				C		
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			54.4%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	1.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↑	↘	
Traffic Vol, veh/h	659	3	23	667	7	69
Future Vol, veh/h	659	3	23	667	7	69
Conflicting Peds, #/hr	0	6	6	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	860	4	30	870	9	90

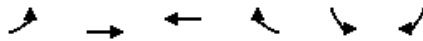
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	870	0	1801	868
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	933	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	775	-	88	352
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	383	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	771	-	84	350
Mov Cap-2 Maneuver	-	-	-	-	84	-
Stage 1	-	-	-	-	409	-
Stage 2	-	-	-	-	367	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	25.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	271	-	-	771	-
HCM Lane V/C Ratio	0.366	-	-	0.039	-
HCM Control Delay (s)	25.8	-	-	9.9	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	1.6	-	-	0.1	-

Lanes, Volumes, Timings
 22: E Market St & Myrtle St

2040 Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	14	721	678	12	6	8
Future Volume (vph)	14	721	678	12	6	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		280	451		356	
Travel Time (s)		5.5	8.8		6.9	
Confl. Peds. (#/hr)	2			2		
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	940	900	0	18	0
Sign Control		Free	Free		Stop	

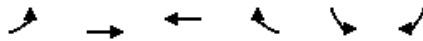
Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 22: E Market St & Myrtle St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	721	678	12	6	8
Future Volume (Veh/h)	14	721	678	12	6	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	940	884	16	8	10
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1154	451			
pX, platoon unblocked	0.73				0.86	0.73
vC, conflicting volume	902				1870	894
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	678				1255	667
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				95	97
cM capacity (veh/h)	664				158	333
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	18	940	900	18		
Volume Left	18	0	0	8		
Volume Right	0	0	16	10		
cSH	664	1700	1700	223		
Volume to Capacity	0.03	0.55	0.53	0.08		
Queue Length 95th (ft)	2	0	0	7		
Control Delay (s)	10.6	0.0	0.0	22.6		
Lane LOS	B			C		
Approach Delay (s)	0.2		0.0	22.6		
Approach LOS				C		
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			55.5%		ICU Level of Service	B
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	721	678	12	6	8
Future Vol, veh/h	14	721	678	12	6	8
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	940	884	16	8	10

Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	902	0	-	0	1870	894
Stage 1	-	-	-	-	894	-
Stage 2	-	-	-	-	976	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	754	-	-	-	79	340
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	365	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	753	-	-	-	77	339
Mov Cap-2 Maneuver	-	-	-	-	77	-
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	364	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	35
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	753	-	-	-	138
HCM Lane V/C Ratio	0.024	-	-	-	0.132
HCM Control Delay (s)	9.9	-	-	-	35
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Lanes, Volumes, Timings
23: Reservoir St/Sterling St & E Market St

2040 Build
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑		↑			↑			↑	
Traffic Volume (vph)	0	506	210	0	417	11	261	86	19	34	84	13
Future Volume (vph)	0	506	210	0	417	11	261	86	19	34	84	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		451			685			454			334	
Travel Time (s)		8.8			13.3			8.8			6.5	
Confl. Peds. (#/hr)	4		5	5		4			1	1		
Confl. Bikes (#/hr)			2									1
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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	660	274	0	558	0	0	477	0	0	171	0
Turn Type		NA	Over		NA		Split	NA		Split	NA	
Protected Phases		2	3		2		3	3		1	1	
Permitted Phases												
Detector Phase		2	3		2		3	3		1	1	
Switch Phase												
Minimum Initial (s)		20.0	7.0		20.0		7.0	7.0		7.0	7.0	
Minimum Split (s)		28.6	27.6		28.6		27.6	27.6		27.5	27.5	
Total Split (s)		39.0	32.0		39.0		32.0	32.0		19.0	19.0	
Total Split (%)		43.3%	35.6%		43.3%		35.6%	35.6%		21.1%	21.1%	
Yellow Time (s)		3.7	3.6		3.7		3.6	3.6		3.2	3.2	
All-Red Time (s)		2.9	2.0		2.9		2.0	2.0		2.3	2.3	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		6.6	5.6		6.6			5.6			5.5	
Lead/Lag		Lag			Lag					Lead	Lead	
Lead-Lag Optimize?		Yes			Yes					Yes	Yes	
Recall Mode		C-Max	None		C-Max		None	None		None	None	
v/c Ratio		0.92	0.46		0.78			0.93			0.70	
Control Delay		44.4	13.2		34.7			58.9			51.1	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		44.4	13.2		34.7			58.9			51.1	
Queue Length 50th (ft)		374	56		285			259			90	
Queue Length 95th (ft)		m#566	m105		#466			#445			#156	
Internal Link Dist (ft)		371			605			374			254	
Turn Bay Length (ft)			200									
Base Capacity (vph)		715	613		713			525			275	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.92	0.45		0.78			0.91			0.62	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 82 (91%), Referenced to phase 2:EBWB, Start of Yellow
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Reservoir St/Sterling St & E Market St



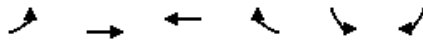
HCM Signalized Intersection Capacity Analysis
 23: Reservoir St/Sterling St & E Market St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↑	↗		↖			↕			↕			
Traffic Volume (vph)	0	506	210	0	417	11	261	86	19	34	84	13		
Future Volume (vph)	0	506	210	0	417	11	261	86	19	34	84	13		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		6.6	5.6		6.6			5.6			5.5			
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00			
Frbp, ped/bikes		1.00	1.00		1.00			1.00			1.00			
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00			
Frt		1.00	0.85		1.00			0.99			0.99			
Flt Protected		1.00	1.00		1.00			0.97			0.99			
Satd. Flow (prot)		1863	1583		1855			1784			1810			
Flt Permitted		1.00	1.00		1.00			0.97			0.99			
Satd. Flow (perm)		1863	1583		1855			1784			1810			
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		
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Adj. Flow (vph)	0	660	274	0	544	14	340	112	25	44	110	17		
RTOR Reduction (vph)	0	0	151	0	1	0	0	2	0	0	4	0		
Lane Group Flow (vph)	0	660	123	0	557	0	0	475	0	0	167	0		
Confl. Peds. (#/hr)	4		5	5		4			1	1				
Confl. Bikes (#/hr)			2									1		
Turn Type		NA	Over		NA		Split	NA		Split	NA			
Protected Phases		2	3		2		3	3		1	1			
Permitted Phases														
Actuated Green, G (s)		34.5	25.7		34.5			25.7			12.1			
Effective Green, g (s)		34.5	25.7		34.5			25.7			12.1			
Actuated g/C Ratio		0.38	0.29		0.38			0.29			0.13			
Clearance Time (s)		6.6	5.6		6.6			5.6			5.5			
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0			
Lane Grp Cap (vph)		714	452		711			509			243			
v/s Ratio Prot		c0.35	0.08		0.30			c0.27			c0.09			
v/s Ratio Perm														
w/c Ratio		0.92	0.27		0.78			0.93			0.69			
Uniform Delay, d1		26.5	24.9		24.5			31.3			37.1			
Progression Factor		0.93	1.56		1.00			1.00			1.00			
Incremental Delay, d2		17.1	0.3		8.4			24.2			7.8			
Delay (s)		41.8	39.2		32.9			55.5			44.9			
Level of Service		D	D		C			E			D			
Approach Delay (s)		41.1			32.9			55.5			44.9			
Approach LOS		D			C			E			D			
Intersection Summary														
HCM 2000 Control Delay			42.5									HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			0.89											
Actuated Cycle Length (s)			90.0								17.7		Sum of lost time (s)	
Intersection Capacity Utilization			73.0%										ICU Level of Service	C
Analysis Period (min)			15											
c Critical Lane Group														

HCM 6th Edition methodology does not support Non-NEMA phasing.



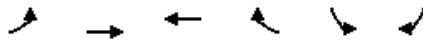
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	555	433	23	51	3
Future Volume (vph)	5	555	433	23	51	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		685	912		392	
Travel Time (s)		13.3	17.8		7.6	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	724	595	0	71	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis
 24: E Market St & Hill St

2040 Build
 Timing Plan: PM Peak

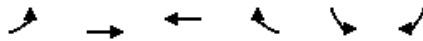


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	1	1		1	
Traffic Volume (veh/h)	5	555	433	23	51	3
Future Volume (Veh/h)	5	555	433	23	51	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	724	565	30	67	4
Pedestrians					4	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		685				
pX, platoon unblocked					0.65	
vC, conflicting volume	599				1322	584
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	599				1226	584
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				47	99
cM capacity (veh/h)	974				127	510
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	7	724	595	71		
Volume Left	7	0	0	67		
Volume Right	0	0	30	4		
cSH	974	1700	1700	132		
Volume to Capacity	0.01	0.43	0.35	0.54		
Queue Length 95th (ft)	1	0	0	65		
Control Delay (s)	8.7	0.0	0.0	60.1		
Lane LOS	A			F		
Approach Delay (s)	0.1		0.0	60.1		
Approach LOS				F		
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			45.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	1	1		1	
Traffic Vol, veh/h	5	555	433	23	51	3
Future Vol, veh/h	5	555	433	23	51	3
Conflicting Peds, #/hr	4	0	0	4	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	724	565	30	67	4
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	599	0	-	0	1322	584
Stage 1	-	-	-	-	584	-
Stage 2	-	-	-	-	738	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	978	-	-	-	173	512
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	473	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	974	-	-	-	170	510
Mov Cap-2 Maneuver	-	-	-	-	170	-
Stage 1	-	-	-	-	551	-
Stage 2	-	-	-	-	471	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.1	0	38.2			
HCM LOS	E					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	974	-	-	-	-	177
HCM Lane V/C Ratio	0.007	-	-	-	-	0.398
HCM Control Delay (s)	8.7	-	-	-	-	38.2
HCM Lane LOS	A	-	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	-	1.8

Lanes, Volumes, Timings
 25: E Market St & Old Furnace Rd

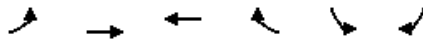
2040 Build
 Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	106	517	402	112	76	54
Future Volume (vph)	106	517	402	112	76	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	65			175	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	0				0	
Link Speed (mph)		35	35		35	
Link Distance (ft)		912	1324		234	
Travel Time (s)		17.8	25.8		4.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	138	674	524	146	169	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis
 25: E Market St & Old Furnace Rd

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	106	517	402	112	76	54
Future Volume (Veh/h)	106	517	402	112	76	54
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	138	674	524	146	99	70
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	670				1474	524
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	670				1474	524
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				16	87
cM capacity (veh/h)	920				118	553
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	138	674	524	146	169	
Volume Left	138	0	0	0	99	
Volume Right	0	0	0	146	70	
cSH	920	1700	1700	1700	176	
Volume to Capacity	0.15	0.40	0.31	0.09	0.96	
Queue Length 95th (ft)	13	0	0	0	189	
Control Delay (s)	9.6	0.0	0.0	0.0	111.5	
Lane LOS	A				F	
Approach Delay (s)	1.6		0.0		111.5	
Approach LOS					F	
Intersection Summary						
Average Delay			12.2			
Intersection Capacity Utilization			51.5%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	12.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	106	517	402	112	76	54
Future Vol, veh/h	106	517	402	112	76	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	65	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	138	674	524	146	99	70

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	670	0	-	0	1474 524
Stage 1	-	-	-	-	524 -
Stage 2	-	-	-	-	950 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	920	-	-	-	139 553
Stage 1	-	-	-	-	594 -
Stage 2	-	-	-	-	376 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	920	-	-	-	118 553
Mov Cap-2 Maneuver	-	-	-	-	118 -
Stage 1	-	-	-	-	505 -
Stage 2	-	-	-	-	376 -

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	113.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	920	-	-	-	175
HCM Lane V/C Ratio	0.15	-	-	-	0.969
HCM Control Delay (s)	9.6	-	-	-	113.6
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0.5	-	-	-	7.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3	Ø4
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	↕		
Traffic Volume (vph)	16	38	11	358	36	74	21	437	237	5	452	81		
Future Volume (vph)	16	38	11	358	36	74	21	437	237	5	452	81		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0	150		250	100		350		
Storage Lanes	0		0	1		0	1		1	1		1		
Taper Length (ft)	0			0			0			0				
Right Turn on Red			No			Yes			No			Yes		
Link Speed (mph)		35			35			35			35			
Link Distance (ft)		552			188			488			1324			
Travel Time (s)		10.8			3.7			9.5			25.8			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Shared Lane Traffic (%)				34%										
Lane Group Flow (vph)	0	82	0	298	292	0	27	552	299	6	673	0		
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA			
Protected Phases	8	8		3 4 7	3 4 7		1	6		5	2		3	4
Permitted Phases							6		6	2				
Minimum Split (s)	14.2	14.2					11.3	13.3	13.3	11.3	13.3		12.3	14.1
Total Split (s)	15.0	15.0					15.0	33.0	33.0	15.0	33.0		15.0	20.0
Total Split (%)	10.7%	10.7%					10.7%	23.6%	23.6%	10.7%	23.6%		11%	14%
Yellow Time (s)	3.1	3.1					4.2	4.2	4.2	4.2	4.2		3.0	3.7
All-Red Time (s)	4.1	4.1					2.1	2.1	2.1	2.1	2.1		2.3	3.4
Lost Time Adjust (s)		0.0					0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)		7.2					6.3	6.3	6.3	6.3	6.3			
Lead/Lag	Lag	Lag					Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?														
v/c Ratio		0.82		0.35	0.34		0.17	0.82	0.99	0.03	1.00			
Control Delay		115.4		2.6	1.3		37.7	65.3	106.2	35.3	90.7			
Queue Delay		64.3		4.4	4.2		0.0	0.0	0.0	0.0	0.0			
Total Delay		179.7		7.0	5.6		37.7	65.3	106.2	35.3	90.7			
Queue Length 50th (ft)		75		14	0		18	256	275	4	~323			
Queue Length 95th (ft)		#174		m13	m0		42	326	#469	15	#458			
Internal Link Dist (ft)		472			108			408			1244			
Turn Bay Length (ft)							150		250	100				
Base Capacity (vph)		100		860	852		163	674	301	176	670			
Starvation Cap Reductn		0		477	473		0	0	0	0	0			
Spillback Cap Reductn		25		0	0		0	0	0	0	0			
Storage Cap Reductn		0		0	0		0	0	0	0	0			
Reduced v/c Ratio		1.09		0.78	0.77		0.17	0.82	0.99	0.03	1.00			

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow, Master Intersection

Natural Cycle: 130

Control Type: Pretimed

- Volume exceeds capacity, queue is theoretically infinite.

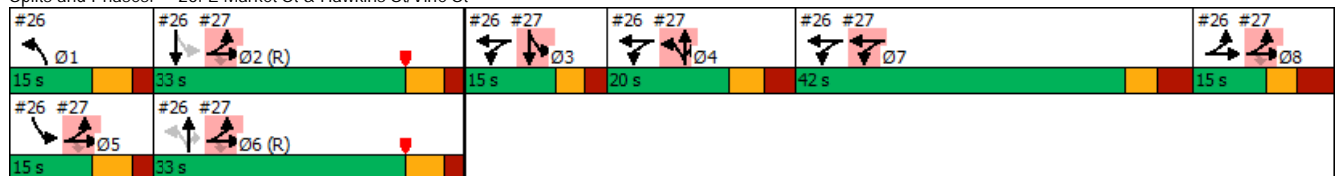
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 26: E Market St & Hawkins St/Vine St



Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Growth Factor	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Minimum Split (s)	14.2
Total Split (s)	42.0
Total Split (%)	30%
Yellow Time (s)	3.4
All-Red Time (s)	3.8
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis
 26: E Market St & Hawkins St/Vine St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	16	38	11	358	36	74	21	437	237	5	452	81
Future Volume (vph)	16	38	11	358	36	74	21	437	237	5	452	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.2		5.3	5.3		6.3	6.3	6.3	6.3	6.3	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95	1.00	1.00	0.95	
Frt		0.98		1.00	0.95		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.99		0.95	0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1798		1681	1642		1770	3539	1583	1770	3459	
Flt Permitted		0.99		0.95	0.97		0.15	1.00	1.00	0.19	1.00	
Satd. Flow (perm)		1798		1681	1642		279	3539	1583	348	3459	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	20	48	14	452	45	93	27	552	299	6	571	102
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	82	0	298	278	0	27	552	299	6	662	0
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	8	8		3 4 7	3 4 7		1	6		5	2	
Permitted Phases							6		6	2		
Actuated Green, G (s)		7.8		69.8	69.8		35.4	26.7	26.7	35.4	26.7	
Effective Green, g (s)		7.8		62.7	62.7		35.4	26.7	26.7	35.4	26.7	
Actuated g/C Ratio		0.06		0.45	0.45		0.25	0.19	0.19	0.25	0.19	
Clearance Time (s)		7.2					6.3	6.3	6.3	6.3	6.3	
Lane Grp Cap (vph)		100		752	735		163	674	301	176	659	
v/s Ratio Prot		c0.05		c0.18	0.17		c0.01	0.16		0.00	c0.19	
v/s Ratio Perm							0.03		0.19	0.01		
v/c Ratio		0.82		0.40	0.38		0.17	0.82	0.99	0.03	1.01	
Uniform Delay, d1		65.4		25.9	25.7		41.4	54.3	56.6	40.1	56.6	
Progression Factor		1.00		0.12	0.07		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		50.5		0.1	0.1		2.2	10.7	50.2	0.4	36.4	
Delay (s)		115.9		3.3	1.8		43.5	65.0	106.8	40.4	93.0	
Level of Service		F		A	A		D	E	F	D	F	
Approach Delay (s)		115.9			2.6			78.6			92.5	
Approach LOS		F			A			E			F	

Intersection Summary

HCM 2000 Control Delay	64.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	39.4
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Edition methodology does not support clustered intersections.

Lanes, Volumes, Timings
27: Country Club Rd & Vine St

2040 Build
Timing Plan: PM Peak

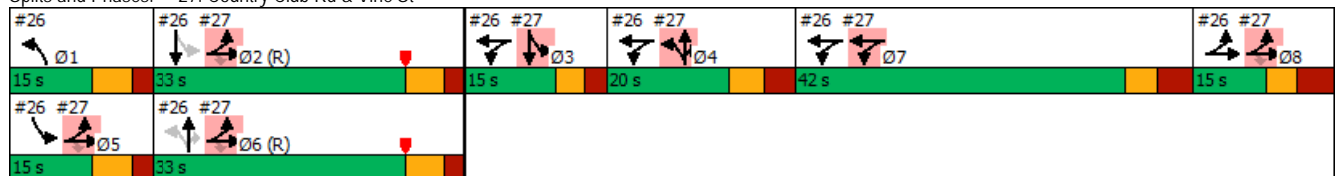


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2
Lane Configurations		↕	↗		↕			↕	↗		↕			
Traffic Volume (vph)	41	290	87	311	380	1	58	64	189	18	20	31		
Future Volume (vph)	41	290	87	311	380	1	58	64	189	18	20	31		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	230		0	200		0	0		0		
Storage Lanes	0		1	1		0	1		1	0		0		
Taper Length (ft)	0			0			0			0				
Right Turn on Red			No			Yes			Yes			Yes		
Link Speed (mph)		35			35			35			35			
Link Distance (ft)		188			552			389			193			
Travel Time (s)		3.7			10.8			7.6			3.8			
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		
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	431	113	0	903	0	0	159	247	0	89	0		
Turn Type	Split	NA	Perm	Split	NA		Split	NA	Prot	Split	NA			
Protected Phases	2 5 6 8	2 5 6 8		7	7		4	4	4	3	3		1	2
Permitted Phases			2 5 6 8											
Minimum Split (s)				14.2	14.2		14.1	14.1	14.1	12.3	12.3		11.3	13.3
Total Split (s)				42.0	42.0		20.0	20.0	20.0	15.0	15.0		15.0	33.0
Total Split (%)				30.0%	30.0%		14.3%	14.3%	14.3%	10.7%	10.7%		11%	24%
Yellow Time (s)				3.4	3.4		3.7	3.7	3.7	3.0	3.0		4.2	4.2
All-Red Time (s)				3.8	3.8		3.4	3.4	3.4	2.3	2.3		2.1	2.1
Lost Time Adjust (s)					0.0			0.0	0.0		0.0			
Total Lost Time (s)					7.2			7.1	7.1		5.3			
Lead/Lag				Lead	Lead		Lag	Lag	Lag	Lead	Lead		Lead	Lag
Lead-Lag Optimize?														
v/c Ratio		0.57	0.18		1.05			0.95	0.67		0.64			
Control Delay		17.7	14.7		94.8			120.5	16.4		67.3			
Queue Delay		55.8	4.5		0.0			0.0	0.0		0.0			
Total Delay		73.5	19.3		94.8			120.5	16.4		67.3			
Queue Length 50th (ft)		121	30		-470			146	0		59			
Queue Length 95th (ft)		m154	m39		#605			#291	87		#132			
Internal Link Dist (ft)		108			472			309			113			
Turn Bay Length (ft)														
Base Capacity (vph)		750	641		860			167	370		140			
Starvation Cap Reductn		358	459		0			0	0		0			
Spillback Cap Reductn		0	0		0			0	0		0			
Storage Cap Reductn		0	0		0			0	0		0			
Reduced v/c Ratio		1.10	0.62		1.05			0.95	0.67		0.64			

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow, Master Intersection
 Natural Cycle: 130
 Control Type: Pretimed
 ~ 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.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 27: Country Club Rd & Vine St



Lane Group	Ø5	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Right Turn on Red			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Growth Factor			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	5	6	8
Permitted Phases			
Minimum Split (s)	11.3	13.3	14.2
Total Split (s)	15.0	33.0	15.0
Total Split (%)	11%	24%	11%
Yellow Time (s)	4.2	4.2	3.1
All-Red Time (s)	2.1	2.1	4.1
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lag
Lead-Lag Optimize?			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 27: Country Club Rd & Vine St

2040 Build
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕↕			↕	↕		↕	
Traffic Volume (vph)	41	290	87	311	380	1	58	64	189	18	20	31
Future Volume (vph)	41	290	87	311	380	1	58	64	189	18	20	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3		7.2			7.1	7.1		5.3	
Lane Util. Factor		1.00	1.00		0.95			1.00	1.00		1.00	
Fr't		1.00	0.85		1.00			1.00	0.85		0.94	
Flt Protected		0.99	1.00		0.98			0.98	1.00		0.99	
Satd. Flow (prot)		1851	1583		3461			1819	1583		1727	
Flt Permitted		0.99	1.00		0.98			0.98	1.00		0.99	
Satd. Flow (perm)		1851	1583		3461			1819	1583		1727	
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	53	378	113	406	496	1	76	83	247	23	26	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	224	0	21	0
Lane Group Flow (vph)	0	431	113	0	903	0	0	159	23	0	68	0
Turn Type	Split	NA	Perm	Split	NA		Split	NA	Prot	Split	NA	
Protected Phases	2 5 6 8	2 5 6 8		7	7		4	4	4	3	3	
Permitted Phases			2 5 6 8									
Actuated Green, G (s)		56.7	56.7		34.8			12.9	12.9		9.7	
Effective Green, g (s)		49.5	49.5		34.8			12.9	12.9		9.7	
Actuated g/C Ratio		0.35	0.35		0.25			0.09	0.09		0.07	
Clearance Time (s)					7.2			7.1	7.1		5.3	
Lane Grp Cap (vph)		654	559		860			167	145		119	
v/s Ratio Prot		c0.23			c0.26			c0.09	0.01		c0.04	
v/s Ratio Perm			0.07									
v/c Ratio		0.66	0.20		1.05			0.95	0.16		0.57	
Uniform Delay, d1		38.1	31.5		52.6			63.2	58.5		63.1	
Progression Factor		0.46	0.53		1.00			1.00	1.00		1.00	
Incremental Delay, d2		4.1	0.6		44.6			58.0	2.3		18.2	
Delay (s)		21.7	17.2		97.2			121.3	60.8		81.3	
Level of Service		C	B		F			F	E		F	
Approach Delay (s)		20.8			97.2			84.5			81.3	
Approach LOS		C			F			F			F	

Intersection Summary		
HCM 2000 Control Delay	72.4	HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio	0.86	
Actuated Cycle Length (s)	140.0	Sum of lost time (s) 39.4
Intersection Capacity Utilization	75.7%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group

HCM 6th Edition methodology does not support clustered intersections.

Lanes, Volumes, Timings
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build - Garbers Church only
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Future Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	360		180	300		140	0		200	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1555			455			767			1017	
Travel Time (s)		30.3			8.9			14.9			19.8	
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)						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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	316	30	157	373	29	0	134	227	0	80	81
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6			8	1	7	7	
Permitted Phases	2		2		6	8						7
Detector Phase	5	2	2	1	6	6	8	8	1	7	7	7
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.9	22.5	22.5	15.6	31.6	31.6	44.1	44.1	15.6	22.5	22.5	22.5
Total Split (s)	14.0	33.0	33.0	19.0	38.0	38.0	45.0	45.0	19.0	28.0	28.0	28.0
Total Split (%)	11.2%	26.4%	26.4%	15.2%	30.4%	30.4%	36.0%	36.0%	15.2%	22.4%	22.4%	22.4%
Yellow Time (s)	3.0	5.4	5.4	5.4	5.4	5.4	3.7	3.7	5.4	3.9	3.9	3.9
All-Red Time (s)	3.9	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.2	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.14	0.33	0.06	0.77	0.29	0.04		0.47	0.59		0.41	0.25
Control Delay	17.2	30.0	0.2	66.2	25.1	0.1		39.2	13.2		47.4	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	17.2	30.0	0.2	66.2	25.1	0.1		39.2	13.2		47.4	1.9
Queue Length 50th (ft)	16	71	0	84	77	0		69	0		41	0
Queue Length 95th (ft)	58	154	0	#259	170	0		126	78		106	0
Internal Link Dist (ft)		1475			375			687			937	
Turn Bay Length (ft)	360		180	300		140			200			100
Base Capacity (vph)	427	963	530	205	1286	657		721	384		447	514
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.14	0.33	0.06	0.77	0.29	0.04		0.19	0.59		0.18	0.16

Intersection Summary

Area Type: Other

Cycle Length: 125

Actuated Cycle Length: 91.2

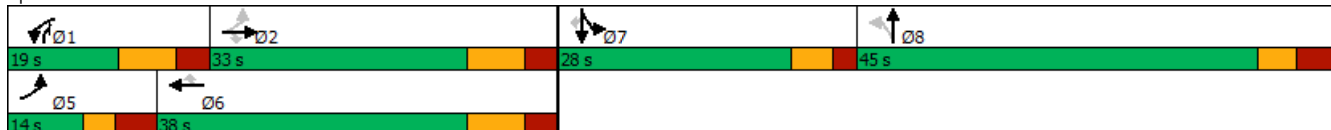
Natural Cycle: 115

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 11: Garbers Church Rd/Switchboard Rd & W Market St



HCM Signalized Intersection Capacity Analysis
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build - Garbers Church only
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗	↘	↖	↗	↘		↖	↗		↖	↗	
Traffic Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62	
Future Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		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	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	1.00	
Satd. Flow (prot)	1770	3539	1549	1770	3539	1548		1845	1583		1839	1583	
Flt Permitted	0.53	1.00	1.00	0.95	1.00	1.00		0.92	1.00		0.99	1.00	
Satd. Flow (perm)	987	3539	1549	1770	3539	1548		1706	1583		1839	1583	
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	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	61	316	30	157	373	29	26	108	227	21	59	81	
RTOR Reduction (vph)	0	0	21	0	0	19	0	0	201	0	0	73	
Lane Group Flow (vph)	61	316	9	157	373	10	0	134	26	0	80	8	
Confl. Peds. (#/hr)			1	1					1	1			
Confl. Bikes (#/hr)					2								
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Over	Split	NA	Perm	
Protected Phases	5	2		1	6			8	1	7	7		
Permitted Phases	2		2			6	8					7	
Actuated Green, G (s)	32.1	26.5	26.5	10.6	33.2	33.2		15.2	10.6		9.6	9.6	
Effective Green, g (s)	32.1	26.5	26.5	10.6	33.2	33.2		15.2	10.6		9.6	9.6	
Actuated g/C Ratio	0.35	0.29	0.29	0.11	0.36	0.36		0.16	0.11		0.10	0.10	
Clearance Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	8.6		6.2	6.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	390	1014	444	203	1271	556		280	181		191	164	
v/s Ratio Prot	0.01	0.09		c0.09	c0.11				0.02		c0.04		
v/s Ratio Perm	0.04		0.01			0.01		c0.08				0.01	
w/c Ratio	0.16	0.31	0.02	0.77	0.29	0.02		0.48	0.14		0.42	0.05	
Uniform Delay, d1	20.4	25.8	23.6	39.7	21.2	19.1		35.0	36.8		38.8	37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.8	0.1	16.6	0.6	0.1		1.3	0.4		1.5	0.1	
Delay (s)	20.6	26.6	23.7	56.3	21.8	19.2		36.3	37.2		40.3	37.4	
Level of Service	C	C	C	E	C	B		D	D		D	D	
Approach Delay (s)		25.5			31.4			36.9			38.8		
Approach LOS		C			C			D			D		
Intersection Summary													
HCM 2000 Control Delay			31.9		HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio			0.46										
Actuated Cycle Length (s)			92.4		Sum of lost time (s)					30.5			
Intersection Capacity Utilization			50.4%		ICU Level of Service					A			
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Edition methodology expects strict NEMA phasing.

Lanes, Volumes, Timings
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build - W Market only
 Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘		↖	↗		↖	↗
Traffic Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Future Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	360		180	300		140	0		200	0		100
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	0			0			0			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1555			455			767			1017	
Travel Time (s)		30.3			8.9			14.9			19.8	
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)						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
Growth Factor	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	316	30	157	373	29	0	134	227	0	80	81
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6			8		7	7	
Permitted Phases	2		2		6	8		8		8		7
Detector Phase	5	2	2	1	6	6	8	8	8	7	7	7
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.9	22.5	22.5	15.6	31.6	31.6	44.1	44.1	44.1	22.5	22.5	22.5
Total Split (s)	14.0	33.0	33.0	19.0	38.0	38.0	45.0	45.0	45.0	28.0	28.0	28.0
Total Split (%)	11.2%	26.4%	26.4%	15.2%	30.4%	30.4%	36.0%	36.0%	36.0%	22.4%	22.4%	22.4%
Yellow Time (s)	3.0	5.4	5.4	5.4	5.4	5.4	3.7	3.7	3.7	3.9	3.9	3.9
All-Red Time (s)	3.9	3.2	3.2	3.2	3.2	3.2	3.4	3.4	3.4	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.14	0.62	0.06	0.77	0.55	0.04		0.47	0.51		0.41	0.25
Control Delay	17.1	38.1	0.2	66.2	31.3	0.1		39.2	8.4		47.4	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	17.1	38.1	0.2	66.2	31.3	0.1		39.2	8.4		47.4	1.9
Queue Length 50th (ft)	16	148	0	84	165	0		69	0		41	0
Queue Length 95th (ft)	58	#369	0	#259	#406	0		126	56		106	0
Internal Link Dist (ft)		1475			375			687			937	
Turn Bay Length (ft)	360		180	300		140			200			100
Base Capacity (vph)	430	507	530	205	677	657		721	785		447	514
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.14	0.62	0.06	0.77	0.55	0.04		0.19	0.29		0.18	0.16

Intersection Summary

Area Type: Other

Cycle Length: 125

Actuated Cycle Length: 91.2

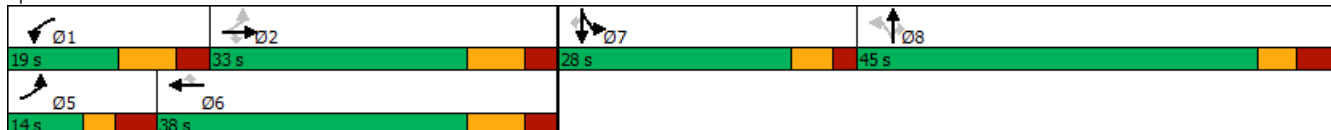
Natural Cycle: 115

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 11: Garbers Church Rd/Switchboard Rd & W Market St



HCM Signalized Intersection Capacity Analysis
 11: Garbers Church Rd/Switchboard Rd & W Market St

2040 Build - W Market only
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘		↖	↗		↖	↗
Traffic Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Future Volume (vph)	47	242	23	120	286	22	20	83	174	16	45	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		1.00	0.98		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
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	1.00
Satd. Flow (prot)	1770	1863	1549	1770	1863	1548		1845	1550		1839	1583
Flt Permitted	0.54	1.00	1.00	0.95	1.00	1.00		0.92	1.00		0.99	1.00
Satd. Flow (perm)	999	1863	1549	1770	1863	1548		1706	1550		1839	1583
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
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	61	316	30	157	373	29	26	108	227	21	59	81
RTOR Reduction (vph)	0	0	21	0	0	19	0	0	190	0	0	73
Lane Group Flow (vph)	61	316	9	157	373	10	0	134	37	0	80	8
Confl. Peds. (#/hr)			1	1					1	1		
Confl. Bikes (#/hr)					2							
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6			8		7	7	
Permitted Phases	2		2			6	8		8			7
Actuated Green, G (s)	32.1	26.5	26.5	10.6	33.2	33.2		15.2	15.2		9.6	9.6
Effective Green, g (s)	32.1	26.5	26.5	10.6	33.2	33.2		15.2	15.2		9.6	9.6
Actuated g/C Ratio	0.35	0.29	0.29	0.11	0.36	0.36		0.16	0.16		0.10	0.10
Clearance Time (s)	6.9	8.6	8.6	8.6	8.6	8.6		7.1	7.1		6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	393	534	444	203	669	556		280	254		191	164
v/s Ratio Prot	0.01	0.17		c0.09	c0.20						c0.04	
v/s Ratio Perm	0.04		0.01			0.01		c0.08	0.02			0.01
w/c Ratio	0.16	0.59	0.02	0.77	0.56	0.02		0.48	0.15		0.42	0.05
Uniform Delay, d1	20.4	28.3	23.6	39.7	23.7	19.1		35.0	33.0		38.8	37.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	4.8	0.1	16.6	3.3	0.1		1.3	0.3		1.5	0.1
Delay (s)	20.6	33.1	23.7	56.3	27.1	19.2		36.3	33.3		40.3	37.4
Level of Service	C	C	C	E	C	B		D	C		D	D
Approach Delay (s)		30.5			34.9			34.4			38.8	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			34.0		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			92.4		Sum of lost time (s)				30.5			
Intersection Capacity Utilization			57.3%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

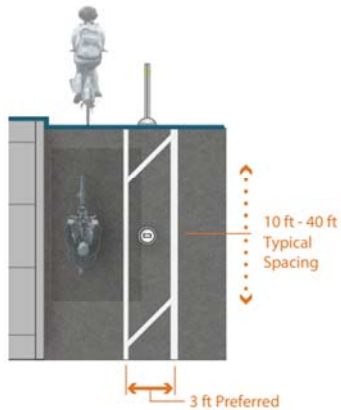
HCM 6th Edition methodology expects strict NEMA phasing.

Attachment D

FHWA Separated Bike Lane Planning and Design Guide – Forms of Separation



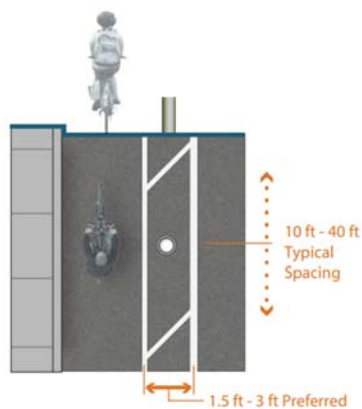
Delineator Posts



San Francisco, CA. (Source: Dianne Yee)

Flexible delineator posts are one of the most popular types of separation elements due to their low cost, visibility, and ease of installation. However, their durability and aesthetic quality can present challenges and agencies may consider converting these types of buffers to a more permanent style when design and budgets allow. Delineators can be placed in the middle of the buffer area or to one side or the other as site conditions dictate (such as street sweeper width or vehicle door opening).

Bollards



Indianapolis, IN (Source: PeopleForBikes)

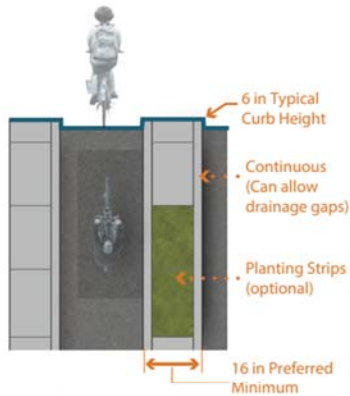
Bollards are a rigid barrier solution that provides a strong vertical element to the buffer space. Depending on how frequently the bollards are placed, this form of separation may result in an increased cost compared to others, and may not be as appropriate on higher speed streets.



Growth & Accessibility Planning

TECHNICAL ASSISTANCE PROGRAM

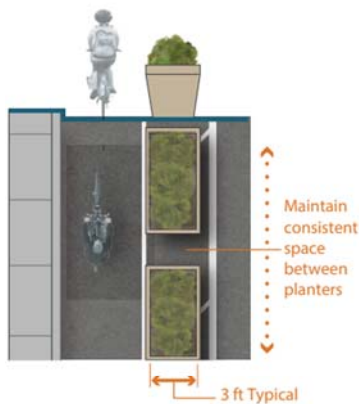
Raised Median



Austin, TX (Source: City of Austin)

Concrete curbs can either be cast in place or precast. This type of buffer element is more expensive to construct and install but provides a continuous raised buffer that is attractive with little long-term maintenance required. Mountable curbs are an option where emergency vehicle access may be required.

Planters



Portland, OR (Source: Oregon Transportation Research and Education Consortium)

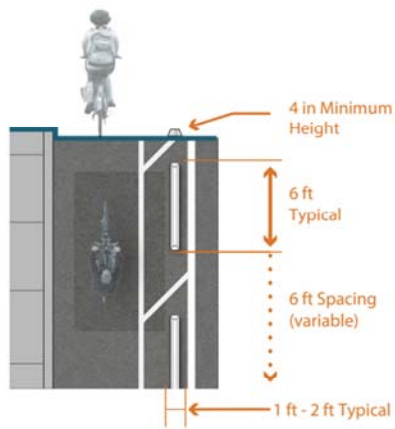
This form of separation provides an aesthetic element to the streetscape, a suitable vertical barrier, and is quick to install. However, depending on the placement, this treatment is more expensive than other solutions, requires maintenance of the landscaping, and may not be as appropriate on higher speed streets.



Growth & Accessibility Planning

TECHNICAL ASSISTANCE PROGRAM

Parking Stops



Baseline Road separated bike lane in Boulder, CO. (Source: City of Boulder)

Parking stops and similar low linear barriers are inexpensive buffer solutions that offer several benefits. These barriers have a high level of durability, can provide near continuous separation, and are a good solution when minimal buffer width is available. However, using the minimum width will not provide the same level of comfort and protection due to their low height and bicyclists' proximity to traffic.



Growth & Accessibility Planning

TECHNICAL ASSISTANCE PROGRAM

Combination of Treatments

Separation types can be used in combination to realize the full benefits of several treatments at a lower overall cost. For example, delineator posts can be alternated with parking stops or other low, linear barriers to provide both horizontal and vertical elements. Planters or rigid barriers and bollards may be used at the start of a block to more clearly identify the separated bike lane and provide an aesthetic treatment, with more inexpensive treatments used midblock.



A raised lane combined with curbside bicycle and car parking provide vertical and horizontal separation from vehicular traffic on Higgins Street in Missoula, MT. (Source: City of Missoula)



Raised curb islands at intersections combined with flexible delineator posts and parked cars midblock on 9th Avenue in New York City, NY (Source: NYC DOT)