Traffic Impact Study

Project Clover

Stafford County, VA

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INTRODUCTION AND SUMMARY

Purpose and Study Objective

This report presents the findings of a traffic impact study (TIS) for the proposed Project Clover development, situated along Centreport Parkway (Rte. 8900), just south of the Stafford Regional Airport in the Stafford County, Virginia.

The property consists of four parcels of relatively vacant land along Centreport Parkway (Rte. 8900) and would total approximately 177.96 acres. The parcels can be identified on the Stafford County GIS with the following Property IDs #: 37-30 (portion), 30C, 78 and 79. Property IDs #: 37-78 and 79 are currently zoned A-1 (Agricultural) and Property IDs #: 37-30 and 30C are currently zoned M-1 (Light Industrial) and subject to proffers associated with 092-11, Centreport. The future land use focuses on business and industry.

The proposed development is planned to incorporate the four parcels referenced above in order to construct approximately 3.07 million square feet of warehouse/distribution use. Property IDs #: 37-30 (portion) and 30C are included in the entitlement to allow for a coordinated development with Property IDs #: 37-78 and 79. The warehouse/distribution use (approximately 0.73 of the 3.07 million square feet) is permitted on Property IDs #: 37-30 and 30C today. The development is anticipated to be complete in 2023.

With the proposed development, a zoning change is required for Property IDs #: 37-78 and 79 to change the parcels to the M-1 zoning district and Property IDs #: 37-30 (portion) and 30C are included in the entitlement to allow for a coordinated development with Property IDs #: 37-78 and 79. Primary access to the development will be provided via three full-movement (T-intersection) access points:

1. A full-movement entrance (Site Access 1) along Centreport Parkway,
2. A full-movement entrance (Site Access 2) along Centreport Parkway, and
3. A full-movement entrance (Site Access 3) along Centreport Parkway.

The following tasks were completed as part of this study:

- A scoping meeting was held with VDOT and Stafford County staff on Wednesday, May 6, 2020, which included discussions about the parameters of the study and relevant background information. A copy of the signed scoping document for this TIS is included in Appendix A.
- Field reconnaissance in the vicinity of the site was performed to collect information related to existing traffic controls, roadway geometry, and traffic flow characteristics.
- Synchro files and signal timings were acquired from VDOT.
- Traffic counts were taken from the previous traffic counts and from other traffic impact studies and grown to 2020. The methodology for determining 2020 “baseline” traffic volumes was summarized in the scoping document and approved for use by VDOT and the County.
- Future without development traffic conditions were projected based on an inherent growth to account for regional growth on the roadway network, and also included potential background developments identified during the aforementioned scoping meeting.

- Proposed site traffic volumes were derived based on the methodology outlined in the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 10th Edition, publication and were assigned to the road network based on the agreed upon direction of approach discussed during the aforementioned scoping meeting.
- Future Conditions with Development were projected based on regional growth, existing regional and site traffic patterns, identifie background developments and improvements, and plans for the proposed development.
- Intersection capacity and queueing analyses were performed at the identified study intersections for the Existing Conditions (2020), Future Conditions without Development (2023), and Future Conditions with Development (2023) scenarios during the weekday morning (AM) and weekday afternoon (PM) peak hours.
- Intersection capacity and queuing analyses were conducted using *Synchro*, version 10, with results based on the Highway Capacity Manual (HCM) methodology and parameters from the Virginia Department of Transportation's (VDOT) Traffic Operations and Safety Analysis Manual (TOSAM), version 2, guidelines. *SimTraffic*, version 10, was utilized in determining the maximum queues at specific intersections when required. Any simulations herein also followed TOSAM parameters.
- The intersection of Route 1 with Enon Road / Cranes Corner Road was included in the analysis network (*Synchro*) files.

Sources of data for this study include the Stafford County (the County), the Virginia Department of Transportation (VDOT), and the office files and field reconnaissance efforts by Gorove Slade Associates, Inc.

Executive Summary

Site Location and Study Area

The development is generally situated along the north side of Centreport Parkway (Rte. 8900), just south of the Stafford Regional Airport in the Stafford County, Virginia. Per the scoping meeting with County and VDOT staff, the study area consists of six existing intersections and three future intersections. All of the three future T-intersections will provide access to the development and will utilize full movements. The existing intersections are as follows:

Intersection 1: American Legion Road/ Eskimo Hill Road at Route 1,

Intersection 2: Ramoth Church Road / American Legion Road at Centreport Parkway,

Intersection 3: Centreport Parkway (Rte. 8900) at Mountain View Road,

Intersection 4: Centreport Parkway (Rte. 8900) at I-95 SB Ramps,

Intersection 5: Centreport Parkway (Rte. 8900) at I-95 NB Ramps, and

Intersection 6: Centreport Parkway (Rte. 8900) at Route 1,

The future intersection is as follows:

Intersection 7: Centreport Parkway (Rte. 8900) at Site Access 1,

Intersection 8: Centreport Parkway (Rte. 8900) at Site Access 2, and

Intersection 9: Centreport Parkway (Rte. 8900) at Site Access 3.

Description of Proposed Development

The property consists of four parcels of relatively vacant land along Centreport Parkway (Rte. 8900) and would total approximately 177.96 acres. The parcels can be identified on the Stafford County GIS with the following Property IDs #: 37-30 (portion), 30C, 78 and 79. Property IDs #: 37-78 and 79 are currently zoned A-1 (Agricultural) and Property IDs #: 37-30 and 30C are currently zoned M-1 (Light Industrial) and subject to proffers associated with 092-11, Centreport. The future land use focuses on business and industry.

The proposed development is planned to incorporate the four parcels referenced above in order to construct approximately 3.07 million square feet of warehouse/distribution use. Property IDs #: 37-30 (portion) and 30C are included in the entitlement to allow for a coordinated development with Property IDs #: 37-78 and 79. The warehouse/distribution use (approximately 0.73 of the 3.07 million square feet) is permitted on Property IDs #: 37-30 and 30C today. The development is anticipated to be complete in 2023.

As detailed in the *Site Location and Study Area* section of the report, access to the development will be provided via three full-movement (T-intersections) access points along Centreport Parkway (Rte. 8900).

Principal Findings, Conclusions and Recommendations

The analysis contained herein presents the Existing Conditions (2020), Future Conditions without Development (2023), and Future Conditions with Development (2023).

Based on the above guidelines, the analysis presented in this report supports the following conclusions:

2020 Existing Conditions:

- Based on the capacity analysis, all signalized intersections in the study area currently operate at acceptable levels of service (LOS D or better) with the exception of Centreport Parkway at the I-95 NB Ramp during the AM peak hour. The intersections of Centreport Parkway at both I-95 ramps and at Route 1 are anticipated to have one or more approaches that will operate at unacceptable levels of service during at least one peak hour.
- Based on the queuing analysis from *Synchro*, the study intersections are anticipated to have 95th percentile queues that were accommodated within the available storage lengths of existing turn lanes with the exception of the Westbound Right turning movement at the intersection of Route 1 at Centreport Parkway during the PM peak hour.
- Based on the queuing analysis from *SimTraffic*, the study intersections are anticipated to have maximum queues that would be accommodated within the available storage lengths of existing turn lanes with the exception of the Westbound Right and Northbound Right turning movements at the intersection of Route 1 at Centreport Parkway during one of the peak hours.

Future Conditions without Development (2023)

- The area around Centreport Parkway is anticipated to experience significant development growth. In addition to the proposed Project Clover development, five other developments could be online within the

next three years including: Centreport Industrial, Centreport Stafford 95 Business Center, portions of Sycamore Grove, McGrath RentCorp Storage Facility, and Centerpoint Gateway. These developments have commitments for roadway improvements along Centreport Parkway (including the geometric improvements at Mountain View Road and at the both I-95 ramps, as well as signal timing adjustments at the I-95 ramps and at Route 1).

- Based on the capacity analysis, three of the six study intersections are anticipated to operate at acceptable levels of service; the intersections of Centreport Parkway at Mountain View Road, at the I-95 NB ramp, and at Route 1 are anticipated to operate an overall unacceptable levels of service during at least one of the peak hour. These intersections also have one or more approaches that will operate at a LOS E or F in addition to Centreport Parkway and the I-95 SB Ramp.
- Based on the queuing analysis from *Synchro*, the study intersections are anticipated to have 95th percentile queues that would be accommodated within the available storage lengths of future turn lanes with the exception of the Westbound and Northbound Right turning movements at the intersection of Route 1 at Centreport Parkway and the Northbound Right turning movement at the intersection of Centreport Parkway at Mountain View Road.
- Based on the queuing analysis from *SimTraffic*, the turning movements at the study intersections are anticipated to have maximum queues that would be accommodated within the available storage lengths of future turn lanes with the exception of the Westbound and Northbound Right turning movements at the intersection of Route 1 at Centreport Parkway and the Northbound Left turning movement at the intersection of Centreport Parkway at Mountain View Road.

Future Conditions with Development (2023)

- The proposed development is planned to incorporate the four parcels relatively vacant land along Centreport Parkway (Rte. 8900). The proposed development is planned to construct approximately 3.07 million square feet of warehouse/distribution use. The warehouse/distribution use (approximately 0.73 of the 3.07 million square feet) is permitted "by-right."
    - The "by-right" portion of the development is anticipated to generate approximately 109 trips during the AM peak hour, 117 trips during the PM peak hour, and 1,319 weekday daily trips.
    - The rezoned M-1 portion of the development is anticipated to generate approximately 350 trips during the AM peak hour, 374 trips during the PM peak hour, and 4,228 weekday daily trips.
- The following roadway improvements and mitigations are recommended (by intersection) in order to accommodate roadway demand due to the changes in traffic patterns and increased vehicular traffic demand along the road network:
    - Route 1 at American Legion Road / Eskimo Hill Road
        - Adjust signal timings.
    - Centreport Parkway at Mountain View Road
        - Install a traffic signal;

        - Extended the Northbound Left storage bay by approximately 50 feet.
    - Centreport Parkway at I-95 SB Ramps
        - Optimize signal offsets.
    - Centreport Parkway at I-95 NB Ramps
        - Adjust signal timings;
        - Optimize signal offsets.
    - Route 1 at Centreport Parkway
        - Restripe the Westbound Approach to support a Westbound Left and Westbound Left/Right configuration.
    - Centreport Parkway at Site Entrance 1
        - Install a Southbound Left turn lane.
    - Centreport Parkway at Site Entrance 2
        - Install a Southbound Left turn lane.
    - Centreport Parkway at Site Entrance 3
        - Install an Eastbound Left turn lane.

- Based on the capacity analysis, all signalized study intersections are anticipated to operate at overall acceptable levels of service with the proposed improvements with the exception of Centreport Parkway with the I-95 NB Ramp (which would operate similar to future without development conditions). The only other intersection that will have an approach operating at an unacceptable level of service would be the intersection of Centreport Parkway at the I-95 SB ramp during the PM peak hour (similar to future conditions without development).The intersections of Centreport Parkway with Mountain View Road, and with Route 1 would begin to operate at overall acceptable levels of service as compared to future conditions without development.
- Based on the queuing analysis from *Synchro*, the study intersections are anticipated to have 95th percentile queues that would be accommodated within the available storage lengths of future turn lanes with the exception of the Northbound Right turning movement at the intersection of Route 1 at Centreport Parkway during the PM peak hour (similar to future conditions without development).
- Based on the queuing analysis from *SimTraffic*, the study intersections are anticipated to have maximum queues that would be accommodated within the available storage lengths of future turn lanes with the exception of the Northbound Right and Southbound Left turning movements at the intersection of Route 1 at Centreport Parkway and the Northbound Left turning movement at the intersection of Centreport Parkway at Mountain View Road. These intersections would experience maximum queues beyond the storage length on generally the same movements under future conditions without development.

Based on the capacity and queuing analysis of future conditions, the proposed development **will not have a detrimental impact** on the surrounding road network and would improve roadway conditions, assuming all planned design recommendations in this report are implemented.

BACKGROUND INFORMATION: PROPOSED DEVELOPMENT (SITE AND NEARBY)

Site Location and Major Transportation Features

This study is being performed to examine the potential traffic impact of the proposed development in the Stafford County, Virginia. The proposed development is situated along the north side of Centreport Parkway (Rte. 8900), just south of the Stafford Regional Airport.

Six existing intersections are located within the study area. Based on the associated site plans, access is to be provided at three full-movement (T-intersection) access point along Centreport Parkway (Rte. 8900). The study intersections are described in the *Scope of Study* section of this report.

An area map is depicted in **Figure 1**. A map of the study intersections is depicted in **Figure 2**, and the site's development plans are depicted in **Figure 3**.

An in-depth description of the roadways in the site vicinity is provide in the *Roadway Network* section of this report.

Scope of Study

The study area consists of six existing intersections and three future intersections. The following intersections were identified for inclusion in this study:

Intersection 1: American Legion Road/ Eskimo Hill Road at Route 1 [existing; signalized; full movement],

Intersection 2: Ramoth Church Road / American Legion Road at Centreport Parkway (Rte. 8900) [existing; three-legged; side street stop controlled; full movement],

Intersection 3: Centreport Parkway (Rte. 8900) at Mountain View Road [existing; four-way stop controlled; full movement],

Intersection 4: Centreport Parkway at I-95 SB Ramps [existing; signalized; full movement],

Intersection 5: Centreport Parkway at I-95 NB Ramps [existing; signalized; full movement],

Intersection 6: Centreport Parkway at Route 1 [existing; signalized; full movement],

Intersection 7: Centreport Parkway at Site Access 1 [future; three-legged; side street stop-controlled; full movement],

Intersection 8: Centreport Parkway at Site Access 2 [future; three-legged; side street stop-controlled; full movement], and

Intersection 9: Centreport Parkway at Site Access 3 [future; three-legged; side street stop-controlled; full movement].

Furthermore, as noted in the agreed to scoping document, the intersection of Enon Road / Cranes Corner Road with Route 1 was included in the analysis network (*Synchro*) files for reference but was not included as study intersection.

Figure 1: Area Map and Site Location

Figure 2: Study Intersections Map

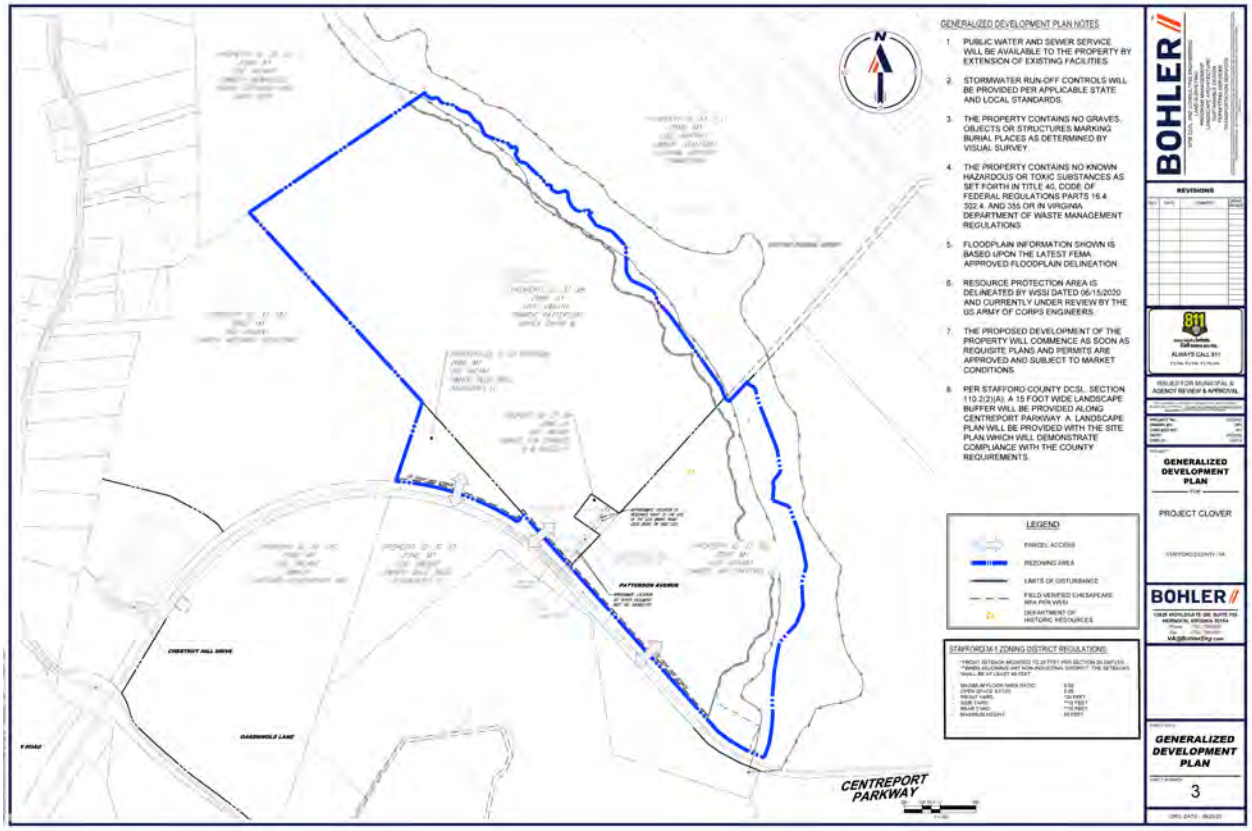


Figure 3: Concept Development Plan
Note: The plan above is for conceptual purposes only.

This report presents the findings of analyses performed for the following conditions:

- **Existing Conditions (2020):** Considers existing traffic volumes and existing roadway configurations.
- **Future Conditions without Development (2023):** Considers future traffic conditions for the year 2023 with regional growth and other nearby development projects, but without the proposed development.
- **Future Conditions with Development (2023):** Considers future traffic conditions for the year 2023 with regional growth and other nearby development projects, and the proposed development.

The results of the analysis and the traffic impacts associated with the proposed development are presented in the *Conclusion* section of this report.

Roadway Network

A description of the major roadways within the immediate vicinity of the site is presented below.

Table 1: Existing Roadway Network

Roadway	RTE #	VDOT Classification	Stafford Classification	Lanes	Legal/Design Speed Limit (mph)	AADT (vpd)	Road Segment Between:		HV%
Centreport Parkway	8900	Major Collector	Major Collector	2	45	15,000	US 1	I-95	4.0%
Centreport Parkway	8900	Major Collector	Major Collector	2	50	7,200	I-95	Mountain View Rd	4.0%
Centreport Parkway	8900	Minor Collector	Minor Collector	2	50	750	Mountain View Road	Dead-End	-
Mountain View Road	627	-	-	2	45	70	Cul-de-Sac	Centreport Parkway	0.0%
Mountain View Road	627	Major Collector	Major Collector	2	45	6,200	Centreport Parkway	Kellogg Mill Road	1.0%
Ramoth Church Road (American Legion Drive)	628	Major Collector	Minor Collector / Major Collector	2	40	2,900	Accokeek Furnace Road	US 1	3.0%
Eskimo Hill Road	628	Major Collector	Major Collector	2	25	2,900	US 1	Southern View Drive	7.0%
I-95 North Ramp	I-95	Interstate Ramp	Interstate Ramp	1	35 (Advisory)	5,600	I-95 N	Centreport Parkway	-
I-95 South Ramp	I-95	Interstate Ramp	Interstate Ramp	1	35 (Advisory)	3,800 (South Only)	I-95 S	Ramp Split	-
Jefferson Davis Highway	1	her Principal Arter	Other Principal Arterial	4	45 / 50	21,000	Cranes Corner	Ramoth/Eskimo	2.0%
Jefferson Davis Highway	1	her Principal Arter	Other Principal Arterial	4/6	40	18,000	Ramoth/Eskimo	Hope Road	2.0%

The existing lane configuration and traffic control in the study area is shown in **Figure 4**.

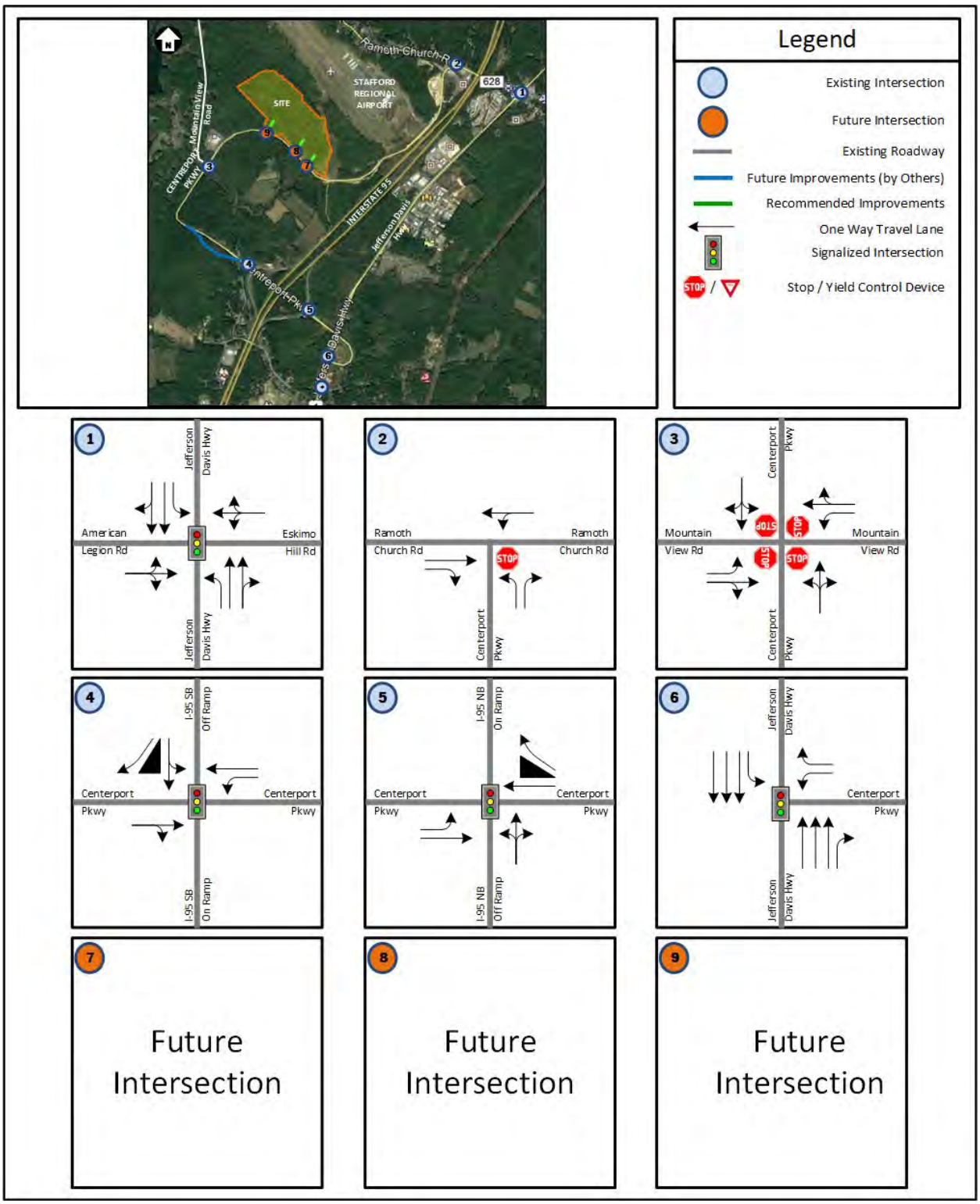


Figure 4: 2020 Existing Conditions – Roadway Network Geometric Configuration and Traffic Control Devices

EXISTING CONDITIONS (2020)

Existing Conditions (2020) Traffic Volumes

To determine the weekday morning (AM) and weekday afternoon (PM) peak hour turning movement traffic volumes, turning movement counts were taken from several previously approved traffic impact studies in the vicinity of the site and previous traffic counts. Traffic volumes from these studies and counts were assessed in order development 2020 'baseline' traffic volumes. It should be noted that these traffic volumes were presented to the County and VDOT for approval and were included in the signed scoping document.

The following assumptions were made in order to develop the 2020 'baseline' traffic volumes:

1. American Legion Road/ Eskimo Hill Road at Route 1
    - Turning movement volumes were based on AM and PM turning movements counts from 2015. These peak hour counts were from the Centreport Industrial Rezoning Traffic Impact Study, conducted by JMT and dated December 24, 2015.
    - Each turning movement was grown to 2020 conditions, based on a 2.5% per annum growth rate.
2. Ramoth Church Road / American Legion Road at Centreport Parkway
    - Turning movement volumes were based on AM and PM turning movements counts from 2015. These peak hour counts were from the Centreport Industrial Rezoning Traffic Impact Study, conducted by JMT and dated December 24, 2015.
    - Each turning movement was grown to 2020 conditions, based on a 2.5% per annum growth rate.
3. Centreport Parkway at Mountain View Road
    - Turning movement volumes were based on AM and PM turning movements counts from 2013. These peak hour counts were from the George Washington Village Traffic Impact Analysis, conducted by Bowman Consulting and dated January 31, 2014.
    - Each turning movement was grown to 2020 conditions, based on a 2.5% per annum growth rate.
4. Centreport Parkway at I-95 SB Ramps
    - Turning movement counts were based on 2016 data provided by VDOT. The AM and PM system peak hours were determined based on traffic data from the following intersections: Centreport Parkway with the I-95 SB Ramps, Centreport Parkway with I-95 NB Ramps, Route 1 with Centrepoint Parkway, and Route 1 with Enon Road / Cranes Corner Road.
    - Each turning movement was grown to 2020 conditions, based on a 2.5% per annum growth rate.
    - Note: The southbound right turning movement from the I-95 southbound ramp to Centreport Parkway was not included in the counts. Given the lack of information, the traffic volumes for the southbound ramp were instead based on the 2013 traffic volumes included in the George Washington Village Traffic Impact Analysis, conducted by Bowman Consulting and dated January 31, 2014, and grown to 2020 conditions, based on a 2.5% per annum growth rate.

5. Centreport Parkway at I-95 NB Ramps

    - Turning movement counts were based on 2016 data provided by VDOT. The AM and PM system peak hours were determined based on traffic data from the following intersections: Centreport Parkway with the I-95 SB Ramps, Centreport Parkway with I-95 NB Ramps, Route 1 with Centrepoint Parkway, and Route 1 with Enon Road / Cranes Corner Road.
    - Each turning movement was grown to 2020 conditions, based on a 2.5% per annum growth rate.

6. Route 1 at Centreport Parkway

    - Turning movement counts were based on 2017 data provided by VDOT. The AM and PM system peak hours were determined based on traffic data from the following intersections: Centreport Parkway with the I-95 SB Ramps, Centreport Parkway with I-95 NB Ramps, Route 1 with Centrepoint Parkway, and Route 1 with Enon Road / Cranes Corner Road.
    - Each turning movement was grown to 2020 conditions, based on a 2.5% per annum growth rate.

7. Route 1 at Enon Road / Cranes Corner Road[1]

    - Turning movement counts were based on 2017 data provided by VDOT. The AM and PM system peak hours were determined based on traffic data from the following intersections: Centreport Parkway with the I-95 SB Ramps, Centreport Parkway with I-95 NB Ramps, Route 1 with Centrepoint Parkway, and Route 1 with Enon Road / Cranes Corner Road.
    - Each turning movement was grown to 2020 conditions, based on a 2.5% per annum growth rate.

The 2020 existing traffic volumes are shown in **Figure 5**. The average daily traffic (ADT) volumes shown in **Figure 5** are based on are based on VDOT historical data for roadway segment k-factors and the PM peak hour volumes. If the historic data was not available for a roadway or roadway segment, then a k-factor of 0.10 was assumed. The reference data for the existing turning count movements are provided within the approved scope document in Appendix A.

[1] As mentioned previously, the intersection Route 1 at Enon Road / Cranes Corner Road was not assessed as a study intersection for the purposes of this report, however it was included in the *Syncrho* model networks as discussed and agreed to in the scoping meeting with the County and VDOT.

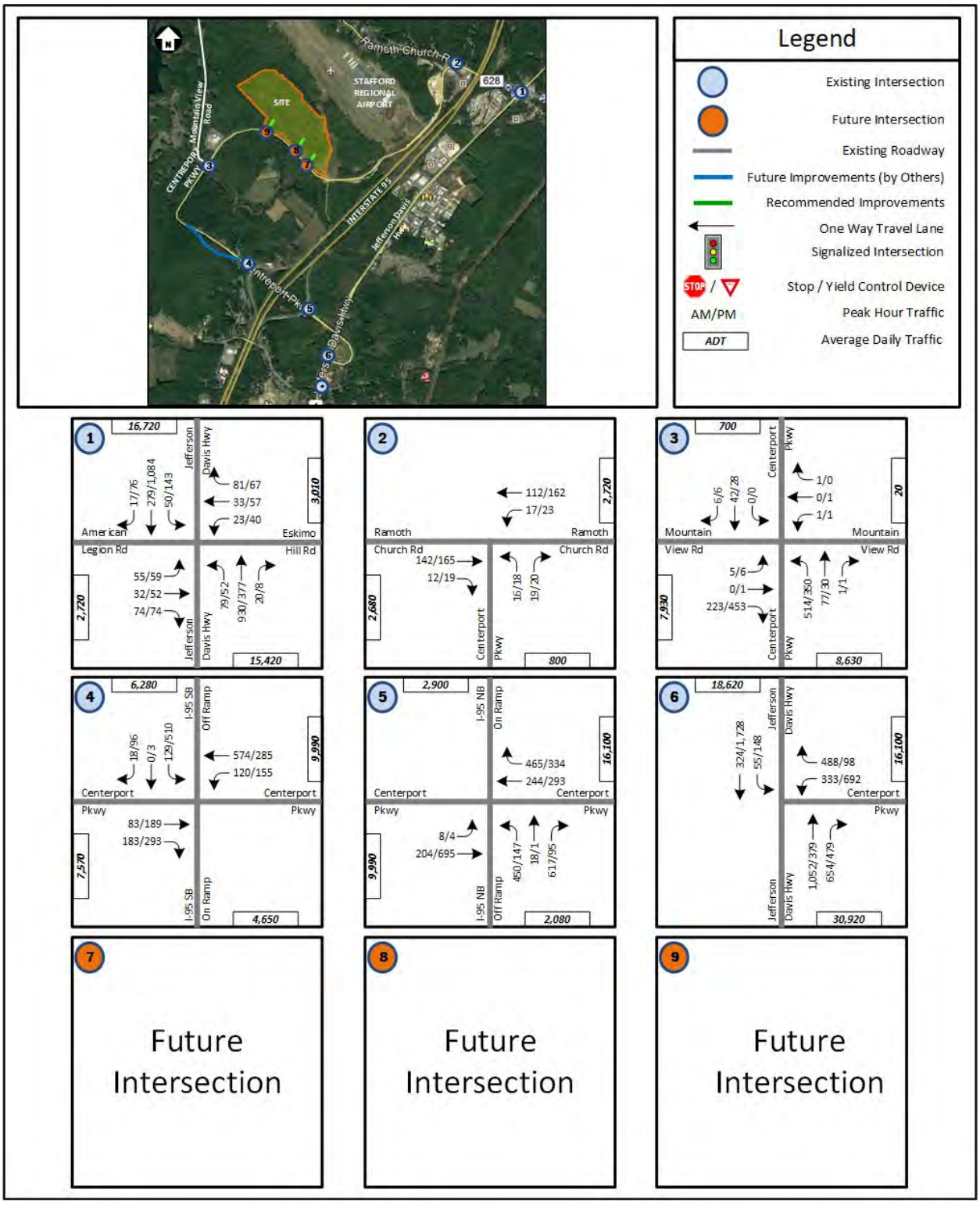


Figure 5: 2020 Existing Conditions – Vehicular Traffic Volumes

Existing Roadway Safety Assessment

Historical crash data was obtained from the VDOT's Crash Analysis Tool for the existing study intersections for a five-year period between January 2015 through December 2019. During the five-year period, a total of 79 crashes were recorded at the six existing intersections as illustrated in **Table 2** and graphically in **Figure 6.** Of the 79 recorded crashes, approximately 71% were classified as "Property Damage Only (PDO)." No fatality has occurred within the study area during the five-year period.

The crash data by intersections is provided in Appendix B.

Table 2: Historical Crash Data Summary (January 2015 through December 2019)

Intersection		PDO	IC	Fatality	Total	Crash Rate (Per MEV)
1	American Legion Road/ Eskimo Hill at Route 1	14	7	0	21	0.51
2	Ramoth Church/ American Legion at Centreport Parkway	2	0	0	2	0.30
3	Centreport Parkway at Mountain View Road	4	0	0	4	0.31
4	Centreport Parkway at I-95 SB Ramp	5	1	0	6	0.30
5	Centreport Parkway at I-95 NB Ramp	16	4	0	20	0.66
6	Centreport Parkway at Route 1	15	11	0	26	0.43

The intersection crash rate was computed for the six existing study intersections using the following formula and was calculated as crashes per one million entering vehicles (MEV). The approach average daily traffic volumes ($ADT_{approach}$) was derived from calculations based on the existing link ADTs.

$$Rate_{intersection} = \frac{1{,}000{,}000 * \#\ of\ Crashes}{\#\ of\ Years * 365\ \left(\frac{days}{year}\right) * ADT_{approach}}$$

It should be noted that according to the Institute of Transportation Engineers' (ITE's) Transportation Impact Analysis for Site Development, a crash rate of 1.0 MEV or higher is an indication that further study is required. A rate over 1.0 MEV does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have an elevated crash rate due to operational, geometric, or other deficiencies.

Based on the crash rates, none of the existing study intersections were high crash locations.

The crashes that occurred at the six intersections are summarized by crash severity and crash type per year in **Table 3** through **Table 8**.

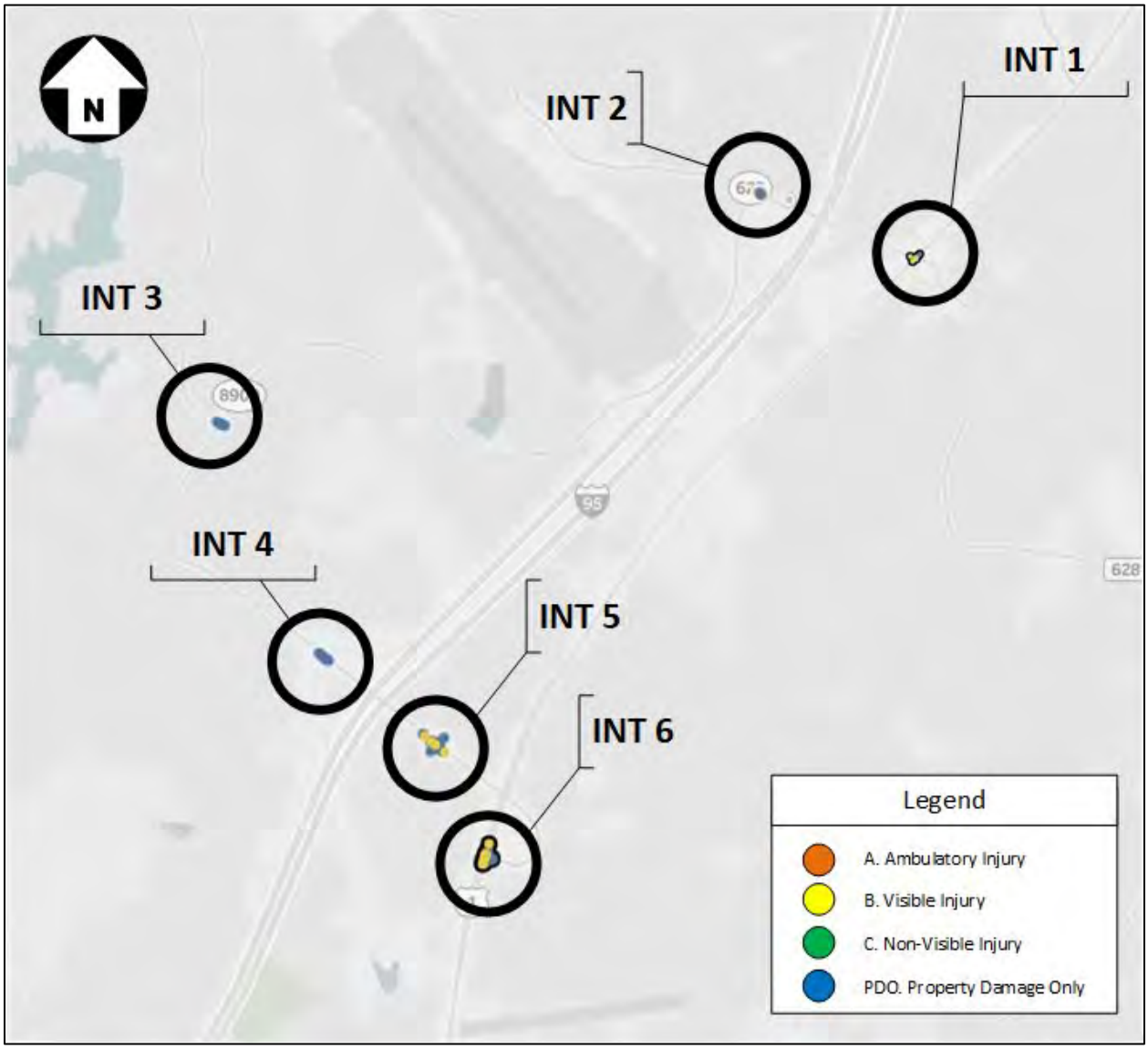


Figure 6: Crash Aerial Map

Table 3: VDOT Crash Data at American Legion Road/ Eskimo Hill Road and Route 1

	Crash Data for the Intersection of American Legion Road/ Eskimo Hill and Route 1 (2015 - 2019)						
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Relative Frequency**
Crash Severity							
Fatal Collision							0.00%
Injury Collision	2	1		2	2	7	33.33%
Type A							
Type B	*1*	*1*		*1*	*2*	*5*	
Type C	*1*			*1*		*2*	
Property Damage Only	3	4	3	1	3	14	66.67%
TOTAL*	5	5	3	3	5	21	100.00%
Crash Type							
Fixed Object/ Single-Vehicle Crash	1					1	4.76%
Head-On		1			1	2	9.52%
Sideswipe / Same Direction	1				1	2	9.52%
Sideswipe / Opposite Direction							0.00%
Rear-End Collision		2			1	3	14.29%
Angle Collision	2	2	3	3	2	12	57.14%
Backed Into							0.00%
Pedestrian Collision							0.00%
Deer/Animal							0.00%
Other	1					1	4.76%
TOTAL*	5	5	3	3	5	21	100.00%
Other Factors							
Distracted Driver		1		1	1	3	14.29%
Alcohol Related**	1					1	4.76%
Work-Zone Related							0.00%
Inclement Weather (Non-Dry)				1		1	4.76%
Speeding							0.00%
Disregard of Traffic Control Device			1			1	4.76%
Pedestrian Injury***							N/A
Time of Day							
AM Peak Period (6 - 10 AM)		1		1		2	9.52%
Off Peak - Daytime (10 AM - 3 PM)	3		3	1	2	9	42.86%
PM Peak Period (3 - 7 PM)	1	4		1	3	9	42.86%
Off Peak - Nighttime (7 PM - 6 AM)	1					1	4.76%
CALCULATED CRASH RATE						***0.51***	***Crashes per MEV***

* It should be noted that an intersection radius of 250 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

Table 4: VDOT Crash Data at Ramoth Church Road/ American Legion Road and Centreport Parkway

	Crash Data for the Intersection of Ramoth Church/ American Legion and Centreport Parkway (2015 - 2019)						
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Relative Frequency**
Crash Severity							
Fatal Collision							0.00%
Injury Collision							0.00%
Type A							
Type B							
Type C							
Property Damage Only				1	1	2	100.00%
TOTAL*				1	1	2	100.00%
Crash Type							
Fixed Object/ Single-Vehicle Crash							0.00%
Head-On							0.00%
Sideswipe / Same Direction							0.00%
Sideswipe / Opposite Direction							0.00%
Rear-End Collision				1	1	2	100.00%
Angle Collision							0.00%
Backed Into							0.00%
Pedestrian Collision							0.00%
Deer/Animal							0.00%
Other							0.00%
TOTAL*	0	0	0	1	1	2	100.00%
Other Factors							
Distracted Driver							0.00%
Alcohol Related**							0.00%
Work-Zone Related							0.00%
Inclement Weather (Non-Dry)							0.00%
Speeding							0.00%
Disregard of Traffic Control Device							0.00%
Pedestrian Injury***							N/A
Time of Day							
AM Peak Period (6 - 10 AM)				1		1	50.00%
Off Peak - Daytime (10 AM - 3 PM)							0.00%
PM Peak Period (3 - 7 PM)					1	1	50.00%
Off Peak - Nighttime (7 PM - 6 AM)							0.00%
CALCULATED CRASH RATE						***0.30***	***Crashes per MEV***

* It should be noted that an intersection radius of 250 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

Table 5: VDOT Crash Data at Centreport Parkway and Mountain View Road

	Crash Data for the Intersection of Centreport Parkway and Mountain View Road (2015 - 2019)						
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Relative Frequency**
Crash Severity							
Fatal Collision							0.00%
Injury Collision							0.00%
Type A							
Type B							
Type C							
Property Damage Only		1	1	1	1	4	100.00%
TOTAL*		1	1	1	1	4	100.00%
Crash Type							
Fixed Object/ Single-Vehicle Crash			1			1	25.00%
Head-On							0.00%
Sideswipe / Same Direction							0.00%
Sideswipe / Opposite Direction							0.00%
Rear-End Collision		1				1	25.00%
Angle Collision				1	1	2	50.00%
Backed Into							0.00%
Pedestrian Collision							0.00%
Deer/Animal							0.00%
Other							0.00%
TOTAL*	0	1	1	1	1	4	100.00%
Other Factors							
Distracted Driver			1			1	25.00%
Alcohol Related**			1			1	25.00%
Work-Zone Related							0.00%
Inclement Weather (Non-Dry)					1	1	25.00%
Speeding							0.00%
Disregard of Traffic Control Device							0.00%
Pedestrian Injury***							N/A
Time of Day							
AM Peak Period (6 - 10 AM)							0.00%
Off Peak - Daytime (10 AM - 3 PM)				1	1	2	50.00%
PM Peak Period (3 - 7 PM)			1			1	25.00%
Off Peak - Nighttime (7 PM - 6 AM)		1				1	25.00%
CALCULATED CRASH RATE						***0.31***	***Crashes per MEV***

* It should be noted that an intersection radius of 250 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

Table 6: VDOT Crash Data at Centreport Parkway and I-95 SB Ramp

	Crash Data for the Intersection of Centreport Parkway and I-95 SB Ramp (2015 - 2019)						
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Relative Frequency**
Crash Severity							
Fatal Collision							0.00%
Injury Collision			1			1	16.67%
Type A							
Type B							
Type C			*1*			*1*	
Property Damage Only	1		2		2	5	83.33%
TOTAL*	1		3		2	6	100.00%
Crash Type							
Fixed Object/ Single-Vehicle Crash							0.00%
Head-On			1			1	16.67%
Sideswipe / Same Direction							0.00%
Sideswipe / Opposite Direction							0.00%
Rear-End Collision			1		2	3	50.00%
Angle Collision	1		1			2	33.33%
Backed Into							0.00%
Pedestrian Collision							0.00%
Deer/Animal							0.00%
Other							0.00%
TOTAL*	1	0	3	0	2	6	100.00%
Other Factors							
Distracted Driver			2		1	3	50.00%
Alcohol Related**			1			1	16.67%
Work-Zone Related							0.00%
Inclement Weather (Non-Dry)					1	1	16.67%
Speeding			1			1	16.67%
Disregard of Traffic Control Device			1			1	16.67%
Pedestrian Injury***							N/A
Time of Day							
AM Peak Period (6 - 10 AM)					1	1	16.67%
Off Peak - Daytime (10 AM - 3 PM)			1			1	16.67%
PM Peak Period (3 - 7 PM)	1		1		1	3	50.00%
Off Peak - Nighttime (7 PM - 6 AM)			1			1	16.67%
CALCULATED CRASH RATE						***0.30***	***Crashes per MEV***

* It should be noted that an intersection radius of 250 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

Table 7: VDOT Crash Data at Centreport Parkway and I-95 NB Ramp

	Crash Data for the Intersection of Centreport Parkway and I-95 NB Ramp (2015 - 2019)						
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Relative Frequency**
Crash Severity							
Fatal Collision							0.00%
Injury Collision	2	1	1			4	20.00%
Type A							
Type B	*2*	*1*	*1*			*4*	
Type C							
Property Damage Only	4	2	4	4	2	16	80.00%
TOTAL*	6	3	5	4	2	20	100.00%
Crash Type							
Fixed Object/ Single-Vehicle Crash	1				1	2	10.00%
Head-On							0.00%
Sideswipe / Same Direction			1		1	2	10.00%
Sideswipe / Opposite Direction							0.00%
Rear-End Collision	1	3	2	3		9	45.00%
Angle Collision	4		1			5	25.00%
Backed Into							0.00%
Pedestrian Collision							0.00%
Deer/Animal							0.00%
Other			1	1		2	10.00%
TOTAL*	6	3	5	4	2	20	100.00%
Other Factors							
Distracted Driver		2	3	3		8	40.00%
Alcohol Related**			1	2	1	4	20.00%
Work-Zone Related							0.00%
Inclement Weather (Non-Dry)	1		1	1		3	15.00%
Speeding							0.00%
Disregard of Traffic Control Device							0.00%
Pedestrian Injury***							N/A
Time of Day							
AM Peak Period (6 - 10 AM)	1	1			1	3	15.00%
Off Peak - Daytime (10 AM - 3 PM)	2		1			3	15.00%
PM Peak Period (3 - 7 PM)	1	1	4	2	1	9	45.00%
Off Peak - Nighttime (7 PM - 6 AM)	2	1		2		5	25.00%
CALCULATED CRASH RATE						***0.66***	***Crashes per MEV***

* It should be noted that an intersection radius of 250 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

Table 8: VDOT Crash Data at Centreport Parkway and Route 1

	Crash Data for the Intersection of Centreport Parkway and Route 1 (2015 - 2019)						
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Relative Frequency**
Crash Severity							
Fatal Collision							0.00%
Injury Collision	1	3	4	1	2	11	42.31%
Type A							
Type B	*1*	*3*	*4*	*1*	*2*	*11*	
Type C							
Property Damage Only	5	4	2	2	2	15	57.69%
TOTAL*	6	7	6	3	4	26	100.00%
Crash Type							
Fixed Object/ Single-Vehicle Crash	1	1			1	3	11.54%
Head-On			1			1	3.85%
Sideswipe / Same Direction							0.00%
Sideswipe / Opposite Direction	1					1	3.85%
Rear-End Collision	2	2	3	2	1	10	38.46%
Angle Collision	2	4	1	1	2	10	38.46%
Backed Into							0.00%
Pedestrian Collision							0.00%
Deer/Animal							0.00%
Other			1			1	3.85%
TOTAL*	6	7	6	3	4	26	100.00%
Other Factors							
Distracted Driver			1	1	1	3	11.54%
Alcohol Related**			2		2	4	15.38%
Work-Zone Related							0.00%
Inclement Weather (Non-Dry)	1	2	1	1	2	7	26.92%
Speeding					1	1	3.85%
Disregard of Traffic Control Device					1	1	3.85%
Pedestrian Injury***							N/A
Time of Day							
AM Peak Period (6 - 10 AM)	1	2		1	1	5	19.23%
Off Peak - Daytime (10 AM - 3 PM)	3	1	1			5	19.23%
PM Peak Period (3 - 7 PM)	1	4	4	2	2	13	50.00%
Off Peak - Nighttime (7 PM - 6 AM)	1		1		1	3	11.54%
CALCULATED CRASH RATE						***0.43***	***Crashes per MEV***

* It should be noted that an intersection radius of 250 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

Existing Conditions (2020) Intersection Capacity Analysis

Intersection capacity analyses were performed for the Existing Conditions (2020) scenario at the study area intersections during AM and PM peak hours. *Synchro,* version 10, was used to analyze the study intersections with results based on the Highway Capacity Manual (HCM) 2010 methodology[2] and includes level of service (LOS), delay, and queue length comparisons for the turning movements analyzed. Synchro files and existing signal timings sheets were provided by VDOT or Stafford County staff and used as a base for the existing analysis.

The peak hour factors utilized in the analysis of existing conditions were based on the traffic count data used in the development of the 2020 'baseline' volumes and were modeled in the *Synchro* network on a by-intersection basis. Peak hours factors in the range of 0.85 to 1.00 were used for the existing scenario, as agreed to in the scoping document. If the peak hour factors for a given intersection were unable to be determined with data, a default *Synchro* peak hour factor of 0.92 was assumed. The heavy vehicle percentages utilized in the analysis were based on the previous traffic counts used in the development of the 2020 'baseline' volumes. If heavy vehicle percentages were unavailable with data, the heavy vehicle percentages were instead based on VDOT historical traffic data for 2019.

Per the scoping meeting between VDOT and Stafford County staff, it would be considered acceptable and/or desirable to achieve an approach level of service (LOS) D or better for traffic operations using HCM methodology. The results of the intersection capacity analyses from *Synchro* are presented in **Table 9** and graphically in **Figure 7**. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized intersections and per approach and lane group for all study intersections. The overall signalized intersections, and any approaches that operate at LOS E or F, are displayed in red.

The 95th percentile queues were also determined from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available effective storage capacity of existing turn lanes are displayed in red.

The description of different LOS and delay are included in Appendix C. The detailed analysis worksheets of Existing Conditions are contained in Appendix D.

[2] It should be noted that HCM 2000 methodology was used in lieu of HCM 2010 if the HCM 2010 methodology was not applicable. HCM 2010 could not be applicable in such cases as nonstandard National Electrical Manufacturers Association (NEMA) configurations, shared lane configurations, placement of loop detectors, U-turns, etc.

Table 9: 2020 Existing Conditions - Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)	LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)
1	**Route 1 & American Legion Rd/Eskimo Hill Rd**							
	Overall Intersection (Signalized)		**B**	**14.7**		**B**	**16.6**	
	Eastbound Approach		***C***	***28.3***		***C***	***33.8***	
	Eastbound Left/Thru/Right		C	28.3	148	C	33.8	#204
	Westbound Approach		***C***	***27.6***		***C***	***32.7***	
	Westbound Left/Thru/Right		C	27.6	110	C	32.7	167
	Northbound Approach		***B***	***12.5***		***B***	***10.8***	
	Northbound Left	325	A	7.3	35	B	10.3	25
	Northbound Thru/Right		B	12.9	290	B	10.9	110
	Southbound Approach		***A***	***9.6***		***B***	***14.1***	
	Southbound Left	230	A	8.7	24	A	8.0	57
	Southbound Thru/Right		A	9.8	81	B	14.8	380
2	**Centreport Pkwy & Ramoth Church Road/American Legion Rd**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Thru							
	Eastbound Right	380						
	Westbound Approach							
	Westbound Left/Thru		A	7.6	0	A	7.7	3
	Northbound Approach		***A***	***9.7***		***B***	***10.2***	
	Northbound Left		B	10.5	3	B	11.3	3
	Northbound Right	290	A	9.1	3	A	9.3	3
3	**Centreport Pkwy & Mountain View Rd**							
	Overall Intersection (AWSC)		**D**	**25.2**		**C**	**18.3**	
	Eastbound Approach		***B***	***11.8***		***C***	***19.4***	
	Eastbound Left	110	A	9.6	0	A	9.2	0
	Eastbound Thru/Right		B	11.8	45	C	19.5	148
	Westbound Approach		***A***	***9.5***		***A***	***9.6***	
	Westbound Left	110	B	10.1	0	A	9.8	0
	Westbound Thru/Right		A	8.8	0	A	9.3	0
	Northbound Approach		***D***	***31.8***		***C***	***17.9***	
	Northbound Left/Thru/Right		D	31.8	265	C	17.9	115
	Southbound Approach		***A***	***9***		***A***	***9.3***	
	Southbound Left/Thru/Right		A	9	8	A	9.3	5
4	**Centreport Pkwy & I-95 SB Ramp**							
	Overall Intersection (Signalized)		**B**	**14.6**		**D**	**44.3**	
	Eastbound Approach		***C***	***20.2***		***E***	***56.2***	
	Eastbound Thru/Right		C	20.2	148	E	56.2	#645
	Westbound Approach		***B***	***11.3***		***C***	***21.5***	
	Westbound Left	300	B	11.7	52	C	28.4	132
	Westbound Thru		B	11.3	283	B	17.7	223
	Southbound Approach		***C***	***20.8***		***D***	***52.7***	
	Southbound Left/Thru		C	20.8	101	D	52.7	#636
5	**Centreport Pkwy & I-95 NB Ramp**							
	Overall Intersection (Signalized)		**F**	**149.8**		**B**	**14.9**	
	Eastbound Approach		***C***	***20.6***		***B***	***12.5***	
	Eastbound Left	310	C	24.0	11	B	10.2	6
	Eastbound Thru		C	20.4	123	B	12.6	472
	Westbound Approach		***C***	***31.5***		***B***	***13.7***	
	Westbound Thru		C	31.5	192	B	13.7	205
	Westbound Right		A	0	73	A	0	50
	Northbound Approach		***F***	***201.5***		***C***	***23.4***	
	Northbound Left/Thru/Right		F	201.5	#1167	C	23.4	221
6	**Route 1 & Centreport Pkwy**							
	Overall Intersection (Signalized)		**C**	**27.4**		**D**	**52.2**	
	Westbound Approach		***D***	***37.4***		***E***	***78.2***	
	Westbound Left		D	41.0	358	F	86.1	#875
	Westbound Right	270	C	35.0	224	C	22.8	47
	Northbound Approach		***C***	***25.7***		***E***	***75.4***	
	Northbound Thru		C	26.2	301	C	33.3	m134
	Northbound Right	270	C	24.9	86	F	108.7	m299
	Southbound Approach		***B***	***13.1***		***C***	***30.6***	
	Southbound Left	530	B	18.4	41	C	26.7	119
	Southbound Thru		B	12.2	62	C	30.9	510

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] $: Delays (reported from Synchro) exceed 300 seconds in TWSC.

[3] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two cycles.

[4] m: 95th percentile volume and queues (reported from Synchro) are metered by upstream signal.

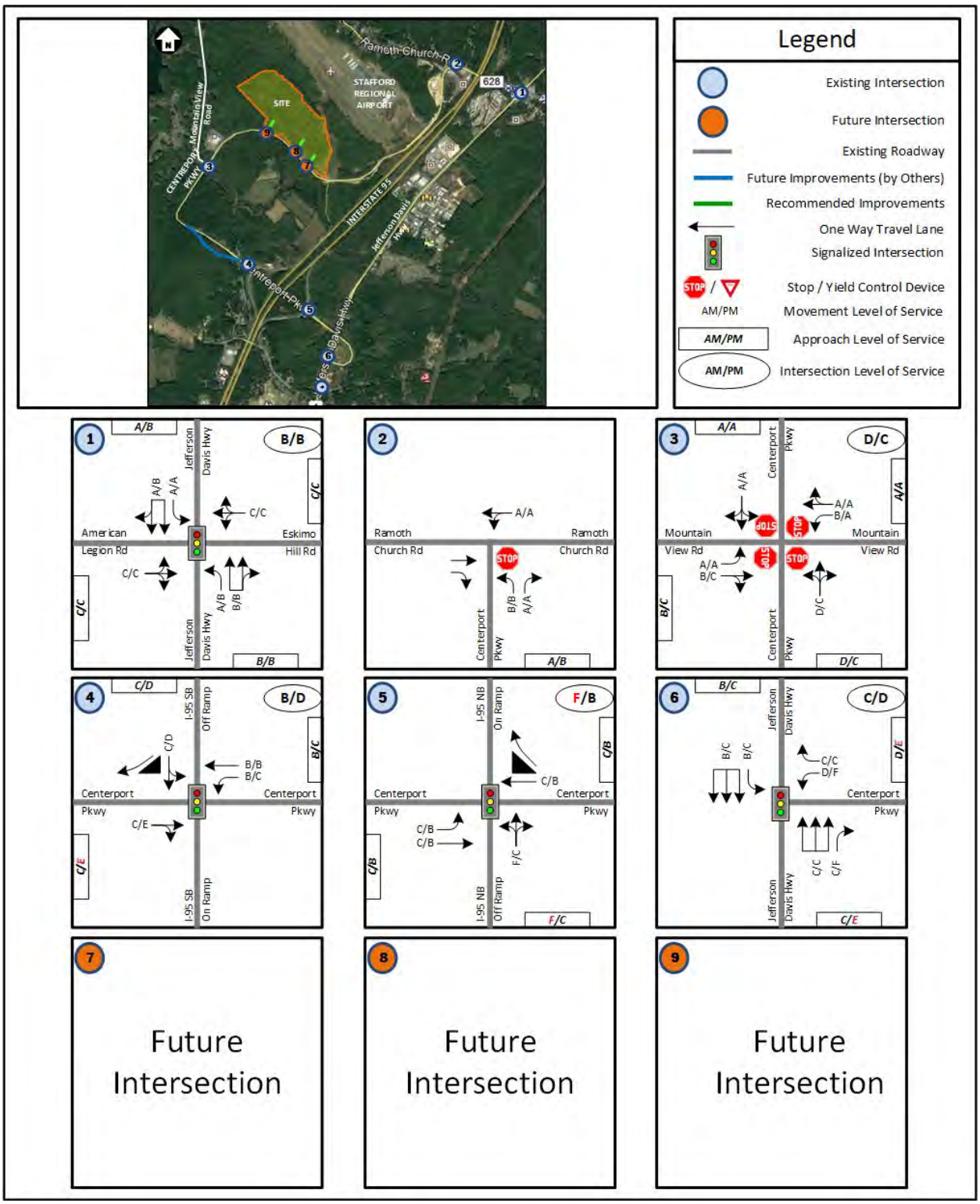


Figure 7: 2020 Existing Conditions – Level of Service Results

Based on the capacity analysis of existing conditions, all study intersections are anticipated to operate at an overall acceptable levels of service with an exception of the following signalized study intersections:

- Centreport Parkway at I-95 NB Ramp (AM peak hour)

The following study intersections have at least one approach that operate at unacceptable levels of service for at least one peak hour:

- Centreport Parkway at I-95 SB Ramp
    - Eastbound Approach (PM peak hour)
- Centreport Parkway at I-95 NB Ramp
    - Northbound Approach (AM peak hour)
- Route 1 at Centreport Parkway
    - Westbound Approach (PM peak hour)
    - Northbound Approach (PM peak hour)

Based on the queuing analysis performed for existing conditions, the turning movements at the study intersections had 95th percentile queues that were accommodated within the available storage lengths of existing turn lanes with an exceptions of Northbound Right turning movement at the intersection of Route 1 at Centreport Parkway during PM peak hour.

Existing Conditions (2020) Simulation Analysis

In addition to the 95th percentile queues that were determined from *Synchro*, the *Synchro* network models were simulated in order to determine the maximum queues under the existing conditions. For the purpose of this analysis, the road network was simulated for the AM and PM peak hours. The simulation was based on *SimTraffic*, version 10, using the same network files that were used in the intersection capacity analysis. These *SimTraffic* simulation results are shown for information purposes only, as the *Synchro* results are to be used to evaluate the impact of the proposed development.

Consistent with the guidelines set forth in VDOT's Traffic Operations and Safety Analysis Manual (TOSAM), **Table 10** below shows the parameters that were used for the simulation. Per Section 7.6 of the TOSAM, all other parameters not addressed in the table should not be modified from the default values.

Table 10: SimTraffic Analysis Input Parameters (TOSAM)

SimTraffic (Ver. 10) Analysis Input Parameters	
Number of Intervals	One (1) Seeding Interval and Four (4) Recording Intervals
Seeding and Recording Interval Duration	15-minutes (each)
Peak Hour Factor (PHF) Adjustment	Selected "Yes" to One of the Four (1 of 4) Recording Intervals Selected "No" for all Other Intervals
Anti-PHF Adjustment	Selected "Yes" for Three (3) Recording Intervals, where PHF Adjustment is set to "No" Selected "No" for the seeding and recording intervals, where PHF Adjustment is set to "Yes"
Number of Runs	Based on the Microsimulation Sample Size Direction Guidance

For the purposes of this analysis, a seeding period was necessary. A seeding period ensures that the results obtained are not skewed, as the network is void of any vehicles prior to seeding. Foregoing seeding would lead to lower travel times and delays for the traffic at the beginning of the simulation. The network reaches a normal state during the seeding period without affecting the results of the simulation.

The results of the simulation are included in **Table 11**. Of note, for the purposes of this analysis, ten model runs were conducted. Hence, the results presented in **Table 11** are the average results of the ten runs for peak period scenario.

The maximum queue results are expressed in feet. The lane groups where the maximum queue length exceeded the available storage are displayed in red.

The *SimTraffic* worksheets for the 2020 Existing Condition scenarios are provided in Appendix E.

Table 11: 2020 Existing Conditions – Intersection Simulation Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour	PM Peak Hour
			Max Queue [5] (ft.)	Max Queue [5] (ft.)
1	**Route 1 & American Legion Rd/Eskimo Hill Rd**			
	Overall Intersection (Signalized)			
	Eastbound Approach			
	Eastbound Left/Thru/Right		183	226
	Westbound Approach			
	Westbound Left/Thru/Right		159	218
	Northbound Approach			
	Northbound Left	325	66	60
	Northbound Thru/Right		182	104
	Southbound Approach			
	Southbound Left	230	50	96
	Southbound Thru/Right		91	222
2	**Centreport Pkwy & Ramoth Church Road/American Legion Rd**			
	Overall Intersection (TWSC)			
	Eastbound Approach			
	Eastbound Thru			
	Eastbound Right	380		
	Westbound Approach			
	Westbound Left/Thru		30	43
	Northbound Approach			
	Northbound Left		46	40
	Northbound Right	290	35	32
3	**Centreport Pkwy & Mountain View Rd**			
	Overall Intersection (AWSC)			
	Eastbound Approach			
	Eastbound Left	110	25	26
	Eastbound Thru/Right		67	124
	Westbound Approach			
	Westbound Left	110	2	14
	Westbound Thru/Right		17	21
	Northbound Approach			
	Northbound Left/Thru/Right		201	181
	Southbound Approach			
	Southbound Left/Thru/Right		67	70
4	**Centreport Pkwy & I-95 SB Ramp**			
	Overall Intersection (Signalized)			
	Eastbound Approach			
	Eastbound Thru/Right		154	557
	Westbound Approach			
	Westbound Left	300	91	189
	Westbound Thru		175	237
	Southbound Approach			
	Southbound Left/Thru		151	310
5	**Centreport Pkwy & I-95 NB Ramp**			
	Overall Intersection (Signalized)			
	Eastbound Approach			
	Eastbound Left	310	30	29
	Eastbound Thru		180	331
	Westbound Approach			
	Westbound Thru		207	155
	Westbound Right		97	
	Northbound Approach			
	Northbound Left/Thru/Right		1386	215
6	**Route 1 & Centreport Pkwy**			
	Overall Intersection (Signalized)			
	Westbound Approach			
	Westbound Left		284	1550
	Westbound Right	270	257	1315
	Northbound Approach			
	Northbound Thru		523	880
	Northbound Right	270	295	151
	Southbound Approach			
	Southbound Left	530	107	180
	Southbound Thru		131	1086

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[5] Max queues are based on results from SimTraffic. Per TOSAM guidelines, the queues are based on the average to 10 simulations.

Based on the simulation of existing conditions, the following study intersections had left and / or right turning movements whereby the maximum queues that exceed the storage length of existing turn bays for at least one of the peak hours.

- Route 1 & Centreport Parkway
    - Westbound Right (PM peak hour)
    - Northbound Right (AM peak hour)

FUTURE CONDITIONS WITHOUT DEVELOPMENT (2023)

Future Conditions without Development (2023) Traffic Volumes

Inherent Growth

The development is anticipated to be complete in 2023.

As agreed upon in the signed scope, to account for 2023 future conditions, an inherent growth rate of 2.5% compounded annually over a three-year period between 2020 to 2023, totaling 7.69% growth of the existing volumes, was applied to all movements at the study intersections, to account for regional growth on the roadway network as well as any potential background developments unaccounted for within the vicinity of the study area. In addition, as explained in the subsequent section, five "background" developments within the vicinity of the site were included as part of the analysis.

The inherent regional growth volumes (for the period between 2020 and 2023) are illustrated in **Figure 8.**

Background Developments

In addition to the applied inherent regional growth reflecting increased traffic demand, a total of five background developments, with their locations depicted in **Figure 9**, were identified in the meeting with VDOT and Stafford County staff for inclusion in this study. The background developments included are as follows:

1. Centreport Industrial
    - Located just north of the Stafford County Regional Airport, the site is anticipated to consist of approximately 80 kSF of light industrial use along Centreport Parkway. Of note, just prior to this study, a portion of the site was recently construct and is now in operation. Given the counts at the study intersections were taken prior to 2017, the entire site was considered a background development.
2. Centreport Stafford 95 Business Center
    - Located just east of the proposed development, the site is anticipated to consist of nearly 488 kSF of warehousing use, according the Stafford County's Department of Planning and Zoning. Currently, the site is under construction.
3. Sycamore Grove
    - The Sycamore Grove development is a mixed-use development just located south of the site across Centreport Parkway. Once fully built, the site is anticipated to contain 170 residential units and 130 kSF of commercial use (retail and office). As agreed to in the scoping document, this study anticipates a "Phase 1" portion of the development, consisting of 100 single-family dwelling units and 20 kSF of retail space. Based on a traffic impact study for the site (titled Traffic Impact Analysis for Sycamore Grove, conducted by VETTRA, and dated June 2016), a northbound left turn lane at the intersection of Centreport Parkway and Mountain View Road is anticipated to be constructed. Similarly, it is anticipated that the eastbound approach would be restriped to have an Eastbound Left/Thru and Eastbound Right configuration. For the purposes of this study, these improvements were considered in the future conditions analyses.

4. McGrath RentCorp Storage Facility

    - Located just west of the proposed development, the site is anticipated to consist of nearly 22.8 kSF of warehousing / storage uses, according the Stafford County's Department of Planning and Zoning. Currently, the site is under construction.

5. Centerpoint Gateway ("Phase 1" – 60 kSF Retail and 90 room hotel)

    - Located south of the site, the Centreport Gateway development is anticipated to be a large commercial development. Based on a traffic impact study conducted for the site (titled CenterPoint Gateway Traffic Impact Study, conducted by JMT, and dated October 2017), it is anticipated that the development would include 60 kSF of shopping center space, and additional 320 kSF of regional destination retail space, and a 90-room hotel. As agreed to in the scoping document, this study anticipates a "Phase 1" portion of the development, consisting of the 60 kSF shopping center space and the hotel. Based on a traffic impact study, the site plans to improve roadway capacity along Centreport Parkway at the I-95 ramps and at Route 1 with the inclusion of a dedicated westbound right turn bay at the I-95 southbound ramps, an extension of the westbound left turn bay at the I-95 northbound ramps, the coordination of the two traffic signals at the ramps, and signal timing adjustments at Route 1. For the purposes of this study, these improvements were considered in the future conditions analyses.

In order to include the potential impacts of the background developments in the future scenarios, the anticipated trips and roadway improvements associated with these background developments were taken into consideration. The site trips generated by each of the proposed background developments are illustrated below in **Table 12**. The assignment of the background trips to the road network is depicted in **Figure 10**. Additional information, including the assignment of trips for each background development and relevant traffic impact studies, are included in Appendix F.

Table 12: Background Developments - Site Trip Generation

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Centreport Industrial TIA - ITE 10th Edition									
General Light Industrial	110	80 kSF of GFA	33	5	38	4	28	32	361
Centreport Stafford 95 Business Center - ITE 10th Edition									
Warehousing	150	487.8 kSF of GFA	65	19	84	23	63	86	849
Sycamore Grove - ITE 9th Edition - From Background TIA									
Single-Family Detached Housing*	210	100 DU	16	48	64	54	31	85	809
Shopping Center	820	20 kSF of GLA	17	11	28	53	57	110	1,239
Subtotal			33	59	92	107	88	195	2,048
McGrath RentCorp Storage Facility - ITE 10th Edition									
Warehousing	150	22.8 kSF of GFA	22	6	28	8	23	31	82
Centerpoint Gateway - ITE 9th Edition - PM Peak Hour Trips From Background TIA									
Shopping Center	820	60 kSF	72	43	115	205	221	426	4,873
Hotel	310	90 Rooms	29	19	48	28	26	54	433
Subtotal			101	62	163	233	247	480	5,306

*Note a 15% reduction was applied to the residential homes units.

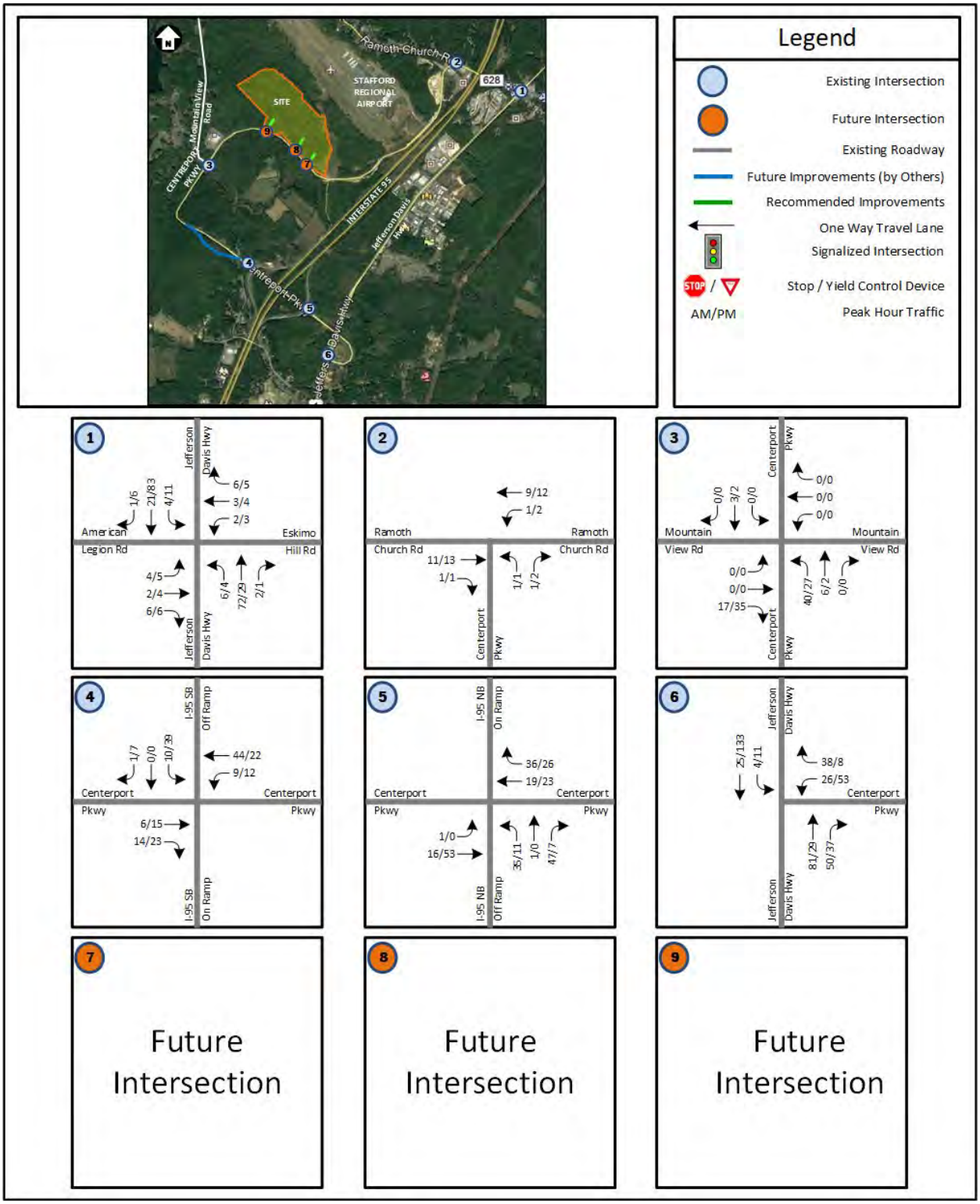


Figure 8: Projected Inherent Regional Growth Traffic Volumes (2020 to 2023)

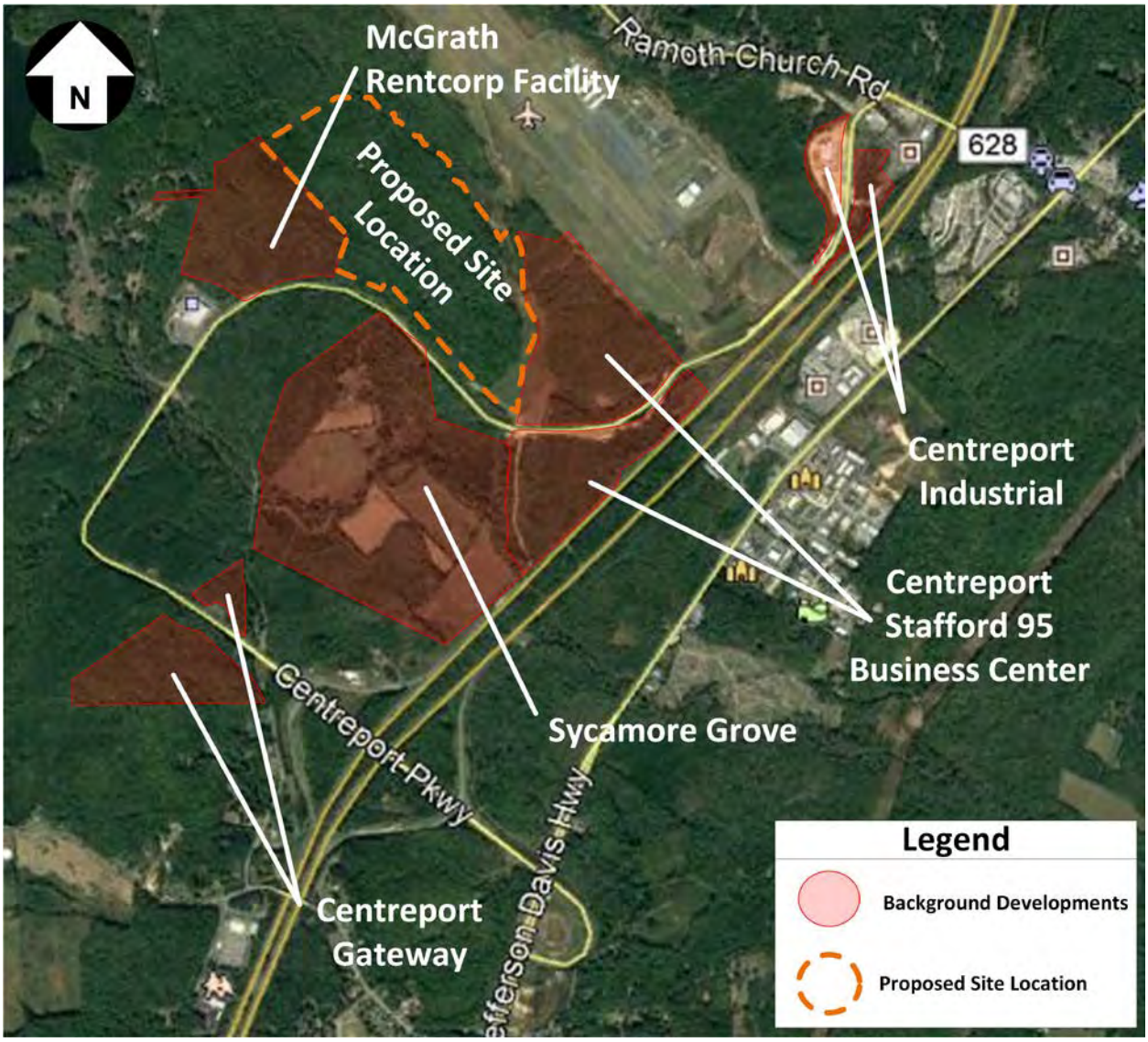


Figure 9: Background Development Location Exhibit

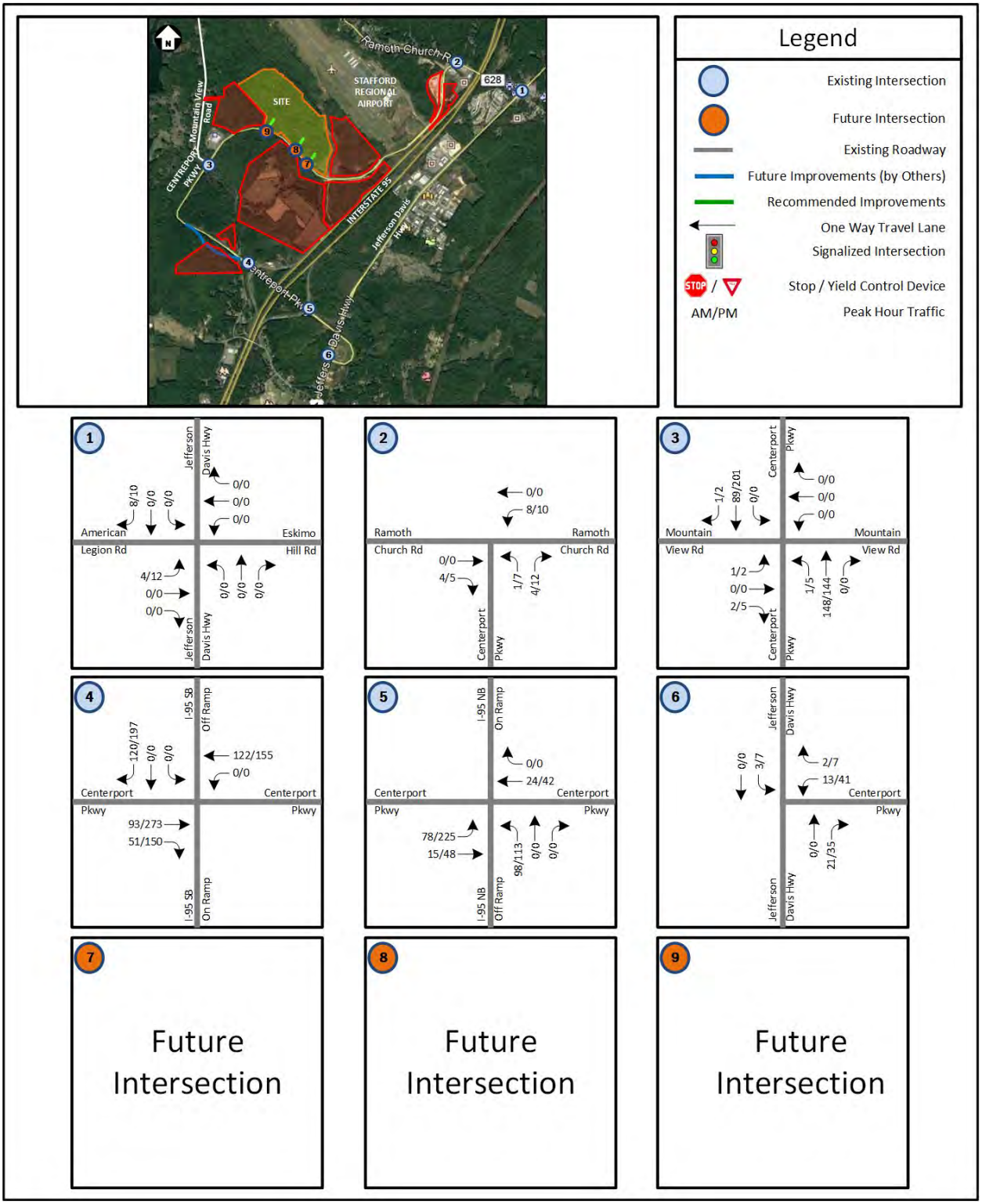


Figure 10: Background Development Traffic Assignment

Potential Roadway Improvement(s)

As discussed in the scoping meeting, with the exception of the roadway improvements associated with the background developments, no other roadway improvements near or within the vicinity of the site are either fully funded or would be completely constructed by 2023. Thus, no other roadway improvements are anticipated to significantly affect future roadway conditions on the road network by 2023.

The anticipated 2023 future road network (without the development) is illustrated in **Figure 11**.

It should be noted that VDOT and the County are investigating potential improvements at the intersection of Route 1 with Enon Road / Cranes Corner Road, including a second northbound left turn bay from Route 1. For the purposes of the future capacity analyses, this improvement was not taken into consideration. However, it was included in the future simulation scenarios. Further discussion is provided in the *Future Conditions without Development (2023) Simulation Analysis* section of this report.

Future without Development Traffic Volumes

In order to forecast future roadway traffic volumes for the year 2023, the 2020 existing traffic volumes were combined with the inherent growth traffic volumes and background developments' traffic volumes. The 2023 Future without Development traffic volumes are illustrated in **Figure 12**.

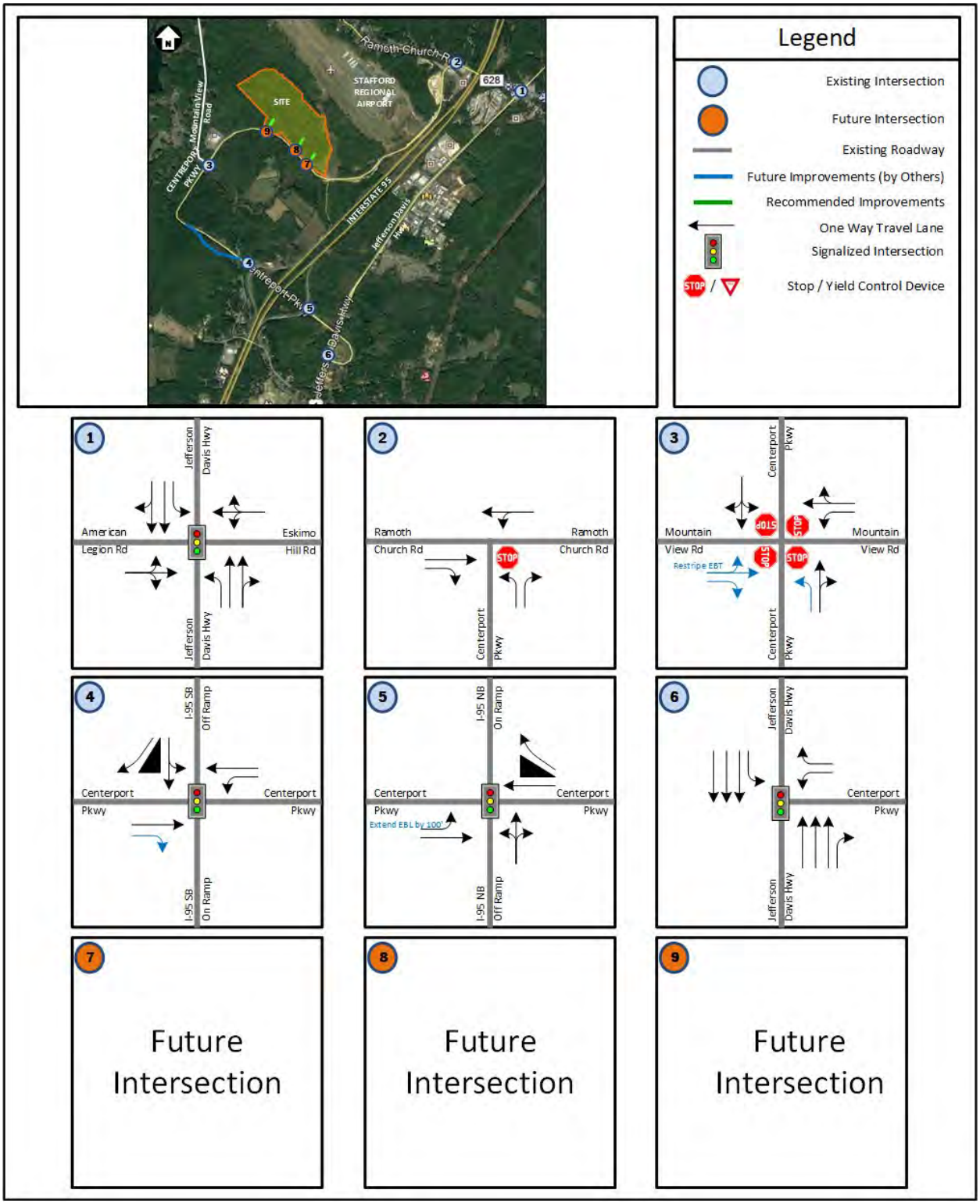


Figure 11: 2023 Future without Development – Roadway Network Geometric Configuration and Traffic Control Devices.

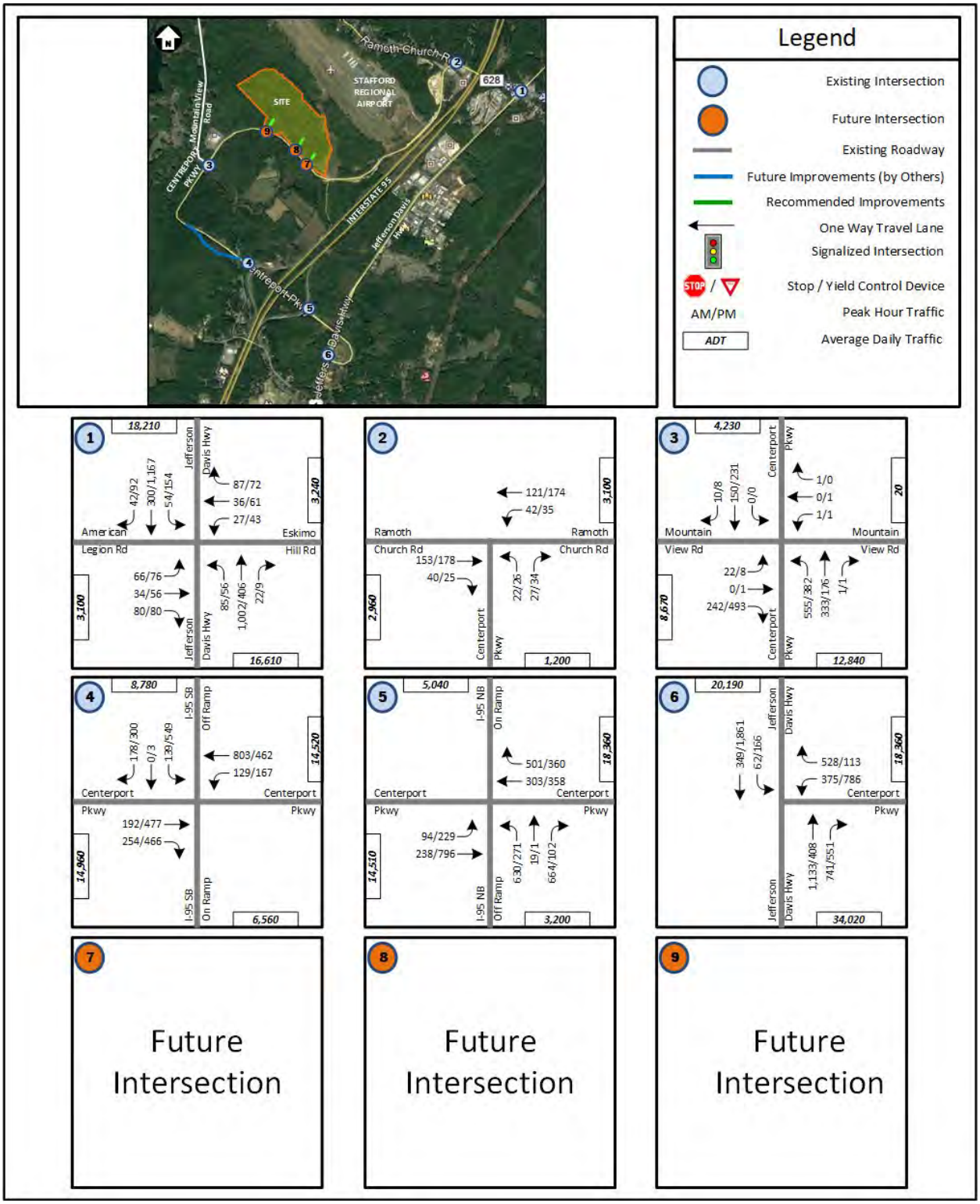


Figure 12: 2023 Future without Development – Vehicular Traffic Volumes

Future Conditions without Development (2023) Intersection Capacity Analysis

Intersection capacity analyses were performed for the Future Conditions without Development (2023) scenario at the study area intersections during the AM and PM peak hours. *Synchro,* version 10, was used to analyze the study intersections with results based on the Highway Capacity Manual (HCM) 2010 methodology and includes level of service (LOS), delay, and queue length comparisons for the turning movements analyzed.

The peak hour factors utilized in the analysis of future conditions were based on the traffic count data used in the development of the 2020 'baseline' volumes and were modeled in the *Synchro* network on a by-intersection basis. Peak hours factors in the range of 0.92 to 1.00 were used for the future scenario, as agreed to in the scoping document. If the peak hour factors for a given intersection were unable to be determined with data, a default *Synchro* peak hour factor of 0.92 was assumed. The heavy vehicle percentages utilized in the analysis were based on the previous traffic counts used in the development of the 2020 'baseline' volumes. If heavy vehicle percentages were unavailable with data, the heavy vehicle percentages were instead based on VDOT historical traffic data for 2019.

Per the scoping meeting between the VDOT and Stafford County staff, it would be considered acceptable and/or desirable to achieve an approach LOS of D or better for traffic operations using the HCM methodology. The results of the intersection capacity analyses from *Synchro* are presented in **Table 13** and graphically in **Figure 13**. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized intersections and per approach and lane group for all study intersections. The overall signalized intersections and any approaches that operate at LOS E or F are displayed in red.

The 95th percentile queues were also determined from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available storage lengths of future turn lanes are displayed in red.

The detailed analysis worksheets of the 2023 Future Conditions without Development are contained in Appendix G.

Table 13: 2023 Future without Development - Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)	LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)
1	**Route 1 & American Legion Rd/Eskimo Hill Rd**							
	Overall Intersection (Signalized)		**B**	**15.7**		**B**	**19.3**	
	Eastbound Approach		***C***	***30.4***		***D***	***38.5***	
	Eastbound Left/Thru/Right		C	30.4	166	D	38.5	#267
	Westbound Approach		***C***	***29.3***		***C***	***34.4***	
	Westbound Left/Thru/Right		C	29.3	125	C	34.4	#194
	Northbound Approach		***B***	***13.4***		***B***	***12.3***	
	Northbound Left	325	A	7.6	37	B	12.7	26
	Northbound Thru/Right		B	13.9	321	B	12.3	119
	Southbound Approach		***B***	***10.1***		***B***	***16.9***	
	Southbound Left	230	A	9.4	26	A	9.0	61
	Southbound Thru/Right		B	10.2	88	B	17.9	435
2	**Centreport Pkwy & Ramoth Church Road/American Legion Rd**							
	Overall Intersection (TWSC)							
	Westbound Approach							
	Westbound Left/Thru		A	7.6	3	A	7.7	3
	Northbound Approach		***A***	***9.9***		***B***	***10.5***	
	Northbound Left		B	10.9	3	B	12	5
	Northbound Right	290	A	9.2	3	A	9.4	3
3	**Centreport Pkwy & Mountain View Rd**							
	Overall Intersection (AWSC)		**E**	**41.1**		**E**	**39.1**	
	Eastbound Approach		***B***	***14.3***		***F***	***53.8***	
	Eastbound Left/Thru		B	10.5	0	B	10.5	3
	Eastbound Right		B	14.4	60	F	54.6	323
	Westbound Approach		***B***	***10.4***		***B***	***11.8***	
	Westbound Left	110	B	11	0	B	12	0
	Westbound Thru/Right		A	9.7	0	B	11.5	0
	Northbound Approach		***F***	***54.8***		***D***	***34.5***	
	Northbound Left	150	F	72.6	415	E	44	233
	Northbound Thru/Right		B	12.1	48	B	14.1	43
	Southbound Approach		***B***	***11.9***		***C***	***19.2***	
	Southbound Left/Thru/Right		B	11.9	28	C	19.2	80
4	**Centreport Pkwy & I-95 SB Ramp**							
	Overall Intersection (Signalized)		**B**	**15.6**		**D**	**37.1**	
	Eastbound Approach		***B***	***10.9***		***C***	***32.5***	
	Eastbound Thru		B	10.9	118	D	37.6	478
	Eastbound Right	500	B	10.8	38	C	27.3	71
	Westbound Approach		***B***	***11.8***		***C***	***21.4***	
	Westbound Left	300	B	10.9	m43	C	26.3	m122
	Westbound Thru		B	11.9	m211	B	19.6	262
	Southbound Approach		***D***	***54.3***		***E***	***62.9***	
	Southbound Left/Thru		D	54.3	174	E	62.9	#673
5	**Centreport Pkwy & I-95 NB Ramp**							
	Overall Intersection (Signalized)		**F**	**345.2**		**C**	**33.9**	
	Eastbound Approach		***C***	***30.5***		***C***	***27.6***	
	Eastbound Left	400	C	23.3	63	B	16.2	m104
	Eastbound Thru		C	33.2	148	C	30.9	m632
	Westbound Approach		***C***	***30.4***		***C***	***24.0***	
	Westbound Thru		C	30.4	269	C	24.0	207
	Westbound Right		A	0	78	A	0	7
	Northbound Approach		***F***	***496.6***		***E***	***60.4***	
	Northbound Left/Thru/Right		F	496.6	#1818	E	60.4	374
6	**Route 1 & Centreport Pkwy**							
	Overall Intersection (Signalized)		**C**	**29.2**		**E**	**59.1**	
	Westbound Approach		***D***	***40.6***		***F***	***129.6***	
	Westbound Left		D	44.6	#425	F	141.3	#1034
	Westbound Right	270	D	37.8	278	D	48.5	m74
	Northbound Approach		***C***	***27.1***		***D***	***47.6***	
	Northbound Thru		C	27.6	327	C	24.8	m63
	Northbound Right	270	C	26.3	94	E	64.5	m348
	Southbound Approach		***B***	***13.6***		***C***	***33.2***	
	Southbound Left	530	B	19.5	45	C	27.5	132
	Southbound Thru		B	12.6	65	C	33.7	572

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] $: Delays (reported from Synchro) exceed 300 seconds in TWSC.

[3] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two cycles.

[4] m: 95th percentile volume and queues (reported from Synchro) are metered by upstream signal.

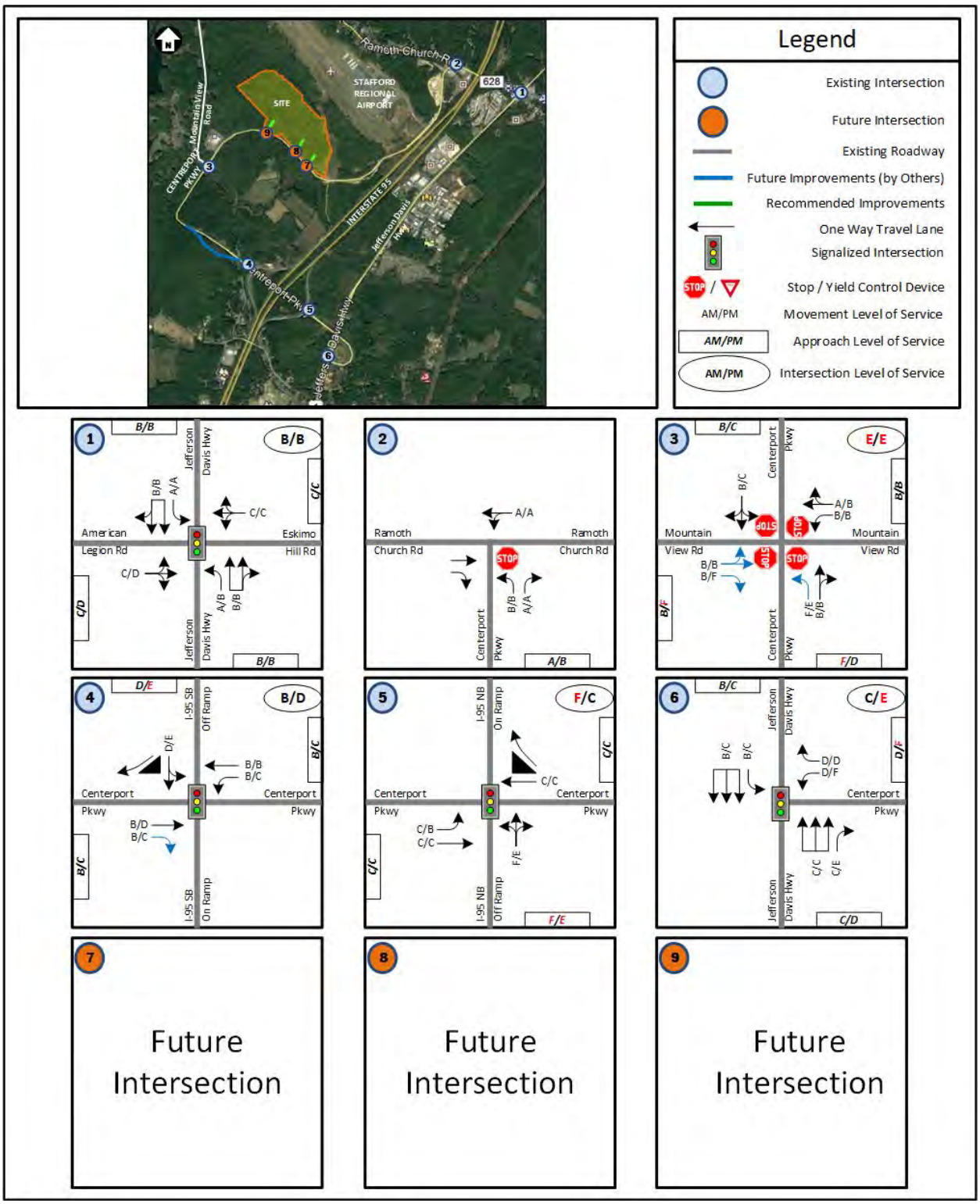


Figure 13: 2023 Future without Development – Level of Service Results

Based on the capacity analysis of future conditions without development, all study intersections are anticipated to operate at an overall acceptable levels of service with an exception of the following signalized intersections:

- Centreport Parkway at Mountain View Road (AM and PM peak hours)
- Centreport Parkway at I-95 NB Ramp (AM peak hour)
- Route 1 at Centreport Parkway (PM peak hour)

The following study intersections have at least one approach that operate at unacceptable levels of service for at least one peak hour:

- Centreport Parkway at Mountain View Road (AM and PM peak hours)
    - Eastbound Approach (PM peak hour)
    - Northbound Approach (AM peak hour)
- Centreport Parkway at I-95 SB Ramp
    - Southbound Approach (PM peak hour)
- Centreport Parkway at I-95 NB Ramp (AM peak hour)
    - Northbound Approach (AM and PM peak hours)
- Route 1 at Centreport Parkway
    - Westbound Approach (PM peak hour)

Based on the queuing analysis performed for future conditions, the turning movements at the study intersections had 95th percentile queues that were accommodated within the available effective storage lengths of the turn bays with the exception of the following turning movements:

- Centreport Parkway at Mountain View Road (AM and PM peak hour)
    - Northbound Left (AM and PM peak hours)
- Route 1 at Centreport Parkway
    - Westbound Right (AM peak Hour)
    - Northbound Right (PM peak Hour)

Future Conditions without Development (2023) Simulation Analysis

In addition to the 95th percentile queues that were determined from *Synchro*, the *Synchro* network models were simulated in order to determine the maximum queues under the future conditions. For the purpose of this analysis, the road network was simulated for the AM and PM peak hours. The simulation was based on *SimTraffic*, version 10, using the same network files that were used in the intersection capacity analysis. These *SimTraffic* simulation results are shown for information purposes only, as the *Synchro* results are to be used to evaluate the impact of the proposed development.

Consistent with the guidelines set forth in VDOT's Traffic Operations and Safety Analysis Manual (TOSAM), **Table 10** shows the parameters that were used for the simulation. Per Section 7.6 of the TOSAM, all other parameters not addressed in the table should not be modified from the default value.

For the purposes of this analysis, a seeding period was necessary. A seeding period ensures that the results obtained are not skewed, as the network is void of any vehicles prior to seeding. Foregoing seeding would lead to lower travel times and delays for the traffic at the beginning of the simulation. The network reaches a normal state during the seeding period without affecting the results of the simulation.

As noted in the scoping document, the intersection of Route 1 with Enon Road / Cranes Corner Road was included in the *Synchro* network models, and thus, was also included with the simulation. During initial testing of the models for future conditions, the intersection of Route 1 with Enon Road / Cranes Corner Road experienced significant queuing issues with respect to the northbound left turning movement along Route 1 during both peak hours and the southbound through turning movement particularly during the PM peak hour. During the PM peak hour, the delays at the intersection caused major spillbacks along both Route 1 and Centreport Parkway as a results of intersection metering. Given these conditions, simulation of the network models would not have yielded an adequate comparison of future conditions without and with development.

As noted previously, VDOT and the County are aware of issues with the intersection of Route 1 with Enon Road / Cranes Corner Road. Currently, the agencies are assessing roadway improvements at this intersection including dual northbound turn lanes from Route 1. As such, two alternative simulation models were tested, which included a model that did not have the Route 1 intersection at Enon Road / Cranes Corner Road and a model that had dual northbound left turn lanes at the intersection. For the purposes of this traffic study and in order to provide an adequate comparison of future conditions (without and with the development in-place), the model was refined for the simulation to include the dual northbound right at Route 1 with Enon Road / Cranes Corner Road.

The results of the simulation for the 2023 Future Conditions without Development are included in **Table 14**. Of note, for the purposes of this analysis, ten model runs were conducted. Hence, the results presented in **Table 14** are the average results of the 10 runs for each scenario.

The lane groups where the maximum queue length exceeded the available storage are also displayed in red. The maximum queue results are expressed in feet.

The *SimTraffic* worksheets for the 2023 Future Conditions without Development scenario are provided in Appendix H.

Table 14: 2023 Future Conditions without Development – Intersection Simulation Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Max Queue (ft.)	PM Peak Max Queue (ft.)
1	**Route 1 & American Legion Rd/Eskimo Hill Rd**			
	Overall Intersection (Signalized)			
	Eastbound Approach			
	Eastbound Left/Thru/Right		181	252
	Westbound Approach			
	Westbound Left/Thru/Right		182	208
	Northbound Approach			
	Northbound Left	325	61	63
	Northbound Thru/Right		215	119
	Southbound Approach			
	Southbound Left	230	52	125
	Southbound Thru/Right		88	264
2	**Centreport Pkwy & Ramoth Church Road/American Legion Rd**			
	Overall Intersection (TWSC)			
	Westbound Approach			
	Westbound Left/Thru		41	52
	Northbound Approach			
	Northbound Left		24	38
	Northbound Right	290	22	42
3	**Centreport Pkwy & Mountain View Rd**			
	Overall Intersection (AWSC)			
	Eastbound Approach			
	Eastbound Left/Thru		26	69
	Eastbound Right		89	254
	Westbound Approach			
	Westbound Left	110	2	7
	Westbound Thru/Right		17	24
	Northbound Approach			
	Northbound Left	150	150	160
	Northbound Thru/Right		122	161
	Southbound Approach			
	Southbound Left/Thru/Right		82	134
4	**Centreport Pkwy & I-95 SB Ramp**			
	Overall Intersection (Signalized)			
	Eastbound Approach			
	Eastbound Thru		131	416
	Eastbound Right	500	94	290
	Westbound Approach			
	Westbound Left	300	82	202
	Westbound Thru		200	315
	Southbound Approach			
	Southbound Left/Thru		243	323
5	**Centreport Pkwy & I-95 NB Ramp**			
	Overall Intersection (Signalized)			
	Eastbound Approach			
	Eastbound Left	400	129	287
	Eastbound Thru		270	842
	Westbound Approach			
	Westbound Thru		257	246
	Westbound Right		86	22
	Northbound Approach			
	Northbound Left/Thru/Right		1383	406
6	**Route 1 & Centreport Pkwy**			
	Overall Intersection (Signalized)			
	Westbound Approach			
	Westbound Left		257	3541
	Westbound Right	270	227	3791
	Northbound Approach			
	Northbound Thru		518	129
	Northbound Right	270	295	234
	Southbound Approach			
	Southbound Left	530	126	446
	Southbound Thru		125	604

Based on the simulation of 2023 future conditions without development, the following study intersections had left and / or right turning movements whereby the maximum queues that exceed the storage length of existing turn bays for at least one of the peak hours.

- Centreport Parkway at Mountain View Road
    - Northbound Left (PM peak hour)
- Route 1 & Centreport Parkway
    - Westbound Right (PM peak hour)
    - Northbound Right (AM peak hour)

SITE TRIP GENERATION

The development is anticipated to be complete in 2023.

As mentioned previously, the proposed development is planned to incorporate the four parcels of land in order to construct approximately 3.07 million square feet of warehouse/distribution use. Property IDs #: 37-30 (portion) and 30C are included in the entitlement to allow for a coordinated development with Property IDs #: 37-78 and 79. The warehouse/distribution use (approximately 0.73 of the 3.07 million square feet) is permitted "by-right" on Property IDs #: 37-30 and 30C today.

In order to calculate the trips generated by the proposed development, the Institute of Transportation Engineers' (ITE's) Trip Generation Manual (10th Edition) publication was used to determine the trips going into and out of the subject study site during the weekday morning (AM) and weekday afternoon (PM) peak hours as well as the typical number of weekday daily trips associated with the by-right and rezoned portions of the site. The projected trip generation for the proposed "by-right" balance of the parcels portion of the development is illustrated in **Table 15**; the projected trip generation associated with the proposed rezoning is illustrated in **Table 16**. The total trip generation, encompassing both the "by-right" and rezoned portions of the site, is illustrated in **Table 17**.

As discussed in the scoping meeting, no internal capture or pass-by trips were assumed with respect to the proposed development. Furthermore, given the nature of the development and as requested by VDOT and the County, heavy vehicle "truck" trips were calculated using ITE's Trip Generation Manual and assessed separately as illustrated in the tables below.

Table 15: Site Trip Generation for the By-Right Balance of the Parcels

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
By-Right									
High-Cube Fulfillment Center Warehouse (Cars)	155	729.00 kSF of GFA	81	13	94	43	67	110	1,151
High-Cube Fulfillment Center Warehouse (Trucks)	155	729.00 kSF of GFA	7	8	15	3	4	7	168
Total			**88**	**21**	**109**	**46**	**71**	**117**	**1,319**

Based on the Trip Generation Manual, the "by-right" portion of the development will generate approximately 109 new trips during the AM peak hour, 117 new trips during the PM peak hour, and 1,319 weekday daily new trips.

Table 16: Site Trip Generation for the Proposed Rezoning

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Rezoning									
High-Cube Fulfillment Center Warehouse (Cars)	155	2,335.65 kSF of GFA	261	42	303	135	216	351	3,691
High-Cube Fulfillment Center Warehouse (Trucks)	155	2,335.65 kSF of GFA	23	24	47	11	12	23	537
Total			**284**	**66**	**350**	**146**	**228**	**374**	**4,228**

Based on the Trip Generation Manual, the rezoned portion of the development will generate approximately 350 new trips during the AM peak hour, 374 new trips during the PM peak hour, and 4,228 new weekday daily trips, in addition to the by-right portion.

Table 17: Total Site Trip Generation

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
By-Right + Rezoning									
High-Cube Fulfillment Center Warehouse (Cars)	155	3,064.65 kSF of GFA	342	57	399	177	282	459	4,842
High-Cube Fulfillment Center Warehouse (Trucks)	155	3,064.65 kSF of GFA	31	30	61	14	17	31	705
Total			**373**	**87**	**460**	**191**	**299**	**490**	**5,547**

Based on the Trip Generation Manual, the development (in total) will generate approximately 460 trips during the AM peak hour, 490 trips during the PM peak hour, and 5,547 weekday daily trips.

SITE ACCESS

Primary access to the development will be provided via three full-movement (T-intersection) access points:

1. A full-movement entrance (Site Access 1) along Centreport Parkway,
2. A full-movement entrance (Site Access 2) along Centreport Parkway, and
3. A full-movement entrance (Site Access 3) along Centreport Parkway.

SITE TRAFFIC DISTRIBUTION AND ASSIGNMENT

The distribution and assignment of the site generated trips was based on the existing traffic patterns, engineering judgement, and the nature of the proposed development. The site direction of approach and trip distribution for both cars and trucks are illustrated in **Figure 14**.

The site traffic assignment for the cars is illustrated for the weekday peak hours in **Figure 15**. The site traffic assignment for the trucks is illustrated for the weekday peak hours in **Figure 16**. The combined site traffic assignment is illustrated in **Figure 17**.

Figure 14: Vehicular Direction of Approach (Trip Distribution)

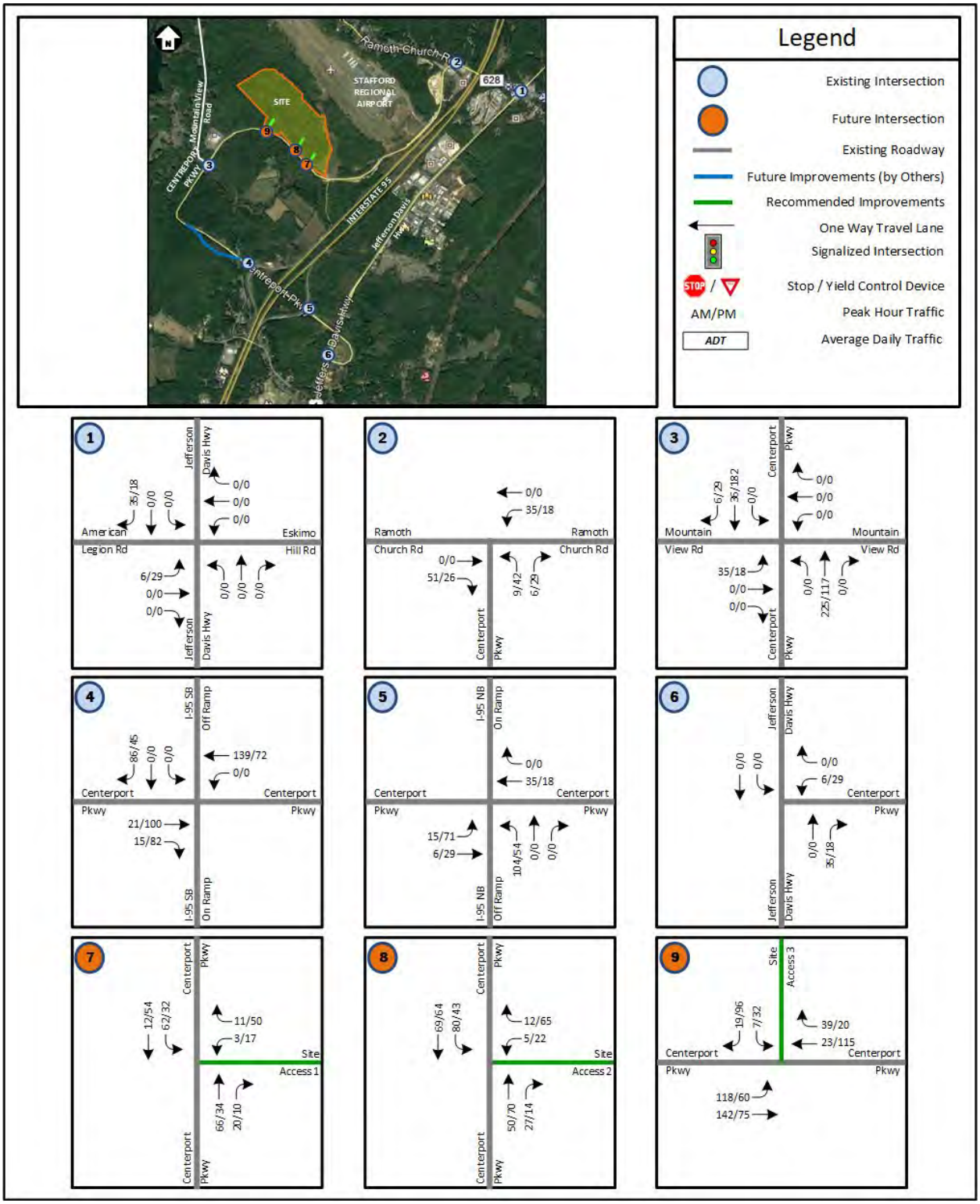


Figure 15: Site Generated Traffic Assignment (Cars)

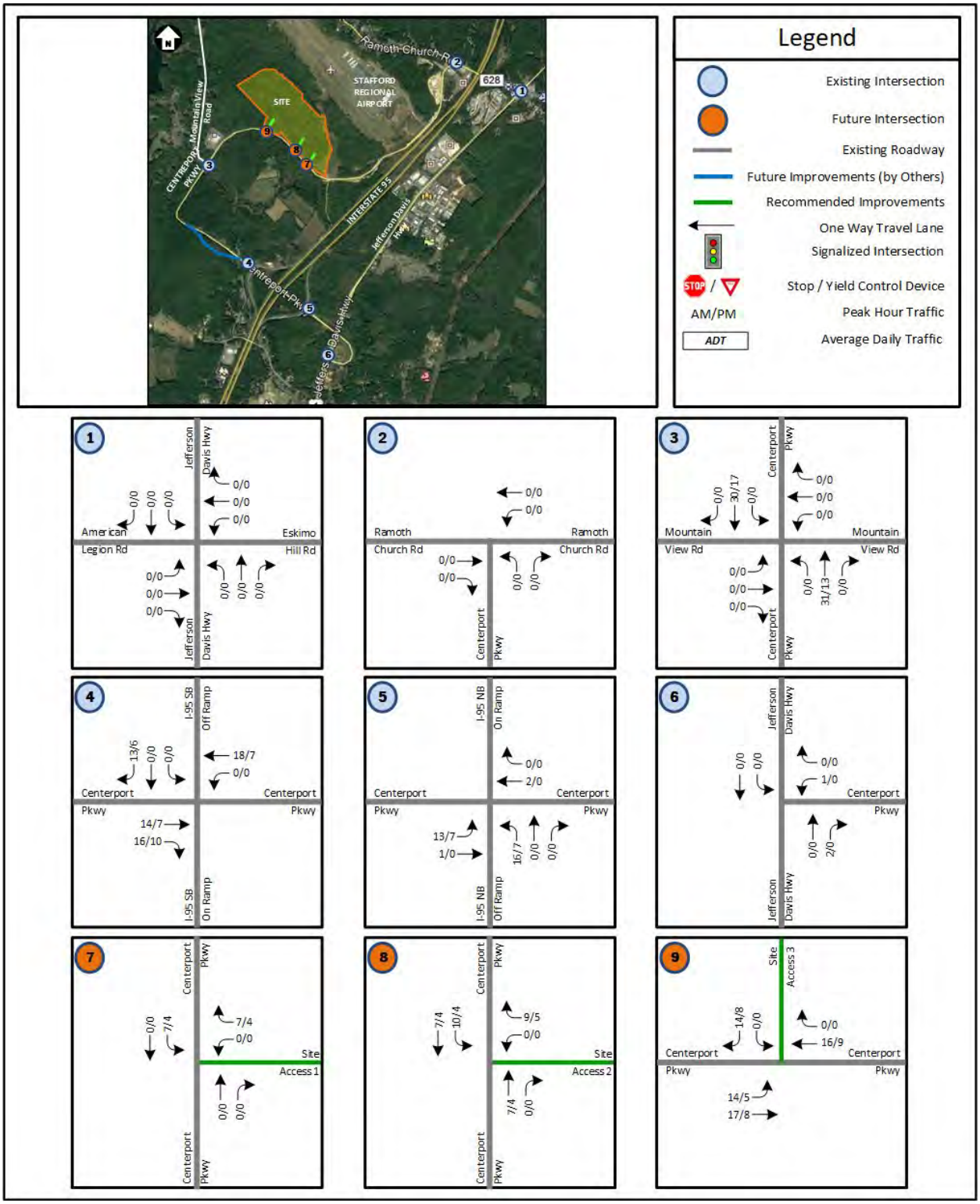


Figure 16: Site Generated Traffic Assignment (Trucks)

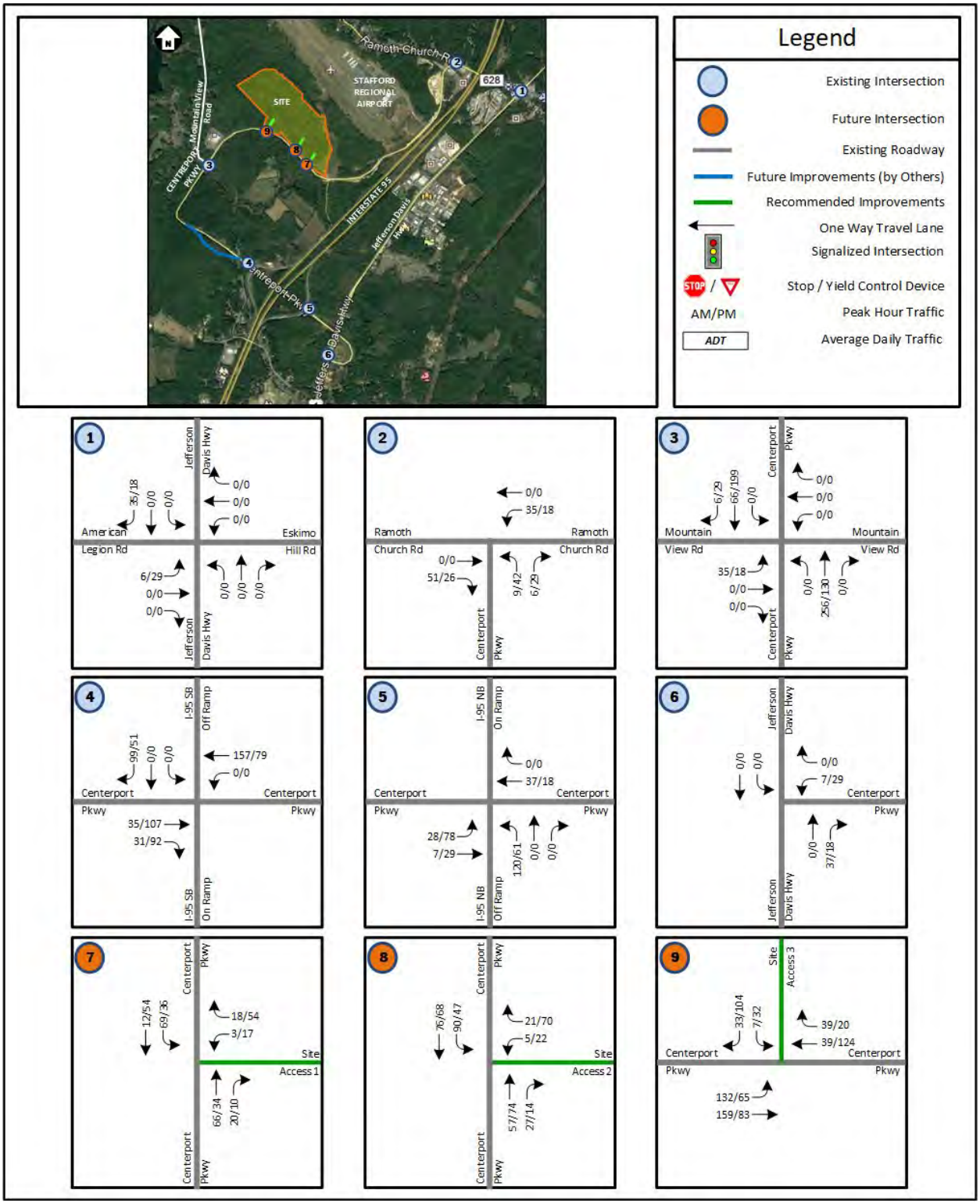


Figure 17: Site Generated Traffic Assignment (Combined)

FUTURE CONDITIONS WITH DEVELOPMENT (2023)

Future Conditions with Development (2023) Traffic Volumes

The site generated traffic volumes for the proposed development were added to the 2023 Future Conditions without Development traffic volumes in order to project traffic volumes on the roadways in the vicinity of the development under the 2023 Future Conditions with Development scenario. The traffic volumes for the future with development traffic conditions are shown in **Figure 18**.

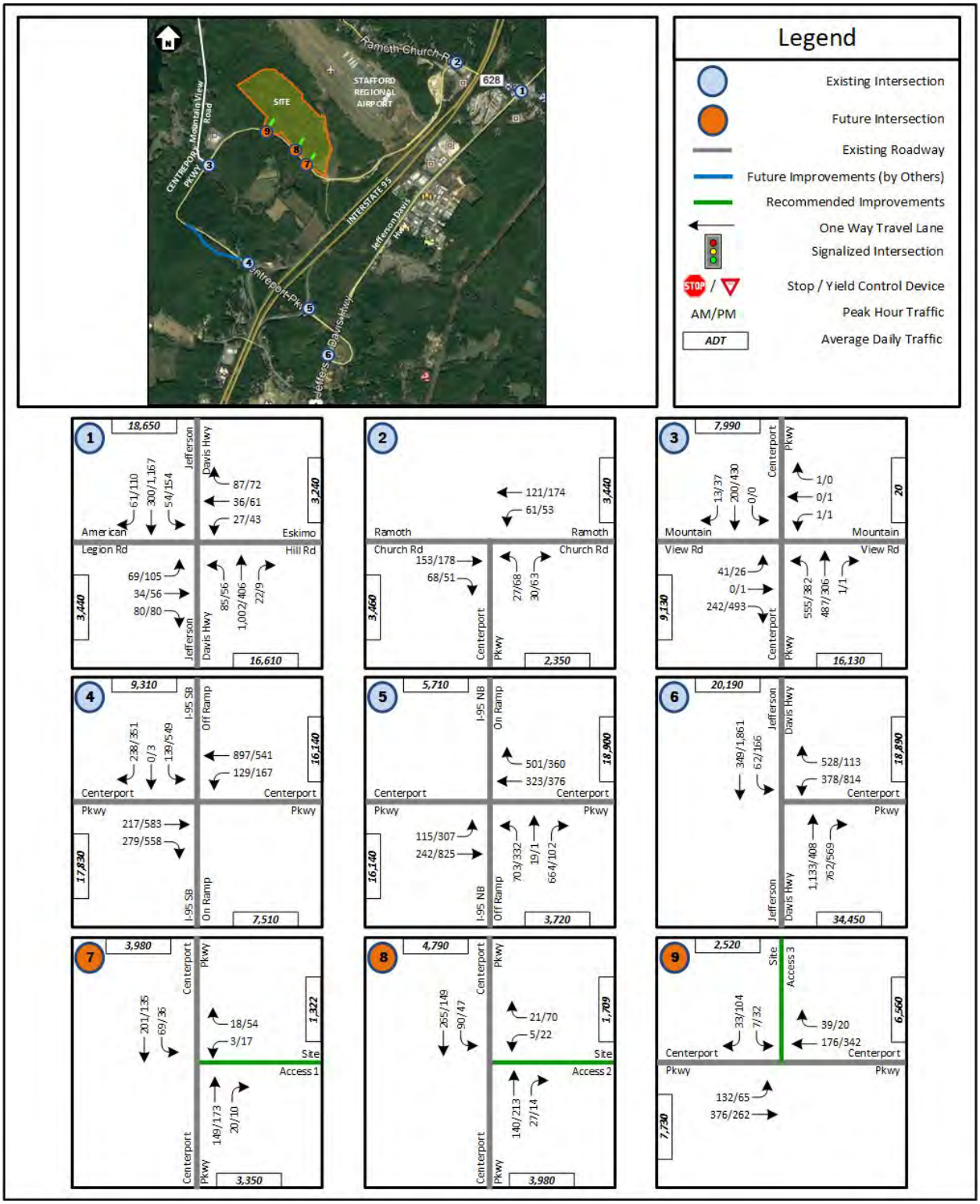


Figure 18: 2023 Future with Development – Vehicular Traffic Volumes

Future Conditions with Development (2023) Intersection Capacity Analysis

Intersection capacity analyses were performed for the Future Conditions with Development (2023) scenario at the study area intersections during the AM and PM peak hours. *Synchro,* version 10, was used to analyze the study intersections with results based on the Highway Capacity Manual (HCM) 2010 methodology and includes level of service (LOS), delay, and queue length comparisons for the turning movements analyzed.

The peak hour factors utilized in the analysis of future conditions were based on the traffic count data used in the development of the 2020 'baseline' volumes and were modeled in the *Synchro* network on a by-intersection basis. Peak hours factors in the range of 0.92 to 1.00 were used for the future scenario, as agreed to in the scoping document. If the peak hour factors for a given intersection were unable to be determined with data, a default *Synchro* peak hour factor of 0.92 was assumed.

Of note and consistent with the guidelines set forth in VDOT's Traffic Operations and Safety Analysis Manual (TOSAM) and as agreed to in the scoping document, the heavy vehicle percentages used in this analysis were modified at the study intersection from those determined under the future conditions without development scenario in order to account for the proposed development.

Per the scoping meeting between the VDOT and Stafford County staff, it would be considered acceptable and/or desirable to achieve an approach LOS of D or better for traffic operations using the HCM methodology. The results of the intersection capacity analyses from *Synchro* are presented in **Table 18** and graphically in **Figure 20**. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized intersections and per approach and lane group for all study intersections. The overall signalized intersections and any approaches that operate at LOS E or F are displayed in red.

The 95th percentile queues were also determined from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available storage lengths of future turn lanes are displayed in red.

The detailed analysis worksheets of the 2023 Future Conditions with Development are contained in Appendix I.

Table 18: 2023 Future with Development - Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)	LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)
1	**Route 1 & American Legion Rd/Eskimo Hill Rd**							
	Overall Intersection (Signalized)		**B**	**15.9**		**C**	**21.9**	
	Eastbound Approach		***C***	***30.5***		***D***	***43.6***	
	Eastbound Left/Thru/Right		C	30.5	175	D	43.6	#332
	Westbound Approach		***C***	***29.1***		***C***	***33.6***	
	Westbound Left/Thru/Right		C	29.1	124	C	33.6	#195
	Northbound Approach		***B***	***13.7***		***B***	***13.9***	
	Northbound Left	325	A	7.8	37	B	14.6	26
	Northbound Thru/Right		B	14.2	321	B	13.8	119
	Southbound Approach		***B***	***10.5***		***B***	***19.5***	
	Southbound Left	230	A	9.6	26	B	10.2	61
	Southbound Thru/Right		B	10.6	94	C	20.6	445
1	**Route 1 & American Legion Rd/Eskimo Hill Rd**							
	Overall Intersection (Signalized)		**B**	**15.9**		**C**	**21.8**	
	(MIT: Adjust Signal Timings)							
	Eastbound Approach		***C***	***30.4***		***D***	***41.1***	
	Eastbound Left/Thru/Right		C	30.4	178	D	41.1	#314
	Westbound Approach		***C***	***29.1***		***C***	***33.5***	
	Westbound Left/Thru/Right		C	29.1	125	C	33.5	179
	Northbound Approach		***B***	***13.7***		***B***	***13.9***	
	Northbound Left	325	A	7.8	41	B	14.8	29
	Northbound Thru/Right		B	14.2	346	B	13.8	129
	Southbound Approach		***B***	***10.5***		***B***	***19.7***	
	Southbound Left	230	A	9.6	28	B	10.3	68
	Southbound Thru/Right		B	10.6	101	C	20.8	482
2	**Centreport Pkwy & Ramoth Church Road/American Legion Rd**							
	Overall Intersection (TWSC)							
	Westbound Approach							
	Westbound Left/Thru		A	7.9	5	A	7.9	3
	Northbound Approach		***B***	***10.5***		***B***	***11.5***	
	Northbound Left		B	11.9	5	B	13.3	13
	Northbound Right	290	A	9.3	3	A	9.6	8
3	**Centreport Pkwy & Mountain View Rd**							
	Overall Intersection (AWSC)		**F**	**51.5**		**F**	**66.9**	
	Eastbound Approach		***C***	***15.4***		***F***	***74.7***	
	Eastbound Left/Thru		B	11.7	8	B	11.8	5
	Eastbound Right		C	16	65	F	78.1	383
	Westbound Approach		***B***	***10.9***		***B***	***13.2***	
	Westbound Left	110	B	11.5	0	B	13.4	0
	Westbound Thru/Right		B	10.3	0	B	12.9	0
	Northbound Approach		***F***	***68.8***		***E***	***46.1***	
	Northbound Left	150	F	92.3	470	F	60.2	270
	Northbound Thru/Right		E	42.1	278	D	28.5	140
	Southbound Approach		***B***	***15***		***F***	***89.1***	
	Southbound Left/Thru/Right		B	15	55	F	89.1	390
3	**Centreport Pkwy & Mountain View Rd**							
	Overall Intersection (Signalized)		**B**	**13.9**		**C**	**25.3**	
	(MIT: Install Signal; Extend NBL Turn Bay)							
	Eastbound Approach		***B***	***12.8***		***C***	***34.3***	
	Eastbound Left/Thru		C	22.9	52	C	23.5	40
	Eastbound Right		B	11.1	32	C	34.9	235
	Westbound Approach		***C***	***22.8***		***C***	***23.4***	
	Westbound Left	110	C	23.5	5	C	23.9	5
	Westbound Thru/Right		C	22.0	0		0.0	5
	Northbound Approach		***B***	***11.5***		***B***	***13.1***	
	Northbound Left	200	B	15.6	189	B	18.3	179
	Northbound Thru/Right		A	6.8	157	A	6.7	81
	Southbound Approach		***C***	***26.9***		***C***	***33.4***	
	Southbound Left/Thru/Right		C	26.9	170	C	33.4	#436

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] $: Delays (reported from Synchro) exceed 300 seconds in TWSC.

[3] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two

[4] m: 95th percentile volume and queues (reported from Synchro) are metered by upstream signal.

Table 18: 2023 Future with Development - Intersection Capacity Analysis Results (Continued)

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)	LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)
4	**Centreport Pkwy & I-95 SB Ramp**							
	Overall Intersection (Signalized)		**B**	**14.5**		**D**	**42.2**	
	Eastbound Approach		***B***	***11.3***		***D***	***40.2***	
	Eastbound Thru		B	11.5	141	D	51.1	#690
	Eastbound Right	500	B	11.2	40	C	28.9	80
	Westbound Approach		***B***	***10.7***		***C***	***29.3***	
	Westbound Left	300	A	8.8	m18	D	54.4	m#161
	Westbound Thru		B	11.0	m141	C	21.5	320
	Southbound Approach		***D***	***54.3***		***E***	***62.9***	
	Southbound Left/Thru		D	54.3	174	E	62.9	#673
4	**Centreport Pkwy & I-95 SB Ramp**							
	Overall Intersection (Signalized)							
	(MIT: Optimize Offsets during PM Peak Hour)		**B**	**11.8**		**D**	**40.8**	
	Eastbound Approach		***B***	***11.3***		***D***	***40.2***	
	Eastbound Thru		B	11.5	141	D	51.1	#690
	Eastbound Right	500	B	11.2	40	C	28.9	80
	Westbound Approach		***A***	***6.2***		***C***	***24.5***	
	Westbound Left	300	A	4.6	m30	D	46.9	#184
	Westbound Thru		A	6.5	m201	B	17.5	421
	Southbound Approach		***D***	***54.3***		***E***	***62.9***	
	Southbound Left/Thru		D	54.3	174	E	62.9	#673
5	**Centreport Pkwy & I-95 NB Ramp**							
	Overall Intersection (Signalized)		**F**	**396.8**		**D**	**38.9**	
	Eastbound Approach		***C***	***30.7***		***C***	***31.7***	
	Eastbound Left	400	C	25.0	123	C	22.7	m148
	Eastbound Thru		C	33.4	234	D	35.1	m#722
	Westbound Approach		***C***	***33.6***		***C***	***32.6***	
	Westbound Thru		C	33.6	306	C	32.6	244
	Westbound Right		A	0	78	A	0	7
	Northbound Approach		***F***	***575.6***		***E***	***62.9***	
	Northbound Left/Thru/Right		F	575.6	#2031	E	62.9	#489
5	**Centreport Pkwy & I-95 NB Ramp**							
	Overall Intersection (Signalized)							
	(MIT: Adjust Timings during AM; Optimize Offsets)		**F**	**341.4**		**C**	**29.6**	
	Eastbound Approach		***B***	***11.3***		***B***	***15.8***	
	Eastbound Left	400	C	25.1	90	C	20.9	m133
	Eastbound Thru		A	4.7	163	B	13.9	m#664
	Westbound Approach		***D***	***38.4***		***C***	***32.6***	
	Westbound Thru		D	38.4	323	C	32.6	261
	Westbound Right		A	0	85	A	0	54
	Northbound Approach		***F***	***496.9***		***E***	***62.9***	
	Northbound Left/Thru/Right		F	496.9	#1985	E	62.9	#489
6	**Route 1 & Centreport Pkwy**							
	Overall Intersection (Signalized)		**C**	**29.5**		**E**	**64.5**	
	Westbound Approach		***D***	***41.1***		***F***	***149.0***	
	Westbound Left		D	45.6	#439	F	162.4	#1089
	Westbound Right	270	D	37.9	278	D	53.2	m63
	Northbound Approach		***C***	***27.3***		***D***	***49.1***	
	Northbound Thru		C	27.7	327	C	24.7	m62
	Northbound Right	270	C	26.8	98	E	66.6	m364
	Southbound Approach		***B***	***13.7***		***C***	***33.2***	
	Southbound Left	530	B	19.5	45	C	27.5	132
	Southbound Thru		B	12.7	65	C	33.7	572

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] $: Delays (reported from Synchro) exceed 300 seconds in TWSC.

[3] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two

[4] m: 95th percentile volume and queues (reported from Synchro) are metered by upstream signal.

Table 18: 2023 Future with Development - Intersection Capacity Analysis Results (Continued)

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)	LOS	Delay [2] (s/veh)	95th % Queue [3][4] (ft.)
6	**Route 1 & Centreport Pkwy** **Overall Intersection (Signalized)** **(MIT: Restripe WB to L,LR Configuration)**		**C**	**30.2**		**C**	**33.9**	
	Westbound Approach		***D***	***42.9***		***C***	***31.6***	
	Westbound Left/Right		D	42.9	#371	C	31.6	341
	Northbound Approach		***C***	***27.7***		***D***	***44.4***	
	Northbound Thru		C	28.1	327	C	22.7	m62
	Northbound Right	270	C	27.2	98	E	60.0	m364
	Southbound Approach		***B***	***13.9***		***C***	***29.9***	
	Southbound Left	530	B	19.8	45	C	25.6	132
	Southbound Thru		B	12.9	65	C	30.2	572
7	**Centreport Pkwy & Site Entrance 1** **Overall Intersection (TWSC)**							
	Westbound Approach		***B***	***10.2***		***B***	***10.3***	
	Westbound Left/Right		B	10.2	3	B	10.3	8
	Southbound Approach							
	Southbound Left/Thru		A	7.8	5	A	7.8	3
7	**Centreport Pkwy & Site Entrance 1** **Overall Intersection (TWSC)** **(MIT: Install SBL)**							
	Westbound Approach		***B***	***10.2***		***B***	***10.3***	
	Westbound Left/Right		B	10.2	3	B	10.3	8
	Southbound Approach							
	Southbound Left	300	A	7.8	5	A	7.8	3
8	**Centreport Pkwy & Site Entrance 2** **Overall Intersection (TWSC)**							
	Westbound Approach		***B***	***10.7***		***B***	***11***	
	Westbound Left/Right		B	10.7	3	B	11	13
	Southbound Approach							
	Southbound Left/Thru		A	7.9	5	A	7.9	3
8	**Centreport Pkwy & Site Entrance 2** **Overall Intersection (TWSC)** **(MIT: Install SBL)**							
	Westbound Approach		***B***	***10.7***		***B***	***11***	
	Westbound Left/Right		B	10.7	3	B	11	13
	Southbound Approach							
	Southbound Left	300	A	7.9	5	A	7.9	3
9	**Centreport Pkwy & Site Entrance 3** **Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left/Thru		A	8.2	10	A	8.4	5
	Southbound Approach		***B***	***12***		***B***	***14.5***	
	Southbound Left/Right		B	12	8	B	14.5	28
9	**Centreport Pkwy & Site Entrance 3** **Overall Intersection (TWSC)** **(MIT: Install EBL)**							
	Eastbound Approach							
	Eastbound Left	300	A	8.2	5	A	8.4	28
	Southbound Approach		***B***	***11.9***		***B***	***14.4***	
	Southbound Left/Right		B	11.9	10	B	14.4	5

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] $: Delays (reported from Synchro) exceed 300 seconds in TWSC.

[3] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two

[4] m: 95th percentile volume and queues (reported from Synchro) are metered by upstream signal.

As noted previously, it would be considered acceptable and/or desirable to achieve an approach LOS of D or better for traffic operations using the HCM methodology. If a LOS D or better is not attainable then the future conditions with development should be similar to the future conditions without development. In order to attain these objectives, and thereby, accommodate future roadway demand due to the changes in traffic patterns and increased vehicular traffic demand along the road network, the following roadway improvements and mitigations are recommended (by intersection):

- Route 1 at American Legion Road / Eskimo Hill Road
  - Adjust signal timings.
- Centreport Parkway at Mountain View Road
  - Install a traffic signal;
  - Extended the Northbound Left storage bay by approximately 50 feet.
- Centreport Parkway at I-95 SB Ramps
  - Optimize signal offsets.
- Centreport Parkway at I-95 NB Ramps
  - Adjust signal timings;
  - Optimize signal offsets.
- Route 1 at Centreport Parkway
  - Restripe the Westbound Approach to support a Westbound Left and Westbound Left/Right configuration.
- Centreport Parkway at Site Entrance 1
  - Install a Southbound Left turn lane.
- Centreport Parkway at Site Entrance 2
  - Install a Southbound Left turn lane.
- Centreport Parkway at Site Entrance 3
  - Install an Eastbound Left turn lane.

The proposed future road network lane configuration with the development and the recommended improvements in place is illustrated in **Figure 19**.

With the proposed improvements, all signalized study intersections are anticipated to operate at overall acceptable levels of services during both peak hours with the exception of Centreport Parkway with the I-95 NB Ramp (which operates similar to future without development conditions). The intersections of Centreport Parkway with Mountain View Road and with Route 1 begin to operate at overall acceptable levels of service as compared to future conditions without development.

The following study intersections are anticipated to continue to have at least one approach that operates at unacceptable levels of service for at least one peak hour:

- Centreport Parkway at I-95 SB Ramp
    - Southbound Approach (PM peak hour), no increase in delay compared with future conditions without development.
- Centreport Parkway at I-95 NB Ramp
    - Northbound Approach (AM and PM peak hour), an insignificant increase in delay during the critical AM peak hour by 0.3 seconds per vehicle (0.1%) and a increase of in delay during the PM peak hour of 2.5 seconds per vehicle (4.1%) as compared with future conditions without development.

Based on the queuing analysis performed for future conditions with the development in place, the turning movements at the study intersections had 95th percentile queues that were accommodated within the available effective storage lengths of the turn bays with the exception of the following turning movement:

- Route 1 at Centreport Parkway
    - Northbound Right (PM peak hour), similar to future conditions without development

Based on the capacity and queuing analysis of future conditions, the proposed development **will not have a detrimental impact** on the surrounding road network and would improve roadway conditions, assuming all planned design recommendations in this report are implemented.

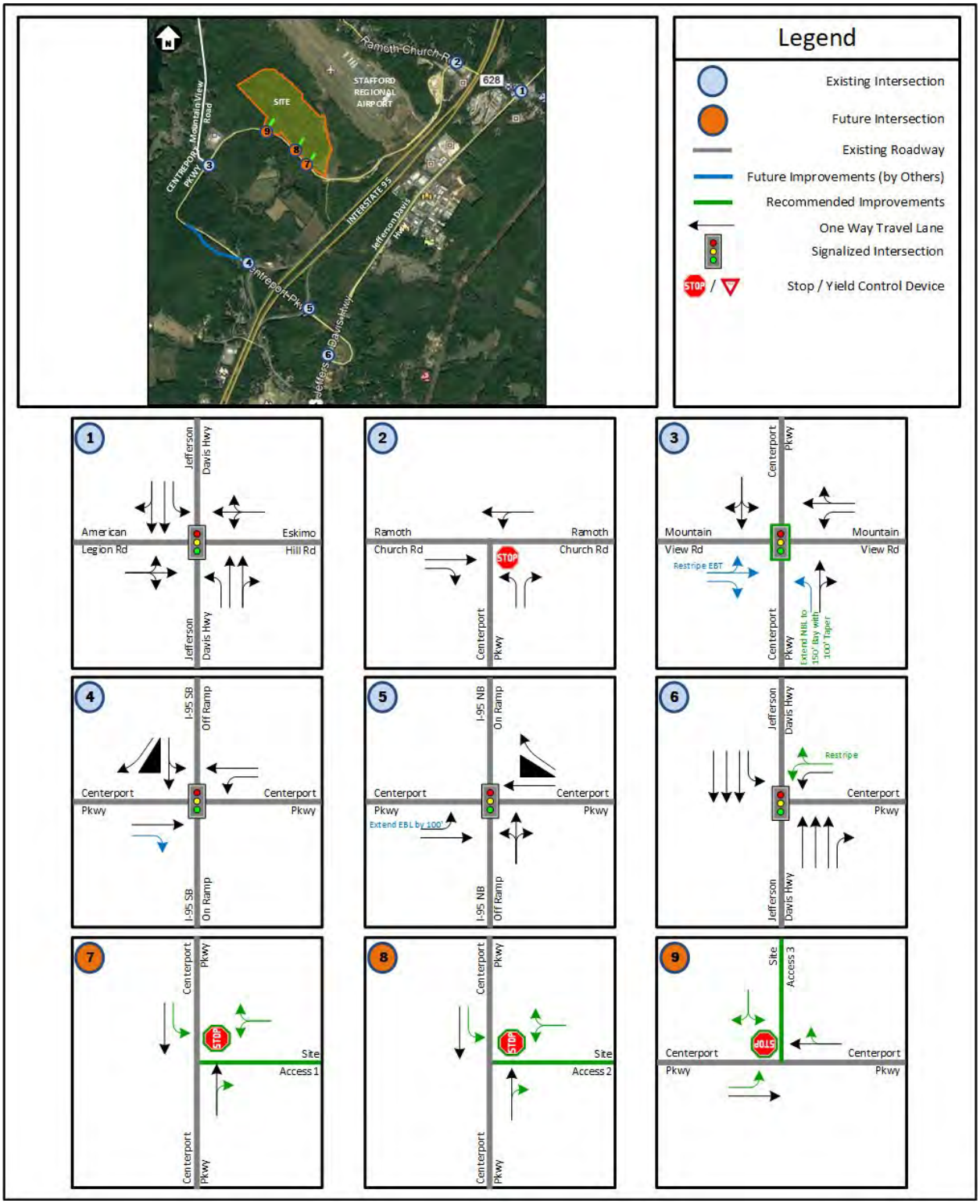


Figure 19: 2023 Future with Development – Proposed Roadway Network with Mitigations

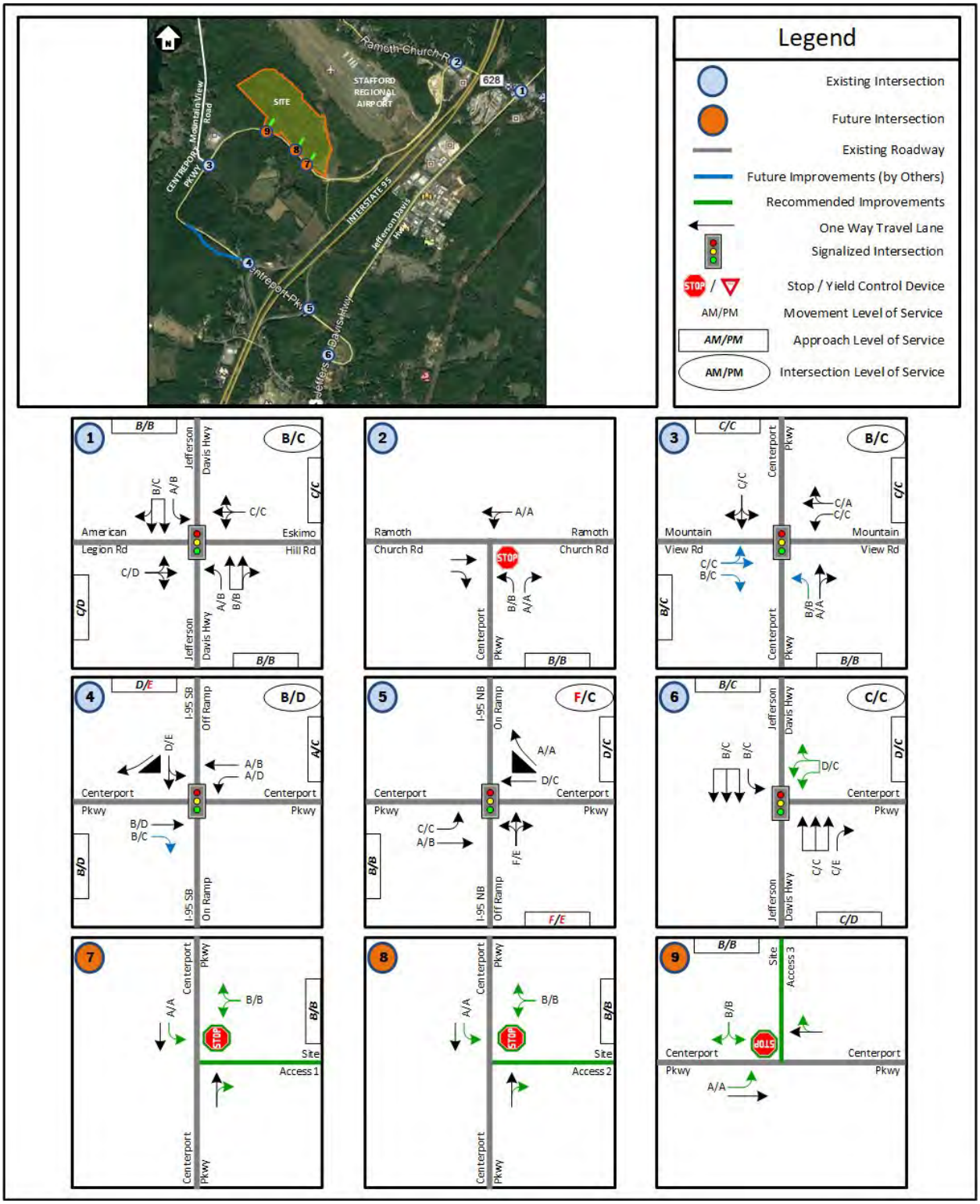


Figure 20: 2023 Future with Development - Level of Service Results

Future Conditions with Development (2023) Simulation Analysis

In addition to the 95th percentile queues that were determined from *Synchro*, the *Synchro* network models were simulated in order to determine the maximum queues under the future conditions. For the purpose of this analysis, the road network was simulated for the AM and PM peak hours. The simulation was based on *SimTraffic*, version 10, using the same network files that were used in the intersection capacity analysis. These *SimTraffic* simulation results are shown for information purposes only, as the *Synchro* results are to be used to evaluate the impact of the proposed development.

Consistent with the guidelines set forth in VDOT's Traffic Operations and Safety Analysis Manual (TOSAM), **Table 10** shows the parameters that were used for the simulation. Per Section 7.6 of the TOSAM, all other parameters not addressed in the table should not be modified from the default value.

For the purposes of this analysis, a seeding period was necessary. A seeding period ensures that the results obtained are not skewed, as the network is void of any vehicles prior to seeding. Foregoing seeding would lead to lower travel times and delays for the traffic at the beginning of the simulation. The network reaches a normal state during the seeding period without affecting the results of the simulation.

As noted in the scoping document, the intersection of Route 1 with Enon Road / Cranes Corner Road was included in the *Synchro* network models, and thus, was also included with the simulation. During initial testing of the models for future conditions, the intersection of Route 1 with Enon Road / Cranes Corner Road experienced significant queuing issues with respect to the northbound left turning movement along Route 1 during both peak hours and the southbound through turning movement particularly during the PM peak hour. During the PM peak hour, the delays at the intersection caused major spillbacks along both Route 1 and Centreport Parkway as a results of intersection metering. Given these conditions, simulation of the network models would not have yielded an adequate comparison of future conditions without and with development.

As noted previously, VDOT and the County are aware of issues with the intersection of Route 1 with Enon Road / Cranes Corner Road. Currently, the agencies are assessing roadway improvements at this intersection including dual northbound turn lanes from Route 1. As such, two alternative simulation models were tested, which included a model that did not have the Route 1 intersection at Enon Road / Cranes Corner Road and a model that had dual northbound left turn lanes at the intersection. For the purposes of this traffic study and in order to provide an adequate comparison of future conditions (without and with the development in-place), the model was refined for the simulation to include the dual northbound right at Route 1 with Enon Road / Cranes Corner Road.

The results of the simulation for the 2023 Future Conditions with Development are included in **Table 19**. Of note, for the purposes of this analysis, ten model runs were conducted. Hence, the results presented in **Table 19** are the average results of the 10 runs for each scenario.

The lane groups where the maximum queue length exceeded the available storage are also displayed in red. The maximum queue results are expressed in feet.

The *SimTraffic* worksheets for the 2023 Future Conditions with Development scenario are provided in Appendix J.

Table 19: 2023 Future Conditions with Development – Intersection Simulation Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Max Queue (ft.)	PM Peak Max Queue (ft.)
1	**Route 1 & American Legion Rd/Eskimo Hill Rd**			
	Overall Intersection (Signalized)			
	(MIT: Adjust Signal Timings)			
	Eastbound Approach			
	Eastbound Left/Thru/Right		177	330
	Westbound Approach			
	Westbound Left/Thru/Right		183	217
	Northbound Approach			
	Northbound Left	325	60	62
	Northbound Thru/Right		208	117
	Southbound Approach			
	Southbound Left	230	50	204
	Southbound Thru/Right		100	303
2	**Centreport Pkwy & Ramoth Church Road/American Legion Rd**			
	Overall Intersection (TWSC)			
	Westbound Approach			
	Westbound Left/Thru		55	67
	Northbound Approach			
	Northbound Left		39	61
	Northbound Right	290	39	52
3	**Centreport Pkwy & Mountain View Rd**			
	Overall Intersection (Signalized)			
	(MIT: Install Signal; Extend NBL Turn Bay)			
	Eastbound Approach			
	Eastbound Left/Thru		68	54
	Eastbound Right		100	243
	Westbound Approach			
	Westbound Left	110	5	9
	Westbound Thru/Right		18	14
	Northbound Approach			
	Northbound Left	200	183	205
	Northbound Thru/Right		120	174
	Southbound Approach			
	Southbound Left/Thru/Right		193	325
4	**Centreport Pkwy & I-95 SB Ramp**			
	Overall Intersection (Signalized)			
	(MIT: Optimize Offsets during PM Peak Hour)			
	Eastbound Approach			
	Eastbound Thru		133	534
	Eastbound Right	500	102	410
	Westbound Approach			
	Westbound Left	300	85	252
	Westbound Thru		185	380
	Southbound Approach			
	Southbound Left/Thru		211	314
5	**Centreport Pkwy & I-95 NB Ramp**			
	Overall Intersection (Signalized)			
	(MIT: Adjust Timings during AM; Optimize Offsets)			
	Eastbound Approach			
	Eastbound Left	400	154	338
	Eastbound Thru		251	508
	Westbound Approach			
	Westbound Thru		321	330
	Westbound Right		87	113
	Northbound Approach			
	Northbound Left/Thru/Right		1390	443

Table 19: 2023 Future Conditions with Development – Intersection Simulation Analysis Results (Continued)

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Max Queue (ft.)	PM Peak Max Queue (ft.)
6	**Route 1 & Centreport Pkwy** **Overall Intersection (Signalized)** **(MIT: Restripe WB to L,LR Configuration)**			
	Westbound Approach			
	Westbound Left/Right		374	448
	Northbound Approach			
	Northbound Thru		683	144
	Northbound Right	270	295	253
	Southbound Approach			
	Southbound Left	530	129	555
	Southbound Thru		129	1458
7	**Centreport Pkwy & Site Entrance 1** **Overall Intersection (TWSC)** **(MIT: Install SBL)**			
	Westbound Approach			
	Westbound Left/Right		63	68
	Southbound Approach			
	Southbound Left	300	46	41
8	**Centreport Pkwy & Site Entrance 2** **Overall Intersection (TWSC)** **(MIT: Install SBL)**			
	Westbound Approach			
	Westbound Left/Right		72	79
	Southbound Approach			
	Southbound Left	300	58	45
9	**Centreport Pkwy & Site Entrance 3** **Overall Intersection (TWSC)** **(MIT: Install EBL)**			
	Eastbound Approach			
	Eastbound Left	300	76	58
	Southbound Approach			
	Southbound Left/Right		72	98

Based on the simulation of 2023 future conditions with development, the following study intersections had left and / or right turning movements whereby the maximum queues that exceed the storage length of existing turn bays for at least one of the peak hours.

- Centreport Parkway at Mountain View Road
    - Northbound Left (AM and PM peak hours)
- Route 1 & Centreport Parkway
    - Northbound Right (AM peak hour)
    - Southbound Left (PM peak hour)

CONCLUSIONS

This report presents the findings of a traffic impact study (TIS) for the proposed Project Clover development, situated along Centreport Parkway (Rte. 8900), just south of the Stafford Regional Airport in the Stafford County, Virginia.

The property consists of four parcels of relatively vacant land along Centreport Parkway (Rte. 8900) and would total approximately 177.96 acres. The parcels can be identified on the Stafford County GIS with the following Property IDs #: 37-30 (portion), 30C, 78 and 79. Property IDs #: 37-78 and 79 are currently zoned A-1 (Agricultural) and Property IDs #: 37-30 and 30C are currently zoned M-1 (Light Industrial) and subject to proffers associated with 092-11, Centreport. The future land use focuses on business and industry.

The proposed development is planned to incorporate the four parcels referenced above in order to construct approximately 3.07 million square feet of warehouse/distribution use. Property IDs #: 37-30 (portion) and 30C are included in the entitlement to allow for a coordinated development with Property IDs #: 37-78 and 79. The warehouse/distribution use (approximately 0.73 of the 3.07 million square feet) is permitted on Property IDs #: 37-30 and 30C today. The development is anticipated to be complete in 2023.

The analysis presented in this report supports the following major conclusions:

2020 Existing Conditions:

- Based on the capacity analysis, all signalized intersections in the study area currently operate at acceptable levels of service (LOS D or better) with the exception of Centreport Parkway at the I-95 NB Ramp during the AM peak hour. The intersections of Centreport Parkway at both I-95 ramps and at Route 1 are anticipated to have one or more approaches that will operate at unacceptable levels of service during at least one peak hour.
- Based on the queuing analysis from *Synchro*, the study intersections are anticipated to have 95th percentile queues that were accommodated within the available storage lengths of existing turn lanes with the exception of the Westbound Right turning movement at the intersection of Route 1 at Centreport Parkway during the PM peak hour.
- Based on the queuing analysis from *SimTraffic*, the study intersections are anticipated to have maximum queues that would be accommodated within the available storage lengths of existing turn lanes with the exception of the Westbound Right and Northbound Right turning movements at the intersection of Route 1 at Centreport Parkway during one of the peak hours.

Future Conditions without Development (2023)

- The area around Centreport Parkway is anticipated to experience significant development growth. In addition to the proposed Project Clover development, five other developments could be online within the next three years including: Centreport Industrial, Centreport Stafford 95 Business Center, portions of Sycamore Grove, McGrath RentCorp Storage Facility, and Centerpoint Gateway. These developments have commitments for roadway improvements along Centreport Parkway (including the geometric improvements at Mountain View Road and at the both I-95 ramps, as well as signal timing adjustments at the I-95 ramps and at Route 1).

- Based on the capacity analysis, three of the six study intersections are anticipated to operate at acceptable levels of service; the intersections of Centreport Parkway at Mountain View Road, at the I-95 NB ramp, and at Route 1 are anticipated to operate an overall unacceptable levels of service during at least one of the peak hour. These intersections also have one or more approaches that will operate at a LOS E or F in addition to Centreport Parkway and the I-95 SB Ramp.
- Based on the queuing analysis from *Synchro*, the study intersections are anticipated to have 95th percentile queues that would be accommodated within the available storage lengths of future turn lanes with the exception of the Westbound and Northbound Right turning movements at the intersection of Route 1 at Centreport Parkway and the Northbound Right turning movement at the intersection of Centreport Parkway at Mountain View Road.
- Based on the queuing analysis from *SimTraffic*, the turning movements at the study intersections are anticipated to have maximum queues that would be accommodated within the available storage lengths of future turn lanes with the exception of the Westbound and Northbound Right turning movements at the intersection of Route 1 at Centreport Parkway and the Northbound Left turning movement at the intersection of Centreport Parkway at Mountain View Road.

Future Conditions with Development (2023)

- The proposed development is planned to incorporate the four parcels relatively vacant land along Centreport Parkway (Rte. 8900). The proposed development is planned to construct approximately 3.07 million square feet of warehouse/distribution use. The warehouse/distribution use (approximately 0.73 of the 3.07 million square feet) is permitted "by-right."
    - The "by-right" portion of the development is anticipated to generate approximately 109 trips during the AM peak hour, 117 trips during the PM peak hour, and 1,319 weekday daily trips.
    - The rezoned M-1 portion of the development is anticipated to generate approximately 350 trips during the AM peak hour, 374 trips during the PM peak hour, and 4,228 weekday daily trips.
- The following roadway improvements and mitigations are recommended (by intersection) in order to accommodate roadway demand due to the changes in traffic patterns and increased vehicular traffic demand along the road network:
    - Route 1 at American Legion Road / Eskimo Hill Road
        - Adjust signal timings.
    - Centreport Parkway at Mountain View Road
        - Install a traffic signal;
        - Extended the Northbound Left storage bay by approximately 50 feet.
    - Centreport Parkway at I-95 SB Ramps
        - Optimize signal offsets.

- Centreport Parkway at I-95 NB Ramps
  - Adjust signal timings;
  - Optimize signal offsets.
- Route 1 at Centreport Parkway
  - Restripe the Westbound Approach to support a Westbound Left and Westbound Left/Right configuration.
- Centreport Parkway at Site Entrance 1
  - Install a Southbound Left turn lane.
- Centreport Parkway at Site Entrance 2
  - Install a Southbound Left turn lane.
- Centreport Parkway at Site Entrance 3
  - Install an Eastbound Left turn lane.

- Based on the capacity analysis, all signalized study intersections are anticipated to operate at overall acceptable levels of service with the proposed improvements with the exception of Centreport Parkway with the I-95 NB Ramp (which would operate similar to future without development conditions). The only other intersection that will have an approach operating at an unacceptable level of service would be the intersection of Centreport Parkway at the I-95 SB ramp during the PM peak hour (similar to future conditions without development).The intersections of Centreport Parkway with Mountain View Road, and with Route 1 would begin to operate at overall acceptable levels of service as compared to future conditions without development.
- Based on the queuing analysis from *Synchro*, the study intersections are anticipated to have 95th percentile queues that would be accommodated within the available storage lengths of future turn lanes with the exception of the Northbound Right turning movement at the intersection of Route 1 at Centreport Parkway during the PM peak hour (similar to future conditions without development).
- Based on the queuing analysis from *SimTraffic*, the study intersections are anticipated to have maximum queues that would be accommodated within the available storage lengths of future turn lanes with the exception of the Northbound Right and Southbound Left turning movements at the intersection of Route 1 at Centreport Parkway and the Northbound Left turning movement at the intersection of Centreport Parkway at Mountain View Road. These intersections would experience maximum queues beyond the storage length on generally the same movements under future conditions without development.

Based on the capacity and queuing analysis of future conditions, the proposed development **will not have a detrimental impact** on the surrounding road network and would improve roadway conditions, assuming all planned design recommendations in this report are implemented.

TECHNICAL APPENDIX

TECHNICAL APPENDIX TABLE OF CONTENTS

Appendix A: Scoping Document

Appendix B: Crash Data

Appendix C: Level of Service Definitions

Appendix D: Intersection Capacity Analysis - Existing Conditions (2020)

Appendix E: SimTraffic Analysis - Existing Conditions (2020)

Appendix F: Background Development Trips

Appendix G: Intersection Capacity Analysis - Future without Development Condition (2023)

Appendix H: SimTraffic Analysis - Future without Development Condition (2023)

Appendix I: Intersection Capacity Analysis - Future with Development Condition (2023)

Appendix J: SimTraffic Analysis - Future with Development Condition (2023)

Appendix A:

Scoping Document

THIS IS NOT A CHAPTER 870 STUDY

VDOT Virginia Department of Transportation	PRE-SCOPE OF WORK MEETING FORM Information on the Project Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

Contact Information			
Consultant Name: Tele: E-mail:	Chad Baird, Gorove/Slade Associates, Inc. 571-248-0992 chad.baird@goroveslade.com		
Developer/Owner Name: Tele: E-mail:	Stephen Green, Peterson Companies 703.631.7518 sgreen@petersoncos.com		
Project Information			
Project Name:	Project Clover	Locality/County:	Stafford County, VA
Project Location: (Attach regional and site specific location map)	The proposed development will be located along both frontages of Centreport Parkway, just south of the Stafford Regional Airport. The site can be found within the Central Stafford Business Planning Area of Stafford County, Virginia.		
Submission Type	Comp Plan ☐	Rezoning ☒	Site Plan ☐ / Subd Plat ☐
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	The proposed Project Clover development will be situated on four parcels of land, fronting the north side of Centreport Parkway (Rte. 8900). The four parcels, totaling approximately 183 acres of land, are zoned a mix of A-1 and M-1; and can be identified with the following Property ID numbers 37-30, 30C, 71, and 78. An additional parcel (Property ID: 37-79) currently contains a residence and will remain as-is. The parcels are part of the Central Stafford Business Planning Area with a projected future lane use focusing on business and industry. The Applicant is proposing to rezone one of the four parcels of land (Property ID: 37-78) in order to construct an approximately 2.34 million square feet of High-Cube Fulfillment Center warehouse/distribution use on the individual parcel. In addition, the Applicant plans to construct "by-right" High-Cube Fulfillment Center warehouse/distribution uses (totaling approximately 0.73 million square feet) on one of the other parcels of land. The development is anticipated to be complete and in operation by 2023. Access to the site will be provided by three full-movement (T-intersection) access points along Centreport Parkway.		
Proposed Use(s): (Check all that apply; attach additional pages as necessary)	Residential ☐ / Commercial ☐ / Mixed Use ☐ / Other ☒		
	Residential Uses(s) ITE LU Code(s): Number of Units: **Commercial Use(s)** ITE LU Code(s): Square Ft or Other Variable:		**Other Use(s)** ITE LU Code(s): 155 (High-Cube Fulfillment Center Warehouse) Square Ft or Other Variable: 2.33565 MSF for the Rezoning 0.729 MSF By-Right

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Total Peak Hour Trip Projection:	Less than 100 ☐	100 – 499 ☒	500 – 999 ☐	1,000 or more ☐

Traffic Impact Analysis Assumptions

Study Period	Existing Year: 2020	Build-out Year: 2023	Design Year: N/A
Study Area Boundaries (Attach map)	North: Ramoth Church Rd / American Legion Rd		South: Centreport Pkwy (Rte. 8900)
	West: Centreport Pkwy (Rte. 8900)		East: Route 1
External Factors That Could Affect Project (Planned road improvements, other nearby developments)	None.		
Consistency With Comprehensive Plan (Land use, transportation plan)	Yes		
Available Traffic Data (Historical, forecasts)	VDOT Historical AADT Data		
Trip Distribution **(Please refer to attached Figure 2 in Supplement)**	Road Name: (to/from the West) – N/A		Road Name: (to/from the East) – N/A
	Road Name: (to/from the South) – N/A		Road Name: (to/from the North) – N/A
Annual Vehicle Trip Growth Rate: (See Note 3.)	2.5%/year	Peak Period for Study (check all that apply)	☒ AM ☒ PM ☐ SAT
		Peak Hour of the Adj. (to be used in study)	REZ: AM: 350/ PM: 374 / DAILY: 4,228

Study Intersections and/or Road Segments (Attach additional sheets as necessary) **(Please refer to attached Figure 1.)**				
	1.	American Legion Road/ Eskimo Hill Road at Route 1	7.	Centreport Pkwy (Rte. 8900) at Site Access 1
	2.	Ramoth Church Road / American Legion Road at Centreport Parkway	8.	Centreport Pkwy (Rte. 8900) at Site Access 2
	3.	Centreport Parkway at Mountain View Road	9.	Centreport Pkwy (Rte. 8900) at Site Access 3
	4.	Centreport Parkway at I-95 SB Ramps	10.	
	5.	Centreport Parkway at I-95 NB Ramps	11.	
	6.	Centreport Parkway at Route 1	12.	

Trip Adjustment Factors	Internal allowance Reduction: ☐ Yes ☒ No	Pass-by allowance Reduction: ☐ Yes ☒ No
Software Methodology	☒ Synchro ☐ HCS (v.2000/+) ☐ SIDRA ☐ CORSIM ☐ Other ____	

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Traffic Signal Proposed or Affected (Analysis software to be used, progression speed, cycle length)	Existing traffic signals that could be affected: 1. American Legion Road/ Eskimo Hill Road at Route 1 2. Centreport Parkway at I-95 SB Ramps 3. Centreport Parkway at I-95 NB Ramps 4. Centreport Parkway at Route 1 5. Enon Road at Route 1 (not included as a study intersection, but will be included in the Synchro network) Analysis Software: Synchro version 10 Results: HCM 2010 Methodology Queue Lengths to be Reported: 95th Percentile and Max Queues (See Note 10.)
Improvement(s) Assumed or to be Considered	None.
Background Traffic Studies Considered **(Please refer to attached Figure 7.)**	1. Centreport Industrial (80 kSF of light industrial use) 2. Centreport Stafford 95 Business Center (487.792 kSF of warehousing use) 3. Sycamore Grove ("Phase 1" – 100 SFDU and 20 kSF of retail use) 4. McGrath Rentcorp Storage Facility (22.8 kSF storage facility) 5. Centreport Gateway ("Phase 1" – 60 kSF Retail and 90 room hotel)
Plan Submission	☐ Master Development Plan (MDP) ☒ Generalized Development Plan (GDP) ☐ Preliminary/Sketch Plan ☐ Other Plan type (Final Site, Subd. Plan)
Additional Issues to be Addressed	☒ Queuing analysis ☐ Actuation/Coordination ☐ Weaving analysis ☐ Merge analysis ☐ Bike/Ped Accommodations ☒ Intersection(s) ☐ TDM Measures ☐ Other (_____)

NOTES on ASSUMPTIONS:

1. Synchro and/or timing sheets will be requested from VDOT.
2. The scenarios to be analyzed in the study are 2020 Existing Conditions, 2023 Future Conditions without Development, and 2023 Future Conditions with Development. The study will analyze AM and PM peak hours.
3. For the purpose of this traffic impact study, 2020 existing "baseline" volumes will be derived from the following:
   a. 2016 and 2017 traffic counts from VDOT;
   b. Nearby traffic impact studies in the vicinity of the site (See "Background Traffic Studies Considered").

   The 2020 "baseline" traffic volumes, to be used in this study, are illustrated in **Figure 6** in the Appendix along with the assumptions used to derive these volumes.
4. In order to project future traffic volumes, a regional growth rate of 2.5% (compounded per year) will be applied to all movements at the "existing" study intersections for the period between 2020 and 2023.
5. Existing peak hour factors will be based on the traffic counts and utilized on a by-intersection basis. Peak hours factors by an intersection in the range of 0.85 to 1.00 will be used for the existing scenario. Peak hour factors of 0.92 will be used for all future scenarios if the existing peak hour factor by intersection is less than 0.92. A peak hour factor of 0.92 will be assumed for intersections with approximated (non-traditional) turning movement counts and/or for new intersections.
6. Heavy vehicle percentages (HV%) will be based on the traffic counts where available; HV% will be based on 2019 VDOT historical data if not available.
7. For any approach, a level of service (LOS) D or better would be considered as acceptable/desirable traffic operation condition. For all approaches, the projected future conditions without development LOS and delay will be maintained in the future with development condition. Will show intersection, approach, and movement LOS.
8. Signal timing adjustments at existing intersections will be considered as an acceptable mitigation strategy where they do not have a detrimental impact to regional traffic flow.
9. For the analysis of the site, truck trips will be separated from non-truck trips.
10. 95th percentile queues will be provided from *Synchro* or max queue from *SimTraffic* at specific locations if required. For turning movements that operate with oversaturated conditions (identified by *Synchro* with a "#"), mitigations will be based using the max queues from *SimTraffic*.
11. HCM 2010 methodology will be utilized where applicable; HCM 2000 methodology will be utilized in the event that HCM 2010 methodology is not applicable.
12. Will follow VDOT's *TOSAM* (version 2) guidelines.

SIGNED: _____ DATE: 06/11/2020
Applicant or Consultant

PRINT NAME: Chad A. Baird
Applicant or Consultant

SIGNED: _____ DATE: 6/11/2020
VDOT Representative

PRINT NAME: DAVID L JEALE
VDOT Representative

SIGNED: _____ DATE: 6/15/2020
Local Government Representative

PRINT NAME: MICHAEL ZURAF

Local Government Representative

Table 1: Historic Growth (Based on VDOT Traffic Data)

Road Segment:	From:	To:	Published VDOT AADT					Growth Rate			
			2014	2015	2016	2017	2018	2014 - 2018	2015 - 2018	2016 - 2018	2017 - 2018
Centreport Pkwy (Rte. 8900)	I-95	Mountain View Rd (Rte. 627)	5,700	6,500	6,600	6,600	7,000	5%	3%	3%	6%
Centreport Pkwy (Rte. 8900)	Mountain View Rd (Rte. 627)	Dead end	450	450	450	450	750	14%	19%	29%	67%

Figure 1: Site Location and Study Intersections

Figure 2: Direction of Approach

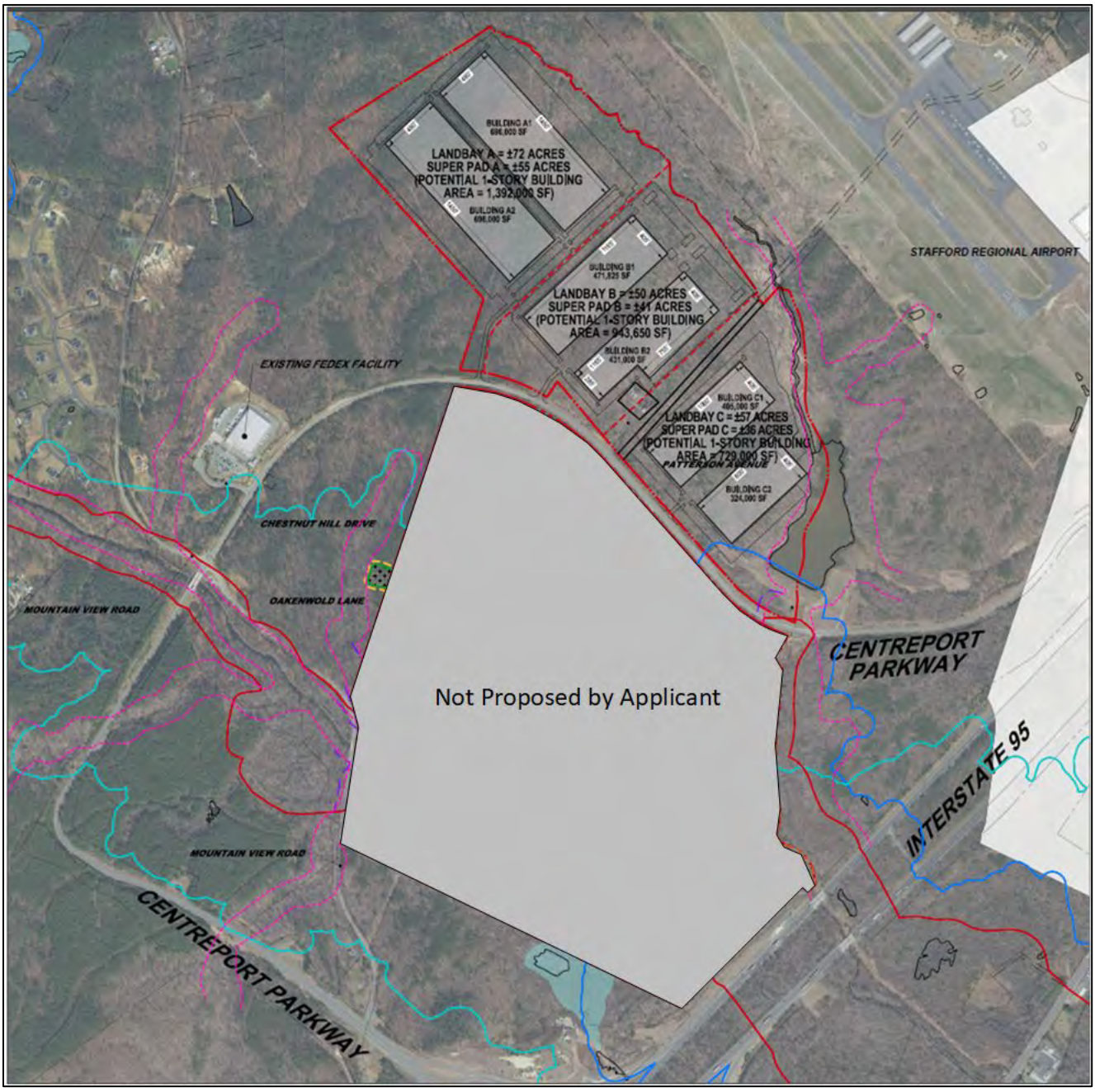


Figure 3: Concept Development Plan (Provided by Bohler Engineering, Dated March 27, 2020)

Table 2: Site Trip Generation for Rezoned Parcel – Peak Hour of the Adjacent Street (ITE 10th Edition; To be Used in Study)

Land Use	ITE Code	Size	------ Weekday ------						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Rezoning									
High-Cube Fulfillment Center Warehouse (Cars)	155*	2,335.65 kSF of GFA	261	42	303	135	216	351	3,691
High-Cube Fulfillment Center Warehouse (Trucks)	155*	2,335.65 kSF of GFA	23	24	47	11	12	23	537
Total			**284**	**66**	**350**	**146**	**228**	**374**	**4,228**

Note:
ITE LUC 155 was utilized to due to the description of the development matching closest to the high-cube definition from ITE, as well as, due to the data range and number of data points ITE LUC 155 has as compared to similar uses. Per the request of the County and VDOT, truck trips generation from ITE was separated and will be analyzed separately in the traffic study.

Derivation of 2020 "Baseline" Traffic Volumes

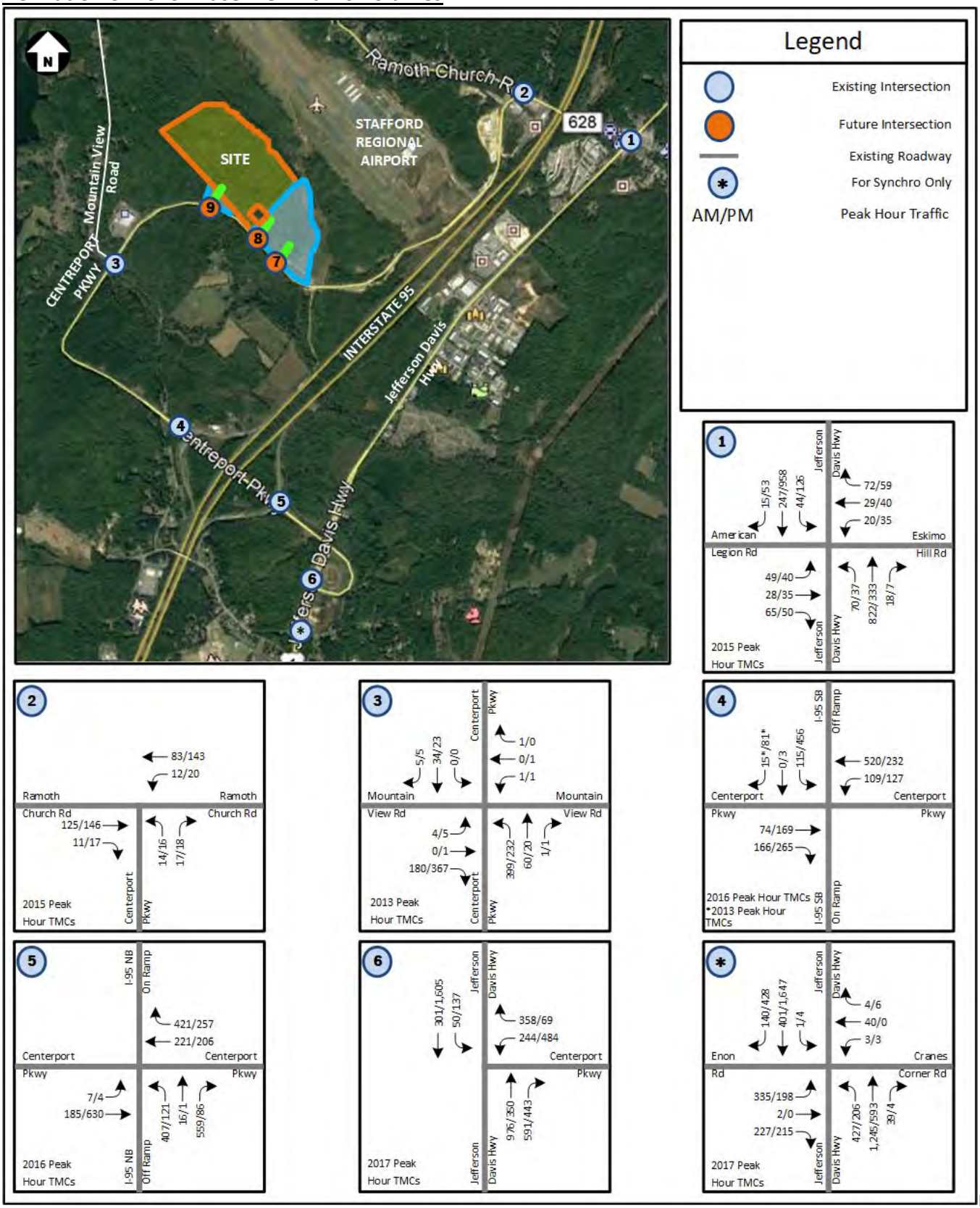


Figure 4: Columniation of Traffic Volumes and Year of Traffic Counts

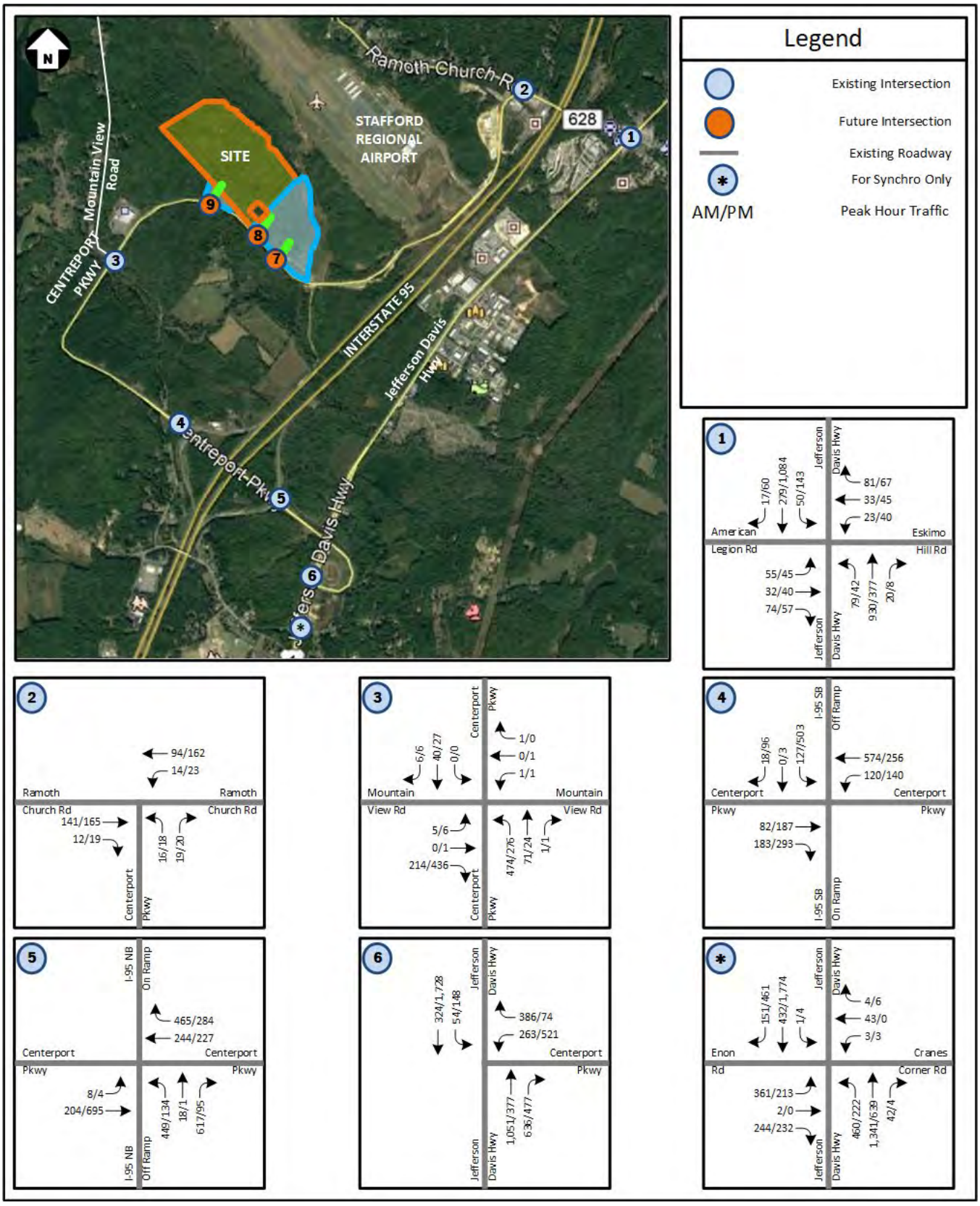


Figure 5: Unbalanced 2020 Traffic Volumes (Figure 4 with Volumes Grown to 2020 Conditions)

Note: Traffic volumes were grown to 2020 conditions by applying a 2.5% growth factor per year to each movement at the study intersections.

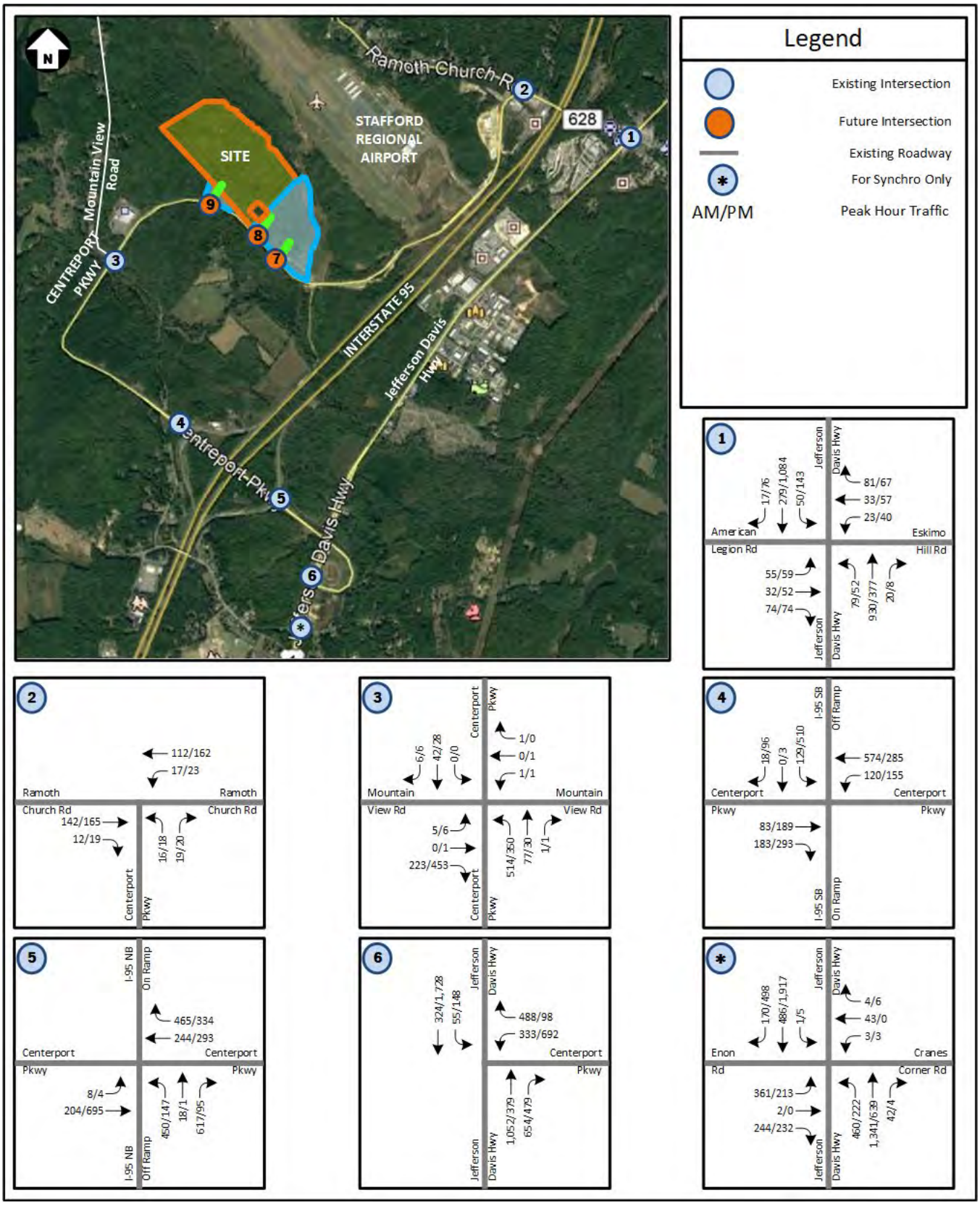


Figure 6: 2020 "Baseline" Traffic Volumes (To Be used in Study) (Figure 5 with Volumes Balanced on the Road Network)

Note: Traffic volumes along roadway segments were balanced directionally and proportionately where appropriate. Traffic volumes were not balanced along Centreport Parkway between Mountain View Road and Ramoth Church Road due to the airport and FedEx entrances.

Notes on the derivation of 2020 "Baseline" Traffic Volumes

1. Intersection 1 (Rte. 1 at American Legion / Eskimo Hill)
    - Based on 2015 Peak Hour TMCs from the Centreport Industrial Rezoning TIA by JMT (December 24, 2015)
    - PHF assumed since no data was available; HV% based on VDOT data.

2. Intersection 2 (Centreport Pkwy at Ramoth Church / American Legion)
    - 2015 Peak Hour TMCs from the Centreport Industrial TIA Rezoning by JMT (December 24, 2015)
    - PHF assumed since no data was available; HV% based on VDOT data.

3. Intersection 3 (Centreport Pkwy at Mountain View)
    - 2013 Peak Hour TMCs from the George Washington Village TIA by Bowman Consulting (January 31, 2013)
    - PHF assumed since no data was available; HV% based on VDOT data.

4. Intersection 4 (Centreport Pkwy at I-95 SB Ramps)
    - 2016 Peak Hour Counts from VDOT; the system peak hour volumes were based on the intersections of Centreport Pkwy with the I-95 SB ramp and I-95 NB Ramp, as well as, Route 1 with Centrepoint Pkwy and with Enon Rd.
    - Note: SBR ramp from I-95 ramp was not included in the counts. The traffic volumes for the southbound ramp were based on the 2013 traffic volumes included in the George Washington Village TIA by Bowman Consulting (January 31, 2013)

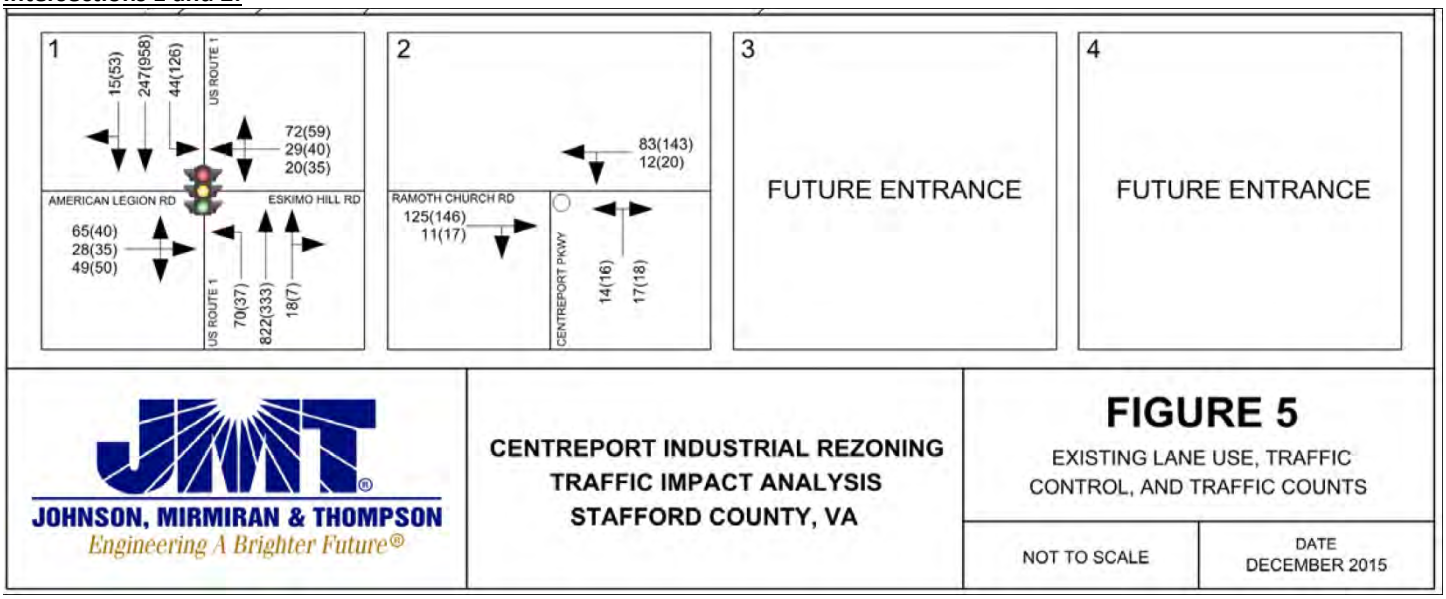
5. Intersection 5 (Centreport Pkwy at I-95 NB Ramps)
    - 2016 Peak Hour Counts from VDOT; the system peak hour volumes were based on the intersections of Centreport Pkwy with the I-95 SB ramp and I-95 NB Ramp, as well as, Route 1 with Centrepoint Pkwy and with Enon Rd.

6. Intersection 6 (Route 1 at Centerport Pkwy)
    - 2017 Peak Hour Counts from VDOT; the system peak hour volumes were based on the intersections of Centreport Pkwy with the I-95 SB ramp and I-95 NB Ramp, as well as, Route 1 with Centrepoint Pkwy and with Enon Rd.

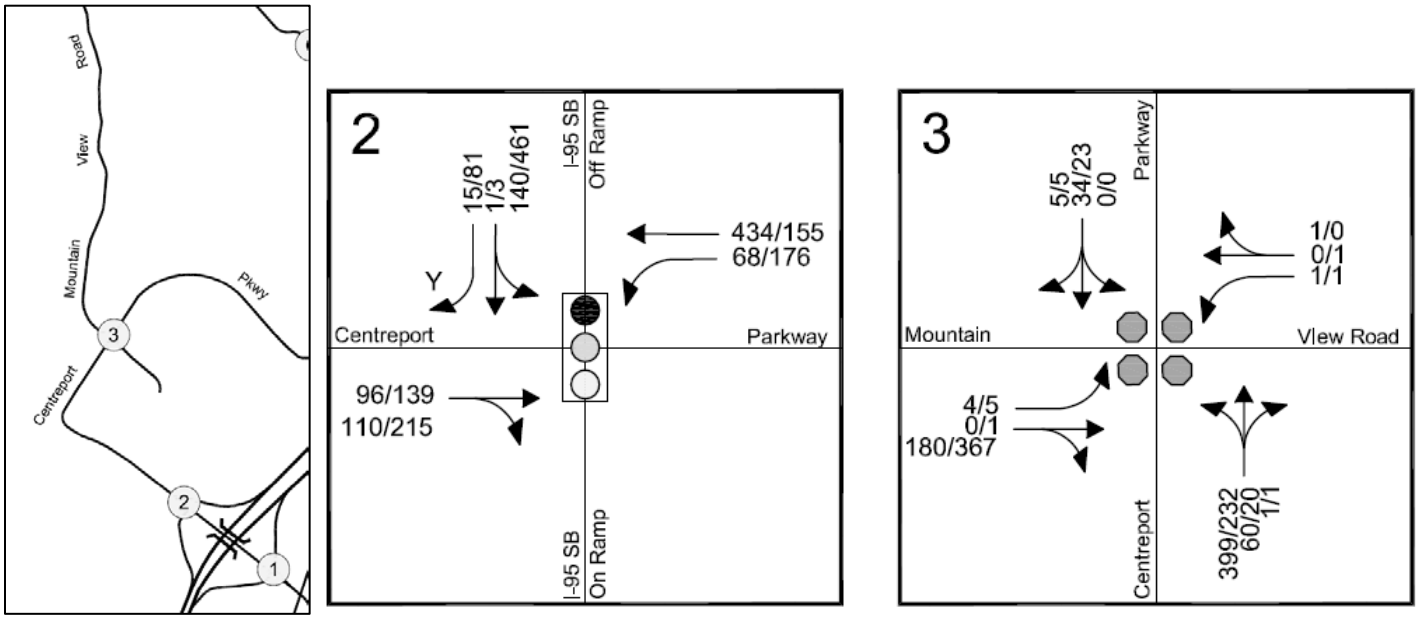
7. Intersection * (Route 1 at Enon Rd)
    - 2017 Peak Hour Counts from VDOT; the system peak hour volumes were based on the intersections of Centreport Pkwy with the I-95 SB ramp and I-95 NB Ramp, as well as, Route 1 with Centrepoint Pkwy and with Enon Rd.

Traffic Volume Data:

Intersections 1 and 2:



Intersection 3 (and SBR for Intersection 4):



Existing Traffic Counts
George Washington Village
Stafford County, Virginia

LEGEND
- Traffic Signal
- Stop Sign
- Future Roadway
- XX/YY: AM/PM Weekday Peak Hour Traffic
- XXX Average Daily Traffic (ADT) (2012 VDOT Counts)

Intersection 4:

	I-95 SB Off Ramp		Centreport Pkwy.			I-95 SB On Ramp			Centreport Pkwy.		
Start Time	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
06:30 AM	0	17	0	164	13	0	0	0	25	8	0
06:45 AM	0	22	0	218	16	0	0	0	30	12	0
07:00 AM	0	20	0	133	28	0	0	0	24	14	0
07:15 AM	0	33	0	124	22	0	0	0	48	19	0
07:30 AM	0	31	0	144	28	0	0	0	48	25	0
07:45 AM	0	31	0	119	31	0	0	0	46	16	0
08:00 AM	0	38	0	131	33	0	0	0	40	16	0
08:15 AM	0	30	0	102	33	0	0	0	36	23	0
08:30 AM	1	27	0	90	33	0	0	0	48	23	0
08:45 AM	0	36	0	67	24	0	0	0	40	29	0
09:00 AM	1	26	0	62	19	0	0	0	38	24	0
09:15 AM	0	29	0	68	28	0	0	0	37	12	0
09:30 AM	1	30	0	42	22	0	0	0	37	24	0
09:45 AM	0	34	0	47	26	0	0	0	29	20	0
10:00 AM	0	26	0	38	24	0	0	0	24	8	0
10:15 AM	0	20	0	29	17	0	0	0	27	17	0
10:30 AM	2	23	0	20	17	0	0	0	20	12	0
10:45 AM	0	34	0	26	20	0	0	0	22	17	0
11:00 AM	0	21	0	27	15	0	0	0	21	12	0
11:15 AM	0	21	0	23	17	0	0	0	22	12	0
11:30 AM	0	25	0	25	25	0	0	0	31	14	0
11:45 AM	1	29	0	29	20	0	0	0	22	11	0
12:00 PM	0	39	0	31	24	0	0	0	23	13	0
12:15 PM	0	35	0	23	20	0	0	0	24	17	0
12:30 PM	0	52	0	26	14	0	0	0	20	16	0
12:45 PM	1	36	0	33	11	0	0	0	28	9	0
01:00 PM	1	48	0	28	11	0	0	0	20	14	0
01:15 PM	0	32	0	23	18	0	0	0	23	11	0
01:30 PM	0	39	0	29	31	0	0	0	33	11	0
01:45 PM	0	49	0	26	22	0	0	0	33	15	0
02:00 PM	0	51	0	49	22	0	0	0	28	15	0
02:15 PM	0	57	0	31	13	0	0	0	27	21	0
02:30 PM	2	48	0	40	26	0	0	0	34	26	0
02:45 PM	0	55	0	33	27	0	0	0	33	16	0
03:00 PM	0	61	0	42	35	0	0	0	48	26	0
03:15 PM	0	84	0	45	26	0	0	0	62	29	0
03:30 PM	0	77	0	44	28	0	0	0	57	28	0
03:45 PM	0	75	0	52	24	0	0	0	57	26	0
04:00 PM	0	75	0	40	34	0	0	0	64	42	0
04:15 PM	0	90	0	55	40	0	0	0	77	50	0
04:30 PM	0	82	0	49	50	0	0	0	66	30	0
04:45 PM	0	78	0	56	38	0	0	0	71	33	0
05:00 PM	0	80	0	57	48	0	0	0	60	34	0
05:15 PM	1	119	0	53	27	0	0	0	76	48	0
05:30 PM	2	132	0	62	34	0	0	0	75	54	0
05:45 PM	0	125	0	60	18	0	0	0	54	33	0

Intersection 5:

File Name : 136-T2 NB 95 Ramps and Centreport Pkwy Site Code :
Start Date : 9/27/2016 Page No : 1
Groups Printed- Combined

	I-95 NB On Ramp			Centreport Pkwy.			I-95 NB Off Ramp			Centreport Pkwy.		
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
06:30 AM	0	0	0	71	56	0	132	1	128	0	21	1
06:45 AM	0	0	0	83	77	0	148	2	153	0	36	1
07:00 AM	0	0	0	82	50	0	189	1	118	0	31	1
07:15 AM	0	0	0	103	52	0	131	8	91	0	54	2
07:30 AM	0	0	0	114	59	0	117	6	104	0	55	3
07:45 AM	0	0	0	122	60	0	122	1	94	0	45	1
08:00 AM	0	0	0	141	90	0	76	5	70	0	54	0
08:15 AM	0	0	0	143	67	0	84	6	70	0	50	3
08:30 AM	0	0	0	137	63	0	72	7	60	0	45	2
08:45 AM	0	0	0	145	56	0	61	6	34	0	65	4
09:00 AM	0	0	0	130	38	0	65	4	41	0	45	3
09:15 AM	0	0	0	135	53	0	63	1	42	0	35	2
09:30 AM	0	0	0	112	42	0	74	3	25	0	51	2
09:45 AM	0	0	0	90	39	0	68	0	32	0	54	1
10:00 AM	0	0	0	68	43	0	39	1	21	0	33	2
10:15 AM	0	0	0	55	27	0	20	0	15	0	34	3
10:30 AM	0	0	0	42	19	0	8	0	14	0	32	2
10:45 AM	0	0	0	40	32	0	12	1	16	0	51	1
11:00 AM	0	0	0	42	21	0	14	3	24	0	30	1
11:15 AM	0	0	0	42	25	0	9	0	12	0	29	1
11:30 AM	0	0	0	49	27	0	14	1	21	0	39	4
11:45 AM	0	0	0	39	26	0	14	0	25	0	36	0
12:00 PM	0	0	0	41	31	0	17	0	25	0	48	4
12:15 PM	0	0	0	49	24	0	28	0	18	0	52	2
12:30 PM	0	0	0	43	31	0	22	0	14	0	66	2
12:45 PM	0	0	0	39	28	0	20	0	15	0	49	0
01:00 PM	0	0	0	43	19	0	27	1	18	0	61	1
01:15 PM	0	0	0	43	31	0	24	0	15	0	37	1
01:30 PM	0	0	0	50	45	0	26	2	13	0	55	0
01:45 PM	0	0	0	56	25	0	24	2	23	0	62	3
02:00 PM	0	0	0	35	43	0	18	0	28	0	61	2
02:15 PM	0	0	0	49	31	0	20	1	15	0	77	1
02:30 PM	0	0	0	42	38	0	11	0	27	0	73	2
02:45 PM	0	0	0	47	31	0	14	0	31	0	69	1
03:00 PM	0	0	0	51	50	0	15	1	23	0	82	0
03:15 PM	0	0	0	49	55	0	18	0	20	0	107	2
03:30 PM	0	0	0	43	45	0	16	0	24	0	104	5
03:45 PM	0	0	0	48	41	0	23	2	30	0	104	1
04:00 PM	0	0	0	52	57	0	29	0	22	0	106	0
04:15 PM	0	0	0	54	68	0	22	0	30	0	151	3
04:30 PM	0	0	0	60	57	0	12	0	30	0	110	2
04:45 PM	0	0	0	67	44	0	19	1	39	0	109	1
05:00 PM	0	0	0	58	64	0	27	0	33	0	109	2
05:15 PM	0	0	0	76	61	0	21	0	30	0	172	0
05:30 PM	0	0	0	71	38	0	28	0	28	0	181	0
05:45 PM	0	0	0	52	43	0	10	1	30	0	168	2

Intersection 6:

File Name : 5-Route 1 and Centreport Pkwy Site Code :
Start Date : 3/23/2017 Page No : 1

Groups Printed- Car - Truck

	Route 1			Centerport Pkwy			Route 1		
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn
07:00 AM	59	9	1	72	40	0	126	225	0
07:15 AM	71	11	0	100	68	0	158	222	1
07:30 AM	89	13	0	105	79	0	162	247	0
07:45 AM	82	16	0	81	57	0	145	281	0
08:00 AM	67	16	0	64	40	0	164	228	0
08:15 AM	84	17	0	58	47	0	139	244	0
08:30 AM	80	12	0	92	31	0	125	181	0
08:45 AM	76	8	0	121	55	0	97	165	0
09:00 AM	93	8	0	43	51	0	90	142	0
09:15 AM	81	11	0	57	41	0	87	88	0
09:30 AM	80	11	0	19	40	0	60	111	0
09:45 AM	101	22	0	20	45	0	65	99	0
10:00 AM	76	19	0	22	40	0	61	74	0
10:15 AM	81	21	0	15	46	0	66	81	0
10:30 AM	109	15	0	24	34	0	69	71	0
10:45 AM	89	9	0	18	38	0	46	103	0
11:00 AM	99	12	0	12	35	0	59	99	0
11:15 AM	80	19	0	16	35	0	62	74	0
11:30 AM	121	11	0	18	44	0	60	97	0
11:45 AM	83	16	0	18	56	0	59	59	0
12:00 PM	105	19	0	20	39	0	42	97	0
12:15 PM	112	18	0	21	61	0	54	97	0
12:30 PM	127	10	0	21	49	0	58	108	0
12:45 PM	103	15	0	23	50	1	51	93	0
01:00 PM	116	18	0	20	64	0	55	103	0
01:15 PM	96	17	0	14	46	0	78	86	0
01:30 PM	122	19	0	22	64	0	64	89	0
01:45 PM	117	20	0	20	66	0	64	93	0
02:00 PM	159	23	0	20	68	0	50	103	0
02:15 PM	178	21	0	18	76	0	54	89	0
02:30 PM	221	27	0	13	58	0	78	109	1
02:45 PM	217	37	0	15	57	0	64	104	0
03:00 PM	247	36	0	14	60	0	89	107	0
03:15 PM	241	55	0	13	72	0	89	88	0
03:30 PM	294	38	0	16	89	0	89	92	0
03:45 PM	309	40	0	16	98	0	70	106	0
04:00 PM	305	40	0	21	117	0	78	100	0
04:15 PM	370	32	0	10	95	0	89	108	0
04:30 PM	335	59	1	10	132	0	111	105	0
04:45 PM	353	47	0	26	116	0	115	100	0
05:00 PM	382	56	0	15	117	0	93	76	0
05:15 PM	413	37	0	14	125	0	146	103	0
05:30 PM	393	21	0	20	126	0	105	89	0
05:45 PM	417	23	0	20	116	0	99	82	0
06:00 PM	348	35	1	19	131	0	77	96	0
06:15 PM	360	20	0	18	100	0	69	100	0
06:30 PM	258	24	0	18	109	0	67	73	0
06:45 PM	265	15	0	10	124	0	57	77	0

Intersection *:

File Name : 6-Route 1 and Enon Cranes Corner Site Code :
Start Date : 3/23/2017 Page No : 1

Groups Printed- Car - Truck

	Route 1				Cranes Corner				Route 1				Enon Rd			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
07:00 AM	32	67	0	0	1	6	1	0	11	259	173	0	55	1	79	0
07:15 AM	37	100	0	0	0	32	1	0	26	304	167	0	73	0	78	0
07:30 AM	41	133	1	0	2	1	0	0	1	319	57	0	72	1	108	0
07:45 AM	30	101	0	0	1	1	1	0	1	363	30	0	27	0	70	0
08:00 AM	20	86	2	0	1	0	1	0	3	323	27	0	14	0	69	1
08:15 AM	19	105	3	0	1	1	1	0	0	327	19	0	19	0	60	0
08:30 AM	20	96	1	0	3	0	1	0	1	239	14	0	31	0	55	0
08:45 AM	24	104	0	0	3	3	0	0	3	218	47	1	22	1	44	0
09:00 AM	31	107	2	0	1	0	1	0	2	188	27	0	20	0	51	0
09:15 AM	28	96	0	0	2	0	2	0	1	141	22	0	16	1	39	0
09:30 AM	22	94	2	0	3	0	4	0	0	140	15	0	15	0	34	0
09:45 AM	32	109	0	0	1	0	0	0	0	135	17	0	10	0	32	0
10:00 AM	24	87	1	0	2	2	5	0	2	114	17	0	14	1	20	0
10:15 AM	25	97	0	0	2	1	0	0	1	112	10	0	17	0	27	0
10:30 AM	25	115	2	0	2	0	0	0	1	118	11	1	27	0	28	0
10:45 AM	31	86	1	0	0	1	3	0	1	128	19	1	24	1	28	0
11:00 AM	20	119	0	0	2	0	3	0	2	123	17	0	15	0	23	0
11:15 AM	26	88	1	0	2	0	0	0	1	100	11	0	14	0	32	0
11:30 AM	43	133	2	0	2	0	1	0	1	126	12	0	17	2	26	0
11:45 AM	22	115	1	0	2	1	0	0	1	95	14	0	22	1	26	0
12:00 PM	24	115	1	0	2	0	1	0	2	95	24	0	17	0	29	0
12:15 PM	33	130	0	0	0	0	1	0	2	129	22	0	22	1	31	0
12:30 PM	31	152	0	0	0	0	1	0	0	128	17	0	29	0	30	0
12:45 PM	28	124	3	0	0	1	0	0	1	120	13	0	26	1	23	0
01:00 PM	42	131	1	0	1	1	3	0	1	126	20	0	23	0	36	0
01:15 PM	32	111	1	0	1	2	2	0	1	131	16	0	10	1	29	0
01:30 PM	38	143	1	0	1	0	1	0	0	111	25	0	13	1	39	0
01:45 PM	43	134	0	0	0	0	1	0	1	117	44	0	26	1	36	0
02:00 PM	47	177	2	0	1	0	2	0	1	121	39	0	47	0	35	0
02:15 PM	61	196	1	0	3	1	2	0	1	119	26	0	170	2	35	0
02:30 PM	65	213	1	0	1	0	2	0	1	141	20	1	87	2	41	0
02:45 PM	56	222	0	0	2	1	2	0	2	146	29	0	41	2	35	0
03:00 PM	56	244	2	0	1	1	0	0	1	140	29	0	49	0	50	0
03:15 PM	48	274	0	0	0	0	1	0	1	125	39	0	47	0	43	0
03:30 PM	65	315	1	0	0	1	0	0	3	135	24	0	57	1	41	0
03:45 PM	58	335	0	0	0	0	0	0	2	122	42	0	35	0	40	0
04:00 PM	70	344	1	0	0	1	0	0	1	151	42	0	73	1	36	0
04:15 PM	85	328	1	0	0	1	0	0	1	151	61	0	59	1	48	0
04:30 PM	99	349	1	0	2	0	2	0	5	167	68	0	125	3	52	0
04:45 PM	94	409	1	0	1	0	0	0	4	133	44	0	101	1	56	0
05:00 PM	107	382	1	0	2	0	1	0	2	135	54	0	72	0	58	0
05:15 PM	106	430	2	0	1	0	0	0	0	172	42	1	48	0	56	0
05:30 PM	107	389	0	0	2	0	1	0	0	149	55	1	51	0	49	0
05:45 PM	108	446	1	0	1	0	1	0	2	137	52	1	44	0	35	0
06:00 PM	85	375	0	0	2	0	3	0	2	143	36	0	71	0	41	0
06:15 PM	75	371	2	0	0	2	1	0	2	133	39	0	28	0	35	0
06:30 PM	74	321	0	0	1	1	0	0	0	95	19	0	29	0	34	0
06:45 PM	69	307	3	0	0	0	3	0	0	91	46	0	42	0	33	0

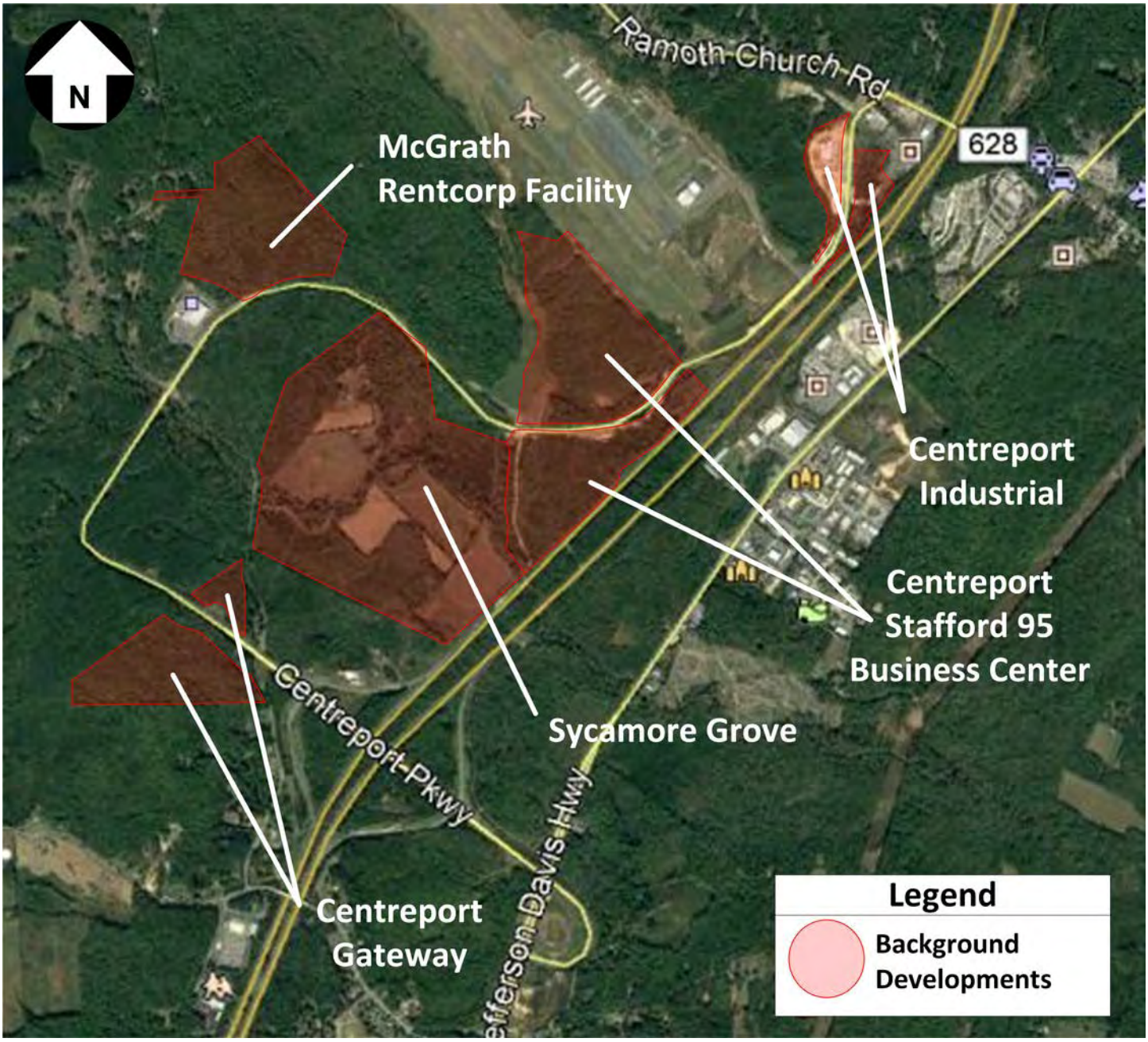


Figure 7: Background Development Locations

Appendix B:

Crash Data

Crash Data for the Intersection of American Legion Road/ Eskimo Hill and Route 1 (2015 - 2019)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Direction of Travel	Work Zone Related	Adverse Weather Conditions	Distracted Driver
160995147	4/6/2016	PDO.Property Damage Only	1. Rear End	0	0	0	South,South,South	no	no	no
190925094	4/1/2019	PDO.Property Damage Only	1. Rear End	0	0	0	South,South	no	no	yes
172045121	7/23/2017	PDO.Property Damage Only	2. Angle	0	0	0	South,West	no	no	no
193195279	11/15/2019	PDO.Property Damage Only	4. Sideswipe - Same Direction	0	0	0	West,West	no	no	no
192895135	10/15/2019	PDO.Property Damage Only	2. Angle	0	0	0	North,North,South	no	no	no
151075106	4/16/2015	PDO.Property Damage Only	2. Angle	0	0	0	North,North	no	no	no
153135379	11/3/2015	PDO.Property Damage Only	8. Non-Collision	0	0	0	East	no	no	no
182135266	7/21/2018	PDO.Property Damage Only	2. Angle	0	0	0	East,West	no	yes	no
162835297	10/8/2016	PDO.Property Damage Only	2. Angle	0	0	0	West,South	no	no	no
173635144	12/13/2017	PDO.Property Damage Only	2. Angle	0	0	0	West,South	no	no	no
152265023	8/13/2015	PDO.Property Damage Only	4. Sideswipe - Same Direction	0	0	0	East,East	no	no	no
163525357	12/16/2016	PDO.Property Damage Only	1. Rear End	0	0	0	North,North	no	no	yes
163335062	11/27/2016	PDO.Property Damage Only	3. Head On	0	0	0	East,West	no	no	no
172565067	9/10/2017	PDO.Property Damage Only	2. Angle	0	0	0	West,East	no	no	no
151405212	5/14/2015	C.Nonvisible Injury	9. Fixed Object - Off Road	0	2	0	East	no	no	no
183145141	11/10/2018	C.Nonvisible Injury	2. Angle	0	2	0	North,South	no	no	no
191235243	5/2/2019	B.Visible Injury	2. Angle	0	1	0	East,West	no	no	no
151735193	6/22/2015	B.Visible Injury	2. Angle	0	2	0	East,South	no	no	no
192775157	10/1/2019	B.Visible Injury	3. Head On	0	1	0	South,North	no	no	no

160735184	3/11/2016	B.Visible Injury	2. Angle	0	1	0	West,North	no	no	no
181365289	5/9/2018	B.Visible Injury	2. Angle	0	1	0	South,West	no	no	yes

Crash Data for the Intersection of Ramoth Church/ American Legion and Centreport Parkway (2015 - 2019)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Direction of Travel	Work Zone Related	Adverse Weather Conditions	Distracted Driver
192735198	9/22/2019	PDO.Property Damage Only	1. Rear End	0	0	0	West,West	no	no	no
180695054	3/8/2018	PDO.Property Damage Only	1. Rear End	0	0	0	West,West	no	no	no

Crash Data for the Intersection of Centreport Parkway and Mountain View Road (2015 - 2019)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Direction of Travel	Work Zone Related	Adverse Weather Conditions	Distracted Driver
161475000	5/25/2016	PDO.Property Damage Only	1. Rear End	0	0	0	East,East	no	no	no
171465061	5/25/2017	PDO.Property Damage Only	9. Fixed Object - Off Road	0	0	0	East	no	no	yes
192365169	8/23/2019	PDO.Property Damage Only	2. Angle	0	0	0	North,West	no	yes	no
180085181	1/5/2018	PDO.Property Damage Only	2. Angle	0	0	0	North,West	no	no	no

Crash Data for the Intersection of Centreport Parkway and I-95 SB Ramp (2015 - 2019)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Direction of Travel	Work Zone Related	Adverse Weather Conditions	Distracted Driver
191705177	6/18/2019	PDO.Property Damage Only	1. Rear End	0	0	0	East,East	no	yes	yes
170055363	1/5/2017	PDO.Property Damage Only	1. Rear End	0	0	0	East,East	no	no	yes
151985308	7/16/2015	PDO.Property Damage Only	2. Angle	0	0	0	West,East	no	no	no
172735008	9/29/2017	PDO.Property Damage Only	2. Angle	0	0	0	West,East	no	no	yes
191105059	4/18/2019	PDO.Property Damage Only	1. Rear End	0	0	0	West,West	no	no	no
172295336	8/12/2017	C.Nonvisible Injury	3. Head On	0	1	0	West,East	no	no	no

Crash Data for the Intersection of Centreport Parkway and I-95 NB Ramp (2015 - 2019)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Direction of Travel	Work Zone Related	Adverse Weather Conditions	Distracted Driver
173315349	11/26/2017	PDO.Property Damage Only	1. Rear End	0	0	0	East,East	no	no	no
182945295	10/21/2018	PDO.Property Damage Only	1. Rear End	0	0	0	East,East	no	no	yes
151025206	4/11/2015	PDO.Property Damage Only	9. Fixed Object - Off Road	0	0	0	North	no	no	no
161495091	5/27/2016	PDO.Property Damage Only	1. Rear End	0	0	0	East,East	no	no	no
183415040	12/6/2018	PDO.Property Damage Only	1. Rear End	0	0	0	East,East	no	no	no
170655001	3/3/2017	PDO.Property Damage Only	4. Sideswipe - Same Direction	0	0	0	East,East,East	no	no	yes
173615010	12/26/2017	PDO.Property Damage Only	2. Angle	0	0	0	North,West	no	no	no
193485074	11/29/2019	PDO.Property Damage Only	4. Sideswipe - Same Direction	0	0	0	East,East	no	no	no
173515006	12/5/2017	PDO.Property Damage Only	1. Rear End	0	0	0	West,West	no	yes	yes
152315289	8/18/2015	PDO.Property Damage Only	2. Angle	0	0	0	North,North	no	no	no
183065230	10/28/2018	PDO.Property Damage Only	1. Rear End	0	0	0	North,North	no	yes	yes
152745196	9/29/2015	PDO.Property Damage Only	1. Rear End	0	0	0	North,North	no	yes	no
152275187	8/10/2015	PDO.Property Damage Only	2. Angle	0	0	0	North,North	no	no	no
191145138	4/21/2019	PDO.Property Damage Only	9. Fixed Object - Off Road	0	0	0	North	no	no	no
170035028	12/31/2016	PDO.Property Damage Only	1. Rear End	0	0	0	North,North	no	no	yes
190155325	12/18/2018	PDO.Property Damage Only	16. Other	0	0	0	North,North,North	no	no	yes
170755257	3/16/2017	B.Visible Injury	16. Other	0	1	0	East,East	no	no	yes
163355117	11/27/2016	B.Visible Injury	1. Rear End	0	3	0	East,East,East,East	no	no	yes
151225219	5/2/2015	B.Visible Injury	2. Angle	0	2	0	East,North	no	no	no
152525330	9/9/2015	B.Visible Injury	2. Angle	0	1	0	East,East	no	no	no

Crash Data for the Intersection of Centreport Parkway and Route 1 (2015 - 2019)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Direction of Travel	Work Zone Related	Adverse Weather Conditions	Distracted Driver
180045325	12/15/2017	PDO.Property Damage Only	1. Rear End	0	0	0	South,South	no	no	no
162005193	6/27/2016	PDO.Property Damage Only	9. Fixed Object - Off Road	0	0	0	North	no	no	no
160885121	3/25/2016	PDO.Property Damage Only	2. Angle	0	0	0	South,North	no	no	no
183265256	11/16/2018	PDO.Property Damage Only	2. Angle	0	0	0	North,East	no	no	yes
153125215	11/7/2015	PDO.Property Damage Only	2. Angle	0	0	0	South,North	no	no	no
190615005	3/1/2019	PDO.Property Damage Only	9. Fixed Object - Off Road	0	0	0	North	no	yes	yes
151835007	7/1/2015	PDO.Property Damage Only	9. Fixed Object - Off Road	0	0	0	East	no	no	no
170775112	3/17/2017	PDO.Property Damage Only	1. Rear End	0	0	0	South,South	no	no	yes
181405121	5/18/2018	PDO.Property Damage Only	1. Rear End	0	0	0	North,North	no	yes	no
160125090	1/8/2016	PDO.Property Damage Only	1. Rear End	0	0	0	North,North	no	yes	no
150775167	3/18/2015	PDO.Property Damage Only	1. Rear End	0	0	0	West,West	no	no	no
150895120	3/16/2015	PDO.Property Damage Only	5. Sideswipe - Opposite	0	0	0	East,West	no	no	no
191105140	4/20/2019	PDO.Property Damage Only	2. Angle	0	0	0	East,West	no	no	no
153025151	10/28/2015	PDO.Property Damage Only	1. Rear End	0	0	0	East,East	no	yes	no
160115130	1/8/2016	PDO.Property Damage Only	2. Angle	0	0	0	South,West	no	yes	no
161455269	5/23/2016	B.Visible Injury	1. Rear End	0	1	0	South,South	no	no	no
173035027	10/29/2017	B.Visible Injury	2. Angle	0	1	0	South,North	no	no	no
151735058	6/21/2015	B.Visible Injury	2. Angle	0	1	0	North,East	no	no	no
172295347	8/4/2017	B.Visible Injury	3. Head On	0	1	0	South,North	no	no	no

162415214	8/28/2016	B.Visible Injury	2. Angle	0	1	0	East,West	no	no	no
192945029	10/20/2019	B.Visible Injury	2. Angle	0	1	0	East,North	no	yes	no
171525310	5/28/2017	B.Visible Injury	16. Other	0	1	0	South	no	yes	no
163355057	11/27/2016	B.Visible Injury	2. Angle	0	2	0	North,North	no	no	no
192515238	9/8/2019	B.Visible Injury	1. Rear End	0	1	0	North,North	no	no	no
173335332	11/28/2017	B.Visible Injury	1. Rear End	0	1	0	South,South	no	no	no
181605041	6/8/2018	B.Visible Injury	1. Rear End	0	2	0	South,South	no	no	no

Appendix C:

Level of Service Definitions

TECHNICAL MEMORANDUM

Subject: Level of Service Definitions

Introduction

The purpose of this memorandum is to define the level of service (LOS) metric that commonly used as a measure of effectiveness (MOE) for traffic operations.

All capacity analyses are based on the procedures specified by the Transportation Research Board's (TRB) Highway Capacity Manual (HCM), which is currently on its sixth edition. Level of service ranges from A to F. A brief description of each level of service for signalized and unsignalized intersections is provided below.

Signalized Intersections

Level of service is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- **Level of Service A** describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.
- **Level of Service B** describes operations with average delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
- **Level of Service C** describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.
- **Level of Service D** describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures, where all waiting vehicles do not clear the intersection during a single green time, are noticeable. This is generally considered the lower end of the range of the acceptable level of service in urban areas.
- **Level of Service E** describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. LOS E has been set as the limit of acceptable conditions.
- **Level of Service F** describes operations with average delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a flow rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

Unsignalized Intersections

At an unsignalized intersection, the major street through traffic and right-turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left-turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn. The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the results from this analysis usually indicate worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- **Level of Service A** describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total delay of less than 10.0 seconds per vehicle.
- **Level of Service B** describes operations with average total delay in the range of 10.1 to 15.0 seconds per vehicle.
- **Level of Service C** describes operations with average total delay in the range of 15.1 to 25.0 second per vehicle.
- **Level of Service D** describes operations with average total delay in the range of 25.1 to 35.0 seconds per vehicle.
- **Level of Service E** describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.
- **Level of Service F** describes operations with average total delay of 50 seconds per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal driver behavior.

Appendix D:

Intersection Capacity Analysis - Existing Conditions (2020)

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	175	149	86	1033	54	321
v/c Ratio	0.55	0.44	0.14	0.60	0.16	0.21
Control Delay	32.3	24.9	7.1	16.1	7.5	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	24.9	7.1	16.1	7.5	13.5
Queue Length 50th (ft)	63	40	14	192	9	46
Queue Length 95th (ft)	148	110	35	290	24	81
Internal Link Dist (ft)	2944	630		2695		2069
Turn Bay Length (ft)			325		230	
Base Capacity (vph)	473	496	830	2755	644	2742
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	0.37	0.30	0.10	0.37	0.08	0.12

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	32	74	23	33	81	79	930	20	50	279	17
Future Volume (veh/h)	55	32	74	23	33	81	79	930	20	50	279	17
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1776	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	60	35	80	25	36	88	86	1011	22	54	303	18
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	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
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	2	2	2
Cap, veh/h	139	56	99	90	64	126	669	1722	37	354	1606	95
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.06	0.49	0.49	0.05	0.47	0.47
Sat Flow, veh/h	474	432	763	180	493	970	1774	3542	77	1774	3396	201
Grp Volume(v), veh/h	175	0	0	149	0	0	86	505	528	54	157	164
Grp Sat Flow(s),veh/h/ln	1670	0	0	1643	0	0	1774	1770	1849	1774	1770	1827
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	1.5	12.9	12.9	0.9	3.2	3.3
Cycle Q Clear(g_c), s	6.1	0.0	0.0	5.3	0.0	0.0	1.5	12.9	12.9	0.9	3.2	3.3
Prop In Lane	0.34		0.46	0.17		0.59	1.00		0.04	1.00		0.11
Lane Grp Cap(c), veh/h	294	0	0	281	0	0	669	860	899	354	837	864
V/C Ratio(X)	0.59	0.00	0.00	0.53	0.00	0.00	0.13	0.59	0.59	0.15	0.19	0.19
Avail Cap(c_a), veh/h	575	0	0	565	0	0	1125	1553	1623	834	1553	1604
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	0.0	26.1	0.0	0.0	7.2	11.6	11.6	8.5	9.6	9.6
Incr Delay (d2), s/veh	1.9	0.0	0.0	1.6	0.0	0.0	0.1	1.4	1.3	0.2	0.2	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	3.1	0.0	0.0	2.6	0.0	0.0	0.7	6.5	6.8	0.5	1.6	1.7
LnGrp Delay(d),s/veh	28.3	0.0	0.0	27.6	0.0	0.0	7.3	12.9	12.9	8.7	9.8	9.8
LnGrp LOS	C			C			A	B	B	A	A	A
Approach Vol, veh/h		175			149			1119			375	
Approach Delay, s/veh		28.3			27.6			12.5			9.6	
Approach LOS		C			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.7	36.4		15.5	9.8	37.3		15.5
Change Period (Y+Rc), s	* 6.8	* 6.8		7.4	* 6.8	* 6.8		7.4
Max Green Setting (Gmax), s	* 20	* 55		20.0	* 20	* 55		20.0
Max Q Clear Time (g_c+I1), s	3.5	5.3		8.1	2.9	14.9		7.3
Green Ext Time (p_c), s	0.2	3.8		0.4	0.1	15.6		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	14.7
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	142	12	17	112	16	19
Future Vol, veh/h	142	12	17	112	16	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	380	-	-	0	290
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	154	13	18	122	17	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	167	0	312	154
Stage 1	-	-	-	-	154	-
Stage 2	-	-	-	-	158	-
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	-	-	1411	-	681	892
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	871	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1411	-	671	892
Mov Cap-2 Maneuver	-	-	-	-	671	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	859	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	9.7
HCM LOS			A

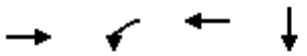
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	671	892	-	-	1411	-
HCM Lane V/C Ratio	0.026	0.023	-	-	0.013	-
HCM Control Delay (s)	10.5	9.1	-	-	7.6	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection	
Intersection Delay, s/veh	25.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	223	1	0	1	514	77	1	0	42	6
Future Vol, veh/h	5	0	223	1	0	1	514	77	1	0	42	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
Heavy Vehicles, %	1	1	1	0	0	0	4	4	4	2	2	2
Mvmt Flow	5	0	242	1	0	1	559	84	1	0	46	7
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

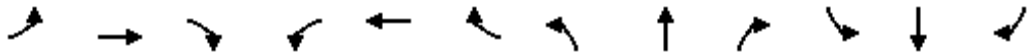
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	11.8	9.5	31.8	9
HCM LOS	B	A	D	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	87%	100%	0%	100%	0%	0%
Vol Thru, %	13%	0%	0%	0%	0%	88%
Vol Right, %	0%	0%	100%	0%	100%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	592	5	223	1	1	48
LT Vol	514	5	0	1	0	0
Through Vol	77	0	0	0	0	42
RT Vol	1	0	223	0	1	6
Lane Flow Rate	643	5	242	1	1	52
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.871	0.01	0.38	0.002	0.002	0.079
Departure Headway (Hd)	4.875	6.867	5.644	7.324	6.094	5.473
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	734	524	642	491	589	657
Service Time	2.966	4.57	3.347	5.036	3.807	3.489
HCM Lane V/C Ratio	0.876	0.01	0.377	0.002	0.002	0.079
HCM Control Delay	31.8	9.6	11.8	10.1	8.8	9
HCM Lane LOS	D	A	B	B	A	A
HCM 95th-tile Q	10.6	0	1.8	0	0	0.3



Lane Group	EBT	WBL	WBT	SBT
Lane Group Flow (vph)	299	135	645	145
v/c Ratio	0.60	0.27	0.65	0.40
Control Delay	19.7	9.5	13.9	24.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.7	9.5	13.9	24.5
Queue Length 50th (ft)	62	21	143	43
Queue Length 95th (ft)	148	52	283	101
Internal Link Dist (ft)	477		2385	224
Turn Bay Length (ft)		300		
Base Capacity (vph)	1180	782	1836	1510
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	0.25	0.17	0.35	0.10

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	83	183	120	574	0	0	0	0	129	0	0
Future Volume (vph)	0	83	183	120	574	0	0	0	0	129	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.9		7.9	7.9						6.9	
Lane Util. Factor		1.00		1.00	1.00						1.00	
Frt		0.91		1.00	1.00						1.00	
Flt Protected		1.00		0.95	1.00						0.95	
Satd. Flow (prot)		1670		1719	1863						1752	
Flt Permitted		1.00		0.55	1.00						0.95	
Satd. Flow (perm)		1670		996	1863						1752	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	93	206	135	645	0	0	0	0	145	0	0
RTOR Reduction (vph)	0	63	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	236	0	135	645	0	0	0	0	0	145	0
Heavy Vehicles (%)	2%	8%	1%	5%	2%	2%	2%	2%	2%	3%	2%	2%
Turn Type		NA		D.P+P	NA					Perm	NA	
Protected Phases		6		5	2						4	
Permitted Phases				6						4		
Actuated Green, G (s)		15.4		23.6	31.5						12.4	
Effective Green, g (s)		15.4		23.6	31.5						12.4	
Actuated g/C Ratio		0.26		0.40	0.54						0.21	
Clearance Time (s)		7.9		7.9	7.9						6.9	
Vehicle Extension (s)		4.0		3.0	4.0						4.0	
Lane Grp Cap (vph)		438		501	999						370	
v/s Ratio Prot		0.14		0.04	c0.35							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.54		0.27	0.65						0.39	
Uniform Delay, d1		18.6		11.4	9.6						19.9	
Progression Factor		1.00		1.00	1.00						1.00	
Incremental Delay, d2		1.6		0.3	1.6						0.9	
Delay (s)		20.2		11.7	11.3						20.8	
Level of Service		C		B	B						C	
Approach Delay (s)		20.2			11.3			0.0			20.8	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	22.7
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Group Flow (vph)	8	213	254	484	1131
v/c Ratio	0.03	0.44	0.59	0.65	1.29
Control Delay	16.6	23.0	29.9	7.0	157.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	23.0	29.9	7.0	157.5
Queue Length 50th (ft)	3	74	90	0	~578
Queue Length 95th (ft)	11	123	192	73	#1167
Internal Link Dist (ft)		2385	1991		1289
Turn Bay Length (ft)	310				
Base Capacity (vph)	689	1746	1189	1216	880
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	0.01	0.12	0.21	0.40	1.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	204	0	0	244	465	450	18	617	0	0	0
Future Volume (veh/h)	8	204	0	0	244	465	450	18	617	0	0	0
Number	5	2	12	1	6	16	7	4	14			
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			
Adj Sat Flow, veh/h/ln	1900	1792	0	0	1810	1881	1900	1850	1900			
Adj Flow Rate, veh/h	8	212	0	0	254	0	469	19	643			
Adj No. of Lanes	1	1	0	0	1	1	0	1	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	0	6	0	0	5	1	0	0	0			
Cap, veh/h	175	531	0	0	329	291	337	14	462			
Arrive On Green	0.01	0.30	0.00	0.00	0.18	0.00	0.49	0.49	0.49			
Sat Flow, veh/h	1810	1792	0	0	1810	1599	684	28	938			
Grp Volume(v), veh/h	8	212	0	0	254	0	1131	0	0			
Grp Sat Flow(s),veh/h/ln	1810	1792	0	0	1810	1599	1650	0	0			
Q Serve(g_s), s	0.3	6.7	0.0	0.0	9.5	0.0	35.0	0.0	0.0			
Cycle Q Clear(g_c), s	0.3	6.7	0.0	0.0	9.5	0.0	35.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.41		0.57			
Lane Grp Cap(c), veh/h	175	531	0	0	329	291	813	0	0			
V/C Ratio(X)	0.05	0.40	0.00	0.00	0.77	0.00	1.39	0.00	0.00			
Avail Cap(c_a), veh/h	793	1953	0	0	1146	1013	813	0	0			
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	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	23.9	20.0	0.0	0.0	27.7	0.0	18.0	0.0	0.0			
Incr Delay (d2), s/veh	0.1	0.5	0.0	0.0	3.9	0.0	183.5	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			
%ile BackOfQ(50%),veh/ln	0.1	3.4	0.0	0.0	5.1	0.0	57.3	0.0	0.0			
LnGrp Delay(d),s/veh	24.0	20.4	0.0	0.0	31.5	0.0	201.5	0.0	0.0			
LnGrp LOS	C	C			C		F					
Approach Vol, veh/h		220			254			1131				
Approach Delay, s/veh		20.6			31.5			201.5				
Approach LOS		C			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		28.4		42.6	8.1	20.3		
Change Period (Y+Rc), s		* 7.4		* 7.6	* 7.4	* 7.4		
Max Green Setting (Gmax), s		* 77		* 35	* 25	* 45		
Max Q Clear Time (g_c+I1), s		8.7		37.0	2.3	11.5		
Green Ext Time (p_c), s		1.2		0.0	0.0	1.4		

Intersection Summary	
HCM 2010 Ctrl Delay	149.8
HCM 2010 LOS	F

Notes

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	366	536	1156	719	60	356
v/c Ratio	0.71	0.71	0.57	0.68	0.27	0.14
Control Delay	43.3	15.2	27.2	5.6	15.9	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.3	15.2	27.2	5.6	15.9	12.7
Queue Length 50th (ft)	239	84	245	0	20	45
Queue Length 95th (ft)	358	224	301	86	41	62
Internal Link Dist (ft)	489		1026			1993
Turn Bay Length (ft)		270		270	530	
Base Capacity (vph)	594	807	2217	1092	456	3544
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	0.62	0.66	0.52	0.66	0.13	0.10

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	333	488	1052	654	55	324
Future Volume (vph)	333	488	1052	654	55	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1599	5036	1568	1530	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.18	1.00
Satd. Flow (perm)	1736	1599	5036	1568	288	4673
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	366	536	1156	719	60	356
RTOR Reduction (vph)	0	280	0	435	0	0
Lane Group Flow (vph)	366	256	1156	284	60	356
Heavy Vehicles (%)	4%	1%	3%	3%	18%	11%
Turn Type	Prot	Perm	NA	Perm	D.P+P	NA
Protected Phases	3		6		5	2
Permitted Phases		3		6	6	
Actuated Green, G (s)	31.8	31.8	42.7	42.7	48.7	58.9
Effective Green, g (s)	31.8	31.8	42.7	42.7	48.7	58.9
Actuated g/C Ratio	0.29	0.29	0.40	0.40	0.45	0.54
Clearance Time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Vehicle Extension (s)	6.0	6.0	4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	510	470	1989	619	198	2546
v/s Ratio Prot	c0.21		c0.23		0.02	c0.08
v/s Ratio Perm		0.16		0.18	0.12	
v/c Ratio	0.72	0.55	0.58	0.46	0.30	0.14
Uniform Delay, d1	34.1	32.1	25.7	24.2	17.5	12.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.8	2.9	0.5	0.7	0.9	0.0
Delay (s)	41.0	35.0	26.2	24.9	18.4	12.2
Level of Service	D	C	C	C	B	B
Approach Delay (s)	37.4		25.7			13.1
Approach LOS	D		C			B

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	108.1	Sum of lost time (s)	27.6
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: Route 1 & American Legion Rd/Eskimo Hill Rd

Timing Plan: EX PM

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	201	178	57	419	155	1258
v/c Ratio	0.67	0.59	0.22	0.27	0.26	0.70
Control Delay	43.0	39.1	8.4	15.0	7.8	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	39.1	8.4	15.0	7.8	19.3
Queue Length 50th (ft)	99	83	12	75	33	296
Queue Length 95th (ft)	#204	167	25	110	57	380
Internal Link Dist (ft)	2944	630		2695		2069
Turn Bay Length (ft)			325		230	
Base Capacity (vph)	365	361	525	2339	793	2324
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	0.55	0.49	0.11	0.18	0.20	0.54

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	52	74	40	57	67	52	377	8	143	1084	74
Future Volume (veh/h)	59	52	74	40	57	67	52	377	8	143	1084	74
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1776	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	64	57	80	43	62	73	57	410	9	155	1178	80
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	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
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	2	2	2
Cap, veh/h	124	83	95	100	100	98	296	1785	39	640	1773	120
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.50	0.50	0.07	0.53	0.53
Sat Flow, veh/h	406	548	630	274	660	650	1774	3541	78	1774	3364	228
Grp Volume(v), veh/h	201	0	0	178	0	0	57	205	214	155	619	639
Grp Sat Flow(s),veh/h/ln	1584	0	0	1584	0	0	1774	1770	1849	1774	1770	1822
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	1.1	4.9	5.0	3.1	19.4	19.4
Cycle Q Clear(g_c), s	9.3	0.0	0.0	8.0	0.0	0.0	1.1	4.9	5.0	3.1	19.4	19.4
Prop In Lane	0.32		0.40	0.24		0.41	1.00		0.04	1.00		0.13
Lane Grp Cap(c), veh/h	302	0	0	298	0	0	296	892	932	640	933	961
V/C Ratio(X)	0.67	0.00	0.00	0.60	0.00	0.00	0.19	0.23	0.23	0.24	0.66	0.66
Avail Cap(c_a), veh/h	469	0	0	464	0	0	680	1277	1335	983	1277	1316
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	0.0	0.0	30.8	0.0	0.0	10.0	10.6	10.6	7.8	13.1	13.1
Incr Delay (d2), s/veh	2.5	0.0	0.0	1.9	0.0	0.0	0.3	0.3	0.3	0.2	1.7	1.7
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	4.3	0.0	0.0	3.7	0.0	0.0	0.5	2.5	2.6	1.5	9.7	10.2
LnGrp Delay(d),s/veh	33.8	0.0	0.0	32.7	0.0	0.0	10.3	10.9	10.9	8.0	14.8	14.8
LnGrp LOS	C			C			B	B	B	A	B	B
Approach Vol, veh/h		201			178			476			1413	
Approach Delay, s/veh		33.8			32.7			10.8			14.1	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.3	47.0		18.9	12.1	45.2		18.9
Change Period (Y+Rc), s	* 6.8	* 6.8		7.4	* 6.8	* 6.8		7.4
Max Green Setting (Gmax), s	* 20	* 55		20.0	* 20	* 55		20.0
Max Q Clear Time (g_c+I1), s	3.1	21.4		11.3	5.1	7.0		10.0
Green Ext Time (p_c), s	0.1	18.7		0.4	0.4	5.0		0.4

Intersection Summary		
HCM 2010 Ctrl Delay		16.6
HCM 2010 LOS		B

Notes

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	165	19	23	162	18	20
Future Vol, veh/h	165	19	23	162	18	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	380	-	-	0	290
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	179	21	25	176	20	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	200	0	405	179
Stage 1	-	-	-	-	179	-
Stage 2	-	-	-	-	226	-
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	-	-	1372	-	602	864
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1372	-	590	864
Mov Cap-2 Maneuver	-	-	-	-	590	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	796	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	10.2
HCM LOS			B

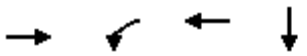
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	590	864	-	-	1372	-
HCM Lane V/C Ratio	0.033	0.025	-	-	0.018	-
HCM Control Delay (s)	11.3	9.3	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	1	453	1	1	0	350	30	1	0	28	6
Future Vol, veh/h	6	1	453	1	1	0	350	30	1	0	28	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
Heavy Vehicles, %	1	1	1	0	0	0	4	4	4	2	2	2
Mvmt Flow	7	1	492	1	1	0	380	33	1	0	30	7
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	19.4	9.6	17.9	9.3
HCM LOS	C	A	C	A

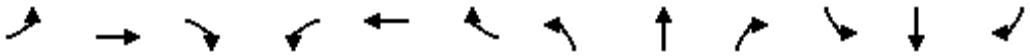
Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	92%	100%	0%	100%	0%	0%
Vol Thru, %	8%	0%	0%	0%	100%	82%
Vol Right, %	0%	0%	100%	0%	0%	18%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	381	6	454	1	1	34
LT Vol	350	6	0	1	0	0
Through Vol	30	0	1	0	1	28
RT Vol	1	0	453	0	0	6
Lane Flow Rate	414	7	493	1	1	37
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.639	0.012	0.709	0.002	0.002	0.06
Departure Headway (Hd)	5.555	6.361	5.174	7.077	6.565	5.888
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	650	563	701	505	544	606
Service Time	3.589	4.09	2.874	4.832	4.321	3.942
HCM Lane V/C Ratio	0.637	0.012	0.703	0.002	0.002	0.061
HCM Control Delay	17.9	9.2	19.5	9.8	9.3	9.3
HCM Lane LOS	C	A	C	A	A	A
HCM 95th-tile Q	4.6	0	5.9	0	0	0.2



Lane Group	EBT	WBL	WBT	SBT
Lane Group Flow (vph)	554	178	328	589
v/c Ratio	0.91	0.62	0.35	0.90
Control Delay	56.7	29.6	19.7	55.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	56.7	29.6	19.7	55.5
Queue Length 50th (ft)	398	79	159	430
Queue Length 95th (ft)	#645	132	223	#636
Internal Link Dist (ft)	477		2385	224
Turn Bay Length (ft)		300		
Base Capacity (vph)	607	381	1036	747
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	0.91	0.47	0.32	0.79

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	189	293	155	285	0	0	0	0	510	3	0
Future Volume (vph)	0	189	293	155	285	0	0	0	0	510	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.9		7.9	7.9						6.9	
Lane Util. Factor		1.00		1.00	1.00						1.00	
Frt		0.92		1.00	1.00						1.00	
Flt Protected		1.00		0.95	1.00						0.95	
Satd. Flow (prot)		1700		1770	1827						1789	
Flt Permitted		1.00		0.14	1.00						0.95	
Satd. Flow (perm)		1700		266	1827						1789	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	217	337	178	328	0	0	0	0	586	3	0
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	514	0	178	328	0	0	0	0	0	589	0
Heavy Vehicles (%)	0%	2%	3%	2%	4%	0%	0%	0%	0%	1%	33%	0%
Turn Type		NA		D.P+P	NA					Perm	NA	
Protected Phases		6		5	2						4	
Permitted Phases				6						4		
Actuated Green, G (s)		40.4		54.0	61.9						43.9	
Effective Green, g (s)		40.4		54.0	61.9						43.9	
Actuated g/C Ratio		0.33		0.45	0.51						0.36	
Clearance Time (s)		7.9		7.9	7.9						6.9	
Vehicle Extension (s)		4.0		3.0	4.0						4.0	
Lane Grp Cap (vph)		569		288	937						651	
v/s Ratio Prot		c0.30		c0.07	0.18							
v/s Ratio Perm				0.21							0.33	
v/c Ratio		0.90		0.62	0.35						0.90	
Uniform Delay, d1		38.2		24.5	17.4						36.4	
Progression Factor		1.00		1.00	1.00						1.00	
Incremental Delay, d2		18.0		3.9	0.3						16.4	
Delay (s)		56.2		28.4	17.7						52.7	
Level of Service		E		C	B						D	
Approach Delay (s)		56.2			21.5			0.0			52.7	
Approach LOS		E			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	44.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.6	Sum of lost time (s)	22.7
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Group Flow (vph)	4	764	322	367	267
v/c Ratio	0.01	0.78	0.35	0.38	0.63
Control Delay	8.5	20.0	13.5	2.9	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	20.0	13.5	2.9	30.7
Queue Length 50th (ft)	1	226	69	0	86
Queue Length 95th (ft)	6	472	205	50	221
Internal Link Dist (ft)		2385	1991		1289
Turn Bay Length (ft)	310				
Base Capacity (vph)	831	1787	1311	1223	910
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	0.00	0.43	0.25	0.30	0.29

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	695	0	0	293	334	147	1	95	0	0	0
Future Volume (veh/h)	4	695	0	0	293	334	147	1	95	0	0	0
Number	5	2	12	1	6	16	7	4	14			
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			
Adj Sat Flow, veh/h/ln	1900	1881	0	0	1863	1863	1900	1789	1900			
Adj Flow Rate, veh/h	4	764	0	0	322	0	162	1	104			
Adj No. of Lanes	1	1	0	0	1	1	0	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	1	0	0	2	2	0	0	0			
Cap, veh/h	381	941	0	0	653	555	205	1	132			
Arrive On Green	0.01	0.50	0.00	0.00	0.35	0.00	0.21	0.21	0.21			
Sat Flow, veh/h	1810	1881	0	0	1863	1583	988	6	634			
Grp Volume(v), veh/h	4	764	0	0	322	0	267	0	0			
Grp Sat Flow(s),veh/h/ln	1810	1881	0	0	1863	1583	1628	0	0			
Q Serve(g_s), s	0.1	17.6	0.0	0.0	7.0	0.0	8.0	0.0	0.0			
Cycle Q Clear(g_c), s	0.1	17.6	0.0	0.0	7.0	0.0	8.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.61		0.39			
Lane Grp Cap(c), veh/h	381	941	0	0	653	555	338	0	0			
V/C Ratio(X)	0.01	0.81	0.00	0.00	0.49	0.00	0.79	0.00	0.00			
Avail Cap(c_a), veh/h	1252	2834	0	0	1632	1387	1109	0	0			
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	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	10.2	10.8	0.0	0.0	13.1	0.0	19.3	0.0	0.0			
Incr Delay (d2), s/veh	0.0	1.7	0.0	0.0	0.6	0.0	4.1	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			
%ile BackOfQ(50%),veh/ln	0.0	9.4	0.0	0.0	3.7	0.0	3.9	0.0	0.0			
LnGrp Delay(d),s/veh	10.2	12.6	0.0	0.0	13.7	0.0	23.4	0.0	0.0			
LnGrp LOS	B	B			B		C					
Approach Vol, veh/h		768			322			267				
Approach Delay, s/veh		12.5			13.7			23.4				
Approach LOS		B			B			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		33.1		18.3	7.7	25.4		
Change Period (Y+Rc), s		* 7.4		* 7.6	* 7.4	* 7.4		
Max Green Setting (Gmax), s		* 77		* 35	* 25	* 45		
Max Q Clear Time (g_c+I1), s		19.6		10.0	2.1	9.0		
Green Ext Time (p_c), s		6.1		0.9	0.0	1.9		

Intersection Summary	
HCM 2010 Ctrl Delay	14.9
HCM 2010 LOS	B

Notes

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	752	107	412	521	161	1878
v/c Ratio	1.06	0.17	0.30	0.65	0.38	0.80
Control Delay	85.7	8.0	33.9	14.1	23.0	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.7	8.0	33.9	14.1	23.0	31.2
Queue Length 50th (ft)	~638	11	101	100	73	446
Queue Length 95th (ft)	#875	47	m134	m299	119	510
Internal Link Dist (ft)	489		1026			1993
Turn Bay Length (ft)		270		270	530	
Base Capacity (vph)	711	619	1381	805	463	2345
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	1.06	0.17	0.30	0.65	0.35	0.80

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	692	98	379	479	148	1728
Future Volume (vph)	692	98	379	479	148	1728
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1787	1429	5085	1568	1736	5136
Flt Permitted	0.95	1.00	1.00	1.00	0.50	1.00
Satd. Flow (perm)	1787	1429	5085	1568	916	5136
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	752	107	412	521	161	1878
RTOR Reduction (vph)	0	51	0	379	0	0
Lane Group Flow (vph)	752	56	412	142	161	1878
Heavy Vehicles (%)	1%	13%	2%	3%	4%	1%
Turn Type	Prot	Perm	NA	Perm	D.P+P	NA
Protected Phases	3		6		5	2
Permitted Phases		3		6	6	
Actuated Green, G (s)	47.8	47.8	32.6	32.6	44.6	54.8
Effective Green, g (s)	47.8	47.8	32.6	32.6	44.6	54.8
Actuated g/C Ratio	0.40	0.40	0.27	0.27	0.37	0.46
Clearance Time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Vehicle Extension (s)	6.0	6.0	4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	711	569	1381	425	422	2345
v/s Ratio Prot	c0.42		0.08		0.04	c0.37
v/s Ratio Perm		0.04		0.09	0.10	
v/c Ratio	1.06	0.10	0.30	0.33	0.38	0.80
Uniform Delay, d1	36.1	22.6	34.6	35.0	26.1	27.9
Progression Factor	1.00	1.00	0.95	3.05	1.00	1.00
Incremental Delay, d2	50.0	0.2	0.5	2.0	0.6	3.0
Delay (s)	86.1	22.8	33.3	108.7	26.7	30.9
Level of Service	F	C	C	F	C	C
Approach Delay (s)	78.2		75.4			30.6
Approach LOS	E		E			C

Intersection Summary			
HCM 2000 Control Delay	52.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.6
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Appendix E:

SimTraffic Analysis - Existing Conditions (2020)

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:12	8:12	8:12	8:12	8:12	8:12	8:12
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	6032	5951	6027	6014	6085	6000	6080
Vehs Exited	6043	5983	5978	6053	6088	5985	6023
Starting Vehs	302	312	252	295	311	312	248
Ending Vehs	291	280	301	256	308	327	305
Denied Entry Before	28	2	18	44	20	3	4
Denied Entry After	176	206	155	275	188	173	99
Travel Distance (mi)	7142	6988	7060	7254	7183	7192	7267
Travel Time (hr)	429.9	385.3	405.9	452.7	413.1	393.7	350.1
Total Delay (hr)	254.2	212.8	232.4	274.3	236.8	216.9	171.1
Total Stops	6493	6509	6402	6530	6555	6596	6738
Fuel Used (gal)	287.1	273.4	280.8	295.4	285.2	282.3	272.4

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:12	8:12	8:12	8:12
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	6066	6009	6091	6034
Vehs Exited	6057	5973	6071	6023
Starting Vehs	318	281	246	279
Ending Vehs	327	317	266	295
Denied Entry Before	15	2	4	13
Denied Entry After	224	180	178	185
Travel Distance (mi)	7263	7253	7233	7183
Travel Time (hr)	424.5	397.9	367.1	402.0
Total Delay (hr)	246.1	219.9	189.3	225.4
Total Stops	6858	6823	6618	6617
Fuel Used (gal)	289.9	282.3	275.2	282.4

Interval #0 Information Seeding

Start Time	6:57
End Time	7:12
Total Time (min)	15

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:12
End Time	7:27
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1445	1468	1409	1404	1440	1420	1471
Vehs Exited	1446	1500	1399	1435	1459	1469	1410
Starting Vehs	302	312	252	295	311	312	248
Ending Vehs	301	280	262	264	292	263	309
Denied Entry Before	28	2	18	44	20	3	4
Denied Entry After	85	40	88	80	67	60	19
Travel Distance (mi)	1721	1748	1689	1740	1709	1757	1729
Travel Time (hr)	88.2	82.3	85.2	86.8	83.1	81.3	70.6
Total Delay (hr)	45.7	39.1	43.6	44.0	41.1	38.0	27.9
Total Stops	1635	1697	1544	1475	1591	1546	1650
Fuel Used (gal)	65.6	64.7	64.8	65.8	64.9	65.4	61.8

Interval #1 Information Recording

Start Time	7:12
End Time	7:27
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1447	1427	1477	1439
Vehs Exited	1486	1414	1418	1441
Starting Vehs	318	281	246	279
Ending Vehs	279	294	305	281
Denied Entry Before	15	2	4	13
Denied Entry After	75	21	43	57
Travel Distance (mi)	1805	1781	1695	1737
Travel Time (hr)	85.8	73.6	74.2	81.1
Total Delay (hr)	41.6	29.8	32.6	38.3
Total Stops	1607	1746	1634	1611
Fuel Used (gal)	67.7	63.2	62.0	64.6

Interval #2 Information

Start Time	7:27
End Time	7:42
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1513	1419	1450	1432	1462	1485	1422
Vehs Exited	1509	1423	1435	1416	1469	1482	1446
Starting Vehs	301	280	262	264	292	263	309
Ending Vehs	305	276	277	280	285	266	285
Denied Entry Before	85	40	88	80	67	60	19
Denied Entry After	142	68	109	142	111	62	32
Travel Distance (mi)	1826	1680	1729	1716	1752	1778	1724
Travel Time (hr)	105.5	82.7	94.0	98.1	95.8	87.8	81.2
Total Delay (hr)	60.6	41.1	51.6	55.9	52.9	44.0	38.6
Total Stops	1613	1450	1507	1479	1486	1642	1548
Fuel Used (gal)	72.5	62.9	67.9	67.7	67.7	67.5	64.5

Interval #2 Information

Start Time	7:27
End Time	7:42
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1425	1466	1456	1452
Vehs Exited	1411	1488	1464	1454
Starting Vehs	279	294	305	281
Ending Vehs	293	272	297	280
Denied Entry Before	75	21	43	57
Denied Entry After	99	89	59	91
Travel Distance (mi)	1711	1778	1753	1745
Travel Time (hr)	92.5	88.2	82.0	90.8
Total Delay (hr)	50.5	44.3	38.9	47.8
Total Stops	1539	1654	1569	1549
Fuel Used (gal)	66.3	67.5	65.0	66.9

Interval #3 Information

Start Time	7:42
End Time	7:57
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1644	1656	1702	1716	1705	1613	1699
Vehs Exited	1607	1572	1649	1668	1647	1564	1638
Starting Vehs	305	276	277	280	285	266	285
Ending Vehs	342	360	330	328	343	315	346
Denied Entry Before	142	68	109	142	111	62	32
Denied Entry After	177	127	147	209	154	153	80
Travel Distance (mi)	1880	1873	1897	1987	1943	1882	2007
Travel Time (hr)	119.5	104.1	114.5	130.6	118.2	108.0	99.9
Total Delay (hr)	73.4	58.0	67.7	82.0	70.5	62.0	50.8
Total Stops	1741	1726	1719	1867	1898	1776	1866
Fuel Used (gal)	76.9	73.8	76.4	82.8	79.0	74.8	75.3

Interval #3 Information

Start Time	7:42
End Time	7:57
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	1684	1624	1631	1666
Vehs Exited	1605	1580	1588	1611
Starting Vehs	293	272	297	280
Ending Vehs	372	316	340	337
Denied Entry Before	99	89	59	91
Denied Entry After	161	179	101	149
Travel Distance (mi)	1890	1903	1922	1918
Travel Time (hr)	115.8	116.8	98.9	112.6
Total Delay (hr)	69.4	70.3	51.7	65.6
Total Stops	1866	1824	1781	1807
Fuel Used (gal)	76.4	77.2	73.7	76.6

Interval #4 Information

Start Time	7:57
End Time	8:12
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1430	1408	1466	1462	1478	1482	1488
Vehs Exited	1481	1488	1495	1534	1513	1470	1529
Starting Vehs	342	360	330	328	343	315	346
Ending Vehs	291	280	301	256	308	327	305
Denied Entry Before	177	127	147	209	154	153	80
Denied Entry After	176	206	155	275	188	173	99
Travel Distance (mi)	1716	1687	1746	1811	1779	1774	1808
Travel Time (hr)	116.6	116.2	112.2	137.1	116.1	116.6	98.4
Total Delay (hr)	74.5	74.5	69.4	92.4	72.3	72.9	53.8
Total Stops	1504	1636	1632	1709	1580	1632	1674
Fuel Used (gal)	72.1	72.0	71.7	79.2	73.6	74.5	70.8

Interval #4 Information

Start Time	7:57
End Time	8:12
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1510	1492	1527	1471
Vehs Exited	1555	1491	1601	1518
Starting Vehs	372	316	340	337
Ending Vehs	327	317	266	295
Denied Entry Before	161	179	101	149
Denied Entry After	224	180	178	185
Travel Distance (mi)	1856	1792	1863	1783
Travel Time (hr)	130.3	119.3	112.0	117.5
Total Delay (hr)	84.6	75.4	66.0	73.6
Total Stops	1846	1599	1634	1646
Fuel Used (gal)	79.5	74.4	74.5	74.2

1: Route 1 & American Legion Rd/Eskimo Hill Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	68	44	93	22	33	83	79	934	20	46	283	18
Vehicles Exited	68	44	93	22	33	84	79	935	20	46	283	18
Hourly Exit Rate	68	44	93	22	33	84	79	935	20	46	283	18
Input Volume	55	34	74	23	33	81	79	930	20	50	279	17
% of Volume	124	129	126	97	100	103	100	101	101	92	101	104
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

1: Route 1 & American Legion Rd/Eskimo Hill Rd Performance by movement

Movement	All
Vehicles Entered	1723
Vehicles Exited	1725
Hourly Exit Rate	1725
Input Volume	1675
% of Volume	103
Denied Entry Before	0
Denied Entry After	0

2: Centreport Pkwy & Ramoth Church Road/American Legion Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Vehicles Entered	143	14	16	117	52	3	59	404
Vehicles Exited	143	14	16	116	51	3	59	402
Hourly Exit Rate	143	14	16	116	51	3	59	402
Input Volume	142	12	17	114	16	0	19	321
% of Volume	101	114	93	101	314		315	125
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0

3: Centreport Pkwy & Mountain View Rd Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBT	SBR	All
Vehicles Entered	4	229	0	2	458	83	1	66	11	854
Vehicles Exited	4	229	0	2	458	83	1	66	11	854
Hourly Exit Rate	4	229	0	2	458	83	1	66	11	854
Input Volume	5	223	1	1	514	88	1	42	6	881
% of Volume	80	103	0	200	89	95	100	156	176	97
Denied Entry Before	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0

4: Centreport Pkwy Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	All
Vehicles Entered	100	202	108	528	130	1068
Vehicles Exited	100	202	107	527	130	1066
Hourly Exit Rate	100	202	107	527	130	1066
Input Volume	88	183	120	590	129	1110
% of Volume	113	111	89	89	101	96
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

5: Centreport Pkwy Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Vehicles Entered	7	222	272	467	379	17	516	1880
Vehicles Exited	7	221	271	467	373	16	514	1869
Hourly Exit Rate	7	221	271	467	373	16	514	1869
Input Volume	8	209	264	465	450	18	617	2031
% of Volume	88	106	103	100	83	88	83	92
Denied Entry Before	0	0	0	0	6	0	6	12
Denied Entry After	0	0	0	0	76	4	105	185

6: Route 1 & Centreport Pkwy Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Vehicles Entered	287	19	443	1058	665	55	328	2855
Vehicles Exited	290	19	444	1054	665	54	327	2853
Hourly Exit Rate	290	19	444	1054	665	54	327	2853
Input Volume	333	18	488	1068	654	55	324	2940
% of Volume	87	104	91	99	102	99	101	97
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0

10: Route 1 & Enon/Cranes Corner Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	362	2	244	4	41	4	446	1348	41	1	462	162
Vehicles Exited	366	2	244	4	42	4	446	1338	42	1	460	161
Hourly Exit Rate	366	2	244	4	42	4	446	1338	42	1	460	161
Input Volume	361	2	244	3	43	4	460	1341	42	1	493	170
% of Volume	101	100	100	133	98	94	97	100	100	100	93	95
Denied Entry Before	0	0	0	0	0	0	0	1	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

10: Route 1 & Enon/Cranes Corner Performance by movement

Movement	All
Vehicles Entered	3117
Vehicles Exited	3110
Hourly Exit Rate	3110
Input Volume	3164
% of Volume	98
Denied Entry Before	1
Denied Entry After	0

Total Zone Performance

Vehicles Entered	5875
Vehicles Exited	102
Hourly Exit Rate	102
Input Volume	12122
% of Volume	1
Denied Entry Before	13
Denied Entry After	185

Intersection: 1: Route 1 & American Legion Rd/Eskimo Hill Rd

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	183	159	66	182	182	50	91	60
Average Queue (ft)	90	68	19	78	77	13	30	11
95th Queue (ft)	160	127	49	148	150	32	69	39
Link Distance (ft)	2929	647		2728	2728		2100	2100
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			325			230		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Centreport Pkwy & Ramoth Church Road/American Legion Rd

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	30	46	35
Average Queue (ft)	2	17	15
95th Queue (ft)	15	35	28
Link Distance (ft)	2929		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		290	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Centreport Pkwy & Mountain View Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	25	67	2	17	201	67
Average Queue (ft)	3	38	0	1	102	31
95th Queue (ft)	16	59	2	7	164	54
Link Distance (ft)		1406		957	1860	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	215		110			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: Centreport Pkwy

Movement	EB	WB	WB	SB
Directions Served	TR	L	T	LT
Maximum Queue (ft)	154	91	175	151
Average Queue (ft)	64	41	81	66
95th Queue (ft)	119	79	151	119
Link Distance (ft)	425		2430	223
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		300		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Centreport Pkwy

Movement	EB	EB	WB	WB	NB
Directions Served	L	T	T	R	LTR
Maximum Queue (ft)	30	180	207	97	1386
Average Queue (ft)	6	93	104	5	1345
95th Queue (ft)	24	157	174	61	1484
Link Distance (ft)		2430	2016	2016	1328
Upstream Blk Time (%)					89
Queuing Penalty (veh)					0
Storage Bay Dist (ft)	310				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Route 1 & Centreport Pkwy

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	T	R	L	T	T	T
Maximum Queue (ft)	284	257	364	389	523	295	107	131	120	98
Average Queue (ft)	145	119	174	177	193	191	44	57	35	32
95th Queue (ft)	242	214	309	318	424	331	87	105	84	78
Link Distance (ft)	436		1007	1007	1007			2013	2013	2013
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		270				270	530			
Storage Blk Time (%)	0	0			1	6				
Queuing Penalty (veh)	2	0			5	20				

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:12	8:12	8:12	8:12	8:12	8:12	8:12
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	6748	6641	6864	6824	6891	6766	6800
Vehs Exited	6618	6579	6754	6614	6671	6566	6557
Starting Vehs	341	375	367	338	340	341	344
Ending Vehs	471	437	477	548	560	541	587
Denied Entry Before	0	5	0	2	0	2	0
Denied Entry After	8	12	13	4	12	10	2
Travel Distance (mi)	8097	8018	8392	8070	8273	8012	8103
Travel Time (hr)	396.7	370.0	427.9	432.9	402.5	415.4	449.5
Total Delay (hr)	199.8	175.4	224.7	236.9	201.6	220.0	252.2
Total Stops	11818	10737	12906	12834	11655	11360	11964
Fuel Used (gal)	299.6	292.6	314.2	309.9	306.3	303.8	314.2

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:12	8:12	8:12	8:12
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	6878	6630	6692	6774
Vehs Exited	6752	6516	6529	6615
Starting Vehs	349	374	330	349
Ending Vehs	475	488	493	503
Denied Entry Before	0	0	1	0
Denied Entry After	3	5	23	8
Travel Distance (mi)	8260	7941	8009	8118
Travel Time (hr)	396.3	413.3	409.0	411.3
Total Delay (hr)	196.0	220.5	214.2	214.1
Total Stops	12141	12048	11316	11879
Fuel Used (gal)	304.2	301.7	301.1	304.8

Interval #0 Information Seeding

Start Time	6:57
End Time	7:12
Total Time (min)	15

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:12
End Time	7:27
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1634	1596	1681	1680	1618	1627	1637
Vehs Exited	1674	1637	1676	1632	1638	1623	1644
Starting Vehs	341	375	367	338	340	341	344
Ending Vehs	301	334	372	386	320	345	337
Denied Entry Before	0	5	0	2	0	2	0
Denied Entry After	1	0	10	4	9	0	1
Travel Distance (mi)	1983	1963	2070	1996	1948	1965	1969
Travel Time (hr)	83.9	82.1	93.3	91.6	83.7	83.6	84.2
Total Delay (hr)	35.5	34.4	43.2	43.2	36.2	35.6	36.0
Total Stops	2513	2324	2907	2779	2539	2276	2197
Fuel Used (gal)	70.0	69.5	75.0	72.8	69.9	70.0	70.1

Interval #1 Information Recording

Start Time	7:12
End Time	7:27
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1662	1607	1624	1635
Vehs Exited	1689	1640	1632	1645
Starting Vehs	349	374	330	349
Ending Vehs	322	341	322	329
Denied Entry Before	0	0	1	0
Denied Entry After	5	1	2	2
Travel Distance (mi)	2055	1963	1969	1988
Travel Time (hr)	87.3	87.0	84.4	86.1
Total Delay (hr)	37.6	39.4	36.6	37.8
Total Stops	2688	2573	2293	2510
Fuel Used (gal)	73.3	71.4	70.3	71.2

Interval #2 Information

Start Time	7:27
End Time	7:42
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1655	1595	1603	1616	1606	1656	1611
Vehs Exited	1598	1574	1589	1617	1537	1585	1582
Starting Vehs	301	334	372	386	320	345	337
Ending Vehs	358	355	386	385	389	416	366
Denied Entry Before	1	0	10	4	9	0	1
Denied Entry After	6	0	22	1	8	10	12
Travel Distance (mi)	1999	1943	1981	1947	1915	1986	1975
Travel Time (hr)	87.6	83.7	100.3	97.8	86.6	91.4	96.5
Total Delay (hr)	39.0	36.3	52.3	50.5	40.0	42.9	48.4
Total Stops	2565	2309	3076	2954	2594	2673	2790
Fuel Used (gal)	72.0	69.3	74.2	73.7	69.0	72.3	73.6

Interval #2 Information

Start Time	7:27
End Time	7:42
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1618	1634	1623	1622
Vehs Exited	1590	1595	1568	1582
Starting Vehs	322	341	322	329
Ending Vehs	350	380	377	369
Denied Entry Before	5	1	2	2
Denied Entry After	9	5	2	6
Travel Distance (mi)	1961	1963	1945	1961
Travel Time (hr)	88.3	90.9	85.6	90.8
Total Delay (hr)	40.5	43.5	38.1	43.1
Total Stops	2708	2741	2281	2667
Fuel Used (gal)	71.3	72.2	70.2	71.8

Interval #3 Information

Start Time	7:42
End Time	7:57
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1787	1804	1884	1824	1899	1818	1841
Vehs Exited	1666	1742	1786	1730	1843	1737	1638
Starting Vehs	358	355	386	385	389	416	366
Ending Vehs	479	417	484	479	445	497	569
Denied Entry Before	6	0	22	1	8	10	12
Denied Entry After	3	4	12	0	2	5	14
Travel Distance (mi)	2078	2122	2219	2137	2267	2088	2132
Travel Time (hr)	110.4	100.0	112.9	115.9	108.2	110.7	123.6
Total Delay (hr)	59.8	48.7	59.0	64.2	53.4	60.0	71.9
Total Stops	3373	2981	3369	3505	3091	3141	3405
Fuel Used (gal)	78.3	78.0	81.9	82.2	83.2	80.0	83.7

Interval #3 Information

Start Time	7:42
End Time	7:57
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	1901	1820	1819	1835
Vehs Exited	1767	1688	1715	1729
Starting Vehs	350	380	377	369
Ending Vehs	484	512	481	476
Denied Entry Before	9	5	2	6
Denied Entry After	2	1	9	4
Travel Distance (mi)	2185	2109	2128	2147
Travel Time (hr)	103.8	114.8	112.3	111.3
Total Delay (hr)	50.9	63.5	60.7	59.2
Total Stops	3353	3330	3296	3283
Fuel Used (gal)	79.2	80.9	80.7	80.8

Interval #4 Information

Start Time	7:57
End Time	8:12
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1672	1646	1696	1704	1768	1665	1711
Vehs Exited	1680	1626	1703	1635	1653	1621	1693
Starting Vehs	479	417	484	479	445	497	569
Ending Vehs	471	437	477	548	560	541	587
Denied Entry Before	3	4	12	0	2	5	14
Denied Entry After	8	12	13	4	12	10	2
Travel Distance (mi)	2036	1990	2122	1990	2143	1972	2028
Travel Time (hr)	114.8	104.2	121.4	127.6	124.1	129.7	145.3
Total Delay (hr)	65.5	56.1	70.2	79.1	72.1	81.5	95.9
Total Stops	3367	3123	3554	3596	3431	3270	3572
Fuel Used (gal)	79.3	75.7	83.1	81.2	84.1	81.4	86.9

Interval #4 Information

Start Time	7:57
End Time	8:12
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1697	1569	1626	1677
Vehs Exited	1706	1593	1614	1653
Starting Vehs	484	512	481	476
Ending Vehs	475	488	493	503
Denied Entry Before	2	1	9	4
Denied Entry After	3	5	23	8
Travel Distance (mi)	2059	1906	1967	2021
Travel Time (hr)	117.0	120.6	126.8	123.1
Total Delay (hr)	67.0	74.0	78.9	74.0
Total Stops	3392	3404	3446	3412
Fuel Used (gal)	80.4	77.3	79.9	80.9

1: Route 1 & American Legion Rd/Eskimo Hill Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	63	63	80	40	59	71	52	385	8	139	1099	74
Vehicles Exited	63	63	80	40	60	71	52	386	8	139	1099	74
Hourly Exit Rate	63	63	80	40	60	71	52	386	8	139	1099	74
Input Volume	59	54	74	40	57	67	52	377	8	143	1084	74
% of Volume	107	116	108	100	106	106	100	102	97	97	101	100
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

1: Route 1 & American Legion Rd/Eskimo Hill Rd Performance by movement

Movement	All
Vehicles Entered	2133
Vehicles Exited	2135
Hourly Exit Rate	2135
Input Volume	2089
% of Volume	102
Denied Entry Before	0
Denied Entry After	0

2: Centreport Pkwy & Ramoth Church Road/American Legion Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Vehicles Entered	162	20	24	166	35	2	40	449
Vehicles Exited	163	20	24	167	35	2	40	451
Hourly Exit Rate	163	20	24	167	35	2	40	451
Input Volume	165	19	23	164	18	0	20	408
% of Volume	99	107	105	102	197		203	110
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0

3: Centreport Pkwy & Mountain View Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR	All
Vehicles Entered	7	0	448	1	1	350	35	2	63	16	923
Vehicles Exited	8	0	448	1	2	349	35	2	62	16	923
Hourly Exit Rate	8	0	448	1	2	349	35	2	62	16	923
Input Volume	6	1	453	1	1	350	36	1	28	6	883
% of Volume	128	0	99	100	200	100	97	200	223	256	105
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0

4: Centreport Pkwy Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	All
Vehicles Entered	206	310	149	292	505	6	1468
Vehicles Exited	205	310	150	291	508	6	1470
Hourly Exit Rate	205	310	150	291	508	6	1470
Input Volume	192	293	155	290	510	4	1444
% of Volume	107	106	97	100	100	171	102
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

5: Centreport Pkwy Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Vehicles Entered	3	718	303	321	141	1	92	1579
Vehicles Exited	3	717	304	320	141	1	92	1578
Hourly Exit Rate	3	717	304	320	141	1	92	1578
Input Volume	4	705	301	334	147	1	95	1587
% of Volume	75	102	101	96	96	100	97	99
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0

6: Route 1 & Centreport Pkwy Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Vehicles Entered	687	8	92	389	470	149	1738	3533
Vehicles Exited	678	8	92	392	470	145	1657	3442
Hourly Exit Rate	678	8	92	392	470	145	1657	3442
Input Volume	692	8	98	389	479	148	1728	3542
% of Volume	98	107	94	101	98	98	96	97
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0

10: Route 1 & Enon/Cranes Corner Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Vehicles Entered	210	233	3	7	225	633	4	5	1868	483	3671
Vehicles Exited	211	233	3	7	196	631	4	5	1846	483	3619
Hourly Exit Rate	211	233	3	7	196	631	4	5	1846	483	3619
Input Volume	213	232	3	6	222	639	4	5	1948	498	3770
% of Volume	99	100	100	117	88	99	100	100	95	97	96
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	1	0	0	0	0	0	0	5	2	8

Total Zone Performance

Vehicles Entered	6160
Vehicles Exited	94
Hourly Exit Rate	94
Input Volume	13723
% of Volume	1
Denied Entry Before	0
Denied Entry After	8

Intersection: 1: Route 1 & American Legion Rd/Eskimo Hill Rd

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	226	218	60	104	100	96	222	217
Average Queue (ft)	106	94	19	41	29	31	108	100
95th Queue (ft)	190	175	47	84	74	73	192	192
Link Distance (ft)	2929	647		2728	2728		2100	2100
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			325			230		
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Intersection: 2: Centreport Pkwy & Ramoth Church Road/American Legion Rd

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	43	40	32
Average Queue (ft)	5	14	11
95th Queue (ft)	24	32	25
Link Distance (ft)	2929		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		290	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Centreport Pkwy & Mountain View Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	26	124	14	21	181	70
Average Queue (ft)	5	63	1	1	86	32
95th Queue (ft)	22	101	7	10	147	55
Link Distance (ft)		1406		957	1860	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	215		110			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: Centreport Pkwy

Movement	EB	WB	WB	SB
Directions Served	TR	L	T	LT
Maximum Queue (ft)	557	189	237	310
Average Queue (ft)	307	82	99	254
95th Queue (ft)	562	150	186	353
Link Distance (ft)	425		2430	223
Upstream Blk Time (%)	11			19
Queuing Penalty (veh)	57			98
Storage Bay Dist (ft)		300		
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 5: Centreport Pkwy

Movement	EB	EB	WB	NB
Directions Served	L	T	T	LTR
Maximum Queue (ft)	29	331	155	215
Average Queue (ft)	2	134	62	95
95th Queue (ft)	15	267	124	168
Link Distance (ft)		2430	2016	1328
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	310			
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 6: Route 1 & Centreport Pkwy

Movement	WB	WB	B12	B13	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	T	T	T	R	L	T	T	T
Maximum Queue (ft)	530	295	880	140	142	151	180	276	555	1086	1071	1008
Average Queue (ft)	474	147	344	9	81	89	74	145	224	514	508	465
95th Queue (ft)	588	365	919	93	127	136	141	245	582	1054	1032	968
Link Distance (ft)	436		1155	2016	1007	1007	1007			2013	2013	2013
Upstream Blk Time (%)	40		4									
Queuing Penalty (veh)	317		29									
Storage Bay Dist (ft)		270						270	530			
Storage Blk Time (%)	49	0						0	1	20		
Queuing Penalty (veh)	48	1						0	4	30		

Appendix F:

Background Development Trips

TRAFFIC IMPACT ANALYSIS

For

Centreport Industrial Rezoning

Stafford County, Virginia

Prepared for:

Ramoth Road Investors, LLC

JMT Project #15-1476-001

Prepared by:

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

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Richmond, VA 23236

December 24, 2015

5. SITE TRIP GENERATION

For the purposes of this TIA, the Centreport Industrial Rezoning is assumed to consist of up to 500,000 square feet of light industrial development. Access to the site is proposed via one entrance along Centreport Parkway south of Ramoth Church Road and one entrance along Ramoth Church Road west of the Ramoth Church Road and Centreport Parkway intersection.

The average weekday AM and PM peak hour, and weekday and average daily trips that are expected to be generated by the proposed Centreport Industrial facility were estimated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th edition and are shown in Table 3. Table 3 also shows the trips that would be generated by the potential by-right development. A discussion of various trip types associated with developments (primary trips, internal trips, and pass-by trips) along with a discussion of the site's by-right trip generation potential is provided below.

5.1 Primary Site Trips

Trips that are made for the specific purpose of visiting the site are known as primary trips. As shown in Table 3, the Centreport Industrial Site would generate approximately 501 new external trips during the AM peak hour (441 in and 60 out), 558 trips during the PM peak hour (67 in 491 out), and 3,633 new daily trips over a 24-hour period. It is noted that during the scoping phase of the project, the Applicant suggested that lower rates be considered for the projected 500,000 SF of development given the potential for such a site to be managed by a very small staff; however, after discussion with VDOT and County staff, it was determined that the ITE rates should be utilized in order to provide a standardized and more conservative analysis.

5.2 Internal Trips

Internal trips are trips that would make a stop at more than one of the uses within the development. For example, a person at an auto repair shop may walk to one to the adjacent restaurant or retail facilities without ever leaving the development. If the proposed Site were to be built out with a group of smaller light industrial users, the potential would exists for some site trips to be "captured" internally. However, for the purposes of this TIA, no reductions were taken due to the unknown nature of the Site's end users and the low internal trip generation potential in general for light industrial uses.

5.3 Pass-By Trips

Pass-by trips are trips that would be drawn to the development from the existing traffic stream on the adjacent streets. These trips are intermediate stops on the way from an origin to the primary destination. These trips do not add to the overall traffic volumes on the roadway, but will add to the turning traffic at the site's driveway connections. Chapter 527 guidelines allows for a percent reduction to be applied to the site generated trips in accordance with the land use and ITE studies. For the proposed Centreport Industrial Site, no pass-by trip adjustments were made due to the low potential for such trips to occur.

5.4 By-Right Trip Generation

For informational purposes, the by-right trip generation potential of the Site was calculated based on the maximum residential density of 3 dwelling units / acre as allowed under the

County's Agricultural (A-1) zoning ordinance. With a total area of slightly over 66 acres, the Site could be developed by-right with up to 22 single-family dwelling units. The traffic intensity of by-right build-out is useful in developing a full understanding of the impacts of a proposed zoning reclassification. The Site's by-right trip generation potential is summarized in Table 3 for reference.

TABLE 3 – SITE TRIP GENERATION SUMMARY

Land Use	Size	Units	Land Use Code	Weekday AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	Weekday PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Average Daily Trips
PROPOSED DEVELOPMENT										
1. ITE Trip Generation[1]										
General Light Industrial	500,000	S.F	110	**441**	**60**	**501**	**67**	**491**	**558**	**3,633**
2. Trip Generation Comparison										
FOR REFERENCE ONLY										
Single Family Detached Housing[2]	22	Dwellings	210	**8**	**20**	**28**	**18**	**10**	**28**	**261**
3. Net Change in Trip Generation Compared to By-Right (1 minus 2)				**433**	**40**	**473**	**49**	**481**	**529**	**3,372**

Notes: (1) Based on the Institute of Transportation Engineers Trip Generation, 9th Edition
(2) Use/size of development allowed under current zoning based on Stafford County Zoning Ordinance

6. SITE TRIP DISTRIBUTION AND ASSIGNMENT

The trip distribution percentages for the proposed Site were agreed upon after iterative analyses and discussions with VDOT and County transportation planning staff during the scoping process. Overall primary site distributions are discussed below. (No pass-by trips are assumed for the proposed Site, therefore no discussion is provided regarding the distribution and assignment of pass-by trips.)

6.1 Primary Site Trips

Primary trips are defined as trips that are made to/from the Site, where the specific purpose of involves the Site as either the primary departure point or primary destination. During the weekday AM and PM peak hour, the primary site trips will predominantly consist of employee traffic. For this reason, during the scoping process it was agreed that demographic information for residences ("rooftops") in Stafford County, the City of Fredericksburg, and northern Spotsylvania County would serve as the basis for the Site trip distribution. The demographic information that was obtained resulted in a general assessment of rooftops within an approximate 15-mile radius of the site.

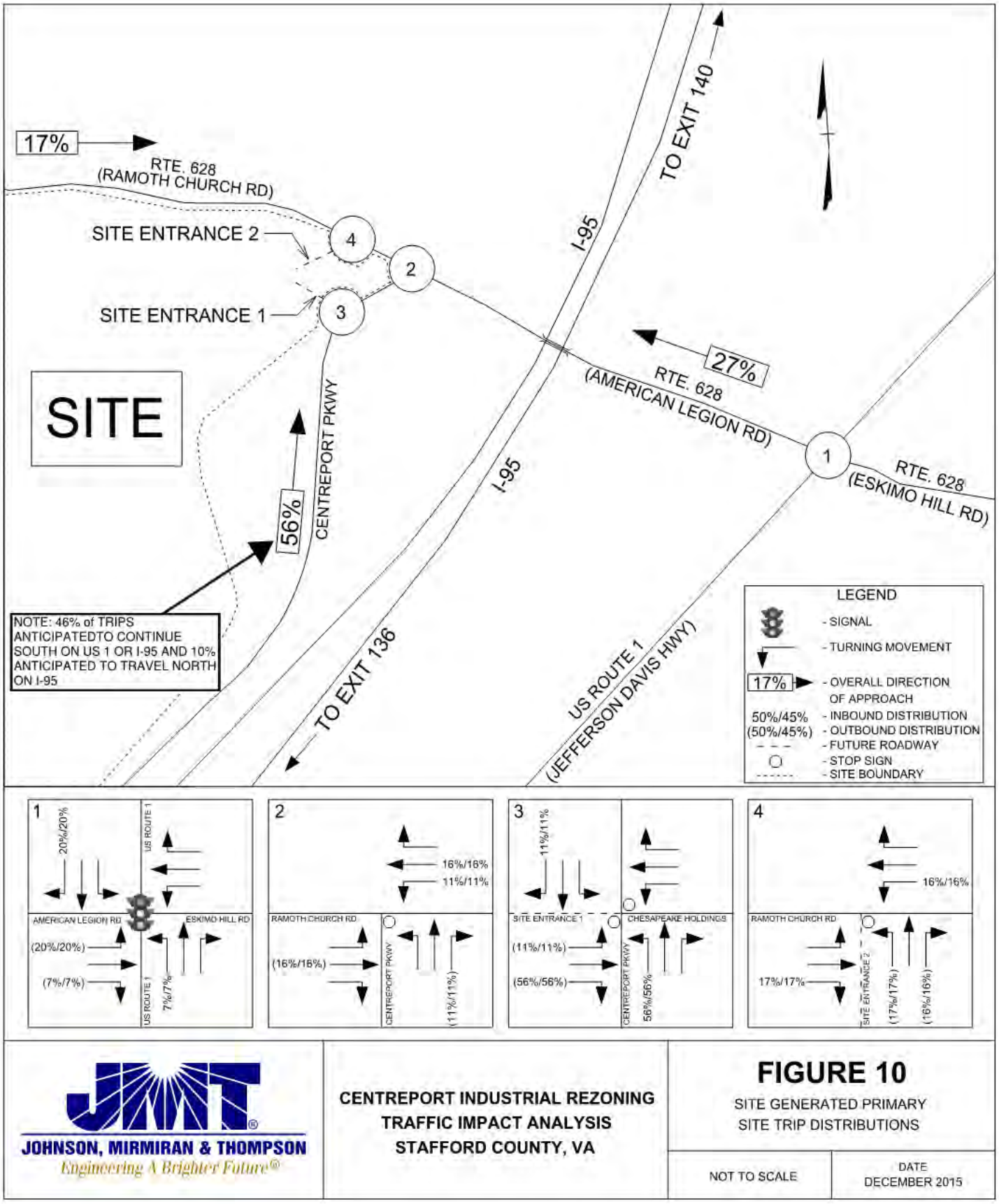
Generally speaking, traffic to/from the west and northwest was assumed to travel to/from the site via Ramoth Church Road. Traffic to/from the north was assigned to both US Route 1 (to/from the north) as well as I-95, which results in some traffic from the north using the I-95/Centreport Pkwy interchange, which is south of the site. Traffic to/from the south was assumed to use I-95 or US Route 1, and be "collected" by Centreport Parkway to access the Site.

Based on the above rationale, the following Site trip distribution percentages were developed (See Appendix A Scoping Documents for additional supporting documentation related to the development of the percentages):

- 27% to/from the east on Ramoth Church Road/American Legion Road
- 17% to/from the west on Ramoth Church Road
- 56% to/from the south on Centreport Parkway, with the following breakdown:
    - 46% destined to/from locations further south along either I-95 or US Route 1
    - 10% destined to/from locations in *northern Stafford* via I-95, which offers a quicker travel time than using the local street network

6.2 Site Trips Assignments

Traffic was assigned to the local street network by applying the trip distribution percentages (above) to the Site trip generation potential presented in Table 3. The trips were assigned to Site Driveway 1 and Site Driveway 2 based on expected convenience of access and engineering judgment. Trip assignments were made with the assumption that both proposed Site Entrances have full-movement operation. Trip assignments of traffic to/from US Route 1 by way of Ramoth Church Road / American Legion Road were assigned to/from US Route 1 and Eskimo Hill Road based on existing traffic splits at that intersection and engineering judgement



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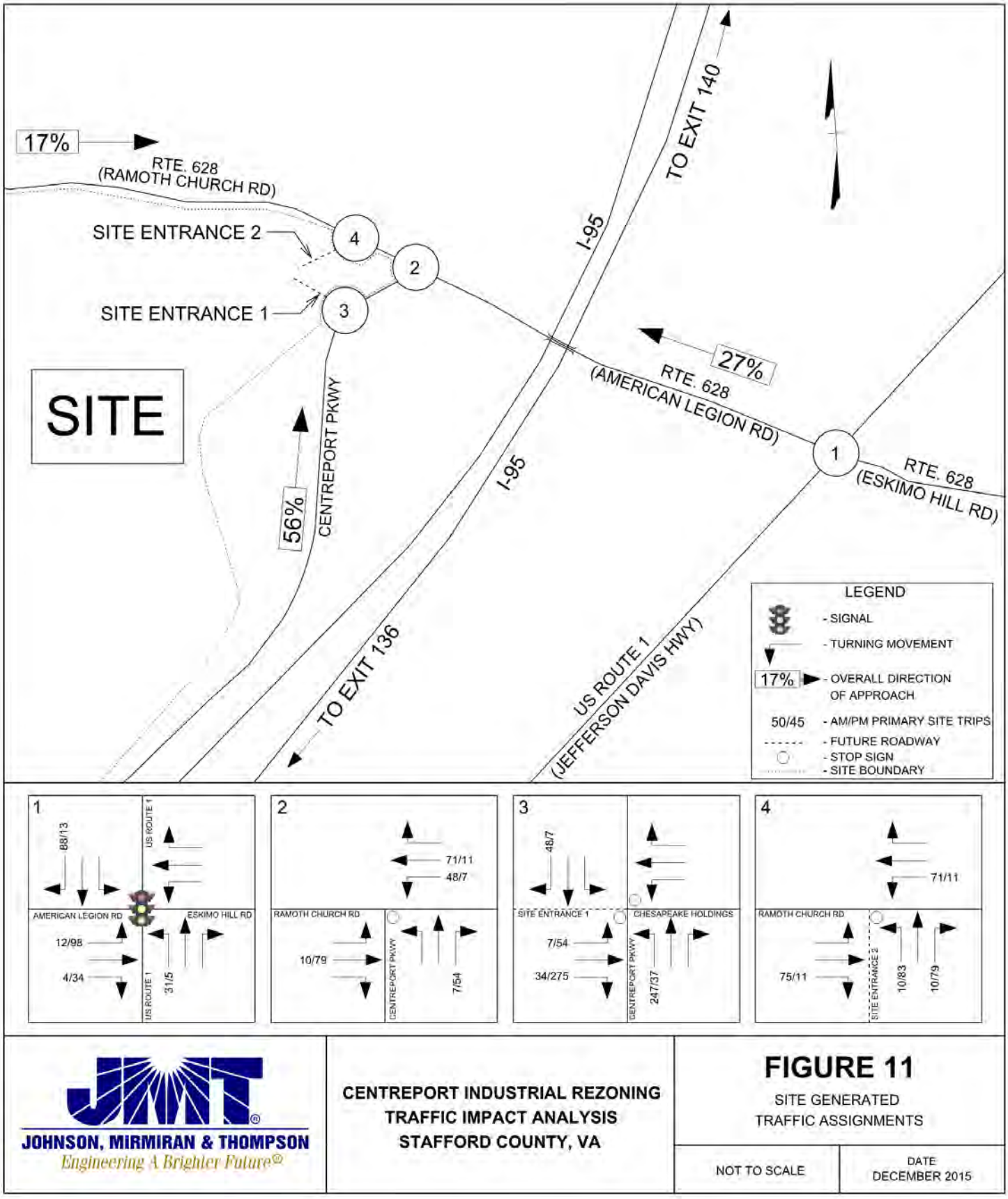
Engineering A Brighter Future®

CENTREPORT INDUSTRIAL REZONING
TRAFFIC IMPACT ANALYSIS
STAFFORD COUNTY, VA

FIGURE 10
SITE GENERATED PRIMARY SITE TRIP DISTRIBUTIONS

NOT TO SCALE | DATE DECEMBER 2015



JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

CENTREPORT INDUSTRIAL REZONING
TRAFFIC IMPACT ANALYSIS
STAFFORD COUNTY, VA

FIGURE 11
SITE GENERATED
TRAFFIC ASSIGNMENTS

NOT TO SCALE | DATE DECEMBER 2015

Pankaj Singla

From: Kevin D. Sitzman
Sent: Wednesday, May 20, 2020 10:44 AM
To: Niraja Chandrapu; Steven Dauterman
Subject: FW: Project Clover Scoping meeting held via online meeting May 6, 2020 attendance roster

Kevin Sitzman
GOROVE SLADE
T 571.248.0992 / **D** 571.261.9718 / **C** 571.318.1285

From: Mike J. Zuraf <MZuraf@staffordcountyva.gov>
Sent: Tuesday, May 19, 2020 1:34 PM
To: Hedrich, Peter <peter.hedrich@vdot.virginia.gov>; Kevin D. Sitzman <kds@goroveslade.com>
Cc: Donald D Logan <donaldd.logan@vdot.virginia.gov>; Joseph A. Valotta <JValotta@staffordcountyva.gov>; Niemann, Margaret <margaret.niemann@vdot.virginia.gov>
Subject: RE: Project Clover Scoping meeting held via online meeting May 6, 2020 attendance roster

Kevin
Here is information on the two site plans:

Parcel under development east of the site (plan prepared by Fairbanks & Franklin)

Centreport Stafford 95 Business Center
USE: 487,792 sq ft storage warehouse
TRIPS: The site plan states the use would generate 847 VPD

Parcel under development west of the site (plan prepared by Bowman)

McGrath Rentcorp Storage Facility
USE: Storage, Maintenance and Rental of Modular Units
22,800 square foot building includes 3 service bays and 1500 square foot office.
Much of the site is an open parking field for the storage of modular units
TRIPS: The site plan states 70 VPD

Michael Zuraf, AICP
Stafford County
Department of Planning and Zoning
540-658-8668

Information contained in this e-mail does not take the place of a written zoning determination and is not intended to be an official zoning decision. An application is available on the Stafford County Government website and shall be submitted with the appropriate fee for an official Zoning Administrator determination.

From: Hedrich, Peter [mailto:peter.hedrich@vdot.virginia.gov]
Sent: Tuesday, May 19, 2020 9:36 AM

To: Kevin D. Sitzman
Cc: Donald D Logan; Mike J. Zuraf; Joseph A. Valotta; Niemann, Margaret
Subject: Re: Project Clover Scoping meeting held via online meeting May 6, 2020 attendance roster

Sorry I extracted the wrong pages from the Centrepoint study. Here are the correct pages.
This study used a 2.5% growth rate for Centerport. Project Clover should probably use this same rate.
Thanks,
Peter

Peter Hedrich, PE, PTOE
Fredericksburg District Traffic Engineer
Virginia Department of Transportation
Desk Phone: 540-899-4540 Cell Phone: 207-939-0806
Office Hours 7:00 AM - 3:30 PM

On Tue, May 19, 2020 at 7:32 AM Hedrich, Peter <peter.hedrich@vdot.virginia.gov> wrote:

> Hello Kevin,
>
> I have attached the most recent counts we have at the ramps and Route 1. We have no recent counts at American Legion. Two are attached for 1/Centreport that may provide some seasonal insights.
> Trip Gen for the following are also attached:
>
> - Centrepoint Gateway
> - Centerport Industrial
> - Sycamore Grove
>
> I dont have information on the two site plans.
>
> The studie used growth rates of 2-2.5%.
> The counts have truck/car tabulations.
>
> Please contact us with any questions.
>
> Thanks,
>
> *Peter*
>
> Peter Hedrich, PE, PTOE
> Fredericksburg District Traffic Engineer
> Virginia Department of Transportation
> Desk Phone: 540-899-4540 Cell Phone: 207-939-0806
> Office Hours 7:00 AM - 3:30 PM
>
> On Tue, May 19, 2020 at 6:04 AM Niemann, Margaret <margaret.niemann@vdot.virginia.gov> wrote:
>
> > See Kevin's request.

Margaret Niemann

Fredericksburg Land Development

(540)899-4106

margaret.niemann@vdot.virginia.gov

---------- Forwarded message ---------
From: **Kevin Sitzman** <kdsitzman@verizon.net>
Date: Mon, May 18, 2020 at 5:30 PM
Subject: Re: Project Clover Scoping meeting held via online meeting May 6, 2020 attendance roster
To: margaret.niemann@vdot.virginia.gov <margaret.niemann@vdot.virginia.gov>
Cc: david.beale@vdot.virginia.gov <david.beale@vdot.virginia.gov>, donaldd.logan@vdot.virginia.gov <donaldd.logan@vdot.virginia.gov>, JValotta@staffordcountyva.gov <JValotta@staffordcountyva.gov>, Stephen.Haynes@vdot.virginia.gov <Stephen.Haynes@vdot.virginia.gov>, MZuraf@staffordcountyva.gov <MZuraf@staffordcountyva.gov>, aowsiak@staffordcountyva.gov <aowsiak@staffordcountyva.gov>, bbrown@staffordcountyva.gov <bbrown@staffordcountyva.gov>

I am checking in to see if any of the traffic counts and/or studies noted in my previous email would be available so we can finalize the revised scoping materials. Please let me know when you have a chance. Thanks.

Kevin Sitzman, PE
Principal

GOROVE SLADE
Transportation Planners and Engineers
T 571.248.0992 / **D** 571.261.9718 / **C** 571.318.1285
15125 Washington Street / Suite 212 / Haymarket, VA 20169
ksitzman@goroveslade.com / www.goroveslade.com

-----Original Message-----
From: Kevin Sitzman <kdsitzman@verizon.net>
To: margaret.niemann@vdot.virginia.gov <margaret.niemann@vdot.virginia.gov>
Cc: david.beale@vdot.virginia.gov <david.beale@vdot.virginia.gov>; donaldd.logan@vdot.virginia.gov <donaldd.logan@vdot.virginia.gov>; JValotta@staffordcountyva.gov <JValotta@staffordcountyva.gov>; Stephen.Haynes@vdot.virginia.gov <Stephen.Haynes@vdot.virginia.gov>; MZuraf@staffordcountyva.gov <MZuraf@staffordcountyva.gov>; aowsiak@staffordcountyva.gov <aowsiak@staffordcountyva.gov>; bbrown@staffordcountyva.gov <bbrown@staffordcountyva.gov>
Sent: Wed, May 13, 2020 6:52 pm
Subject: Re: Project Clover Scoping meeting held via online meeting May 6, 2020 attendance roster

I wanted to follow up on the other development plans and traffic studies that we discussed during the online meeting. As shown on the attached, I believe we concluded that the following developments would be reflected in the traffic study:

Centreport Industrial (north end of Centreport Parkway)
Parcel under development east of the site (plan prepared by Fairbanks & Franklin)
Parcel under development west of the site (plan prepared by Bowman)
Sycamore Grove (opposite Centreport Parkway from the site)
Centreport Retail (south end of Centreport Parkway)

In addition, there may be some relevant information from the application near the airport along Ramoth Church that is not moving forward.

We have the Sycamore Grove study, but if there are other studies or plans that VDOT or County staff could send along, that would be greatly appreciated.

In addition, I recall that there may be some counts that VDOT can provide for the I-95 ramps and the Route 1 intersection(s).

We are looking into the growth rates, ITE land use codes, heavy vehicle percentages, etc. and would like to evaluate the counts as well.

Thank you all again for your help on this.

Kevin Sitzman, PE
Principal

GOROVE SLADE
Transportation Planners and Engineers
T 571.248.0992 / **D** 571.261.9718 / **C** 571.318.1285
15125 Washington Street / Suite 212 / Haymarket, VA 20169
ksitzman@goroveslade.com / www.goroveslade.com

-----Original Message-----
From: Niemann, Margaret <margaret.niemann@vdot.virginia.gov>
To: Kevin Sitzman <kdsitzman@verizon.net>
Cc: David Beale <david.beale@vdot.virginia.gov>; Donald D Logan <donaldd.logan@vdot.virginia.gov>; Joseph A. Valotta <JValotta@staffordcountyva.gov>; Stephen Haynes <Stephen.Haynes@vdot.virginia.gov>; Mike J. Zuraf <MZuraf@staffordcountyva.gov>; Alex Owsiak <aowsiak@staffordcountyva.gov>; Brandon F. Brown <bbrown@staffordcountyva.gov>
Sent: Wed, May 6, 2020 2:29 pm
Subject: Project Clover Scoping meeting held via online meeting May 6, 2020 attendance roster

Kevin,

I have copied everyone in attendance for the meeting unless I missed someone so you have their email address. I have added Peter Hedrich to the cc's.

David Beale - VDOT
Don Logan - VDOT
Stephen Haynes - VDOT
Margaret Niemann - VDOT

Mike Zuraf - Stafford County
Alex Owsiak - Stafford County
Joe Valotta - Stafford County
Brandon Brown - Stafford County

thank you
Margaret Niemann
Fredericksburg Land Development
(540)899-4106
margaret.niemann@vdot.virginia.gov

VETTRA Co. VETTRA Co.

5/25/16

\sycgrv\sitegen1.wk4

TABLE 1

"SITE" DEVELOPMENT DENSITIES & TRIP GENERATION

SYCAMORE GROVE

PROPOSED DENSITIES AND TRIP RATES

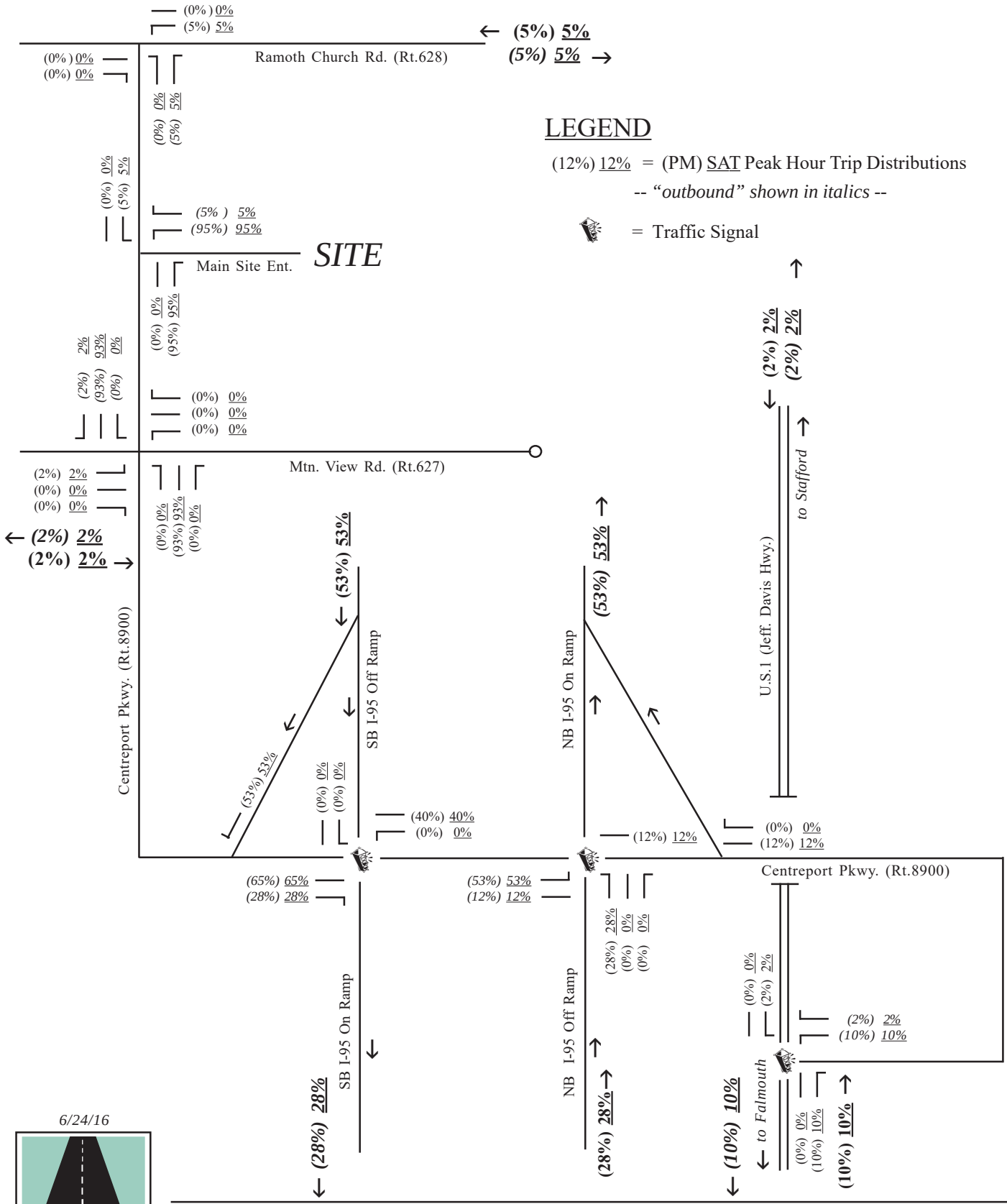
Land Uses & Densities	Quantity	Unit	ITE Avg. "Adj.St." Trip Rates (9th Edition -- 2012) ITE (Code)	AM Pk.Hr.	PM Pk.Hr.	SAT Pk.Hr.	Weekday VPD
SYCAMORE GROVE (prev. Oakenwold) -- Yr. 2023 Buildout							
Residential							
170 du Single-family, detached homes	170	du	(210)	0.75	1.00	0.93 *	9.52
Office							
20,000 gsf Gen. Office bldg. -- use fitted curve equations	20.00	Kgsf	(710)	2.64	5.04	0.43 *	19.32
Retail							
130,000 gsf Gen. Retail/Shop.Ctr. -- use fitted curve equations	130.00	Kgsf	(820)	1.41	5.49	7.98 *	61.95

Notes:
du = dwelling unit (Res.)
Kgsf = Thousand gross square feet
* = "Peak Hour of Gen." trip rate (avg. rate not available)

GENERATED TRIPS

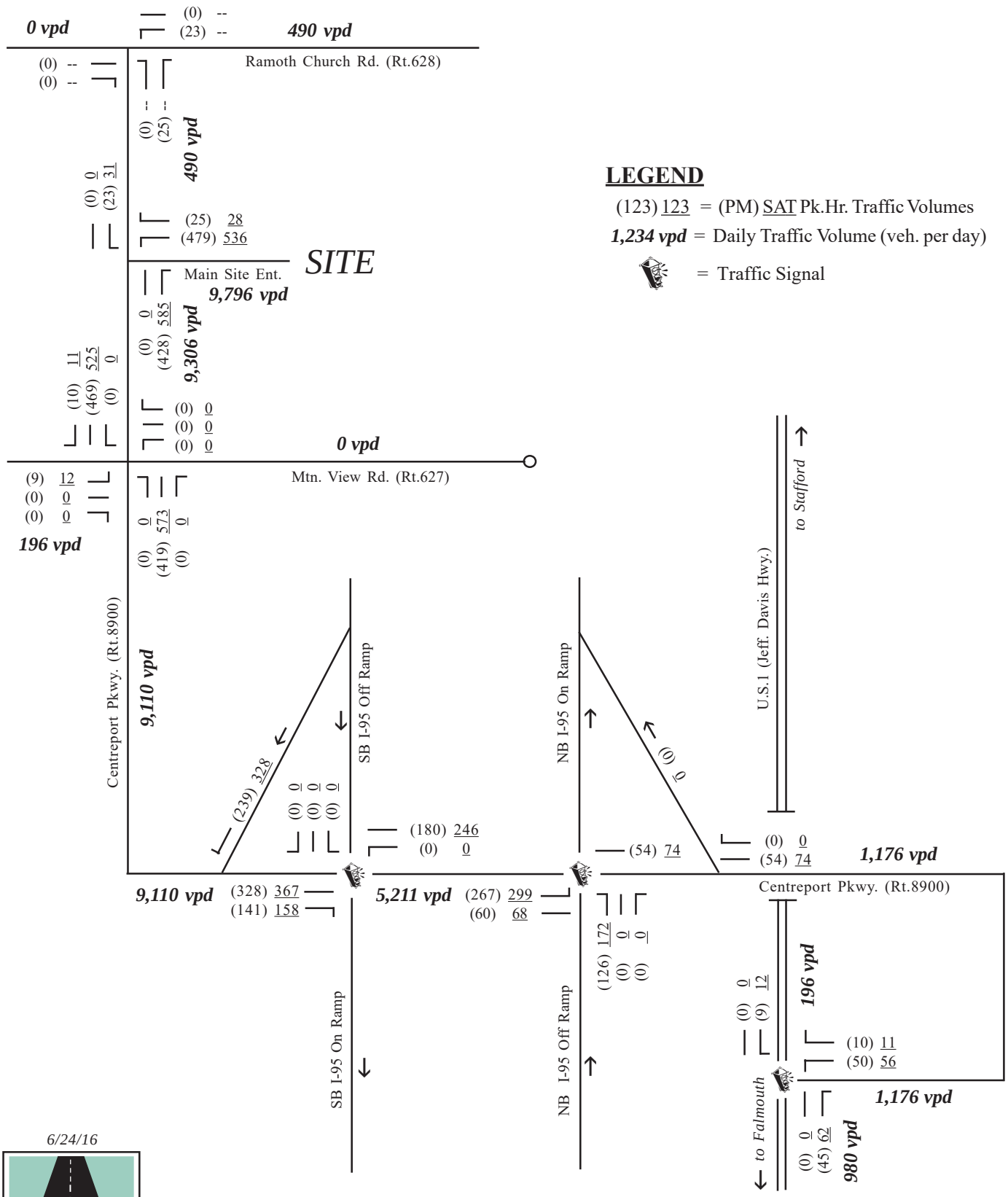
Land Uses & Densities	AM Pk.Hr. In	AM Pk.Hr. Out	AM Pk.Hr. Total	PM Pk.Hr. In	PM Pk.Hr. Out	PM Pk.Hr. Total	SAT Pk.Hr. In	SAT Pk.Hr. Out	SAT Pk.Hr. Total	Weekday VPD
SYCAMORE GROVE (prev. Oakenwold) -- Yr. 2023 Buildout										
Residential										
170 du Single-family, detached homes	32	96	128	107	63	170	85	73	158	1,618
minus 15% int. capture discount =	*-5*	*-14*	*-19*	*-16*	*-9*	*-26*	*-13*	*-11*	*-24*	*-243*
Res. (net) =	**27**	**81**	**108**	**92**	**53**	**145**	**72**	**62**	**134**	**1,376**
Office										
20,000 gsf Gen. Office bldg. -- use fitted curve equations	46	6	53	17	84	101	5	4	9	386
minus 5% int. capture discount =	*-2*	*-0*	*-3*	*-1*	*-4*	*-5*	*-0*	*-0*	*-0*	*-19*
Office (net) =	**44**	**6**	**50**	**16**	**80**	**96**	**5**	**4**	**9**	**367**
Retail										
130,000 gsf Gen. Retail/Shop.Ctr. -- use fitted curve equations	**113**	**70**	**183**	**343**	**371**	**714**	**539**	**498**	**1,037**	**8,054**
TOTAL SITE =	**185**	**157**	**341**	**451**	**504**	**955**	**616**	**564**	**1,180**	**9,796**

Note: All computations are automatically rounded.



Yr. 2023 & 2029 Generalized "Site" PM & SAT Peak Hour Directional Trip Distributions

FIGURE 3



6/24/16

N

No Scale

Yr. 2023 & 2029 "Site" Daily & PM/SAT Peak Hour Traffic Volumes

FIGURE 4

5) PROPOSED SITE TRIP GENERATION

a) Site Trip Generation

The "Sycamore Grove" mixed-use development is expected to be built out by Year 2023. **Table 1** provides an itemization of the site's proposed "worst-case" land use and development densities.

Table 1 also presents the calculated buildout Daily and Peak Hour (PM/SAT) trip generations for the proposed "Sycamore Grove" development. These calculations are based on the *ITE Trip Generation Manual – 9th Edition (2012)* average and fitted curve equation trip rates.

The "site" is expected to generate up to 9,796 one-way vehicle-trips (4,898 vehicles visiting the site) per day with 955 (PM peak hour) and 1,180 (SAT peak hour) vehicle-trips.

b) Trip Discounts and Reductions

In keeping with a "worst case" scenario, minimal (15% residential, 5% office) internal capture trip discounts for specific land uses have been assumed for this project. No (0) pass-by trip discounts are taken or assumed. See **Table 1** for details.

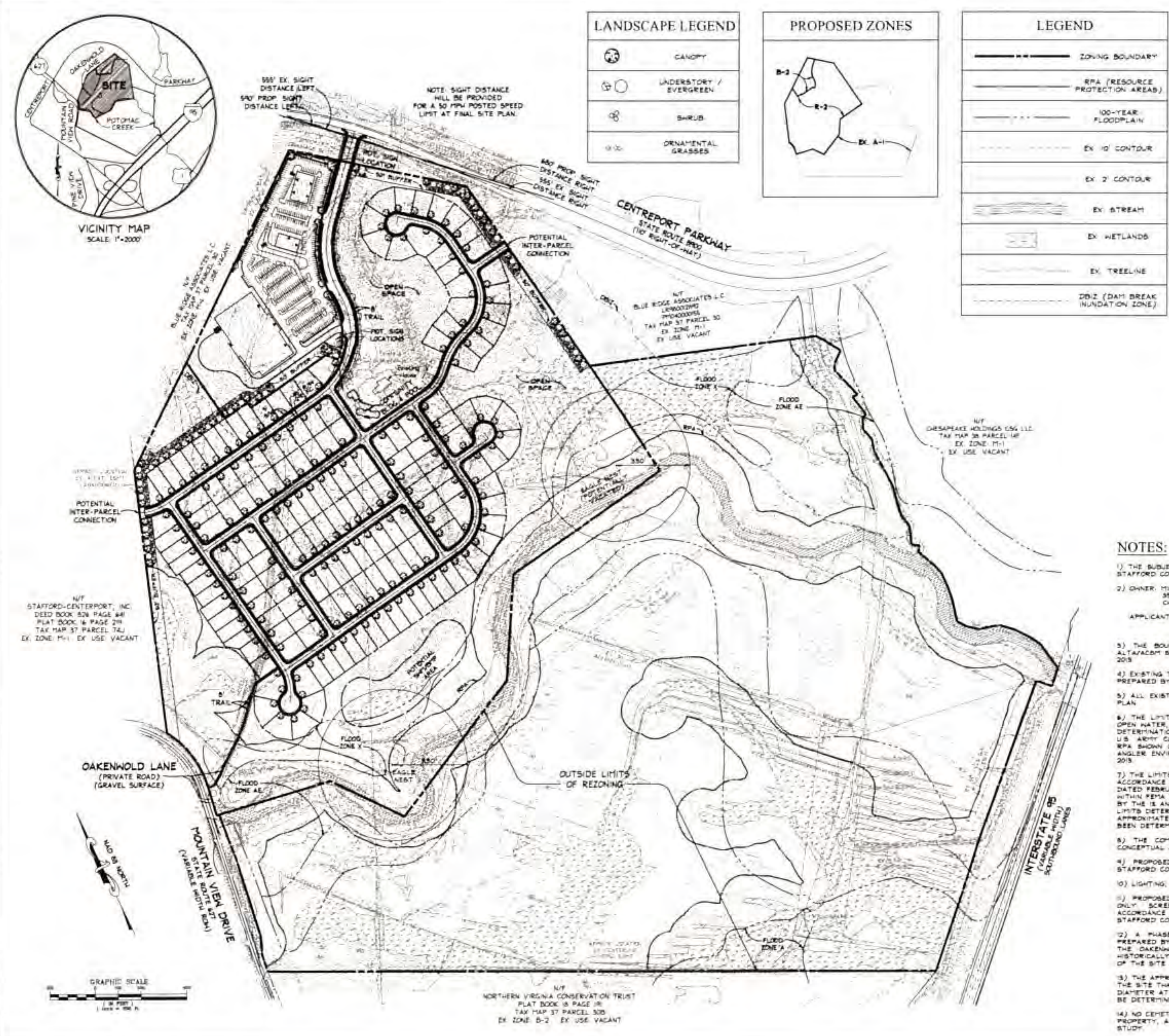
6) PROPOSED SITE TRIP DISTRIBUTION AND ASSIGNMENT

a) Site Trip Distributions

Year 2023 & 2029 site-generated trips were assigned to the road network based on pre- approved distributions from staff. Generalized "site" trip distributions for residential, office, & retail uses are shown in **Figure 3** and provided in **Appendix A.**

b) Site Trip Assignment

Based on the abovementioned site trip generation and distributions, site traffic volumes are assigned to the roadway network. **Figure 4** shows the Year 2023/2029 "site-related" PM & SAT Peak Hour Intersection Movement Volumes.



DEVELOPMENT SUMMARY

PARCEL ID	37-80
TOTAL PARCEL AREA	±231.6 AC
AREA TO BE REZONED	±98.5 AC
EXISTING ZONING DISTRICT	A-1
PROP. ZONING DISTRICTS	B-2, R-2

B-2 STANDARDS:

PARCEL AREA	±10.2 ACRES
PROP. FLOOR AREA	75,000-150,000 SQ. FT.
MAXIMUM FAR ALLOWED	0.70
MAXIMUM FAR PROVIDED	0.34
OPEN SPACE REQUIRED	25%
OPEN SPACE PROVIDED	25%
MINIMUM YARDS:	
FRONT	40'
SIDE	0
BACK	25'
MAXIMUM HEIGHT	65'

R-2 STANDARDS:

PARCEL AREA	±88.3 ACRES
PROPOSED USE	SINGLE FAMILY, VILLAGE
TOTAL LOTS PROPOSED	170 LOTS
MAXIMUM DENSITY	3.5 DU/AC
DENSITY PROVIDED	2.0 DU/AC
OPEN SPACE REQUIRED	25%
OPEN SPACE PROVIDED	30%
MINIMUM YARDS (SINGLE FAMILY):	
FRONT	20'
SIDE	10'
REAR	35'
MINIMUM LOT WIDTH	80'
MAXIMUM HEIGHT	35'
MINIMUM YARDS (VILLAGE):	
FRONT	15'
SIDE	3'
REAR	25'
MINIMUM LOT WIDTH	60'
MAXIMUM HEIGHT	35'
MINIMUM LOT SIZE	6,000 SQ. FT.

NOTES:

1) THE SUBJECT PROPERTY IS DESIGNATED AS TAX MAP 37 PARCEL 80 ON THE STAFFORD COUNTY TAX ASSESSMENT MAP.

2) OWNER: MICHELLE MONCURE
352 SHEETGRASS CREEK ROAD
CHARLESTON, SC 29412

APPLICANT: IVI STRATEGIES, LLC
13580 GROUPE DRIVE
WOODBRIDGE, VA 22192

3) THE BOUNDARY INFORMATION, AS SHOWN HEREON, IS TAKEN FROM THE ALTA/ACSM SURVEY PLAT, PREPARED BY THE ENGINEERING GROUPE ON APRIL 10, 2013.

4) EXISTING TOPOGRAPHY IS SHOWN HEREON PURSUANT TO AERIAL PHOTOGRAPHY, PREPARED BY MCKENZIE SNYDER, DATED FEBRUARY 2013.

5) ALL EXISTING EASEMENTS AND ENCUMBRANCES MAY NOT BE SHOWN ON THIS PLAN.

6) THE LIMITS OF WATERS OF THE U.S., INCLUDING STREAMS, WETLANDS AND OPEN WATER, SHOWN ON THIS PLAN ARE IN ACCORDANCE WITH A JURISDICTIONAL DETERMINATION PREPARED BY ANGLER ENVIRONMENTAL AND APPROVED BY THE U.S. ARMY CORPS OF ENGINEERS ON NOVEMBER 27, 2013. THE LIMITS OF THE RPA SHOWN ON THIS PLAN ARE IN ACCORDANCE WITH A STUDY PREPARED BY ANGLER ENVIRONMENTAL AND APPROVED BY STAFFORD COUNTY ON OCTOBER 2, 2013.

7) THE LIMITS OF EXISTING 100-YEAR FLOODPLAIN ARE SHOWN HEREON IN ACCORDANCE WITH THE FEMA FLOOD INSURANCE RATE MAP NUMBER 51019C0213E, DATED FEBRUARY 4, 2005. THE 100-YEAR FLOODPLAIN ALONG POTOMAC CREEK IS WITHIN FEMA ZONE AE, A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH BASE FLOOD ELEVATIONS AND FLOODWAY LIMITS DETERMINED. A SMALL PORTION OF THE PROPERTY IS WITHIN APPROXIMATE FLOODPLAIN ZONE A WHERE NO BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED.

8) THE COMMERCIAL AND RESIDENTIAL LAYOUTS, AS SHOWN HEREON, ARE CONCEPTUAL AND SUBJECT TO CHANGE WITH FINAL ENGINEERING.

9) PROPOSED ROADS WILL BE DESIGNED IN ACCORDANCE WITH VDOT AND STAFFORD COUNTY STANDARDS.

10) LIGHTING, WALLS AND FENCES WILL BE PROVIDED AT FINAL SITE PLAN.

11) PROPOSED LANDSCAPING IS SHOWN HEREON FOR ILLUSTRATIVE PURPOSES ONLY. SCREENING FOR THE SUBJECT PROPERTY WILL BE PLANTED IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION STANDARDS MANUAL FOR STAFFORD COUNTY.

12) A PHASE I ARCHEOLOGICAL STUDY FOR THE SUBJECT PROPERTY WAS PREPARED BY CIRCA-CULTURAL RESOURCE MANAGEMENT, LLC DATED MARCH 2013. THE OAKENWOLD HOUSE AND SEVERAL OUTBUILDINGS WERE FOUND TO BE HISTORICALLY SIGNIFICANT. ADDITIONAL STUDIES AND POTENTIAL PRESERVATION OF THE SITE WILL BE PROVIDED AS DISCUSSED IN THE PROFFERS.

13) THE APPROXIMATE LOCATION OF TREES ON THE SITE THAT ARE 6 INCHES OR GREATER DIAMETER AT BREAST HEIGHT (DBH) WILL BE DETERMINED AT FINAL ENGINEERING.

14) NO CEMETERIES EXIST ON THE SUBJECT PROPERTY, AS REFERENCED IN THE PHASE I STUDY.

ENGINEERING GROUPE PROJECT STATUS	
DATE	ACTION

The Engineering Groupe Inc.
Engineers | Surveyors | Planners

NO.	DATE	COUNTY REVISIONS

GENERALIZED DEVELOPMENT PLAN
SYCAMORE GROVE
B-2, R-2 REZONING
HARTWOOD MAGISTERIAL DISTRICT
STAFFORD COUNTY, VIRGINIA

DATE:	June 10, 2016
SCALE:	1"=200'
DESIGNER:	BF
DRAFTSMAN:	DMB
FILE NO.:	M-3090
SHEET:	1 OF 1

SITE TRIP GENERATION

For the purposes of this TIS, the current concept plan for Centerpoint Gateway consists of up to 380,000 square feet of commercial development with a 90 room hotel. Access to the site is proposed via one right-in/right-out entrance along Centreport Parkway located approximately 1,950' west of the I-95 SB Ramps/Centreport Parkway intersection.

The average weekday PM peak hour, weekend Saturday midday peak hour and average daily trips that are expected to be generated by the proposed Centerpoint Gateway facility were estimated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th edition and are shown in Table 3. During the scoping process for this TIS, it was agreed that the land use code for the 320,000 SF Retail Center would be updated from the Stafford Retail Center TIA from Land Use Code (LUC) 820 to LUC 823. This change reflects more accurately the regional destination nature of this use, which is anticipated to have a significantly different (and less intense) trip generation profile than Shopping Center retail. A discussion of various trip types associated with developments (primary trips, internal trips, and pass-by trips) is provided below.

5.1 PRIMARY SITE TRIPS

Trips that are made for the specific purpose of visiting the site are known as primary trips. As shown in Table 3, the Centerpoint Gateway site would generate approximately 1,092 new external trips during the weekday PM peak hour (516 In and 577 out), and 1,795 new external trips during the Saturday peak hour (926 in and 869 out).

5.2 INTERNAL CAPTURE TRIPS

Internal capture trips are trips that would make a stop at more than one of the uses within the development. For example, a person at a hotel may walk to one of the adjacent retail facilities (which may include restaurants) without ever leaving the development. Some internal capture trips are expected for the proposed Site. However, based on discussions with VDOT and the County during the scoping process regarding other changes to trip generation and the anticipated pass-by trips (discussed below), it was agreed that no adjustments would be applied to the Site's trip generation for internal capture trips.

5.3 PASS-BY TRIPS

Pass-by trips are trips that would be drawn to the development from the existing traffic stream on the adjacent streets. These trips are intermediate stops on the way from an origin to the primary destination. These trips do not add to the overall traffic volumes on the roadway, but will add to the turning traffic at the site's driveway connections. Chapter 527 guidelines allows for up to a 33% reduction to be applied to the site generated retail trips in accordance with the land use and ITE studies; however, because of the low-volume nature of Centreport Parkway, it was determined during previous scoping efforts for the 2016 *Stafford Retail Center TIA* to calculate pass-by adjustments using 10% of the prevailing Centreport Parkway through volumes. This updated TIS is consistent with the past assumption. JMT applied a 10% adjustment for pass-by trips to Centreport Parkway's eastbound traffic volume *only*. It is noted that some pass-by trips in the westbound direction may occur; however, during the peak hours, the elongated ingress and egress route to the Site for westbound pass-by trips coupled with expected peak hour delays will make this pass-by movement far less appealing than for a typical entrance at a signalized access point or median

opening. Therefore, for the purposes of this TIS, westbound pass-by trips were assumed to be zero during the peak hours analyzed herein. This assumption was confirmed with Fredericksburg District Traffic Engineering, and it is conservative in nature as it will result in slightly more primary trips being assigned throughout the study area network.

TABLE 3 – SITE TRIP GENERATION SUMMARY

Centerpoint Gateway Trip Generation Summary[1]	**Weekday PM Peak Hour**			**Saturday Peak Hour**		
	In	**Out**	**Total**	**In**	**Out**	**Total**
60,000 S.F. Shopping Center	204	221	425	326	301	627
320,000 S.F. Regional Destination Retail	344	389	733	619	594	1,213
90 Room Hotel	28	26	54	36	29	65
A. Subtotal (Unadjusted)	**576**	**637**	**1,212**	**981**	**924**	**1,905**
~~*B. 33% Pass-by Trip Reduction (Gen Retail)*~~[2] *- NOT USED*	~~*181*~~	~~*201*~~	~~*382*~~	~~*312*~~	~~*295*~~	~~*607*~~
C. 10% Pass-by Trip Reduction (Mainline Centreport Pkwy)[3]	**60**	**60**	**120**	**55**	**55**	**110**
D. Total (A minus C)	**516**	**577**	**1,092**	**926**	**869**	**1,795**
E. Internal Trip Reduction - (n/a)[4]	**0**	**0**	**0**	**0**	**0**	**0**
Total Trips	**516**	**577**	**1,092**	**926**	**869**	**1,795**

Notes:

(1) Based on the Institute of Transportation Engineers Trip Generation, 9th Edition

(2) Theoretical pass-by allowed by TOSAM shown for reference only

(3) Applied Pass-By is for Eastbound Centreport Parkway Traffic (only) under Projected 2025 Total Future Conditions (without Sycamore Grove trips). Because pass-by is based on a percentage of background traffic on the roadway, pass-by volumes for the 2019 Total Future will be lower than those listed in the table above.

(4) Internal capture trips are expected to occur on the site; however, they were assumed to be zero for this TIS. Refer to report writeup for rationale.

5.4 BY-RIGHT TRIP GENERATION

It is important to note that the Site already has a significant trip generation potential under its current Urban Commercial (B2) zoning, with proffers. However, the Site's by-right trip generation potential was not calculated as part of this analysis.

SITE TRIP DISTRIBUTION AND ASSIGNMENT

The trip distribution percentages for the proposed Site were agreed upon in the previous *Stafford Retail Center TIA* and remain unchanged for the analyses in this TIS. Overall primary site trips and pass-by trips are discussed below.

6.1 PRIMARY SITE TRIPS

Primary trips are defined as trips that are made to/from the Site, where the specific trip purpose involves the Site as either the primary departure point or primary destination. During the weekday AM and PM peak hour, the primary site trip distribution percentages are assumed to be as follows (consistent with the *Stafford Retail Center TIA*), as shown on Figure 10:

- 54% to/from the north on I-95
- 28% to/from the south on I-95
- 2% to/from the north on US Route 1
- 10% to/from the south on US Route 1
- 4% to/from the north on Centreport Parkway
- 2% to/from the west on Mountain View Road

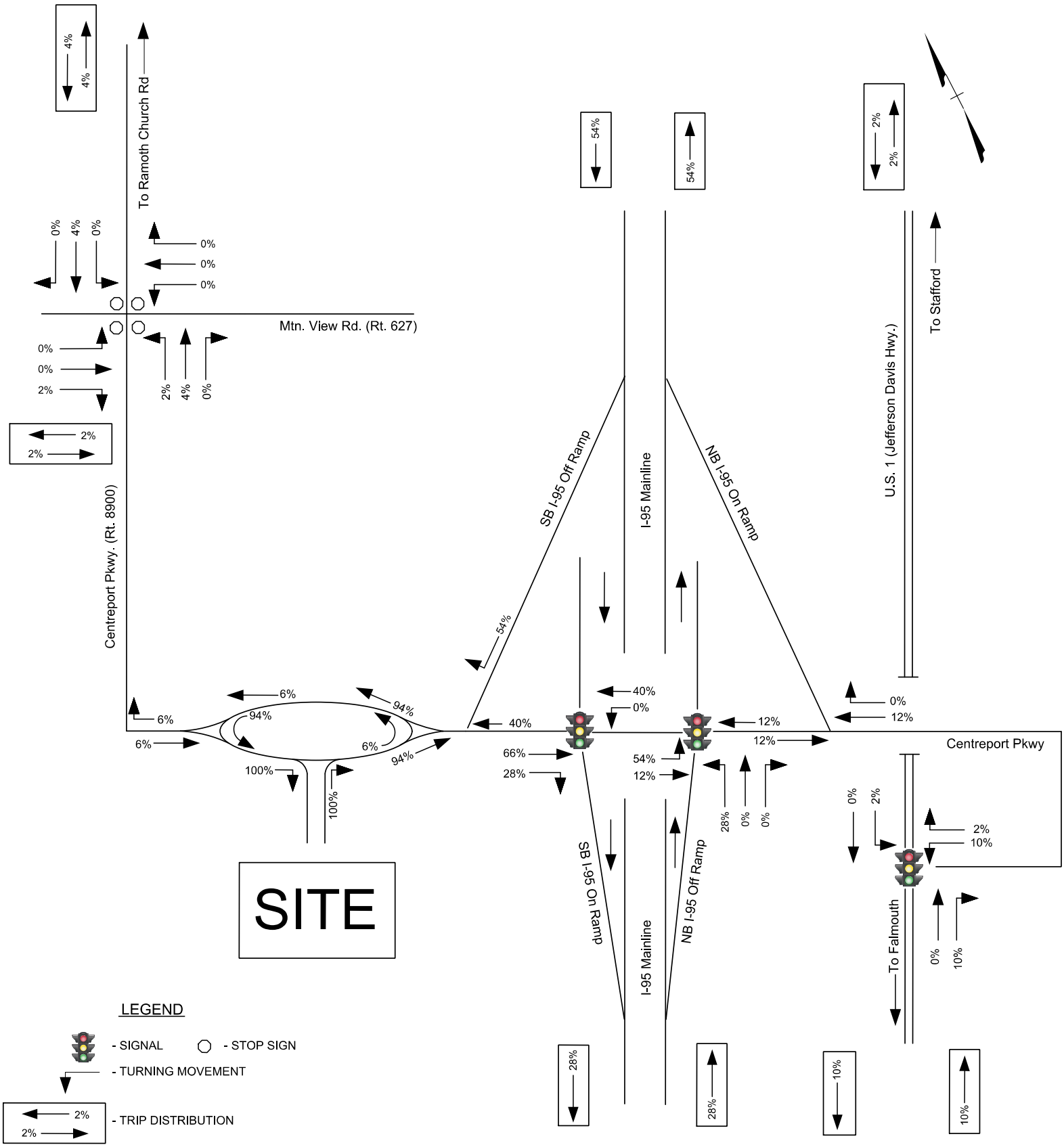
6.2 PRIMARY SITE TRIP ASSIGNMENTS

Traffic was assigned to the local street network by applying the trip distribution percentages (above) to the Site trip generation potential presented in Table 3. All site trips enter and exit via the proposed Site RI/RO entrance. Primary site trip assignments are shown on Figure 11.

6.3 PASS-BY TRIP ASSIGNMENTS

Pass-by trip assignments were applied along eastbound Centreport Parkway (only) at the proposed Site RI/RO entrance as agreed upon during the scoping process for this updated TIS and as discussed in the previous section. Pass-by trip assignments are shown on Figure 12.

The sum of primary site trips and pass-by site trips are shown on Figure 13 and represent the total site trips evaluated in the TIS.

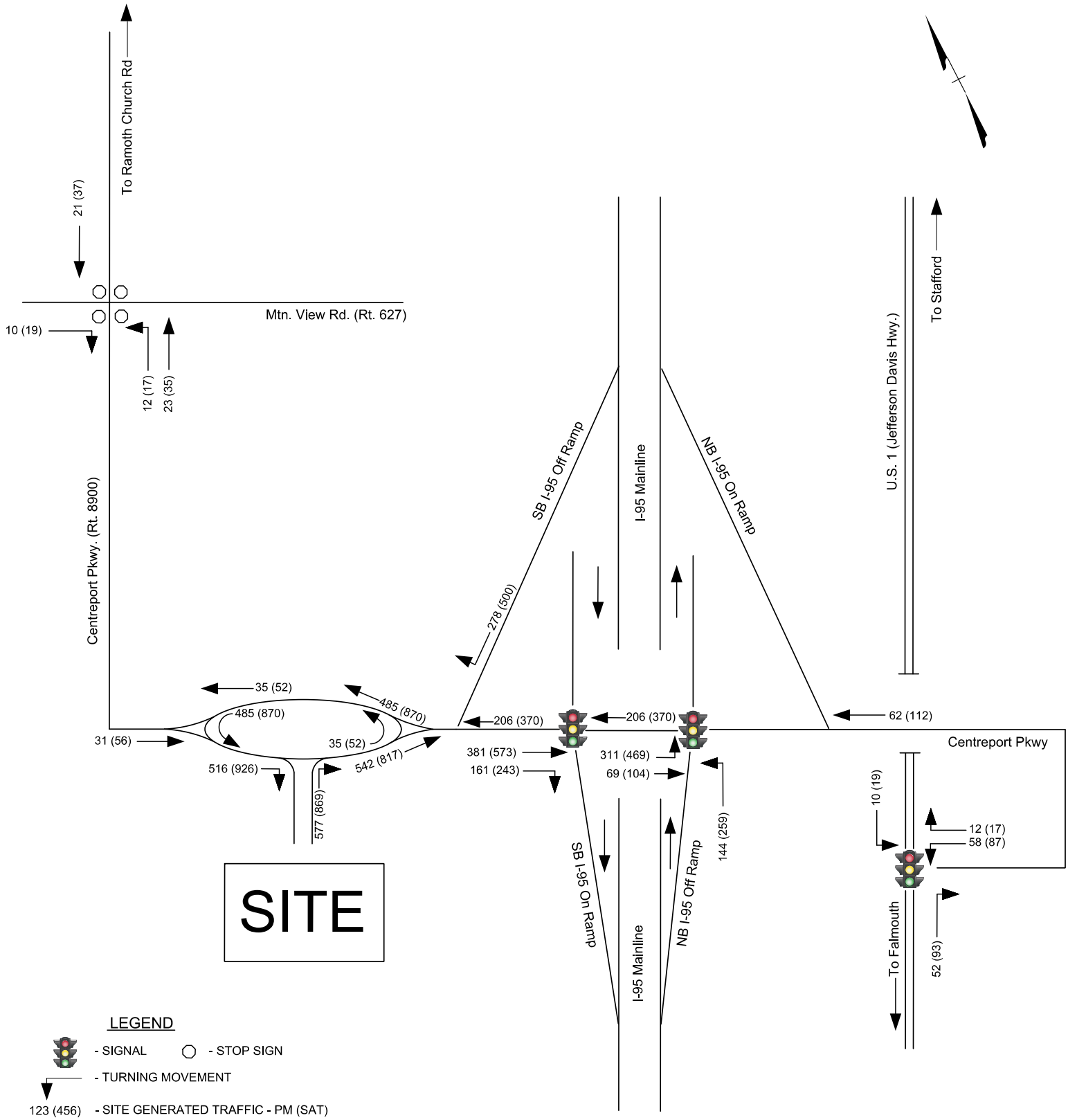


CENTERPOINT GATEWAY
STAFFORD COUNTY, VA

FIGURE 10

SITE GENERATED PRIMARY
SITE TRIP DISTRIBUTIONS

NOT TO SCALE
OCTOBER 2017

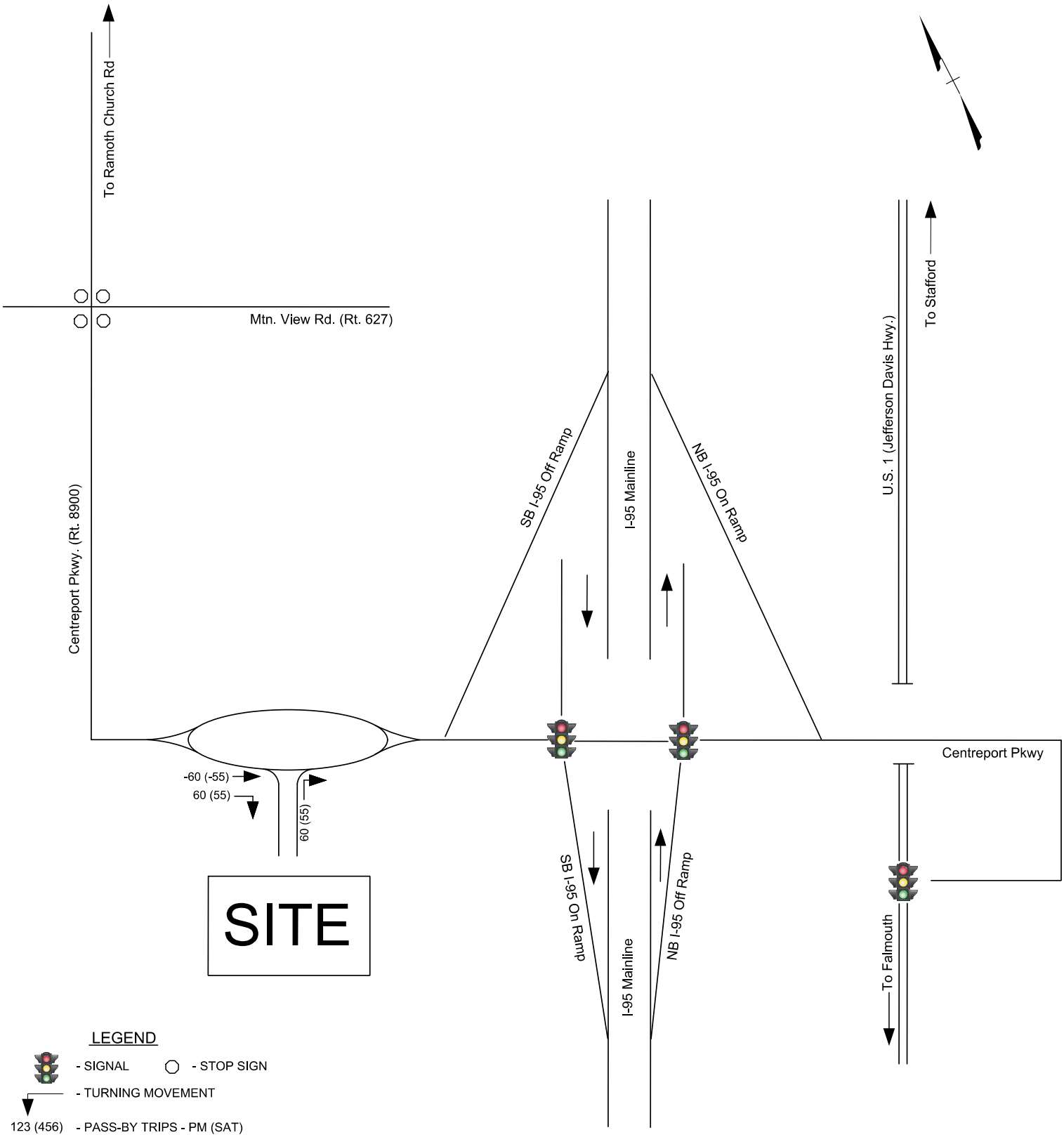


CENTERPOINT GATEWAY
STAFFORD COUNTY, VA

FIGURE 11

SITE GENERATED TRAFFIC
ASSIGNMENTS - PRIMARY TRIPS

NOT TO SCALE
OCTOBER 2017

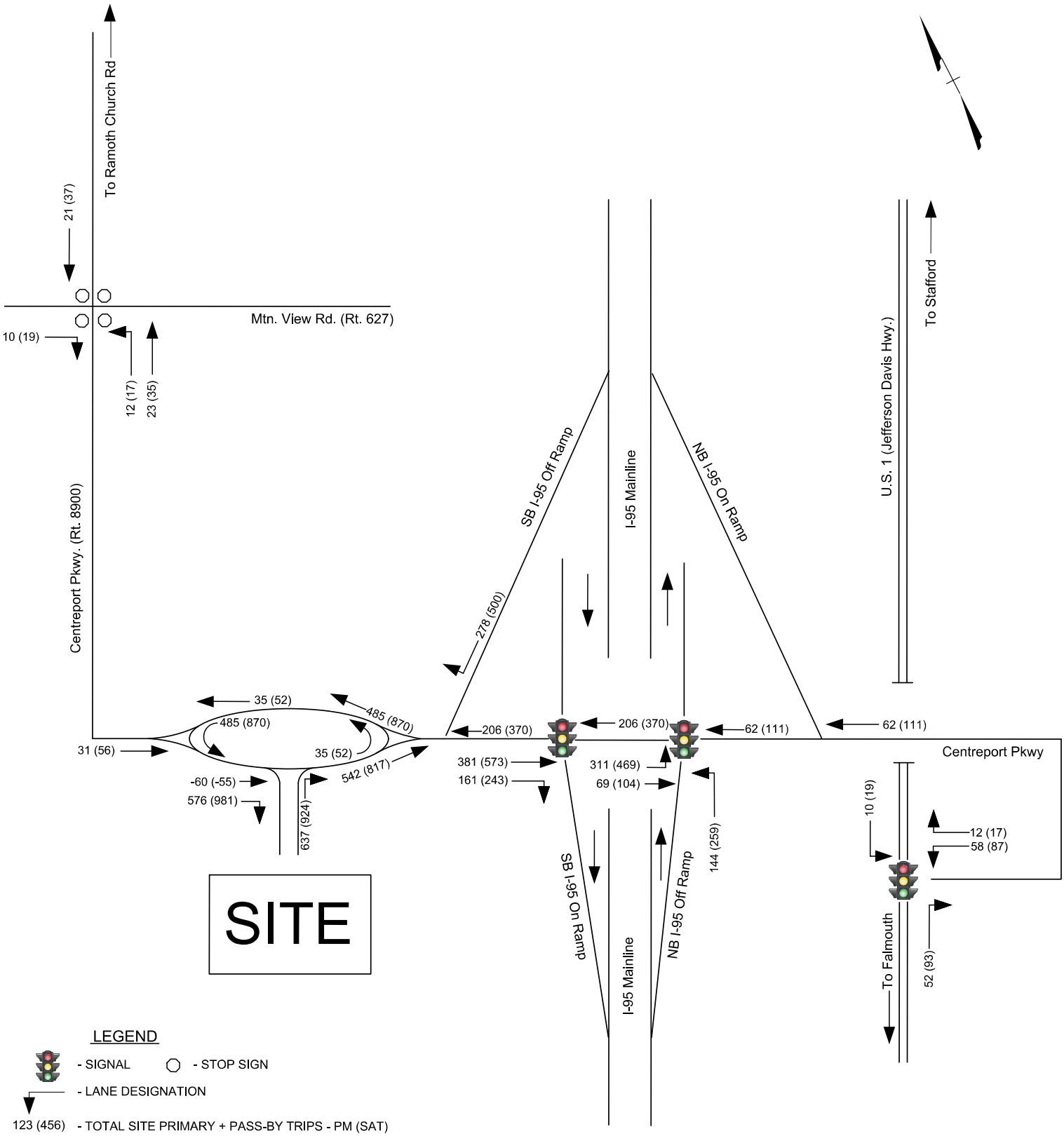


CENTERPOINT GATEWAY
STAFFORD COUNTY, VA

FIGURE 12

SITE GENERATED TRAFFIC
ASSIGNMENTS - PASS-BY TRIPS

NOT TO SCALE
OCTOBER 2017



CENTERPOINT GATEWAY
STAFFORD COUNTY, VA

FIGURE 13

SITE GENERATED TRAFFIC ASSIGNMENTS
- TOTAL SITE PRIMARY + PASS-BY TRIPS

NOT TO SCALE

OCTOBER 2017

Appendix G:

Intersection Capacity Analysis - Future without Development Condition (2023)

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	192	163	92	1113	59	354
v/c Ratio	0.61	0.48	0.15	0.66	0.20	0.21
Control Delay	36.7	27.8	7.2	18.6	8.1	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.7	27.8	7.2	18.6	8.1	13.3
Queue Length 50th (ft)	79	52	17	232	11	55
Queue Length 95th (ft)	166	125	37	321	26	88
Internal Link Dist (ft)	2944	630		2695		2069
Turn Bay Length (ft)			325		230	
Base Capacity (vph)	410	438	816	2482	583	2461
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	0.47	0.37	0.11	0.45	0.10	0.14

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	34	80	27	36	87	85	1002	22	54	300	26
Future Volume (veh/h)	63	34	80	27	36	87	85	1002	22	54	300	26
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1776	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	68	37	87	29	39	95	92	1089	24	59	326	28
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	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
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	2	2	2
Cap, veh/h	140	59	105	90	71	138	654	1766	39	332	1610	137
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.06	0.50	0.50	0.05	0.49	0.49
Sat Flow, veh/h	472	408	729	191	493	955	1774	3541	78	1774	3301	282
Grp Volume(v), veh/h	192	0	0	163	0	0	92	544	569	59	174	180
Grp Sat Flow(s),veh/h/ln	1610	0	0	1638	0	0	1774	1770	1849	1774	1770	1813
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	0.0	1.7	15.2	15.2	1.1	3.8	3.9
Cycle Q Clear(g_c), s	7.7	0.0	0.0	6.3	0.0	0.0	1.7	15.2	15.2	1.1	3.8	3.9
Prop In Lane	0.35		0.45	0.18		0.58	1.00		0.04	1.00		0.16
Lane Grp Cap(c), veh/h	304	0	0	299	0	0	654	883	922	332	863	884
V/C Ratio(X)	0.63	0.00	0.00	0.55	0.00	0.00	0.14	0.62	0.62	0.18	0.20	0.20
Avail Cap(c_a), veh/h	522	0	0	520	0	0	1066	1424	1488	764	1424	1459
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	0.0	0.0	27.8	0.0	0.0	7.5	12.4	12.4	9.1	9.9	10.0
Incr Delay (d2), s/veh	2.2	0.0	0.0	1.5	0.0	0.0	0.1	1.5	1.4	0.3	0.2	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	3.7	0.0	0.0	3.0	0.0	0.0	0.8	7.8	8.1	0.5	1.9	2.0
LnGrp Delay(d),s/veh	30.4	0.0	0.0	29.3	0.0	0.0	7.6	13.9	13.8	9.4	10.2	10.2
LnGrp LOS	C			C			A	B	B	A	B	B
Approach Vol, veh/h		192			163			1205			413	
Approach Delay, s/veh		30.4			29.3			13.4			10.1	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	40.1		17.3	10.2	40.9		17.3
Change Period (Y+Rc), s	* 6.8	* 6.8		7.4	* 6.8	* 6.8		7.4
Max Green Setting (Gmax), s	* 20	* 55		20.0	* 20	* 55		20.0
Max Q Clear Time (g_c+I1), s	3.7	5.9		9.7	3.1	17.2		8.3
Green Ext Time (p_c), s	0.2	4.2		0.4	0.1	16.9		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	153	17	26	121	18	24
Future Vol, veh/h	153	17	26	121	18	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	380	-	-	0	290
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	166	18	28	132	20	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	184	0	354	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	188	-
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	-	-	1391	-	644	878
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	844	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1391	-	630	878
Mov Cap-2 Maneuver	-	-	-	-	630	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	825	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	630	878	-	-	1391	-
HCM Lane V/C Ratio	0.031	0.03	-	-	0.02	-
HCM Control Delay (s)	10.9	9.2	-	-	7.6	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	41.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	242	1	0	1	555	231	1	0	134	7
Future Vol, veh/h	6	0	242	1	0	1	555	231	1	0	134	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
Heavy Vehicles, %	1	1	1	0	0	0	4	4	4	2	2	2
Mvmt Flow	7	0	263	1	0	1	603	251	1	0	146	8
Number of Lanes	0	1	1	1	1	0	1	1	0	0	1	0

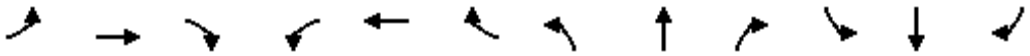
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	14.3	10.4	54.8	11.9
HCM LOS	B	B	F	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	0%	0%	95%
Vol Right, %	0%	0%	0%	100%	0%	100%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	555	232	6	242	1	1	141
LT Vol	555	0	6	0	1	0	0
Through Vol	0	231	0	0	0	0	134
RT Vol	0	1	0	242	0	1	7
Lane Flow Rate	603	252	7	263	1	1	153
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	1.04	0.399	0.014	0.455	0.002	0.002	0.271
Departure Headway (Hd)	6.208	5.7	7.649	6.423	8.263	7.026	6.473
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	591	635	471	566	436	512	558
Service Time	3.912	3.405	5.349	4.123	5.963	4.726	4.473
HCM Lane V/C Ratio	1.02	0.397	0.015	0.465	0.002	0.002	0.274
HCM Control Delay	72.6	12.1	10.5	14.4	11	9.7	11.9
HCM Lane LOS	F	B	B	B	B	A	B
HCM 95th-tile Q	16.6	1.9	0	2.4	0	0	1.1

Lane Group	EBT	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	198	270	140	804	151
v/c Ratio	0.19	0.25	0.17	0.58	0.62
Control Delay	12.1	2.1	8.5	13.5	59.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	2.1	8.5	13.5	59.4
Queue Length 50th (ft)	65	0	45	358	112
Queue Length 95th (ft)	118	38	m43	m211	174
Internal Link Dist (ft)	477			2385	224
Turn Bay Length (ft)		500	300		
Base Capacity (vph)	1063	1073	822	1375	410
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	0.19	0.25	0.17	0.58	0.37

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	182	248	129	740	0	0	0	0	139	0	0
Future Volume (vph)	0	182	248	129	740	0	0	0	0	139	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.9	7.9	7.9	7.9						6.9	
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	
Frt		1.00	0.85	1.00	1.00						1.00	
Flt Protected		1.00	1.00	0.95	1.00						0.95	
Satd. Flow (prot)		1759	1599	1719	1863						1752	
Flt Permitted		1.00	1.00	0.63	1.00						0.95	
Satd. Flow (perm)		1759	1599	1146	1863						1752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	198	270	140	804	0	0	0	0	151	0	0
RTOR Reduction (vph)	0	0	107	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	198	163	140	804	0	0	0	0	0	151	0
Heavy Vehicles (%)	2%	8%	1%	5%	2%	2%	2%	2%	2%	3%	2%	2%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	
Protected Phases		6		5	2						4	
Permitted Phases			6	6						4		
Actuated Green, G (s)		72.6	72.6	80.7	88.6						16.6	
Effective Green, g (s)		72.6	72.6	80.7	88.6						16.6	
Actuated g/C Ratio		0.60	0.60	0.67	0.74						0.14	
Clearance Time (s)		7.9	7.9	7.9	7.9						6.9	
Vehicle Extension (s)		4.0	4.0	3.0	4.0						4.0	
Lane Grp Cap (vph)		1064	967	809	1375						242	
v/s Ratio Prot		0.11		0.01	c0.43							
v/s Ratio Perm			0.10	0.10							0.09	
v/c Ratio		0.19	0.17	0.17	0.58						0.62	
Uniform Delay, d1		10.5	10.4	7.0	7.2						48.8	
Progression Factor		1.00	1.00	1.55	1.63						1.00	
Incremental Delay, d2		0.4	0.4	0.0	0.2						5.6	
Delay (s)		10.9	10.8	10.9	11.9						54.3	
Level of Service		B	B	B	B						D	
Approach Delay (s)		10.9			11.8			0.0			54.3	
Approach LOS		B			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.7
Intersection Capacity Utilization	128.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Group Flow (vph)	91	245	298	522	1319
v/c Ratio	0.21	0.28	0.47	0.58	1.89
Control Delay	15.6	16.6	33.9	5.4	430.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	16.6	33.9	5.4	430.1
Queue Length 50th (ft)	32	91	180	0	~1553
Queue Length 95th (ft)	63	148	269	78	#1818
Internal Link Dist (ft)		2385	1991		1289
Turn Bay Length (ft)	400				
Base Capacity (vph)	451	860	629	896	698
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	0.20	0.28	0.47	0.58	1.89

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	235	0	0	286	501	583	19	664	0	0	0
Future Volume (veh/h)	87	235	0	0	286	501	583	19	664	0	0	0
Number	5	2	12	1	6	16	7	4	14			
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			
Adj Sat Flow, veh/h/ln	1900	1792	0	0	1810	1881	1900	1853	1900			
Adj Flow Rate, veh/h	91	245	0	0	298	0	607	20	692			
Adj No. of Lanes	1	1	0	0	1	1	0	1	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	0	6	0	0	5	1	0	0	0			
Cap, veh/h	416	860	0	0	674	596	302	10	344			
Arrive On Green	0.02	0.16	0.00	0.00	0.37	0.00	0.40	0.40	0.40			
Sat Flow, veh/h	1810	1792	0	0	1810	1599	764	25	871			
Grp Volume(v), veh/h	91	245	0	0	298	0	1319	0	0			
Grp Sat Flow(s),veh/h/ln	1810	1792	0	0	1810	1599	1661	0	0			
Q Serve(g_s), s	3.7	14.5	0.0	0.0	14.8	0.0	47.4	0.0	0.0			
Cycle Q Clear(g_c), s	3.7	14.5	0.0	0.0	14.8	0.0	47.4	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.46		0.52			
Lane Grp Cap(c), veh/h	416	860	0	0	674	596	656	0	0			
V/C Ratio(X)	0.22	0.28	0.00	0.00	0.44	0.00	2.01	0.00	0.00			
Avail Cap(c_a), veh/h	478	860	0	0	674	596	656	0	0			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.99	0.99	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	23.1	32.3	0.0	0.0	28.3	0.0	36.3	0.0	0.0			
Incr Delay (d2), s/veh	0.3	0.8	0.0	0.0	2.1	0.0	460.3	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			
%ile BackOfQ(50%),veh/ln	1.9	7.4	0.0	0.0	7.8	0.0	105.5	0.0	0.0			
LnGrp Delay(d),s/veh	23.3	33.2	0.0	0.0	30.4	0.0	496.6	0.0	0.0			
LnGrp LOS	C	C			C		F					
Approach Vol, veh/h		336			298			1319				
Approach Delay, s/veh		30.5			30.4			496.6				
Approach LOS		C			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		65.0		55.0	12.9	52.1		
Change Period (Y+Rc), s		* 7.4		* 7.6	* 7.4	* 7.4		
Max Green Setting (Gmax), s		* 58		* 47	* 9.6	* 41		
Max Q Clear Time (g_c+I1), s		16.5		49.4	5.7	16.8		
Green Ext Time (p_c), s		1.4		0.0	0.1	1.6		

Intersection Summary	
HCM 2010 Ctrl Delay	345.2
HCM 2010 LOS	F

Notes

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	403	574	1232	788	67	379
v/c Ratio	0.76	0.75	0.61	0.72	0.32	0.15
Control Delay	46.5	18.3	28.5	6.0	17.3	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	18.3	28.5	6.0	17.3	13.0
Queue Length 50th (ft)	272	120	267	0	23	48
Queue Length 95th (ft)	#425	278	327	94	45	65
Internal Link Dist (ft)	489		1026			1993
Turn Bay Length (ft)		270		270	530	
Base Capacity (vph)	569	789	2123	1116	432	3512
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	0.71	0.73	0.58	0.71	0.16	0.11

Intersection Summary

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	371	528	1133	725	62	349
Future Volume (vph)	371	528	1133	725	62	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1599	5036	1568	1530	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.15	1.00
Satd. Flow (perm)	1736	1599	5036	1568	249	4673
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	403	574	1232	788	67	379
RTOR Reduction (vph)	0	276	0	477	0	0
Lane Group Flow (vph)	403	298	1232	311	67	379
Heavy Vehicles (%)	4%	1%	3%	3%	18%	11%
Turn Type	Prot	Perm	NA	Perm	D.P+P	NA
Protected Phases	3		6		5	2
Permitted Phases		3		6	6	
Actuated Green, G (s)	33.3	33.3	43.9	43.9	50.3	60.5
Effective Green, g (s)	33.3	33.3	43.9	43.9	50.3	60.5
Actuated g/C Ratio	0.30	0.30	0.39	0.39	0.45	0.54
Clearance Time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Vehicle Extension (s)	6.0	6.0	4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	519	478	1988	619	186	2542
v/s Ratio Prot	c0.23		c0.24		c0.02	0.08
v/s Ratio Perm		0.19		0.20	0.14	
v/c Ratio	0.78	0.62	0.62	0.50	0.36	0.15
Uniform Delay, d1	35.6	33.5	27.0	25.4	18.3	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.0	4.3	0.7	0.9	1.2	0.0
Delay (s)	44.6	37.8	27.6	26.3	19.5	12.6
Level of Service	D	D	C	C	B	B
Approach Delay (s)	40.6		27.1			13.6
Approach LOS	D		C			B

Intersection Summary			
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	111.2	Sum of lost time (s)	27.6
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	231	191	61	451	167	1368
v/c Ratio	0.74	0.60	0.28	0.28	0.29	0.76
Control Delay	49.5	40.4	9.7	15.6	8.2	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	40.4	9.7	15.6	8.2	21.4
Queue Length 50th (ft)	123	94	12	82	36	339
Queue Length 95th (ft)	#267	#194	26	119	61	435
Internal Link Dist (ft)	2944	630		2695		2069
Turn Bay Length (ft)			325		230	
Base Capacity (vph)	313	319	461	2123	753	2108
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	0.74	0.60	0.13	0.21	0.22	0.65

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	56	80	43	61	72	56	406	9	154	1167	92
Future Volume (veh/h)	76	56	80	43	61	72	56	406	9	154	1167	92
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1776	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	83	61	87	47	66	78	61	441	10	167	1268	100
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	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
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	2	2	2
Cap, veh/h	137	85	100	100	113	111	259	1785	40	616	1763	139
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.04	0.50	0.50	0.07	0.53	0.53
Sat Flow, veh/h	446	475	557	265	634	620	1774	3538	80	1774	3325	262
Grp Volume(v), veh/h	231	0	0	191	0	0	61	220	231	167	674	694
Grp Sat Flow(s),veh/h/ln	1478	0	0	1519	0	0	1774	1770	1849	1774	1770	1817
Q Serve(g_s), s	3.1	0.0	0.0	0.0	0.0	0.0	1.3	6.0	6.0	3.8	24.6	24.8
Cycle Q Clear(g_c), s	13.0	0.0	0.0	9.9	0.0	0.0	1.3	6.0	6.0	3.8	24.6	24.8
Prop In Lane	0.36		0.38	0.25		0.41	1.00		0.04	1.00		0.14
Lane Grp Cap(c), veh/h	322	0	0	324	0	0	259	893	933	616	939	964
V/C Ratio(X)	0.72	0.00	0.00	0.59	0.00	0.00	0.24	0.25	0.25	0.27	0.72	0.72
Avail Cap(c_a), veh/h	403	0	0	406	0	0	595	1140	1191	906	1140	1170
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.0	0.0	0.0	32.7	0.0	0.0	12.2	12.0	12.0	8.8	15.2	15.2
Incr Delay (d2), s/veh	4.5	0.0	0.0	1.7	0.0	0.0	0.5	0.3	0.3	0.2	2.7	2.7
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	5.7	0.0	0.0	4.3	0.0	0.0	0.6	3.0	3.2	1.8	12.7	13.1
LnGrp Delay(d),s/veh	38.5	0.0	0.0	34.4	0.0	0.0	12.7	12.3	12.3	9.0	17.9	17.9
LnGrp LOS	D			C			B	B	B	A	B	B
Approach Vol, veh/h		231			191			512			1535	
Approach Delay, s/veh		38.5			34.4			12.3			16.9	
Approach LOS		D			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.6	52.1		22.7	12.8	49.9		22.7
Change Period (Y+Rc), s	* 6.8	* 6.8		7.4	* 6.8	* 6.8		7.4
Max Green Setting (Gmax), s	* 20	* 55		20.0	* 20	* 55		20.0
Max Q Clear Time (g_c+I1), s	3.3	26.8		15.0	5.8	8.0		11.9
Green Ext Time (p_c), s	0.1	18.5		0.3	0.4	5.5		0.4

Intersection Summary		
HCM 2010 Ctrl Delay		19.3
HCM 2010 LOS		B

Notes

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	178	25	35	174	26	34
Future Vol, veh/h	178	25	35	174	26	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	380	-	-	0	290
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	193	27	38	189	28	37

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	220	0	458	193
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	265	-
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	-	-	1349	-	561	849
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	779	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1349	-	544	849
Mov Cap-2 Maneuver	-	-	-	-	544	-
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	755	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	544	849	-	-	1349	-
HCM Lane V/C Ratio	0.052	0.044	-	-	0.028	-
HCM Control Delay (s)	12	9.4	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	39.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	1	493	1	1	0	382	176	1	0	231	8
Future Vol, veh/h	8	1	493	1	1	0	382	176	1	0	231	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
Heavy Vehicles, %	1	1	1	0	0	0	4	4	4	2	2	2
Mvmt Flow	9	1	536	1	1	0	415	191	1	0	251	9
Number of Lanes	0	1	1	1	1	0	1	1	0	0	1	0

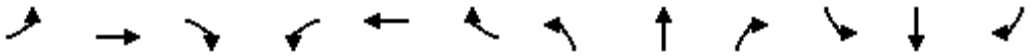
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	53.8	11.8	34.5	19.2
HCM LOS	F	B	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	89%	0%	100%	0%	0%
Vol Thru, %	0%	99%	11%	0%	0%	100%	97%
Vol Right, %	0%	1%	0%	100%	0%	0%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	382	177	9	493	1	1	239
LT Vol	382	0	8	0	1	0	0
Through Vol	0	176	1	0	0	1	231
RT Vol	0	1	0	493	0	0	8
Lane Flow Rate	415	192	10	536	1	1	260
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.876	0.378	0.021	0.963	0.003	0.003	0.543
Departure Headway (Hd)	7.593	7.079	7.643	6.471	9.195	8.674	7.518
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	478	508	469	563	388	412	481
Service Time	5.343	4.829	5.377	4.204	6.969	6.446	5.569
HCM Lane V/C Ratio	0.868	0.378	0.021	0.952	0.003	0.002	0.541
HCM Control Delay	44	14.1	10.5	54.6	12	11.5	19.2
HCM Lane LOS	E	B	B	F	B	B	C
HCM 95th-tile Q	9.3	1.7	0.1	12.9	0	0	3.2

Lane Group	EBT	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	517	507	182	502	600
v/c Ratio	0.72	0.55	0.59	0.52	0.95
Control Delay	38.8	4.8	24.7	20.2	64.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	4.8	24.7	20.2	64.5
Queue Length 50th (ft)	342	0	65	180	444
Queue Length 95th (ft)	478	71	m122	262	#673
Internal Link Dist (ft)	477			2385	224
Turn Bay Length (ft)		500	300		
Base Capacity (vph)	716	914	312	958	642
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	0.72	0.55	0.58	0.52	0.93

Intersection Summary

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.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	476	466	167	462	0	0	0	0	549	3	0
Future Volume (vph)	0	476	466	167	462	0	0	0	0	549	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.9	7.9	7.9	7.9						6.9	
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	
Frt		1.00	0.85	1.00	1.00						1.00	
Flt Protected		1.00	1.00	0.95	1.00						0.95	
Satd. Flow (prot)		1863	1568	1770	1827						1789	
Flt Permitted		1.00	1.00	0.25	1.00						0.95	
Satd. Flow (perm)		1863	1568	464	1827						1789	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	517	507	182	502	0	0	0	0	597	3	0
RTOR Reduction (vph)	0	0	312	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	517	195	182	502	0	0	0	0	0	600	0
Heavy Vehicles (%)	0%	2%	3%	2%	4%	0%	0%	0%	0%	1%	33%	0%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	
Protected Phases		6		5	2						4	
Permitted Phases			6	6						4		
Actuated Green, G (s)		46.2	46.2	55.1	63.0						42.2	
Effective Green, g (s)		46.2	46.2	55.1	63.0						42.2	
Actuated g/C Ratio		0.39	0.39	0.46	0.52						0.35	
Clearance Time (s)		7.9	7.9	7.9	7.9						6.9	
Vehicle Extension (s)		4.0	4.0	3.0	4.0						4.0	
Lane Grp Cap (vph)		717	603	309	959						629	
v/s Ratio Prot		c0.28		0.04	c0.27							
v/s Ratio Perm			0.12	0.23							0.34	
v/c Ratio		0.72	0.32	0.59	0.52						0.95	
Uniform Delay, d1		31.4	25.9	22.1	18.7						38.0	
Progression Factor		1.00	1.00	1.08	0.96						1.00	
Incremental Delay, d2		6.2	1.4	2.4	1.7						25.0	
Delay (s)		37.6	27.3	26.3	19.6						62.9	
Level of Service		D	C	C	B						E	
Approach Delay (s)		32.5			21.4			0.0			62.9	
Approach LOS		C			C			A			E	

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.7
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Group Flow (vph)	249	865	389	391	407
v/c Ratio	0.48	0.77	0.49	0.43	0.85
Control Delay	8.1	14.8	17.8	1.6	55.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	14.8	17.8	1.6	55.5
Queue Length 50th (ft)	62	336	127	0	286
Queue Length 95th (ft)	m104	m632	207	7	374
Internal Link Dist (ft)		2385	1991		1289
Turn Bay Length (ft)	400				
Base Capacity (vph)	543	1117	797	901	597
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	0.46	0.77	0.49	0.43	0.68

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	229	796	0	0	358	360	271	1	102	0	0	0
Future Volume (veh/h)	229	796	0	0	358	360	271	1	102	0	0	0
Number	5	2	12	1	6	16	7	4	14			
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			
Adj Sat Flow, veh/h/ln	1900	1881	0	0	1863	1863	1900	1785	1900			
Adj Flow Rate, veh/h	249	865	0	0	389	0	295	1	111			
Adj No. of Lanes	1	1	0	0	1	1	0	1	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	1	0	0	2	2	0	0	0			
Cap, veh/h	537	1143	0	0	854	726	319	1	120			
Arrive On Green	0.06	0.41	0.00	0.00	0.46	0.00	0.27	0.27	0.27			
Sat Flow, veh/h	1810	1881	0	0	1863	1583	1193	4	449			
Grp Volume(v), veh/h	249	865	0	0	389	0	407	0	0			
Grp Sat Flow(s),veh/h/ln	1810	1881	0	0	1863	1583	1646	0	0			
Q Serve(g_s), s	8.2	47.3	0.0	0.0	17.2	0.0	28.9	0.0	0.0			
Cycle Q Clear(g_c), s	8.2	47.3	0.0	0.0	17.2	0.0	28.9	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.72		0.27			
Lane Grp Cap(c), veh/h	537	1143	0	0	854	726	440	0	0			
V/C Ratio(X)	0.46	0.76	0.00	0.00	0.46	0.00	0.92	0.00	0.00			
Avail Cap(c_a), veh/h	599	1143	0	0	854	726	582	0	0			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.62	0.62	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	15.8	28.0	0.0	0.0	22.2	0.0	42.8	0.0	0.0			
Incr Delay (d2), s/veh	0.4	3.0	0.0	0.0	1.8	0.0	17.6	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			
%ile BackOfQ(50%),veh/ln	4.1	25.4	0.0	0.0	9.2	0.0	15.3	0.0	0.0			
LnGrp Delay(d),s/veh	16.2	30.9	0.0	0.0	24.0	0.0	60.4	0.0	0.0			
LnGrp LOS	B	C			C		E					
Approach Vol, veh/h		1114			389			407				
Approach Delay, s/veh		27.6			24.0			60.4				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		80.3		39.7	17.9	62.4		
Change Period (Y+Rc), s		* 7.4		* 7.6	* 7.4	* 7.4		
Max Green Setting (Gmax), s		* 63		* 42	* 15	* 41		
Max Q Clear Time (g_c+I1), s		49.3		30.9	10.2	19.2		
Green Ext Time (p_c), s		5.0		1.2	0.3	2.1		

Intersection Summary	
HCM 2010 Ctrl Delay	33.9
HCM 2010 LOS	C

Notes

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	853	123	443	599	180	2023
v/c Ratio	1.20	0.20	0.28	0.66	0.48	0.86
Control Delay	136.5	18.8	24.9	8.8	27.0	34.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	136.5	18.8	24.9	8.8	27.0	34.1
Queue Length 50th (ft)	~787	22	104	121	83	502
Queue Length 95th (ft)	#1034	m74	m63	m348	132	572
Internal Link Dist (ft)	489		1026			1993
Turn Bay Length (ft)		270		270	530	
Base Capacity (vph)	711	620	1601	904	378	2345
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	1.20	0.20	0.28	0.66	0.48	0.86

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	785	113	408	551	166	1861
Future Volume (vph)	785	113	408	551	166	1861
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1787	1429	5085	1568	1736	5136
Flt Permitted	0.95	1.00	1.00	1.00	0.49	1.00
Satd. Flow (perm)	1787	1429	5085	1568	888	5136
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	853	123	443	599	180	2023
RTOR Reduction (vph)	0	51	0	410	0	0
Lane Group Flow (vph)	853	72	443	189	180	2023
Heavy Vehicles (%)	1%	13%	2%	3%	4%	1%
Turn Type	Prot	Perm	NA	Perm	D.P+P	NA
Protected Phases	3		6		5	2
Permitted Phases		3		6	6	
Actuated Green, G (s)	47.8	47.8	37.8	37.8	44.6	54.8
Effective Green, g (s)	47.8	47.8	37.8	37.8	44.6	54.8
Actuated g/C Ratio	0.40	0.40	0.31	0.31	0.37	0.46
Clearance Time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Vehicle Extension (s)	6.0	6.0	4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	711	569	1601	493	378	2345
v/s Ratio Prot	c0.48		0.09		0.03	c0.39
v/s Ratio Perm		0.05		0.12	0.15	
v/c Ratio	1.20	0.13	0.28	0.38	0.48	0.86
Uniform Delay, d1	36.1	22.9	30.8	32.0	26.6	29.2
Progression Factor	1.19	2.11	0.79	1.95	1.00	1.00
Incremental Delay, d2	98.5	0.2	0.4	2.1	0.9	4.5
Delay (s)	141.3	48.5	24.8	64.5	27.5	33.7
Level of Service	F	D	C	E	C	C
Approach Delay (s)	129.6		47.6			33.2
Approach LOS	F		D			C

Intersection Summary			
HCM 2000 Control Delay	59.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.6
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Appendix H:

SimTraffic Analysis - Future without Development Condition (2023)

Total Zone Performance By Run

Run Number	1	10	2	3	4	5	6
Vehicles Entered	3266	3291	3176	3164	3231	3191	3277
Vehicles Exited	75	84	81	76	79	49	86
Hourly Exit Rate	75	84	81	76	79	49	86
Input Volume	10421	10421	10421	10421	10421	10421	10421
% of Volume	1	1	1	1	1	0	1
Denied Entry Before	81	148	105	111	80	123	99
Denied Entry After	688	777	648	687	686	790	648

Total Zone Performance By Run

Run Number	7	8	9	Avg
Vehicles Entered	3240	3190	3259	3228
Vehicles Exited	67	76	69	74
Hourly Exit Rate	67	76	69	74
Input Volume	10421	10421	10421	10421
% of Volume	1	1	1	1
Denied Entry Before	80	122	109	106
Denied Entry After	625	689	695	692

Intersection: 1: Route 1 & American Legion Rd/Eskimo Hill Rd

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	181	182	61	212	215	52	88	72
Average Queue (ft)	78	72	20	88	84	17	28	12
95th Queue (ft)	143	141	47	170	168	42	70	44
Link Distance (ft)	2929	647		2728	2728		2100	2100
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			325			230		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Centreport Pkwy & Ramoth Church Road/American Legion Rd

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	41	24	22
Average Queue (ft)	4	6	6
95th Queue (ft)	24	21	18
Link Distance (ft)	2929	871	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		290	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Centreport Pkwy & Mountain View Rd

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	L	TR	LTR
Maximum Queue (ft)	26	89	2	17	150	122	82
Average Queue (ft)	4	44	0	1	73	42	36
95th Queue (ft)	20	72	0	9	120	82	63
Link Distance (ft)		1400		951		1852	678
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	215		110		150		
Storage Blk Time (%)					0		
Queuing Penalty (veh)					1		

Intersection: 4: I-95 SB Ramps & Centreport Pkwy

Movement	EB	EB	WB	WB	SB
Directions Served	T	R	L	T	LT
Maximum Queue (ft)	131	94	82	200	243
Average Queue (ft)	41	34	32	85	106
95th Queue (ft)	103	68	66	163	192
Link Distance (ft)	423			2430	223
Upstream Blk Time (%)					1
Queuing Penalty (veh)					1
Storage Bay Dist (ft)		500	300		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: I-95 NB Ramps & Centreport Pkwy

Movement	EB	EB	WB	WB	NB
Directions Served	L	T	T	R	LTR
Maximum Queue (ft)	129	270	257	86	1383
Average Queue (ft)	56	112	138	2	1351
95th Queue (ft)	110	213	231	39	1372
Link Distance (ft)		2430	2016	2016	1328
Upstream Blk Time (%)					86
Queuing Penalty (veh)					0
Storage Bay Dist (ft)	400				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Route 1 & Centreport Pkwy

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	T	R	L	T	T	T
Maximum Queue (ft)	257	227	341	383	518	295	126	125	107	104
Average Queue (ft)	134	93	160	167	208	202	48	58	36	34
95th Queue (ft)	224	176	298	312	445	342	100	109	85	81
Link Distance (ft)	436		1007	1007	1007			2013	2013	2013
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		270				270	530			
Storage Blk Time (%)	0	0			1	8				
Queuing Penalty (veh)	1	0			6	30				

Zone Summary

Zone wide Queuing Penalty: 39

Intersection: 1: Route 1 & American Legion Rd/Eskimo Hill Rd

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	252	208	63	119	109	125	242	264
Average Queue (ft)	118	94	19	47	34	38	117	117
95th Queue (ft)	208	174	47	93	81	87	204	215
Link Distance (ft)	2929	647		2728	2728		2100	2100
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			325			230		
Storage Blk Time (%)							0	
Queuing Penalty (veh)							1	

Intersection: 2: Centreport Pkwy & Ramoth Church Road/American Legion Rd

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	52	38	42
Average Queue (ft)	7	12	12
95th Queue (ft)	31	30	29
Link Distance (ft)	2929	871	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		290	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Centreport Pkwy & Mountain View Rd

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	L	TR	LTR
Maximum Queue (ft)	69	254	7	24	160	161	134
Average Queue (ft)	10	105	0	1	84	46	54
95th Queue (ft)	53	202	3	10	141	107	99
Link Distance (ft)		1400		951		1852	678
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	215		110		150		
Storage Blk Time (%)		2			1		
Queuing Penalty (veh)		0			2		

Intersection: 4: I-95 SB Ramps & Centreport Pkwy

Movement	EB	EB	WB	WB	SB
Directions Served	T	R	L	T	LT
Maximum Queue (ft)	416	290	202	315	323
Average Queue (ft)	222	92	98	163	285
95th Queue (ft)	358	193	182	275	354
Link Distance (ft)	423			2430	223
Upstream Blk Time (%)	0	0			35
Queuing Penalty (veh)	2	0			192
Storage Bay Dist (ft)		500	300		
Storage Blk Time (%)	0	0	0	0	
Queuing Penalty (veh)	1	0	2	0	

Intersection: 5: I-95 NB Ramps & Centreport Pkwy

Movement	EB	EB	WB	WB	NB
Directions Served	L	T	T	R	LTR
Maximum Queue (ft)	287	842	246	22	406
Average Queue (ft)	107	302	141	1	245
95th Queue (ft)	264	842	229	22	382
Link Distance (ft)		2430	2016	2016	1328
Upstream Blk Time (%)		0			
Queuing Penalty (veh)		0			
Storage Bay Dist (ft)	400				
Storage Blk Time (%)		4			
Queuing Penalty (veh)		10			

Intersection: 6: Route 1 & Centreport Pkwy

Movement	WB	WB	B12	B13	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	T	T	T	T	T	R	L	T	T	T
Maximum Queue (ft)	534	295	1259	1748	129	118	116	234	446	601	604	561
Average Queue (ft)	503	161	925	583	72	69	33	97	244	370	369	327
95th Queue (ft)	545	383	1627	1770	113	109	85	183	466	599	586	534
Link Distance (ft)	436		1155	2016	1007	1007	1007			2013	2013	2013
Upstream Blk Time (%)	57		43	0								
Queuing Penalty (veh)	513		392	2								
Storage Bay Dist (ft)		270						270	530			
Storage Blk Time (%)	57	0						0	2	2		
Queuing Penalty (veh)	65	1						0	13	4		

Intersection: 10: Route 1 & Enon/Cranes Corner

Movement	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	L	T	T	TR	L	T	T	R
Maximum Queue (ft)	292	268	45	213	232	89	74	162	80	970	944	838
Average Queue (ft)	165	142	8	125	148	27	18	67	8	583	609	290
95th Queue (ft)	262	238	31	212	225	65	52	138	44	1084	1101	864
Link Distance (ft)	577		614			1798	1798			1007	1007	1007
Upstream Blk Time (%)										0	1	0
Queuing Penalty (veh)										4	4	1
Storage Bay Dist (ft)		350		605	605			605	120			
Storage Blk Time (%)		0								36		
Queuing Penalty (veh)		0								2		

Zone Summary

Zone wide Queuing Penalty: 1212

Appendix I:

Intersection Capacity Analysis - Future with Development Condition (2023)

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	199	163	92	1113	59	392
v/c Ratio	0.62	0.46	0.15	0.66	0.20	0.24
Control Delay	37.3	27.2	7.4	19.0	8.3	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	27.2	7.4	19.0	8.3	13.1
Queue Length 50th (ft)	84	52	19	242	12	61
Queue Length 95th (ft)	175	124	37	321	26	94
Internal Link Dist (ft)	2944	630		2695		2069
Turn Bay Length (ft)			325		230	
Base Capacity (vph)	398	432	794	2459	573	2412
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	0.50	0.38	0.12	0.45	0.10	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	34	80	27	36	87	85	1002	22	54	300	61
Future Volume (veh/h)	69	34	80	27	36	87	85	1002	22	54	300	61
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1776	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	75	37	87	29	39	95	92	1089	24	59	326	66
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	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
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	2	2	2
Cap, veh/h	148	59	105	90	74	144	626	1757	39	329	1427	285
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.06	0.50	0.50	0.05	0.49	0.49
Sat Flow, veh/h	503	390	694	188	494	952	1774	3541	78	1774	2940	588
Grp Volume(v), veh/h	199	0	0	163	0	0	92	544	569	59	195	197
Grp Sat Flow(s),veh/h/ln	1588	0	0	1633	0	0	1774	1770	1849	1774	1770	1759
Q Serve(g_s), s	1.8	0.0	0.0	0.0	0.0	0.0	1.7	15.5	15.5	1.1	4.4	4.5
Cycle Q Clear(g_c), s	8.2	0.0	0.0	6.4	0.0	0.0	1.7	15.5	15.5	1.1	4.4	4.5
Prop In Lane	0.38		0.44	0.18		0.58	1.00		0.04	1.00		0.33
Lane Grp Cap(c), veh/h	311	0	0	308	0	0	626	878	918	329	859	854
V/C Ratio(X)	0.64	0.00	0.00	0.53	0.00	0.00	0.15	0.62	0.62	0.18	0.23	0.23
Avail Cap(c_a), veh/h	514	0	0	515	0	0	1033	1408	1472	755	1408	1400
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	0.0	0.0	27.7	0.0	0.0	7.7	12.7	12.7	9.3	10.3	10.3
Incr Delay (d2), s/veh	2.2	0.0	0.0	1.4	0.0	0.0	0.1	1.5	1.5	0.3	0.3	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	3.8	0.0	0.0	3.1	0.0	0.0	0.8	7.8	8.1	0.5	2.2	2.2
LnGrp Delay(d),s/veh	30.5	0.0	0.0	29.1	0.0	0.0	7.8	14.2	14.1	9.6	10.6	10.6
LnGrp LOS	C			C			A	B	B	A	B	B
Approach Vol, veh/h		199			163			1205			451	
Approach Delay, s/veh		30.5			29.1			13.7			10.5	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	40.3		17.8	10.2	41.1		17.8
Change Period (Y+Rc), s	* 6.8	* 6.8		7.4	* 6.8	* 6.8		7.4
Max Green Setting (Gmax), s	* 20	* 55		20.0	* 20	* 55		20.0
Max Q Clear Time (g_c+I1), s	3.7	6.5		10.2	3.1	17.5		8.4
Green Ext Time (p_c), s	0.2	4.8		0.4	0.1	16.8		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 LOS	B

Notes

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	153	68	61	121	27	30
Future Vol, veh/h	153	68	61	121	27	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	380	-	-	0	290
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	166	74	66	132	29	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	240	0	430	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	264	-
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	-	-	1327	-	582	878
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	780	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1327	-	551	878
Mov Cap-2 Maneuver	-	-	-	-	551	-
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	780	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	551	878	-	-	1327	-
HCM Lane V/C Ratio	0.053	0.037	-	-	0.05	-
HCM Control Delay (s)	11.9	9.3	-	-	7.9	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.2	-

Intersection	
Intersection Delay, s/veh	51.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	0	242	1	0	1	555	487	1	0	200	13
Future Vol, veh/h	41	0	242	1	0	1	555	487	1	0	200	13
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
Heavy Vehicles, %	1	1	1	0	0	0	4	10	4	2	17	2
Mvmt Flow	45	0	263	1	0	1	603	529	1	0	217	14
Number of Lanes	0	1	1	1	1	0	1	1	0	0	1	0

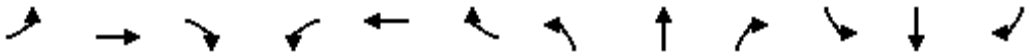
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	15.4	10.9	68.8	15
HCM LOS	C	B	F	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	0%	0%	94%
Vol Right, %	0%	0%	0%	100%	0%	100%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	555	488	41	242	1	1	213
LT Vol	555	0	41	0	1	0	0
Through Vol	0	487	0	0	0	0	200
RT Vol	0	1	0	242	0	1	13
Lane Flow Rate	603	530	45	263	1	1	232
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	1.098	0.906	0.098	0.488	0.003	0.002	0.432
Departure Headway (Hd)	6.553	6.149	8.106	6.876	8.813	7.57	6.895
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	561	594	445	529	408	476	526
Service Time	4.253	3.849	5.806	4.576	6.513	5.27	4.895
HCM Lane V/C Ratio	1.075	0.892	0.101	0.497	0.002	0.002	0.441
HCM Control Delay	92.3	42.1	11.7	16	11.5	10.3	15
HCM Lane LOS	F	E	B	C	B	B	B
HCM 95th-tile Q	18.8	11.1	0.3	2.6	0	0	2.2

Lane Group	EBT	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	236	303	140	975	151
v/c Ratio	0.23	0.29	0.18	0.72	0.62
Control Delay	12.6	2.2	6.8	12.7	59.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	2.2	6.8	12.7	59.4
Queue Length 50th (ft)	79	0	46	335	112
Queue Length 95th (ft)	141	40	m18	m141	174
Internal Link Dist (ft)	477			2385	224
Turn Bay Length (ft)		500	300		
Base Capacity (vph)	1008	1032	799	1348	410
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	0.23	0.29	0.18	0.72	0.37

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	217	279	129	897	0	0	0	0	139	0	0
Future Volume (vph)	0	217	279	129	897	0	0	0	0	139	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.9	7.9	7.9	7.9						6.9	
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	
Frt		1.00	0.85	1.00	1.00						1.00	
Flt Protected		1.00	1.00	0.95	1.00						0.95	
Satd. Flow (prot)		1667	1509	1719	1827						1752	
Flt Permitted		1.00	1.00	0.61	1.00						0.95	
Satd. Flow (perm)		1667	1509	1107	1827						1752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	236	303	140	975	0	0	0	0	151	0	0
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	236	183	140	975	0	0	0	0	0	151	0
Heavy Vehicles (%)	0%	14%	7%	5%	4%	0%	0%	0%	0%	3%	2%	0%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	
Protected Phases		6		5	2						4	
Permitted Phases			6	6						4		
Actuated Green, G (s)		72.6	72.6	80.7	88.6						16.6	
Effective Green, g (s)		72.6	72.6	80.7	88.6						16.6	
Actuated g/C Ratio		0.60	0.60	0.67	0.74						0.14	
Clearance Time (s)		7.9	7.9	7.9	7.9						6.9	
Vehicle Extension (s)		4.0	4.0	3.0	4.0						4.0	
Lane Grp Cap (vph)		1008	912	785	1348						242	
v/s Ratio Prot		0.14		0.01	c0.53							
v/s Ratio Perm			0.12	0.11							0.09	
v/c Ratio		0.23	0.20	0.18	0.72						0.62	
Uniform Delay, d1		10.9	10.7	7.0	8.8						48.8	
Progression Factor		1.00	1.00	1.25	1.21						1.00	
Incremental Delay, d2		0.5	0.5	0.0	0.3						5.6	
Delay (s)		11.5	11.2	8.8	11.0						54.3	
Level of Service		B	B	A	B						D	
Approach Delay (s)		11.3			10.7			0.0			54.3	
Approach LOS		B			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.7
Intersection Capacity Utilization	136.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Group Flow (vph)	120	252	336	522	1444
v/c Ratio	0.34	0.29	0.54	0.59	2.08
Control Delay	23.1	22.1	36.0	5.4	512.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	22.1	36.0	5.4	512.7
Queue Length 50th (ft)	42	92	210	0	~1764
Queue Length 95th (ft)	123	234	306	78	#2031
Internal Link Dist (ft)		2385	1991		1289
Turn Bay Length (ft)	400				
Base Capacity (vph)	365	860	620	891	695
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	0.33	0.29	0.54	0.59	2.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	242	0	0	323	501	703	19	664	0	0	0
Future Volume (veh/h)	115	242	0	0	323	501	703	19	664	0	0	0
Number	5	2	12	1	6	16	7	4	14			
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			
Adj Sat Flow, veh/h/ln	1681	1792	0	0	1810	1881	1900	1855	1900			
Adj Flow Rate, veh/h	120	252	0	0	336	0	732	20	692			
Adj No. of Lanes	1	1	0	0	1	1	0	1	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	13	6	0	0	5	1	0	0	0			
Cap, veh/h	356	860	0	0	644	569	335	9	316			
Arrive On Green	0.02	0.16	0.00	0.00	0.36	0.00	0.40	0.40	0.40			
Sat Flow, veh/h	1601	1792	0	0	1810	1599	847	23	801			
Grp Volume(v), veh/h	120	252	0	0	336	0	1444	0	0			
Grp Sat Flow(s),veh/h/ln	1601	1792	0	0	1810	1599	1671	0	0			
Q Serve(g_s), s	5.6	14.9	0.0	0.0	17.6	0.0	47.4	0.0	0.0			
Cycle Q Clear(g_c), s	5.6	14.9	0.0	0.0	17.6	0.0	47.4	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.51		0.48			
Lane Grp Cap(c), veh/h	356	860	0	0	644	569	660	0	0			
V/C Ratio(X)	0.34	0.29	0.00	0.00	0.52	0.00	2.19	0.00	0.00			
Avail Cap(c_a), veh/h	384	860	0	0	644	569	660	0	0			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.98	0.98	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	24.5	32.5	0.0	0.0	30.6	0.0	36.3	0.0	0.0			
Incr Delay (d2), s/veh	0.5	0.8	0.0	0.0	3.0	0.0	539.3	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			
%ile BackOfQ(50%),veh/ln	2.5	7.6	0.0	0.0	9.3	0.0	120.7	0.0	0.0			
LnGrp Delay(d),s/veh	25.0	33.4	0.0	0.0	33.6	0.0	575.6	0.0	0.0			
LnGrp LOS	C	C			C		F					
Approach Vol, veh/h		372			336			1444				
Approach Delay, s/veh		30.7			33.6			575.6				
Approach LOS		C			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		65.0		55.0	14.9	50.1		
Change Period (Y+Rc), s		* 7.4		* 7.6	* 7.4	* 7.4		
Max Green Setting (Gmax), s		* 58		* 47	* 9.6	* 41		
Max Q Clear Time (g_c+I1), s		16.9		49.4	7.6	19.6		
Green Ext Time (p_c), s		1.4		0.0	0.1	1.8		

Intersection Summary	
HCM 2010 Ctrl Delay	396.8
HCM 2010 LOS	F

Notes

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	411	574	1232	828	67	379
v/c Ratio	0.78	0.75	0.61	0.74	0.32	0.15
Control Delay	47.4	18.3	28.5	6.3	17.3	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	18.3	28.5	6.3	17.3	13.0
Queue Length 50th (ft)	279	120	267	0	23	48
Queue Length 95th (ft)	#439	278	327	98	45	65
Internal Link Dist (ft)	489		1026			1993
Turn Bay Length (ft)		270		270	530	
Base Capacity (vph)	565	786	2109	1138	430	3488
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	0.73	0.73	0.58	0.73	0.16	0.11

Intersection Summary

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	378	528	1133	762	62	349
Future Volume (vph)	378	528	1133	762	62	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1599	5036	1568	1530	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.15	1.00
Satd. Flow (perm)	1736	1599	5036	1568	249	4673
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	411	574	1232	828	67	379
RTOR Reduction (vph)	0	276	0	500	0	0
Lane Group Flow (vph)	411	298	1232	328	67	379
Heavy Vehicles (%)	4%	1%	3%	3%	18%	11%
Turn Type	Prot	Perm	NA	Perm	D.P+P	NA
Protected Phases	3		6		5	2
Permitted Phases		3		6	6	
Actuated Green, G (s)	33.5	33.5	44.2	44.2	50.6	60.8
Effective Green, g (s)	33.5	33.5	44.2	44.2	50.6	60.8
Actuated g/C Ratio	0.30	0.30	0.40	0.40	0.45	0.54
Clearance Time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Vehicle Extension (s)	6.0	6.0	4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	520	479	1992	620	186	2543
v/s Ratio Prot	c0.24		c0.24		c0.02	0.08
v/s Ratio Perm		0.19		0.21	0.14	
v/c Ratio	0.79	0.62	0.62	0.53	0.36	0.15
Uniform Delay, d1	35.9	33.7	27.0	25.8	18.3	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.7	4.3	0.7	1.1	1.2	0.0
Delay (s)	45.6	37.9	27.7	26.8	19.5	12.7
Level of Service	D	D	C	C	B	B
Approach Delay (s)	41.1		27.3			13.7
Approach LOS	D		C			B

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	111.7	Sum of lost time (s)	27.6
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	18	149	20	69	201
Future Vol, veh/h	3	18	149	20	69	201
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	92	92	92	92	92	92
Heavy Vehicles, %	0	39	2	0	10	2
Mvmt Flow	3	20	162	22	75	218

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	541	173	0	0	184	0
Stage 1	173	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Critical Hdwy	6.4	6.59	-	-	4.2	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.651	-	-	2.29	-
Pot Cap-1 Maneuver	506	783	-	-	1344	-
Stage 1	862	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	474	783	-	-	1344	-
Mov Cap-2 Maneuver	474	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	704	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	716	1344	-
HCM Lane V/C Ratio	-	-	0.032	0.056	-
HCM Control Delay (s)	-	-	10.2	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	21	140	27	90	265
Future Vol, veh/h	5	21	140	27	90	265
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	92	92	92	92	92	92
Heavy Vehicles, %	0	42	7	0	11	5
Mvmt Flow	5	23	152	29	98	288

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	651	167	0	0	181	0
Stage 1	167	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.21	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.299	-
Pot Cap-1 Maneuver	436	783	-	-	1342	-
Stage 1	867	-	-	-	-	-
Stage 2	624	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	398	783	-	-	1342	-
Mov Cap-2 Maneuver	398	-	-	-	-	-
Stage 1	792	-	-	-	-	-
Stage 2	624	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	660	1342	-
HCM Lane V/C Ratio	-	-	0.043	0.073	-
HCM Control Delay (s)	-	-	10.7	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	132	376	176	39	7	33
Future Vol, veh/h	132	376	176	39	7	33
Conflicting Peds, #/hr	0	0	0	0	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, %	12	6	11	0	0	42
Mvmt Flow	143	409	191	42	8	36

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	233	0	-	0	907	212
Stage 1	-	-	-	-	212	-
Stage 2	-	-	-	-	695	-
Critical Hdwy	4.22	-	-	-	6.4	6.62
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.308	-	-	-	3.5	3.678
Pot Cap-1 Maneuver	1278	-	-	-	309	737
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	499	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1278	-	-	-	264	737
Mov Cap-2 Maneuver	-	-	-	-	264	-
Stage 1	-	-	-	-	708	-
Stage 2	-	-	-	-	499	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1278	-	-	-	561
HCM Lane V/C Ratio	0.112	-	-	-	0.078
HCM Control Delay (s)	8.2	0	-	-	12
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.3

Queues

1: Route 1 & American Legion Rd/Eskimo Hill Rd

Timing Plan: TF PM

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	262	191	61	451	167	1388
v/c Ratio	0.89	0.60	0.28	0.28	0.29	0.76
Control Delay	67.7	40.9	9.8	15.5	8.2	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.7	40.9	9.8	15.5	8.2	21.6
Queue Length 50th (ft)	154	96	12	82	36	347
Queue Length 95th (ft)	#332	#195	26	119	61	445
Internal Link Dist (ft)	2944	630		2695		2069
Turn Bay Length (ft)			325		230	
Base Capacity (vph)	296	316	457	2109	754	2091
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	0.89	0.60	0.13	0.21	0.22	0.66

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	56	80	43	61	72	56	406	9	154	1167	110
Future Volume (veh/h)	105	56	80	43	61	72	56	406	9	154	1167	110
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1776	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	114	61	87	47	66	78	61	441	10	167	1268	120
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	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
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	2	2	2
Cap, veh/h	170	80	96	103	131	127	238	1739	39	596	1696	160
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.04	0.49	0.49	0.07	0.52	0.52
Sat Flow, veh/h	547	387	464	258	634	616	1774	3538	80	1774	3269	309
Grp Volume(v), veh/h	262	0	0	191	0	0	61	220	231	167	685	703
Grp Sat Flow(s),veh/h/ln	1398	0	0	1508	0	0	1774	1770	1849	1774	1770	1808
Q Serve(g_s), s	6.6	0.0	0.0	0.0	0.0	0.0	1.4	6.6	6.6	4.1	27.6	27.8
Cycle Q Clear(g_c), s	16.7	0.0	0.0	10.1	0.0	0.0	1.4	6.6	6.6	4.1	27.6	27.8
Prop In Lane	0.44		0.33	0.25		0.41	1.00		0.04	1.00		0.17
Lane Grp Cap(c), veh/h	346	0	0	362	0	0	238	870	908	596	918	938
V/C Ratio(X)	0.76	0.00	0.00	0.53	0.00	0.00	0.26	0.25	0.25	0.28	0.75	0.75
Avail Cap(c_a), veh/h	365	0	0	381	0	0	552	1071	1119	862	1071	1094
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	0.0	0.0	32.4	0.0	0.0	14.1	13.4	13.4	9.9	17.2	17.2
Incr Delay (d2), s/veh	8.4	0.0	0.0	1.2	0.0	0.0	0.6	0.3	0.3	0.3	3.4	3.4
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	7.2	0.0	0.0	4.5	0.0	0.0	0.7	3.3	3.4	2.0	14.2	14.8
LnGrp Delay(d),s/veh	43.6	0.0	0.0	33.6	0.0	0.0	14.6	13.8	13.7	10.2	20.6	20.7
LnGrp LOS	D			C			B	B	B	B	C	C
Approach Vol, veh/h		262			191			512			1555	
Approach Delay, s/veh		43.6			33.6			13.9			19.5	
Approach LOS		D			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.7	54.0		26.2	13.2	51.5		26.2
Change Period (Y+Rc), s	* 6.8	* 6.8		7.4	* 6.8	* 6.8		7.4
Max Green Setting (Gmax), s	* 20	* 55		20.0	* 20	* 55		20.0
Max Q Clear Time (g_c+I1), s	3.4	29.8		18.7	6.1	8.6		12.1
Green Ext Time (p_c), s	0.1	17.3		0.1	0.4	5.5		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	21.9
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	178	51	53	174	68	63
Future Vol, veh/h	178	51	53	174	68	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	380	-	-	0	290
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	193	55	58	189	74	68

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	248	0	498	193
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	305	-
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	-	-	1318	-	532	849
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1318	-	506	849
Mov Cap-2 Maneuver	-	-	-	-	506	-
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	748	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	506	849	-	-	1318	-
HCM Lane V/C Ratio	0.146	0.081	-	-	0.044	-
HCM Control Delay (s)	13.3	9.6	-	-	7.9	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.5	0.3	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	66.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	1	493	1	1	0	382	306	1	0	430	37
Future Vol, veh/h	26	1	493	1	1	0	382	306	1	0	430	37
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
Heavy Vehicles, %	1	1	1	0	0	0	4	6	4	2	4	2
Mvmt Flow	28	1	536	1	1	0	415	333	1	0	467	40
Number of Lanes	0	1	1	1	1	0	1	1	0	0	1	0

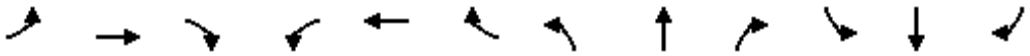
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	74.7	13.2	46.1	89.1
HCM LOS	F	B	E	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	96%	0%	100%	0%	0%
Vol Thru, %	0%	100%	4%	0%	0%	100%	92%
Vol Right, %	0%	0%	0%	100%	0%	0%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	382	307	27	493	1	1	467
LT Vol	382	0	26	0	1	0	0
Through Vol	0	306	1	0	0	1	430
RT Vol	0	1	0	493	0	0	37
Lane Flow Rate	415	334	29	536	1	1	508
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.944	0.715	0.067	1.041	0.003	0.003	1.067
Departure Headway (Hd)	8.535	8.051	8.457	7.232	10.697	10.167	7.832
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	428	450	426	504	337	354	467
Service Time	6.235	5.751	6.157	4.932	8.397	7.867	5.832
HCM Lane V/C Ratio	0.97	0.742	0.068	1.063	0.003	0.003	1.088
HCM Control Delay	60.2	28.5	11.8	78.1	13.4	12.9	89.1
HCM Lane LOS	F	D	B	F	B	B	F
HCM 95th-tile Q	10.8	5.6	0.2	15.3	0	0	15.6

Lane Group	EBT	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	634	607	182	588	600
v/c Ratio	0.90	0.63	0.81	0.62	0.95
Control Delay	52.3	5.4	51.5	22.3	64.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	5.4	51.5	22.3	64.5
Queue Length 50th (ft)	463	0	94	242	444
Queue Length 95th (ft)	#690	80	m#161	320	#673
Internal Link Dist (ft)	477			2385	224
Turn Bay Length (ft)		500	300		
Base Capacity (vph)	707	963	224	949	642
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	0.90	0.63	0.81	0.62	0.93

Intersection Summary

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.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	583	558	167	541	0	0	0	0	549	3	0
Future Volume (vph)	0	583	558	167	541	0	0	0	0	549	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.9	7.9	7.9	7.9						6.9	
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	
Frt		1.00	0.85	1.00	1.00						1.00	
Flt Protected		1.00	1.00	0.95	1.00						0.95	
Satd. Flow (prot)		1845	1538	1770	1810						1789	
Flt Permitted		1.00	1.00	0.13	1.00						0.95	
Satd. Flow (perm)		1845	1538	235	1810						1789	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	634	607	182	588	0	0	0	0	597	3	0
RTOR Reduction (vph)	0	0	374	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	634	233	182	588	0	0	0	0	0	600	0
Heavy Vehicles (%)	0%	3%	5%	2%	5%	0%	0%	0%	0%	1%	33%	0%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	
Protected Phases		6		5	2						4	
Permitted Phases			6	6						4		
Actuated Green, G (s)		46.0	46.0	55.1	63.0						42.2	
Effective Green, g (s)		46.0	46.0	55.1	63.0						42.2	
Actuated g/C Ratio		0.38	0.38	0.46	0.52						0.35	
Clearance Time (s)		7.9	7.9	7.9	7.9						6.9	
Vehicle Extension (s)		4.0	4.0	3.0	4.0						4.0	
Lane Grp Cap (vph)		707	589	224	950						629	
v/s Ratio Prot		c0.34		0.06	c0.32							
v/s Ratio Perm			0.15	0.31							0.34	
v/c Ratio		0.90	0.40	0.81	0.62						0.95	
Uniform Delay, d1		34.8	26.9	25.2	20.1						38.0	
Progression Factor		1.00	1.00	1.57	0.96						1.00	
Incremental Delay, d2		16.4	2.0	14.8	2.2						25.0	
Delay (s)		51.1	28.9	54.4	21.5						62.9	
Level of Service		D	C	D	C						E	
Approach Delay (s)		40.2			29.3			0.0			62.9	
Approach LOS		D			C			A			E	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.7
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Group Flow (vph)	334	897	409	391	473
v/c Ratio	0.73	0.85	0.58	0.46	0.90
Control Delay	13.5	19.6	22.1	2.0	58.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	19.6	22.1	2.0	58.9
Queue Length 50th (ft)	135	507	210	9	332
Queue Length 95th (ft)	m148	m#722	244	7	#489
Internal Link Dist (ft)		2385	1991		1289
Turn Bay Length (ft)	400				
Base Capacity (vph)	461	1053	708	844	588
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	0.72	0.85	0.58	0.46	0.80

Intersection Summary

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	307	825	0	0	376	360	332	1	102	0	0	0
Future Volume (veh/h)	307	825	0	0	376	360	332	1	102	0	0	0
Number	5	2	12	1	6	16	7	4	14			
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			
Adj Sat Flow, veh/h/ln	1845	1881	0	0	1863	1863	1900	1759	1900			
Adj Flow Rate, veh/h	334	897	0	0	409	0	361	1	111			
Adj No. of Lanes	1	1	0	0	1	1	0	1	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	1	0	0	2	2	0	0	0			
Cap, veh/h	476	1066	0	0	714	607	383	1	118			
Arrive On Green	0.08	0.38	0.00	0.00	0.38	0.00	0.31	0.31	0.31			
Sat Flow, veh/h	1757	1881	0	0	1863	1583	1243	3	382			
Grp Volume(v), veh/h	334	897	0	0	409	0	473	0	0			
Grp Sat Flow(s),veh/h/ln	1757	1881	0	0	1863	1583	1629	0	0			
Q Serve(g_s), s	13.1	52.2	0.0	0.0	20.8	0.0	34.0	0.0	0.0			
Cycle Q Clear(g_c), s	13.1	52.2	0.0	0.0	20.8	0.0	34.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.76		0.23			
Lane Grp Cap(c), veh/h	476	1066	0	0	714	607	502	0	0			
V/C Ratio(X)	0.70	0.84	0.00	0.00	0.57	0.00	0.94	0.00	0.00			
Avail Cap(c_a), veh/h	476	1066	0	0	714	607	576	0	0			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.32	0.32	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	21.2	32.3	0.0	0.0	29.2	0.0	40.4	0.0	0.0			
Incr Delay (d2), s/veh	1.5	2.8	0.0	0.0	3.3	0.0	22.5	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			
%ile BackOfQ(50%),veh/ln	6.5	27.9	0.0	0.0	11.3	0.0	18.4	0.0	0.0			
LnGrp Delay(d),s/veh	22.7	35.1	0.0	0.0	32.6	0.0	62.9	0.0	0.0			
LnGrp LOS	C	D			C		E					
Approach Vol, veh/h		1231			409			473				
Approach Delay, s/veh		31.7			32.6			62.9				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		75.4		44.6	22.0	53.4		
Change Period (Y+Rc), s		* 7.4		* 7.6	* 7.4	* 7.4		
Max Green Setting (Gmax), s		* 63		* 42	* 15	* 41		
Max Q Clear Time (g_c+I1), s		54.2		36.0	15.1	22.8		
Green Ext Time (p_c), s		3.9		1.0	0.0	2.1		

Intersection Summary	
HCM 2010 Ctrl Delay	38.9
HCM 2010 LOS	D

Notes

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	885	123	443	618	180	2023
v/c Ratio	1.24	0.20	0.28	0.67	0.48	0.86
Control Delay	155.4	21.5	24.8	9.0	27.0	34.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	155.4	21.5	24.8	9.0	27.0	34.1
Queue Length 50th (ft)	~838	46	104	128	83	502
Queue Length 95th (ft)	#1089	m63	m62	m364	132	572
Internal Link Dist (ft)	489		1026			1993
Turn Bay Length (ft)		270		270	530	
Base Capacity (vph)	711	618	1601	917	378	2345
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	1.24	0.20	0.28	0.67	0.48	0.86

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	814	113	408	569	166	1861
Future Volume (vph)	814	113	408	569	166	1861
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1787	1429	5085	1568	1736	5136
Flt Permitted	0.95	1.00	1.00	1.00	0.49	1.00
Satd. Flow (perm)	1787	1429	5085	1568	888	5136
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	885	123	443	618	180	2023
RTOR Reduction (vph)	0	49	0	423	0	0
Lane Group Flow (vph)	885	74	443	195	180	2023
Heavy Vehicles (%)	1%	13%	2%	3%	4%	1%
Turn Type	Prot	Perm	NA	Perm	D.P+P	NA
Protected Phases	3		6		5	2
Permitted Phases		3		6	6	
Actuated Green, G (s)	47.8	47.8	37.8	37.8	44.6	54.8
Effective Green, g (s)	47.8	47.8	37.8	37.8	44.6	54.8
Actuated g/C Ratio	0.40	0.40	0.31	0.31	0.37	0.46
Clearance Time (s)	7.2	7.2	10.2	10.2	10.2	10.2
Vehicle Extension (s)	6.0	6.0	4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	711	569	1601	493	378	2345
v/s Ratio Prot	c0.50		0.09		0.03	c0.39
v/s Ratio Perm		0.05		0.12	0.15	
v/c Ratio	1.24	0.13	0.28	0.39	0.48	0.86
Uniform Delay, d1	36.1	22.9	30.8	32.2	26.6	29.2
Progression Factor	1.28	2.31	0.79	2.00	1.00	1.00
Incremental Delay, d2	116.3	0.1	0.4	2.2	0.9	4.5
Delay (s)	162.4	53.2	24.7	66.6	27.5	33.7
Level of Service	F	D	C	E	C	C
Approach Delay (s)	149.0		49.1			33.2
Approach LOS	F		D			C

Intersection Summary			
HCM 2000 Control Delay	64.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.6
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	54	173	10	36	135
Future Vol, veh/h	17	54	173	10	36	135
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	92	92	92	92	92	92
Heavy Vehicles, %	0	7	2	0	11	2
Mvmt Flow	18	59	188	11	39	147

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	419	194	0	0	199	0
Stage 1	194	-	-	-	-	-
Stage 2	225	-	-	-	-	-
Critical Hdwy	6.4	6.27	-	-	4.21	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.363	-	-	2.299	-
Pot Cap-1 Maneuver	595	835	-	-	1321	-
Stage 1	844	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	576	835	-	-	1321	-
Mov Cap-2 Maneuver	576	-	-	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	817	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	1.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	754	1321	-
HCM Lane V/C Ratio	-	-	0.102	0.03	-
HCM Control Delay (s)	-	-	10.3	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	70	213	14	47	149
Future Vol, veh/h	22	70	213	14	47	149
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	92	92	92	92	92	92
Heavy Vehicles, %	0	7	4	0	9	5
Mvmt Flow	24	76	232	15	51	162

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	504	240	0	0	247	0
Stage 1	240	-	-	-	-	-
Stage 2	264	-	-	-	-	-
Critical Hdwy	6.4	6.27	-	-	4.19	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.363	-	-	2.281	-
Pot Cap-1 Maneuver	531	787	-	-	1279	-
Stage 1	805	-	-	-	-	-
Stage 2	785	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	508	787	-	-	1279	-
Mov Cap-2 Maneuver	508	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	785	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	696	1279	-
HCM Lane V/C Ratio	-	-	0.144	0.04	-
HCM Control Delay (s)	-	-	11	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	65	262	342	20	32	104
Future Vol, veh/h	65	262	342	20	32	104
Conflicting Peds, #/hr	0	0	0	0	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, %	8	5	5	0	0	8
Mvmt Flow	71	285	372	22	35	113

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	394	0	-	0	810	383
Stage 1	-	-	-	-	383	-
Stage 2	-	-	-	-	427	-
Critical Hdwy	4.18	-	-	-	6.4	6.28
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.272	-	-	-	3.5	3.372
Pot Cap-1 Maneuver	1133	-	-	-	352	651
Stage 1	-	-	-	-	694	-
Stage 2	-	-	-	-	662	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1133	-	-	-	326	651
Mov Cap-2 Maneuver	-	-	-	-	326	-
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	662	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1133	-	-	-	527
HCM Lane V/C Ratio	0.062	-	-	-	0.281
HCM Control Delay (s)	8.4	0	-	-	14.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	199	163	92	1113	59	392
v/c Ratio	0.64	0.48	0.15	0.65	0.20	0.24
Control Delay	38.4	27.5	7.6	19.0	8.5	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	27.5	7.6	19.0	8.5	13.2
Queue Length 50th (ft)	84	51	17	229	11	58
Queue Length 95th (ft)	178	125	41	346	28	101
Internal Link Dist (ft)	2944	630		2695		2069
Turn Bay Length (ft)			325		230	
Base Capacity (vph)	469	505	762	2450	509	2403
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	0.42	0.32	0.12	0.45	0.12	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	34	80	27	36	87	85	1002	22	54	300	61
Future Volume (veh/h)	69	34	80	27	36	87	85	1002	22	54	300	61
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1776	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	75	37	87	29	39	95	92	1089	24	59	326	66
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	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
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	2	2	2
Cap, veh/h	148	59	105	90	75	144	625	1756	39	328	1426	285
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.06	0.50	0.50	0.05	0.48	0.48
Sat Flow, veh/h	503	391	694	187	494	952	1774	3541	78	1774	2940	588
Grp Volume(v), veh/h	199	0	0	163	0	0	92	544	569	59	195	197
Grp Sat Flow(s),veh/h/ln	1588	0	0	1633	0	0	1774	1770	1849	1774	1770	1759
Q Serve(g_s), s	1.8	0.0	0.0	0.0	0.0	0.0	1.7	15.5	15.5	1.1	4.4	4.5
Cycle Q Clear(g_c), s	8.2	0.0	0.0	6.4	0.0	0.0	1.7	15.5	15.5	1.1	4.4	4.5
Prop In Lane	0.38		0.44	0.18		0.58	1.00		0.04	1.00		0.33
Lane Grp Cap(c), veh/h	313	0	0	309	0	0	625	878	917	328	858	853
V/C Ratio(X)	0.64	0.00	0.00	0.53	0.00	0.00	0.15	0.62	0.62	0.18	0.23	0.23
Avail Cap(c_a), veh/h	589	0	0	592	0	0	939	1406	1469	661	1406	1398
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	0.0	0.0	27.7	0.0	0.0	7.7	12.7	12.7	9.4	10.3	10.3
Incr Delay (d2), s/veh	2.2	0.0	0.0	1.4	0.0	0.0	0.1	1.5	1.5	0.3	0.3	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	3.8	0.0	0.0	3.1	0.0	0.0	0.8	7.8	8.1	0.5	2.2	2.3
LnGrp Delay(d),s/veh	30.4	0.0	0.0	29.1	0.0	0.0	7.8	14.2	14.2	9.6	10.6	10.6
LnGrp LOS	C			C			A	B	B	A	B	B
Approach Vol, veh/h		199			163			1205			451	
Approach Delay, s/veh		30.4			29.1			13.7			10.5	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	40.4		17.9	10.2	41.1		17.9
Change Period (Y+Rc), s	* 6.8	* 6.8		7.4	* 6.8	* 6.8		7.4
Max Green Setting (Gmax), s	* 16	* 55		23.6	* 16	* 55		23.6
Max Q Clear Time (g_c+I1), s	3.7	6.5		10.2	3.1	17.5		8.4
Green Ext Time (p_c), s	0.2	4.8		0.5	0.1	16.8		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 LOS	B

Notes

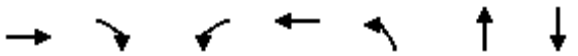
Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	153	68	61	121	27	30
Future Vol, veh/h	153	68	61	121	27	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	380	-	-	0	290
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	166	74	66	132	29	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	240	0	430	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	264	-
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	-	-	1327	-	582	878
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	780	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1327	-	551	878
Mov Cap-2 Maneuver	-	-	-	-	551	-
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	780	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	551	878	-	-	1327	-
HCM Lane V/C Ratio	0.053	0.037	-	-	0.05	-
HCM Control Delay (s)	11.9	9.3	-	-	7.9	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.2	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	45	263	1	1	603	530	231
v/c Ratio	0.21	0.28	0.01	0.00	0.64	0.37	0.54
Control Delay	33.2	2.1	32.0	0.0	8.0	4.9	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	2.1	32.0	0.0	8.0	4.9	28.8
Queue Length 50th (ft)	19	0	0	0	100	83	93
Queue Length 95th (ft)	52	32	5	0	189	157	170
Internal Link Dist (ft)	1362			910		1848	658
Turn Bay Length (ft)			110		200		
Base Capacity (vph)	372	1072	376	679	1048	1539	782
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	0.12	0.25	0.00	0.00	0.58	0.34	0.30

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	0	242	1	0	1	555	487	1	0	200	13
Future Volume (veh/h)	41	0	242	1	0	1	555	487	1	0	200	13
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	1900	1900	1827	1727	1900	1900	1637	1900
Adj Flow Rate, veh/h	45	0	263	1	0	1	603	529	1	0	217	14
Adj No. of Lanes	0	1	1	1	1	0	1	1	0	0	1	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
Percent Heavy Veh, %	1	1	1	0	0	0	4	10	10	17	17	17
Cap, veh/h	328	0	727	254	0	238	727	1071	2	0	302	19
Arrive On Green	0.15	0.00	0.15	0.15	0.00	0.15	0.31	0.62	0.62	0.00	0.20	0.20
Sat Flow, veh/h	1419	0	1599	1134	0	1615	1740	1724	3	0	1521	98
Grp Volume(v), veh/h	45	0	263	1	0	1	603	0	530	0	0	231
Grp Sat Flow(s),veh/h/ln	1419	0	1599	1134	0	1615	1740	0	1727	0	0	1619
Q Serve(g_s), s	1.7	0.0	6.5	0.0	0.0	0.0	14.8	0.0	10.1	0.0	0.0	8.1
Cycle Q Clear(g_c), s	1.7	0.0	6.5	1.8	0.0	0.0	14.8	0.0	10.1	0.0	0.0	8.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	0.00		0.06
Lane Grp Cap(c), veh/h	328	0	727	254	0	238	727	0	1073	0	0	321
V/C Ratio(X)	0.14	0.00	0.36	0.00	0.00	0.00	0.83	0.00	0.49	0.00	0.00	0.72
Avail Cap(c_a), veh/h	424	0	835	331	0	347	997	0	1799	0	0	750
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	0.00	0.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	10.8	23.5	0.0	22.0	11.2	0.0	6.3	0.0	0.0	22.7
Incr Delay (d2), s/veh	0.2	0.0	0.3	0.0	0.0	0.0	4.3	0.0	0.5	0.0	0.0	4.3
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	0.7	0.0	2.9	0.0	0.0	0.0	7.7	0.0	4.9	0.0	0.0	4.0
LnGrp Delay(d),s/veh	22.9	0.0	11.1	23.5	0.0	22.0	15.6	0.0	6.8	0.0	0.0	26.9
LnGrp LOS	C		B	C		C	B		A			C
Approach Vol, veh/h		308			2			1133			231	
Approach Delay, s/veh		12.8			22.8			11.5			26.9	
Approach LOS		B			C			B			C	

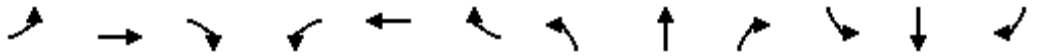
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		44.6		15.9	25.6	19.0		15.9
Change Period (Y+Rc), s		7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s		63.0		13.0	28.0	28.0		13.0
Max Q Clear Time (g_c+I1), s		12.1		8.5	16.8	10.1		3.8
Green Ext Time (p_c), s		3.3		0.5	1.8	1.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B

Lane Group	EBT	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	236	303	140	975	151
v/c Ratio	0.23	0.29	0.18	0.72	0.62
Control Delay	12.6	2.2	3.6	7.5	59.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	2.2	3.6	7.5	59.4
Queue Length 50th (ft)	79	0	5	244	112
Queue Length 95th (ft)	141	40	m30	m201	174
Internal Link Dist (ft)	477			2385	224
Turn Bay Length (ft)		500	300		
Base Capacity (vph)	1008	1032	799	1348	410
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	0.23	0.29	0.18	0.72	0.37

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	217	279	129	897	0	0	0	0	139	0	0
Future Volume (vph)	0	217	279	129	897	0	0	0	0	139	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.9	7.9	7.9	7.9						6.9	
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	
Frt		1.00	0.85	1.00	1.00						1.00	
Flt Protected		1.00	1.00	0.95	1.00						0.95	
Satd. Flow (prot)		1667	1509	1719	1827						1752	
Flt Permitted		1.00	1.00	0.61	1.00						0.95	
Satd. Flow (perm)		1667	1509	1107	1827						1752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	236	303	140	975	0	0	0	0	151	0	0
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	236	183	140	975	0	0	0	0	0	151	0
Heavy Vehicles (%)	0%	14%	7%	5%	4%	0%	0%	0%	0%	3%	2%	0%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	
Protected Phases		6		5	2						4	
Permitted Phases			6	6						4		
Actuated Green, G (s)		72.6	72.6	80.7	88.6						16.6	
Effective Green, g (s)		72.6	72.6	80.7	88.6						16.6	
Actuated g/C Ratio		0.60	0.60	0.67	0.74						0.14	
Clearance Time (s)		7.9	7.9	7.9	7.9						6.9	
Vehicle Extension (s)		4.0	4.0	3.0	4.0						4.0	
Lane Grp Cap (vph)		1008	912	785	1348						242	
v/s Ratio Prot		0.14		0.01	c0.53							
v/s Ratio Perm			0.12	0.11							0.09	
v/c Ratio		0.23	0.20	0.18	0.72						0.62	
Uniform Delay, d1		10.9	10.7	7.0	8.8						48.8	
Progression Factor		1.00	1.00	0.65	0.70						1.00	
Incremental Delay, d2		0.5	0.5	0.0	0.3						5.6	
Delay (s)		11.5	11.2	4.6	6.5						54.3	
Level of Service		B	B	A	A						D	
Approach Delay (s)		11.3			6.2			0.0			54.3	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.7
Intersection Capacity Utilization	136.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Group Flow (vph)	120	252	336	522	1444
v/c Ratio	0.38	0.32	0.60	0.61	1.92
Control Delay	25.0	24.9	40.8	6.1	443.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	24.9	40.8	6.1	443.8
Queue Length 50th (ft)	73	160	222	0	~1718
Queue Length 95th (ft)	90	163	323	85	#1985
Internal Link Dist (ft)		2385	1991		1289
Turn Bay Length (ft)	400				
Base Capacity (vph)	326	800	559	854	751
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	0.37	0.32	0.60	0.61	1.92

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	242	0	0	323	501	703	19	664	0	0	0
Future Volume (veh/h)	115	242	0	0	323	501	703	19	664	0	0	0
Number	5	2	12	1	6	16	7	4	14			
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			
Adj Sat Flow, veh/h/ln	1681	1792	0	0	1810	1881	1900	1855	1900			
Adj Flow Rate, veh/h	120	252	0	0	336	0	732	20	692			
Adj No. of Lanes	1	1	0	0	1	1	0	1	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	13	6	0	0	5	1	0	0	0			
Cap, veh/h	319	801	0	0	577	510	363	10	343			
Arrive On Green	0.13	0.89	0.00	0.00	0.32	0.00	0.43	0.43	0.43			
Sat Flow, veh/h	1601	1792	0	0	1810	1599	847	23	801			
Grp Volume(v), veh/h	120	252	0	0	336	0	1444	0	0			
Grp Sat Flow(s),veh/h/ln	1601	1792	0	0	1810	1599	1671	0	0			
Q Serve(g_s), s	6.0	2.5	0.0	0.0	18.6	0.0	51.4	0.0	0.0			
Cycle Q Clear(g_c), s	6.0	2.5	0.0	0.0	18.6	0.0	51.4	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.51		0.48			
Lane Grp Cap(c), veh/h	319	801	0	0	577	510	716	0	0			
V/C Ratio(X)	0.38	0.31	0.00	0.00	0.58	0.00	2.02	0.00	0.00			
Avail Cap(c_a), veh/h	342	801	0	0	577	510	716	0	0			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.98	0.98	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	24.3	3.7	0.0	0.0	34.2	0.0	34.3	0.0	0.0			
Incr Delay (d2), s/veh	0.7	1.0	0.0	0.0	4.3	0.0	462.6	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			
%ile BackOfQ(50%),veh/ln	2.7	1.3	0.0	0.0	10.0	0.0	115.7	0.0	0.0			
LnGrp Delay(d),s/veh	25.1	4.7	0.0	0.0	38.4	0.0	496.9	0.0	0.0			
LnGrp LOS	C	A			D		F					
Approach Vol, veh/h		372			336			1444				
Approach Delay, s/veh		11.3			38.4			496.9				
Approach LOS		B			D			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		61.0		59.0	15.3	45.7		
Change Period (Y+Rc), s		* 7.4		* 7.6	* 7.4	* 7.4		
Max Green Setting (Gmax), s		* 54		* 51	* 9.6	* 37		
Max Q Clear Time (g_c+I1), s		4.5		53.4	8.0	20.6		
Green Ext Time (p_c), s		1.5		0.0	0.0	1.6		

Intersection Summary	
HCM 2010 Ctrl Delay	341.4
HCM 2010 LOS	F

Notes

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	985	1232	828	67	379
v/c Ratio	0.84	0.61	0.74	0.33	0.15
Control Delay	34.2	28.8	6.4	17.4	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	28.8	6.4	17.4	13.2
Queue Length 50th (ft)	271	267	0	23	48
Queue Length 95th (ft)	#371	327	98	45	65
Internal Link Dist (ft)	489	1026			1993
Turn Bay Length (ft)			270	530	
Base Capacity (vph)	1214	2087	1134	426	3452
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	0.81	0.59	0.73	0.16	0.11

Intersection Summary

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	378	528	1133	762	62	349
Future Volume (vph)	378	528	1133	762	62	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2		10.2	10.2	10.2	10.2
Lane Util. Factor	0.97		0.91	1.00	1.00	0.91
Frt	0.91		1.00	0.85	1.00	1.00
Flt Protected	0.98		1.00	1.00	0.95	1.00
Satd. Flow (prot)	3222		5036	1568	1530	4673
Flt Permitted	0.98		1.00	1.00	0.15	1.00
Satd. Flow (perm)	3222		5036	1568	248	4673
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	411	574	1232	828	67	379
RTOR Reduction (vph)	180	0	0	503	0	0
Lane Group Flow (vph)	805	0	1232	325	67	379
Heavy Vehicles (%)	4%	1%	3%	3%	18%	11%
Turn Type	Prot		NA	Perm	D.P+P	NA
Protected Phases	3		6		5	2
Permitted Phases				6	6	
Actuated Green, G (s)	34.1		44.1	44.1	50.5	60.7
Effective Green, g (s)	34.1		44.1	44.1	50.5	60.7
Actuated g/C Ratio	0.30		0.39	0.39	0.45	0.54
Clearance Time (s)	7.2		10.2	10.2	10.2	10.2
Vehicle Extension (s)	6.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	979		1979	616	184	2528
v/s Ratio Prot	c0.25		c0.24		c0.02	0.08
v/s Ratio Perm				0.21	0.14	
v/c Ratio	0.82		0.62	0.53	0.36	0.15
Uniform Delay, d1	36.2		27.4	26.1	18.6	12.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6		0.7	1.1	1.2	0.0
Delay (s)	42.9		28.1	27.2	19.8	12.9
Level of Service	D		C	C	B	B
Approach Delay (s)	42.9		27.7			13.9
Approach LOS	D		C			B

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	112.2	Sum of lost time (s)	27.6
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	18	149	20	69	201
Future Vol, veh/h	3	18	149	20	69	201
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	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	39	2	0	10	2
Mvmt Flow	3	20	162	22	75	218

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	541	173	0	0	184	0
Stage 1	173	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Critical Hdwy	6.4	6.59	-	-	4.2	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.651	-	-	2.29	-
Pot Cap-1 Maneuver	506	783	-	-	1344	-
Stage 1	862	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	478	783	-	-	1344	-
Mov Cap-2 Maneuver	478	-	-	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	704	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	718	1344	-
HCM Lane V/C Ratio	-	-	0.032	0.056	-
HCM Control Delay (s)	-	-	10.2	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	21	140	27	90	265
Future Vol, veh/h	5	21	140	27	90	265
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	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	42	7	0	11	5
Mvmt Flow	5	23	152	29	98	288

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	651	167	0	0	181	0
Stage 1	167	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.21	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.299	-
Pot Cap-1 Maneuver	436	783	-	-	1342	-
Stage 1	867	-	-	-	-	-
Stage 2	624	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	404	783	-	-	1342	-
Mov Cap-2 Maneuver	404	-	-	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	624	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	663	1342	-
HCM Lane V/C Ratio	-	-	0.043	0.073	-
HCM Control Delay (s)	-	-	10.7	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	132	376	176	39	7	33
Future Vol, veh/h	132	376	176	39	7	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	12	6	11	0	0	42
Mvmt Flow	143	409	191	42	8	36

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	233	0	-	0	907	212
Stage 1	-	-	-	-	212	-
Stage 2	-	-	-	-	695	-
Critical Hdwy	4.22	-	-	-	6.4	6.62
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.308	-	-	-	3.5	3.678
Pot Cap-1 Maneuver	1278	-	-	-	309	737
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	499	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1278	-	-	-	274	737
Mov Cap-2 Maneuver	-	-	-	-	274	-
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	499	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1278	-	-	-	569
HCM Lane V/C Ratio	0.112	-	-	-	0.076
HCM Control Delay (s)	8.2	-	-	-	11.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.2

1: Route 1 & American Legion Rd/Eskimo Hill Rd

Timing Plan: TF PM MIt

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	262	191	61	451	167	1388
v/c Ratio	0.79	0.53	0.30	0.29	0.30	0.79
Control Delay	53.4	36.7	11.6	17.4	9.4	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	36.7	11.6	17.4	9.4	24.4
Queue Length 50th (ft)	159	99	14	90	41	378
Queue Length 95th (ft)	#314	179	29	129	68	482
Internal Link Dist (ft)	2944	630		2695		2069
Turn Bay Length (ft)			325		230	
Base Capacity (vph)	333	360	369	2012	683	1996
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	0.79	0.53	0.17	0.22	0.24	0.70

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	56	80	43	61	72	56	406	9	154	1167	110
Future Volume (veh/h)	105	56	80	43	61	72	56	406	9	154	1167	110
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1776	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	114	61	87	47	66	78	61	441	10	167	1268	120
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	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
Percent Heavy Veh, %	3	3	3	7	7	7	2	2	2	2	2	2
Cap, veh/h	171	81	97	103	133	129	237	1737	39	594	1693	160
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.04	0.49	0.49	0.07	0.52	0.52
Sat Flow, veh/h	547	388	465	258	635	617	1774	3538	80	1774	3269	309
Grp Volume(v), veh/h	262	0	0	191	0	0	61	220	231	167	685	703
Grp Sat Flow(s),veh/h/ln	1401	0	0	1510	0	0	1774	1770	1849	1774	1770	1808
Q Serve(g_s), s	6.6	0.0	0.0	0.0	0.0	0.0	1.4	6.6	6.6	4.2	27.8	28.0
Cycle Q Clear(g_c), s	16.7	0.0	0.0	10.1	0.0	0.0	1.4	6.6	6.6	4.2	27.8	28.0
Prop In Lane	0.44		0.33	0.25		0.41	1.00		0.04	1.00		0.17
Lane Grp Cap(c), veh/h	349	0	0	365	0	0	237	869	907	594	916	936
V/C Ratio(X)	0.75	0.00	0.00	0.52	0.00	0.00	0.26	0.25	0.25	0.28	0.75	0.75
Avail Cap(c_a), veh/h	421	0	0	438	0	0	480	1067	1114	789	1067	1090
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	0.0	0.0	32.4	0.0	0.0	14.2	13.5	13.5	10.0	17.3	17.4
Incr Delay (d2), s/veh	6.0	0.0	0.0	1.2	0.0	0.0	0.6	0.3	0.3	0.3	3.5	3.5
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	7.0	0.0	0.0	4.5	0.0	0.0	0.7	3.3	3.4	2.0	14.4	14.8
LnGrp Delay(d),s/veh	41.1	0.0	0.0	33.5	0.0	0.0	14.8	13.8	13.8	10.3	20.8	20.9
LnGrp LOS	D			C			B	B	B	B	C	C
Approach Vol, veh/h		262			191			512			1555	
Approach Delay, s/veh		41.1			33.5			13.9			19.7	
Approach LOS		D			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.7	54.0		26.5	13.2	51.6		26.5
Change Period (Y+Rc), s	* 6.8	* 6.8		7.4	* 6.8	* 6.8		7.4
Max Green Setting (Gmax), s	* 16	* 55		23.6	* 16	* 55		23.6
Max Q Clear Time (g_c+I1), s	3.4	30.0		18.7	6.2	8.6		12.1
Green Ext Time (p_c), s	0.1	17.2		0.4	0.3	5.5		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	21.8
HCM 2010 LOS	C

Notes

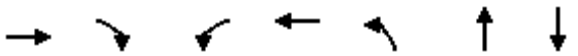
Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	178	51	53	174	68	63
Future Vol, veh/h	178	51	53	174	68	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	380	-	-	0	290
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	193	55	58	189	74	68

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	248	0	498	193
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	305	-
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	-	-	1318	-	532	849
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1318	-	506	849
Mov Cap-2 Maneuver	-	-	-	-	506	-
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	748	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	506	849	-	-	1318	-
HCM Lane V/C Ratio	0.146	0.081	-	-	0.044	-
HCM Control Delay (s)	13.3	9.6	-	-	7.9	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.5	0.3	-	-	0.1	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	29	536	1	1	415	334	507
v/c Ratio	0.13	0.72	0.00	0.00	0.55	0.21	0.78
Control Delay	34.1	16.8	34.0	34.0	9.7	2.6	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	16.8	34.0	34.0	9.7	2.6	31.9
Queue Length 50th (ft)	10	117	0	0	18	0	149
Queue Length 95th (ft)	40	235	5	5	179	81	#436
Internal Link Dist (ft)	1362			910		1848	658
Turn Bay Length (ft)			110		200		
Base Capacity (vph)	409	937	412	412	937	1600	849
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	0.07	0.57	0.00	0.00	0.44	0.21	0.60

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	1	493	1	1	0	382	306	1	0	430	37
Future Volume (veh/h)	26	1	493	1	1	0	382	306	1	0	430	37
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	1900	1900	1827	1793	1900	1900	1830	1900
Adj Flow Rate, veh/h	28	1	536	1	1	0	415	333	1	0	467	40
Adj No. of Lanes	0	1	1	1	1	0	1	1	0	0	1	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
Percent Heavy Veh, %	1	1	1	0	0	0	4	6	6	4	4	4
Cap, veh/h	360	11	605	254	356	0	483	1092	3	0	531	45
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.00	0.19	0.61	0.61	0.00	0.32	0.32
Sat Flow, veh/h	1379	60	1599	882	1900	0	1740	1786	5	0	1662	142
Grp Volume(v), veh/h	29	0	536	1	1	0	415	0	334	0	0	507
Grp Sat Flow(s),veh/h/ln	1439	0	1599	882	1900	0	1740	0	1792	0	0	1805
Q Serve(g_s), s	1.1	0.0	13.0	0.1	0.0	0.0	10.0	0.0	6.2	0.0	0.0	18.5
Cycle Q Clear(g_c), s	1.1	0.0	13.0	1.2	0.0	0.0	10.0	0.0	6.2	0.0	0.0	18.5
Prop In Lane	0.97		1.00	1.00		0.00	1.00		0.00	0.00		0.08
Lane Grp Cap(c), veh/h	371	0	605	254	356	0	483	0	1095	0	0	576
V/C Ratio(X)	0.08	0.00	0.89	0.00	0.00	0.00	0.86	0.00	0.31	0.00	0.00	0.88
Avail Cap(c_a), veh/h	371	0	605	254	356	0	852	0	1625	0	0	728
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	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	20.2	23.9	23.0	0.0	13.7	0.0	6.5	0.0	0.0	22.4
Incr Delay (d2), s/veh	0.1	0.0	14.7	0.0	0.0	0.0	4.6	0.0	0.2	0.0	0.0	11.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	12.0	0.0	0.0	0.0	5.2	0.0	3.0	0.0	0.0	10.9
LnGrp Delay(d),s/veh	23.5	0.0	34.9	23.9	23.0	0.0	18.3	0.0	6.7	0.0	0.0	33.4
LnGrp LOS	C		C	C	C		B		A			C
Approach Vol, veh/h		565			2			749			507	
Approach Delay, s/veh		34.3			23.4			13.1			33.4	
Approach LOS		C			C			B			C	

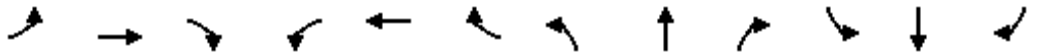
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		49.4		20.0	20.3	29.2		20.0
Change Period (Y+Rc), s		7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s		63.0		13.0	28.0	28.0		13.0
Max Q Clear Time (g_c+I1), s		8.2		15.0	12.0	20.5		3.2
Green Ext Time (p_c), s		1.9		0.0	1.3	1.7		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		25.3
HCM 2010 LOS		C

Lane Group	EBT	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	634	607	182	588	600
v/c Ratio	0.90	0.63	0.81	0.62	0.95
Control Delay	52.3	5.4	46.2	19.0	64.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	5.4	46.2	19.0	64.5
Queue Length 50th (ft)	463	0	49	311	444
Queue Length 95th (ft)	#690	80	m#149	452	#673
Internal Link Dist (ft)	477			2385	224
Turn Bay Length (ft)		500	300		
Base Capacity (vph)	707	963	224	949	642
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	0.90	0.63	0.81	0.62	0.93

Intersection Summary

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.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	583	558	167	541	0	0	0	0	549	3	0
Future Volume (vph)	0	583	558	167	541	0	0	0	0	549	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.9	7.9	7.9	7.9						6.9	
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	
Frt		1.00	0.85	1.00	1.00						1.00	
Flt Protected		1.00	1.00	0.95	1.00						0.95	
Satd. Flow (prot)		1845	1538	1770	1810						1789	
Flt Permitted		1.00	1.00	0.13	1.00						0.95	
Satd. Flow (perm)		1845	1538	235	1810						1789	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	634	607	182	588	0	0	0	0	597	3	0
RTOR Reduction (vph)	0	0	374	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	634	233	182	588	0	0	0	0	0	600	0
Heavy Vehicles (%)	0%	3%	5%	2%	5%	0%	0%	0%	0%	1%	33%	0%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	
Protected Phases		6		5	2						4	
Permitted Phases			6	6						4		
Actuated Green, G (s)		46.0	46.0	55.1	63.0						42.2	
Effective Green, g (s)		46.0	46.0	55.1	63.0						42.2	
Actuated g/C Ratio		0.38	0.38	0.46	0.52						0.35	
Clearance Time (s)		7.9	7.9	7.9	7.9						6.9	
Vehicle Extension (s)		4.0	4.0	3.0	4.0						4.0	
Lane Grp Cap (vph)		707	589	224	950						629	
v/s Ratio Prot		c0.34		0.06	c0.32							
v/s Ratio Perm			0.15	0.31							0.34	
v/c Ratio		0.90	0.40	0.81	0.62						0.95	
Uniform Delay, d1		34.8	26.9	25.2	20.1						38.0	
Progression Factor		1.00	1.00	1.27	0.81						1.00	
Incremental Delay, d2		16.4	2.0	14.8	2.2						25.0	
Delay (s)		51.1	28.9	46.9	18.3						62.9	
Level of Service		D	C	D	B						E	
Approach Delay (s)		40.2			25.1			0.0			62.9	
Approach LOS		D			C			A			E	

Intersection Summary			
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.7
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Group Flow (vph)	334	897	409	391	473
v/c Ratio	0.73	0.85	0.58	0.46	0.90
Control Delay	21.2	28.1	25.1	2.9	58.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	28.1	25.1	2.9	58.9
Queue Length 50th (ft)	103	593	174	0	332
Queue Length 95th (ft)	m133	m#664	261	54	#489
Internal Link Dist (ft)		2385	1991		1289
Turn Bay Length (ft)	400				
Base Capacity (vph)	461	1053	708	844	588
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	0.72	0.85	0.58	0.46	0.80

Intersection Summary

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	307	825	0	0	376	360	332	1	102	0	0	0
Future Volume (veh/h)	307	825	0	0	376	360	332	1	102	0	0	0
Number	5	2	12	1	6	16	7	4	14			
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			
Adj Sat Flow, veh/h/ln	1845	1881	0	0	1863	1863	1900	1759	1900			
Adj Flow Rate, veh/h	334	897	0	0	409	0	361	1	111			
Adj No. of Lanes	1	1	0	0	1	1	0	1	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	1	0	0	2	2	0	0	0			
Cap, veh/h	476	1066	0	0	714	607	383	1	118			
Arrive On Green	0.16	0.75	0.00	0.00	0.38	0.00	0.31	0.31	0.31			
Sat Flow, veh/h	1757	1881	0	0	1863	1583	1243	3	382			
Grp Volume(v), veh/h	334	897	0	0	409	0	473	0	0			
Grp Sat Flow(s),veh/h/ln	1757	1881	0	0	1863	1583	1629	0	0			
Q Serve(g_s), s	13.9	38.5	0.0	0.0	20.8	0.0	34.0	0.0	0.0			
Cycle Q Clear(g_c), s	13.9	38.5	0.0	0.0	20.8	0.0	34.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	0.76		0.23			
Lane Grp Cap(c), veh/h	476	1066	0	0	714	607	502	0	0			
V/C Ratio(X)	0.70	0.84	0.00	0.00	0.57	0.00	0.94	0.00	0.00			
Avail Cap(c_a), veh/h	476	1066	0	0	714	607	576	0	0			
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.32	0.32	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	19.4	11.2	0.0	0.0	29.2	0.0	40.4	0.0	0.0			
Incr Delay (d2), s/veh	1.5	2.8	0.0	0.0	3.3	0.0	22.5	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			
%ile BackOfQ(50%),veh/ln	6.7	20.1	0.0	0.0	11.3	0.0	18.4	0.0	0.0			
LnGrp Delay(d),s/veh	20.9	13.9	0.0	0.0	32.6	0.0	62.9	0.0	0.0			
LnGrp LOS	C	B			C		E					
Approach Vol, veh/h		1231			409			473				
Approach Delay, s/veh		15.8			32.6			62.9				
Approach LOS		B			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		75.4		44.6	22.0	53.4		
Change Period (Y+Rc), s		* 7.4		* 7.6	* 7.4	* 7.4		
Max Green Setting (Gmax), s		* 63		* 42	* 15	* 41		
Max Q Clear Time (g_c+I1), s		40.5		36.0	15.9	22.8		
Green Ext Time (p_c), s		6.7		1.0	0.0	2.1		

Intersection Summary	
HCM 2010 Ctrl Delay	29.6
HCM 2010 LOS	C

Notes

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1008	443	618	180	2023
v/c Ratio	0.79	0.26	0.66	0.45	0.82
Control Delay	35.0	23.3	8.5	25.6	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	23.3	8.5	25.6	31.1
Queue Length 50th (ft)	275	104	128	83	502
Queue Length 95th (ft)	352	m62	m364	132	572
Internal Link Dist (ft)	489	1026			1993
Turn Bay Length (ft)			270	530	
Base Capacity (vph)	1356	1711	938	397	2456
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	0.74	0.26	0.66	0.45	0.82

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	814	113	408	569	166	1861
Future Volume (vph)	814	113	408	569	166	1861
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2		10.2	10.2	10.2	10.2
Lane Util. Factor	0.97		0.91	1.00	1.00	0.91
Frt	0.98		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	3383		5085	1568	1736	5136
Flt Permitted	0.96		1.00	1.00	0.49	1.00
Satd. Flow (perm)	3383		5085	1568	888	5136
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	885	123	443	618	180	2023
RTOR Reduction (vph)	9	0	0	410	0	0
Lane Group Flow (vph)	999	0	443	208	180	2023
Heavy Vehicles (%)	1%	13%	2%	3%	4%	1%
Turn Type	Prot		NA	Perm	D.P+P	NA
Protected Phases	3		6		5	2
Permitted Phases				6	6	
Actuated Green, G (s)	45.2		40.4	40.4	47.2	57.4
Effective Green, g (s)	45.2		40.4	40.4	47.2	57.4
Actuated g/C Ratio	0.38		0.34	0.34	0.39	0.48
Clearance Time (s)	7.2		10.2	10.2	10.2	10.2
Vehicle Extension (s)	6.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	1274		1711	527	397	2456
v/s Ratio Prot	c0.30		0.09		0.03	c0.39
v/s Ratio Perm				0.13	0.15	
v/c Ratio	0.78		0.26	0.39	0.45	0.82
Uniform Delay, d1	33.1		28.9	30.4	24.8	26.9
Progression Factor	1.00		0.77	1.90	1.00	1.00
Incremental Delay, d2	2.1		0.3	2.1	0.8	3.3
Delay (s)	35.2		22.7	60.0	25.6	30.2
Level of Service	D		C	E	C	C
Approach Delay (s)	35.2		44.4			29.9
Approach LOS	D		D			C

Intersection Summary			
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.6
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	54	173	10	36	135
Future Vol, veh/h	17	54	173	10	36	135
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	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	7	2	0	11	2
Mvmt Flow	18	59	188	11	39	147

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	419	194	0	0	199	0
Stage 1	194	-	-	-	-	-
Stage 2	225	-	-	-	-	-
Critical Hdwy	6.4	6.27	-	-	4.21	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.363	-	-	2.299	-
Pot Cap-1 Maneuver	595	835	-	-	1321	-
Stage 1	844	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	577	835	-	-	1321	-
Mov Cap-2 Maneuver	577	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	817	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	1.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	754	1321	-
HCM Lane V/C Ratio	-	-	0.102	0.03	-
HCM Control Delay (s)	-	-	10.3	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	70	213	14	47	149
Future Vol, veh/h	22	70	213	14	47	149
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	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	7	4	0	9	5
Mvmt Flow	24	76	232	15	51	162

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	504	240	0	0	247	0
Stage 1	240	-	-	-	-	-
Stage 2	264	-	-	-	-	-
Critical Hdwy	6.4	6.27	-	-	4.19	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.363	-	-	2.281	-
Pot Cap-1 Maneuver	531	787	-	-	1279	-
Stage 1	805	-	-	-	-	-
Stage 2	785	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	510	787	-	-	1279	-
Mov Cap-2 Maneuver	510	-	-	-	-	-
Stage 1	773	-	-	-	-	-
Stage 2	785	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	697	1279	-
HCM Lane V/C Ratio	-	-	0.143	0.04	-
HCM Control Delay (s)	-	-	11	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	65	262	342	20	32	104
Future Vol, veh/h	65	262	342	20	32	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	5	5	0	0	8
Mvmt Flow	71	285	372	22	35	113

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	394	0	-	0	810	383
Stage 1	-	-	-	-	383	-
Stage 2	-	-	-	-	427	-
Critical Hdwy	4.18	-	-	-	6.4	6.28
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.272	-	-	-	3.5	3.372
Pot Cap-1 Maneuver	1133	-	-	-	352	651
Stage 1	-	-	-	-	694	-
Stage 2	-	-	-	-	662	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1133	-	-	-	330	651
Mov Cap-2 Maneuver	-	-	-	-	330	-
Stage 1	-	-	-	-	650	-
Stage 2	-	-	-	-	662	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1133	-	-	-	530
HCM Lane V/C Ratio	0.062	-	-	-	0.279
HCM Control Delay (s)	8.4	-	-	-	14.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1

Appendix J:

SimTraffic Analysis - Future with Development Condition (2023)

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:12	8:12	8:12	8:12	8:12	8:12	8:12
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	6839	6972	7076	6964	6978	6973	7001
Vehs Exited	6836	6972	7088	6979	6979	7006	7037
Starting Vehs	335	366	369	361	350	326	371
Ending Vehs	338	366	357	346	349	293	335
Denied Entry Before	96	126	122	123	131	152	108
Denied Entry After	761	855	750	694	827	806	687
Travel Distance (mi)	8786	8988	9070	8873	8775	8781	9058
Travel Time (hr)	785.0	859.3	793.1	766.4	820.8	816.5	762.5
Total Delay (hr)	570.9	640.3	572.0	549.9	606.2	601.7	541.5
Total Stops	7292	7591	7487	7522	7341	7319	7489
Fuel Used (gal)	414.0	436.0	423.9	413.1	424.7	421.9	416.0

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:12	8:12	8:12	8:12
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	7000	6853	7006	6967
Vehs Exited	6962	6899	7031	6980
Starting Vehs	328	330	395	344
Ending Vehs	366	284	370	339
Denied Entry Before	139	150	129	126
Denied Entry After	796	797	780	774
Travel Distance (mi)	8856	8703	8915	8881
Travel Time (hr)	822.5	820.5	816.8	806.3
Total Delay (hr)	606.4	607.9	599.2	589.6
Total Stops	7315	7167	7355	7387
Fuel Used (gal)	426.2	420.4	426.4	422.3

Interval #0 Information Seeding

Start Time	6:57
End Time	7:12
Total Time (min)	15

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:12
End Time	7:27
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1635	1744	1738	1701	1721	1709	1708
Vehs Exited	1662	1731	1782	1692	1745	1698	1728
Starting Vehs	335	366	369	361	350	326	371
Ending Vehs	308	379	325	370	326	337	351
Denied Entry Before	96	126	122	123	131	152	108
Denied Entry After	265	284	262	248	268	305	253
Travel Distance (mi)	2078	2283	2265	2173	2206	2149	2290
Travel Time (hr)	126.1	147.6	139.8	135.1	137.8	143.4	136.6
Total Delay (hr)	75.4	91.7	84.6	82.0	84.1	90.9	80.7
Total Stops	1636	1954	1807	1799	1777	1755	1880
Fuel Used (gal)	84.3	94.8	92.4	89.3	91.4	89.7	91.8

Interval #1 Information Recording

Start Time	7:12
End Time	7:27
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1691	1654	1688	1697
Vehs Exited	1689	1641	1719	1708
Starting Vehs	328	330	395	344
Ending Vehs	330	343	364	334
Denied Entry Before	139	150	129	126
Denied Entry After	305	314	276	277
Travel Distance (mi)	2158	2130	2148	2188
Travel Time (hr)	143.2	144.0	133.8	138.7
Total Delay (hr)	90.9	91.9	81.3	85.4
Total Stops	1613	1729	1654	1756
Fuel Used (gal)	90.7	89.9	87.7	90.2

Interval #2 Information

Start Time	7:27
End Time	7:42
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1691	1707	1713	1636	1616	1700	1703
Vehs Exited	1674	1727	1687	1653	1649	1638	1725
Starting Vehs	308	379	325	370	326	337	351
Ending Vehs	325	359	351	353	293	399	329
Denied Entry Before	265	284	262	248	268	305	253
Denied Entry After	431	490	409	394	447	444	386
Travel Distance (mi)	2151	2213	2167	2080	2054	2173	2187
Travel Time (hr)	172.0	188.8	171.1	165.0	174.7	181.2	169.5
Total Delay (hr)	119.6	135.1	118.2	114.1	124.4	128.2	115.9
Total Stops	1708	1893	1774	1677	1700	1800	1745
Fuel Used (gal)	96.4	102.1	97.3	92.7	95.8	99.7	96.9

Interval #2 Information

Start Time	7:27
End Time	7:42
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1674	1683	1702	1685
Vehs Exited	1692	1651	1704	1679
Starting Vehs	330	343	364	334
Ending Vehs	312	375	362	343
Denied Entry Before	305	314	276	277
Denied Entry After	459	465	459	437
Travel Distance (mi)	2132	2120	2133	2141
Travel Time (hr)	181.2	180.9	177.8	176.2
Total Delay (hr)	129.0	129.1	125.6	123.9
Total Stops	1795	1732	1733	1751
Fuel Used (gal)	99.1	98.1	98.9	97.7

Interval #3 Information

Start Time	7:42
End Time	7:57
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1854	1817	1932	1950	1916	1864	1916
Vehs Exited	1783	1786	1887	1865	1797	1865	1822
Starting Vehs	325	359	351	353	293	399	329
Ending Vehs	396	390	396	438	412	398	423
Denied Entry Before	431	490	409	394	447	444	386
Denied Entry After	598	688	583	544	659	622	561
Travel Distance (mi)	2304	2299	2396	2427	2337	2327	2341
Travel Time (hr)	223.1	242.7	223.2	220.2	234.4	228.5	212.5
Total Delay (hr)	167.1	186.7	164.7	161.5	177.1	171.5	155.6
Total Stops	2040	1936	2121	2185	2071	1959	2034
Fuel Used (gal)	113.3	117.0	115.3	115.8	116.3	115.0	111.8

Interval #3 Information

Start Time	7:42
End Time	7:57
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	1946	1901	1913	1902
Vehs Exited	1857	1879	1885	1843
Starting Vehs	312	375	362	343
Ending Vehs	401	397	390	398
Denied Entry Before	459	465	459	437
Denied Entry After	624	628	616	611
Travel Distance (mi)	2373	2340	2361	2350
Travel Time (hr)	232.9	234.8	237.3	229.0
Total Delay (hr)	175.0	177.5	179.3	171.6
Total Stops	2033	2012	2106	2044
Fuel Used (gal)	116.3	116.1	117.9	115.5

Interval #4 Information

Start Time	7:57
End Time	8:12
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1659	1704	1693	1677	1725	1700	1674
Vehs Exited	1717	1728	1732	1769	1788	1805	1762
Starting Vehs	396	390	396	438	412	398	423
Ending Vehs	338	366	357	346	349	293	335
Denied Entry Before	598	688	583	544	659	622	561
Denied Entry After	761	855	750	694	827	806	687
Travel Distance (mi)	2254	2193	2243	2192	2179	2132	2240
Travel Time (hr)	263.7	280.2	259.0	246.0	273.9	263.3	243.9
Total Delay (hr)	208.8	226.8	204.4	192.3	220.6	211.1	189.3
Total Stops	1908	1808	1785	1861	1793	1805	1830
Fuel Used (gal)	119.9	122.1	118.9	115.2	121.2	117.5	115.6

Interval #4 Information

Start Time	7:57
End Time	8:12
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	1689	1615	1703	1677
Vehs Exited	1724	1728	1723	1746
Starting Vehs	401	397	390	398
Ending Vehs	366	284	370	339
Denied Entry Before	624	628	616	611
Denied Entry After	796	797	780	774
Travel Distance (mi)	2193	2114	2272	2201
Travel Time (hr)	265.2	260.8	268.0	262.4
Total Delay (hr)	211.6	209.4	212.9	208.7
Total Stops	1874	1694	1862	1819
Fuel Used (gal)	120.1	116.4	122.0	118.9

Intersection: 1: Route 1 & American Legion Rd/Eskimo Hill Rd

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	177	183	60	189	208	50	100	87
Average Queue (ft)	79	75	21	83	82	15	32	17
95th Queue (ft)	148	143	48	153	159	38	74	54
Link Distance (ft)	2929	647		2728	2728		2100	2100
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			325			230		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Centreport Pkwy & Ramoth Church Road/American Legion Rd

Movement	EB	WB	NB	NB
Directions Served	R	LT	L	R
Maximum Queue (ft)	8	55	39	39
Average Queue (ft)	0	13	10	9
95th Queue (ft)	4	43	29	28
Link Distance (ft)		2929	871	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	380			290
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Centreport Pkwy & Mountain View Rd

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	L	TR	LTR
Maximum Queue (ft)	68	100	5	18	183	120	193
Average Queue (ft)	26	46	0	1	76	32	82
95th Queue (ft)	56	80	4	8	146	92	157
Link Distance (ft)		1400		951		1852	678
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	215		110		200		
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

Intersection: 4: I-95 SB Ramps & Centreport Pkwy

Movement	EB	EB	WB	WB	SB
Directions Served	T	R	L	T	LT
Maximum Queue (ft)	133	102	85	185	211
Average Queue (ft)	49	39	34	83	106
95th Queue (ft)	109	80	69	158	181
Link Distance (ft)	423			2430	223
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (ft)		500	300		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: I-95 NB Ramps & Centreport Pkwy

Movement	EB	EB	WB	WB	NB
Directions Served	L	T	T	R	LTR
Maximum Queue (ft)	154	251	321	87	1390
Average Queue (ft)	67	124	190	5	1352
95th Queue (ft)	128	211	299	55	1374
Link Distance (ft)		2430	2016	2016	1328
Upstream Blk Time (%)					80
Queuing Penalty (veh)					0
Storage Bay Dist (ft)	400				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Route 1 & Centreport Pkwy

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LR	T	T	T	R	L	T	T	T
Maximum Queue (ft)	374	294	423	426	683	295	129	129	113	94
Average Queue (ft)	97	178	198	202	308	244	47	56	37	33
95th Queue (ft)	235	288	354	359	635	362	100	104	81	75
Link Distance (ft)	437		1001	1001	1001			2019	2019	2019
Upstream Blk Time (%)	0				0					
Queuing Penalty (veh)	0				0					
Storage Bay Dist (ft)		270				270	530			
Storage Blk Time (%)	0	2			1	18				
Queuing Penalty (veh)	2	4			8	68				

Intersection: 7: Centreport Pkwy & Site Entrance 1

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	63	46
Average Queue (ft)	22	7
95th Queue (ft)	59	29
Link Distance (ft)	492	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Centreport Pkwy & Site Entrance 2

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (ft)	72	2	58
Average Queue (ft)	25	0	10
95th Queue (ft)	64	2	39
Link Distance (ft)	447	535	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: Centreport Pkwy & Site Entrance 3

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	76	72
Average Queue (ft)	19	30
95th Queue (ft)	53	68
Link Distance (ft)		409
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 82

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:12	8:12	8:12	8:12	8:12	8:12	8:12
Total Time (min)	75	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	8694	8681	8665	8502	8552	8606	8782
Vehs Exited	8536	8537	8535	8409	8407	8547	8563
Starting Vehs	481	505	450	518	409	472	442
Ending Vehs	639	649	580	611	554	531	661
Denied Entry Before	2	4	4	2	1	0	2
Denied Entry After	5	3	11	2	4	4	5
Travel Distance (mi)	11447	11402	11670	11260	11284	11356	11658
Travel Time (hr)	575.6	558.2	499.5	516.9	503.3	525.3	528.0
Total Delay (hr)	296.6	280.0	214.6	242.2	227.6	247.8	243.8
Total Stops	15688	15396	13020	14486	13739	14752	13912
Fuel Used (gal)	434.4	430.9	421.2	416.3	413.6	419.1	429.3

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:12	8:12	8:12	8:12
Total Time (min)	75	75	75	75
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	8761	8562	8641	8643
Vehs Exited	8622	8429	8555	8517
Starting Vehs	462	456	464	457
Ending Vehs	601	589	550	590
Denied Entry Before	2	0	2	1
Denied Entry After	2	5	1	3
Travel Distance (mi)	11541	11316	11510	11444
Travel Time (hr)	524.7	505.9	535.1	527.3
Total Delay (hr)	243.8	229.5	254.2	248.0
Total Stops	14439	13916	15266	14461
Fuel Used (gal)	426.1	414.3	425.9	423.1

Interval #0 Information Seeding

Start Time	6:57
End Time	7:12
Total Time (min)	15

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:12
End Time	7:27
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	2145	2100	2139	2050	2082	2035	2103
Vehs Exited	2128	2145	2145	2091	2048	2003	2146
Starting Vehs	481	505	450	518	409	472	442
Ending Vehs	498	460	444	477	443	504	399
Denied Entry Before	2	4	4	2	1	0	2
Denied Entry After	8	6	4	6	1	8	1
Travel Distance (mi)	2869	2852	2922	2739	2702	2682	2829
Travel Time (hr)	127.1	116.6	112.2	119.9	105.9	112.5	104.1
Total Delay (hr)	57.1	46.9	40.8	53.0	39.8	46.6	35.1
Total Stops	3606	3051	2691	3479	2596	3104	2384
Fuel Used (gal)	104.7	101.5	103.5	99.7	95.6	95.8	98.6

Interval #1 Information Recording

Start Time	7:12
End Time	7:27
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	2061	2070	2111	2085
Vehs Exited	2068	2081	2059	2089
Starting Vehs	462	456	464	457
Ending Vehs	455	445	516	458
Denied Entry Before	2	0	2	1
Denied Entry After	2	3	4	3
Travel Distance (mi)	2787	2758	2864	2801
Travel Time (hr)	110.4	110.2	119.8	113.9
Total Delay (hr)	42.6	42.8	50.1	45.5
Total Stops	2857	2834	3305	2986
Fuel Used (gal)	98.8	97.2	102.4	99.8

Interval #2 Information

Start Time	7:27
End Time	7:42
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	2091	2091	2092	2047	2129	2180	2162
Vehs Exited	2019	2038	2090	2044	2063	2150	2036
Starting Vehs	498	460	444	477	443	504	399
Ending Vehs	570	513	446	480	509	534	525
Denied Entry Before	8	6	4	6	1	8	1
Denied Entry After	10	7	5	6	0	15	1
Travel Distance (mi)	2739	2716	2795	2729	2821	2849	2808
Travel Time (hr)	134.4	127.9	109.4	121.5	119.1	131.3	111.1
Total Delay (hr)	67.7	61.8	41.3	54.9	50.3	61.9	42.8
Total Stops	3700	3633	2690	3384	3262	3692	2911
Fuel Used (gal)	103.4	101.7	99.3	99.6	102.0	105.3	99.8

Interval #2 Information

Start Time	7:27
End Time	7:42
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	2150	2104	2137	2118
Vehs Exited	2102	2041	2112	2070
Starting Vehs	455	445	516	458
Ending Vehs	503	508	541	506
Denied Entry Before	2	3	4	3
Denied Entry After	5	1	10	4
Travel Distance (mi)	2840	2837	2834	2797
Travel Time (hr)	116.6	119.8	131.0	122.2
Total Delay (hr)	47.5	50.9	61.9	54.1
Total Stops	3234	3404	3760	3364
Fuel Used (gal)	102.3	102.0	104.6	102.0

Interval #3 Information

Start Time	7:42
End Time	7:57
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	2363	2337	2359	2288	2265	2377	2379
Vehs Exited	2243	2206	2204	2189	2166	2289	2261
Starting Vehs	570	513	446	480	509	534	525
Ending Vehs	690	644	601	579	608	622	643
Denied Entry Before	10	7	5	6	0	15	1
Denied Entry After	2	0	3	1	5	9	2
Travel Distance (mi)	3032	2973	3055	2902	2990	3041	3149
Travel Time (hr)	155.6	152.2	131.2	132.1	137.6	145.8	150.9
Total Delay (hr)	81.7	79.7	56.7	61.3	65.0	71.8	74.3
Total Stops	4329	4478	3459	3752	3946	4146	4362
Fuel Used (gal)	115.3	113.8	108.9	107.4	110.0	113.4	117.4

Interval #3 Information

Start Time	7:42
End Time	7:57
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	2379	2279	2281	2326
Vehs Exited	2269	2214	2234	2225
Starting Vehs	503	508	541	506
Ending Vehs	613	573	588	605
Denied Entry Before	5	1	10	4
Denied Entry After	2	1	2	0
Travel Distance (mi)	3035	2934	2995	3011
Travel Time (hr)	145.3	136.5	147.0	143.4
Total Delay (hr)	71.4	64.8	74.1	70.1
Total Stops	4246	3913	4249	4083
Fuel Used (gal)	112.8	108.6	112.4	112.0

Interval #4 Information

Start Time	7:57
End Time	8:12
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	2095	2153	2075	2117	2076	2014	2138
Vehs Exited	2146	2148	2096	2085	2130	2105	2120
Starting Vehs	690	644	601	579	608	622	643
Ending Vehs	639	649	580	611	554	531	661
Denied Entry Before	2	0	3	1	5	9	2
Denied Entry After	5	3	11	2	4	4	5
Travel Distance (mi)	2806	2861	2897	2890	2771	2785	2872
Travel Time (hr)	158.5	161.5	146.7	143.5	140.7	135.7	161.8
Total Delay (hr)	90.1	91.7	75.8	73.1	72.7	67.5	91.6
Total Stops	4053	4234	4180	3871	3935	3810	4255
Fuel Used (gal)	111.0	113.9	109.5	109.6	106.0	104.7	113.6

Interval #4 Information

Start Time	7:57
End Time	8:12
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	2171	2109	2112	2099
Vehs Exited	2183	2093	2150	2121
Starting Vehs	613	573	588	605
Ending Vehs	601	589	550	590
Denied Entry Before	2	1	2	0
Denied Entry After	2	5	1	3
Travel Distance (mi)	2878	2786	2816	2836
Travel Time (hr)	152.4	139.3	137.2	147.7
Total Delay (hr)	82.4	71.1	68.2	78.4
Total Stops	4102	3765	3952	4013
Fuel Used (gal)	112.2	106.6	106.5	109.4

Intersection: 1: Route 1 & American Legion Rd/Eskimo Hill Rd

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	330	217	62	117	115	204	303	297
Average Queue (ft)	161	97	21	49	40	47	151	146
95th Queue (ft)	296	173	48	97	92	133	259	259
Link Distance (ft)	2929	647		2728	2728		2100	2100
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			325			230		
Storage Blk Time (%)							1	
Queuing Penalty (veh)							2	

Intersection: 2: Centreport Pkwy & Ramoth Church Road/American Legion Rd

Movement	EB	WB	NB	NB
Directions Served	R	LT	L	R
Maximum Queue (ft)	8	67	61	52
Average Queue (ft)	0	12	23	18
95th Queue (ft)	4	44	45	38
Link Distance (ft)		2929	871	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	380			290
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Centreport Pkwy & Mountain View Rd

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	L	TR	LTR
Maximum Queue (ft)	54	243	9	14	205	174	325
Average Queue (ft)	19	130	0	1	92	21	170
95th Queue (ft)	47	212	5	8	172	91	282
Link Distance (ft)		1400		951		1852	678
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	215		110		200		
Storage Blk Time (%)		1			0		
Queuing Penalty (veh)		0			1		

Intersection: 4: I-95 SB Ramps & Centreport Pkwy

Movement	EB	EB	WB	WB	SB
Directions Served	T	R	L	T	LT
Maximum Queue (ft)	534	410	252	380	314
Average Queue (ft)	302	172	122	199	287
95th Queue (ft)	481	385	240	372	351
Link Distance (ft)	423			2430	223
Upstream Blk Time (%)	2	0			32
Queuing Penalty (veh)	24	0			177
Storage Bay Dist (ft)		500	300		
Storage Blk Time (%)	2	0	3	0	
Queuing Penalty (veh)	12	2	16	1	

Intersection: 5: I-95 NB Ramps & Centreport Pkwy

Movement	EB	EB	WB	WB	NB
Directions Served	L	T	T	R	LTR
Maximum Queue (ft)	338	508	330	113	443
Average Queue (ft)	142	283	198	6	276
95th Queue (ft)	291	467	307	63	421
Link Distance (ft)		2430	2016	2016	1328
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	400				
Storage Blk Time (%)	0	2			
Queuing Penalty (veh)	1	6			

Intersection: 6: Route 1 & Centreport Pkwy

Movement	WB	WB	B12	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LR	T	T	T	T	R	L	T	T	T
Maximum Queue (ft)	440	295	8	124	129	144	253	555	1458	1420	1343
Average Queue (ft)	222	224	0	72	67	43	110	392	779	766	713
95th Queue (ft)	381	325	8	113	111	115	194	708	1516	1480	1402
Link Distance (ft)	437		1155	1001	1001	1001			2019	2019	2019
Upstream Blk Time (%)	0								0		
Queuing Penalty (veh)	4								0		
Storage Bay Dist (ft)		270					270	530			
Storage Blk Time (%)	4	7					0	2	37		
Queuing Penalty (veh)	22	29					1	13	62		

Intersection: 7: Centreport Pkwy & Site Entrance 1

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	68	41
Average Queue (ft)	33	6
95th Queue (ft)	57	27
Link Distance (ft)	492	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Centreport Pkwy & Site Entrance 2

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	79	45
Average Queue (ft)	37	8
95th Queue (ft)	63	31
Link Distance (ft)	447	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Centreport Pkwy

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	58	98
Average Queue (ft)	14	47
95th Queue (ft)	41	80
Link Distance (ft)	637	410
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 373