Traffic Impact Analysis

for

Annapolis Kiddie Academy

Prepared for:

City of Annapolis
Department of Planning and Zoning
145 Gorman Street, 3rd Floor
Annapolis, MD 21401

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Traffic Engineering & Transportation Planning

March 28, 2019

Revised: June 10, 2019

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Section 1 Introduction

1.1 Purpose

This Traffic Impact Analysis was requested by the City of Annapolis Department of Planning and Zoning for a proposed Kiddie Academy located along the north side of Forest Drive just west of Thom Drive. The proposed Kiddie Academy will occupy 10,320 square feet and accommodate up to 145 students. The purpose of the study is to evaluate the traffic impacts of the proposed project and determine any improvements to mitigate adverse impacts.

The scope of the study was developed by the City in their Bid Invitation on January 28th, 2019. A copy of the Scoping Agreement and related correspondence is included in Appendix A. This study has been prepared and conducted according to the City of Annapolis "Policies and Guidelines for Traffic Impact Analysis for Proposed Development in the City of Annapolis."

1.2 Executive Summary

Overall, the proposed development will have minimal impact on the adjacent street network and overall intersection delay. Under Total Conditions, all signalized intersections continue to operate at overall LOS D or better when compared to Background Conditions. Additionally, all movements at unsignalized intersections continue to operate at LOS D or better with the exception of the northbound Thom Drive approach at Forest Drive, and the eastbound Forest Hills Drive approach at Bay Ridge Avenue. However, these approaches exceed LOS "D" with or without the development of the Kiddie Academy, and these two unsignalized intersections operate at LOS C or better (overall) under Background and Total Conditions.

Section 2 Proposed Development

2.1 Site Location

The proposed development is located along the north side of Forest Drive just west of Thom Drive as shown on **Exhibit 1**.

2.2 Site Plan

The proposed Kiddie Academy will occupy 10,320 square feet and accommodate up to 145 students. Note that the site is currently vacant with no existing structures or access.

2.3 Phasing and Timing

The development is assumed to be built and occupied within two (2) years.

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Site Location
Map

Exhibit 1

Section 3 Study Area

3.1 Geographic Area

The proposed development is located within the corporate limits of the City of Annapolis. The study area includes nine (9) existing intersections and one (1) proposed intersection. The study intersections are as follows:

1. Forest Drive at Forest Hills Avenue
2. Forest Drive at Annapolis Neck Road/Martha Court
3. Forest Drive at Site Access (Right-in and right-out only)
4. Forest Drive at Thom Drive
5. Forest Drive at Bay Ridge Avenue/Hillsmere Drive
6. Forest Hills Avenue at Bricin Street
7. Forest Hills Avenue at Thom Drive
8. Forest Hills Avenue at Bay Ridge Avenue
9. Bricin Street at Janwall Street

Exhibit 1 shows the location of the study intersections relative to the proposed site.

3.2 Description of Key Roads

The key roads in the study area are Forest Drive, Bay Ridge Avenue, and Forest Hills Avenue. Forest Drive is a four-lane roadway that runs in the east/west direction with a posted speed limit of 40 MPH in the vicinity of the site. Bay Ridge Avenue is a two-lane roadway that runs in the north/south direction with a posted speed limit of 30 MPH in the vicinity of the site. Forest Hills Avenue is a two-lane roadway that runs in the east/west direction with a posted speed limit of 30 MPH in the vicinity of the site.

Section 4 Existing Conditions

4.1 Physical Characteristics

Driveways

The site is located along the north side of Forest Drive with a proposed single access point to Forest Drive. Note that at the location of the proposed access, Forest Drive is a divided roadway and therefore, access to the site will be via a right-in/right-out driveway along westbound Forest Drive.

Sight Distance

Sight distance was evaluated for the proposed access point along Forest Drive. While a speed study was not performed and given the posted speed limit of 40 MPH, a 45 MPH 85th percentile speed was assumed for the purposes of evaluating sight distance. Based on the assumed 85th percentile speed of 45 MPH, 430 feet of sight distance is required for vehicles turning right from a minor roadway. Note that this information is from Table 9-8 "Case B2 Right Turn from Stop" of the AASHTO Green Book, 6th Edition.

Note that Forest Drive in the vicinity of the proposed site access point is straight with minimal vertical curvature. Given these characteristics, sight distance along westbound Forest Drive was estimated to be approximately 650 feet, which extends through the adjacent intersection of Forest Drive at Thom Drive. Therefore, adequate sight distance is provided at the proposed site access point based on the estimated 85th percentile speed.

Pedestrian Facilities

Under existing conditions, sidewalk is provided along both east- and westbound Forest Drive throughout the study area, including along the site frontage. In addition, sidewalk is also provided along northbound Hillsmere Drive and Bay Ridge Avenue.

Bicycle Facilities

Under existing conditions, there are no bicycle facilities provided in the immediate vicinity of the site.

Transit Services

Annapolis Transit provides frequent bus service to the study area including the brown and purple routes. Note that these routes have stops along both Forest Drive and Bay Ridge Avenue.

4.2 Existing Lane Configurations

The Lane Use & Traffic Control Devices are shown on **Exhibit 2**.

4.3 Existing Traffic Counts

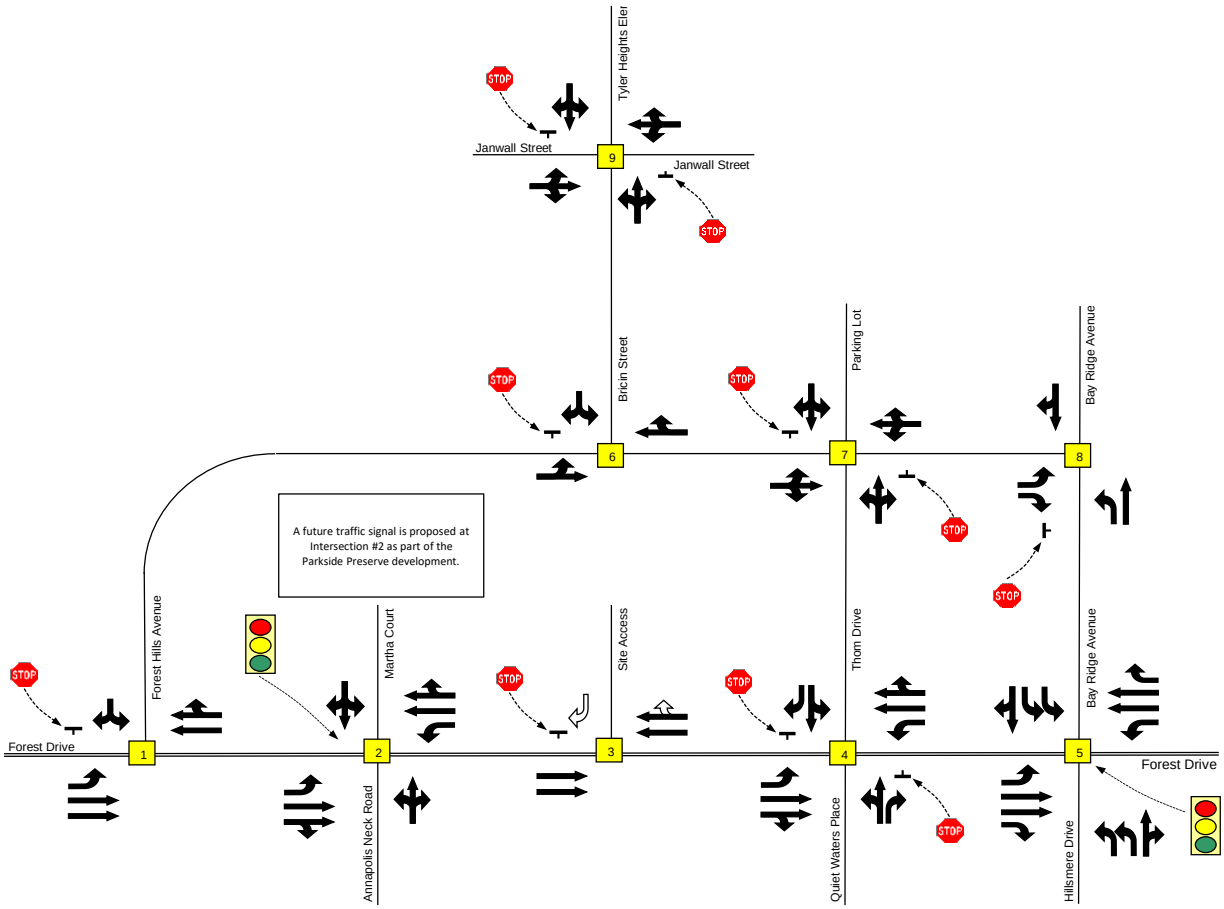
Weekday traffic counts at the study intersections were obtained on February 14, 2019 and were conducted from 7 to 9 AM and from 4 to 6 PM on a typical weekday. The Existing Peak Hour Traffic Volumes are provided on **Exhibit 3**. The full turning movement counts are included in **Appendix B**.

4.4 Level of Service Analysis

The City of Annapolis' Traffic Impact Analysis Guidelines require that all intersections be analyzed using techniques contained in the Highway Capacity Manual (HCM). A table is shown below detailing the Levels of Service "A" through "F" for both signalized and unsignalized intersections, along with the corresponding thresholds between each Level of Service (LOS). The Guidelines recommend that all intersections operate at a LOS "D" or better at full build-out.

Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10
B	> 10 - 20
C	> 20 - 35
D	> 35 - 55
E	> 55 - 80
F	> 80



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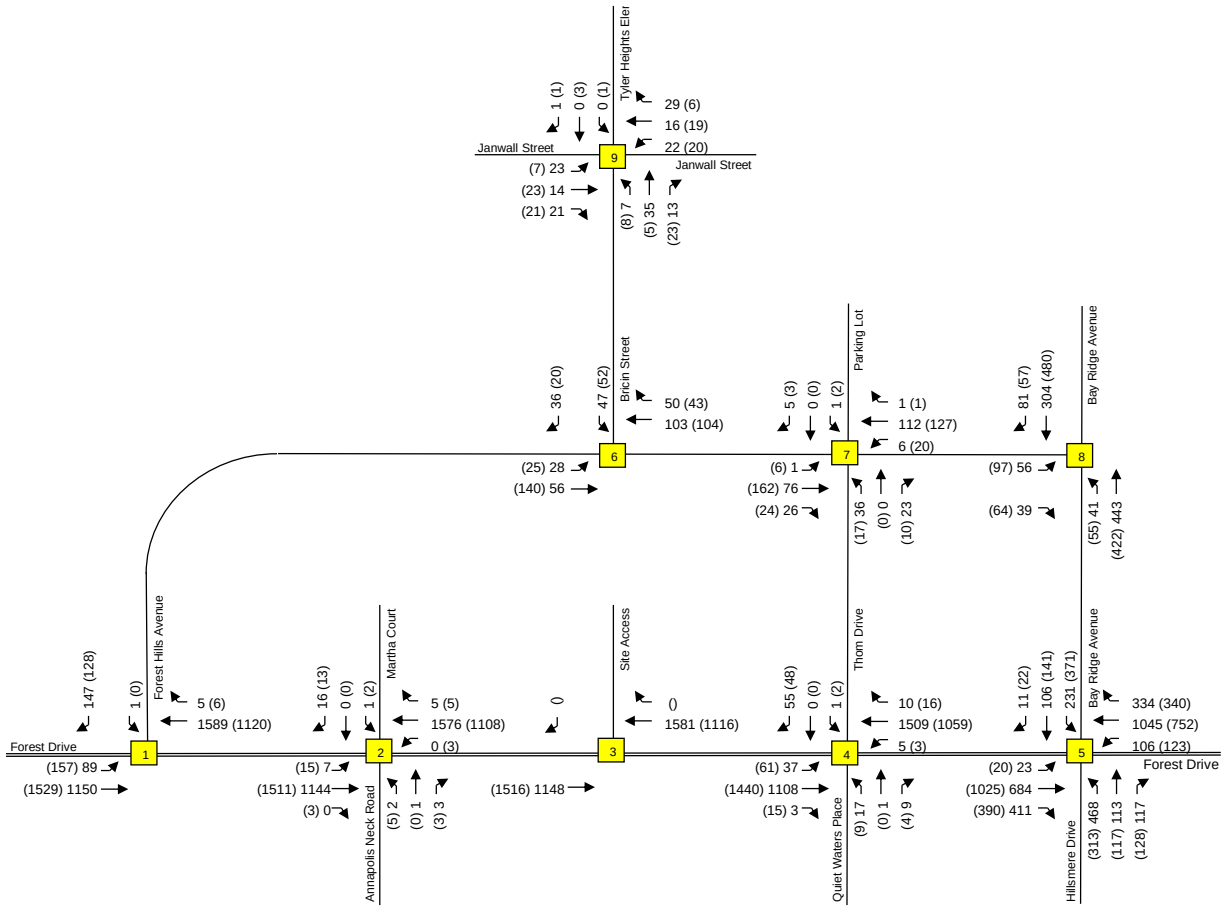
Lane Use &
Traffic Control Devices

Existing Lane Use - ➡ Future Lane Use - ⇨

Exhibit 2



Traffic Impact Analysis	Existing Peak Hour Traffic Volumes	**Exhibit 3**
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Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

LOS was determined using HCM reports from the Synchro software. Existing Synchro files were built based on the existing traffic counts and signal timings provided by Anne Arundel County.

4.5 Existing Conditions Analysis Results

Exhibit 4 summarizes the results of the LOS analysis under Existing Conditions. All signalized intersections operate at overall LOS D or better. Additionally, all movements at unsignalized intersections operate at LOS D or better with the exception of the southbound movements at Forest Drive at Forest Hills Avenue, and the northbound movements at Forest Drive at Annapolis Neck Road/Martha Court and Forest Drive at Thom Drive. Note that the intersection of Forest Drive at Annapolis Neck Road/Martha Court is proposed to be signalized as part of the Parkside Preserve development located along the south side of Annapolis Neck Road. The Synchro analysis worksheets for Existing Conditions are included in Appendix C.

4.6 Critical Gap in Traffic Flow

Critical gap was evaluated using the HCM methodology rather than actual field measurements. The critical gap analysis is included as part of the Synchro analysis and is summarized as intersection/movement LOS and delay.

	Movement	LOS AM	LOS PM	Delay AM	Delay PM	v/c Ratio AM	v/c Ratio PM		
Forest Drive & Forest Hills Avenue	**Overall**	**C**	**B**	**2.4**	**1.5**	**68.2%**	**57.8%**	**(% ICU)**	**Int #1**
	EBL	C	B	18.6	14.1	0.27	0.30		
	EBT	A	A	0.0	0.0	0.37	0.49		
	WBT/R	A	A	0.0	0.0	0.68	0.48		
	SBL/R	E	C	36.9	17.1	0.60	0.32		
Forest Drive & Annapolis Neck Road/Martha Court	**Overall**	**A**	**A**	**0.5**	**0.7**	**53.7%**	**51.9%**	**(% ICU)**	**Int #2**
	EBL	C	B	15.1	11.5	0.02	0.03		
	EBT/R	A	A	0.0	0.0	0.49	0.64		
	WBL	A	B	0.0	14.3	0.00	0.01		
	WBT/R	A	A	0.0	0.0	0.67	0.47		
	NBL/T/R	F	F	116.8	161.6	0.16	0.26		
	SBL/T/R	D	D	30.8	29.4	0.11	0.10		
Forest Drive & Site Access	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**(% ICU)**	**Int #3**
	WBT/R	N/A	N/A	N/A	N/A	N/A	N/A		
	SBR	N/A	N/A	N/A	N/A	N/A	N/A		
Forest Drive & Thom Drive	**Overall**	**B**	**B**	**2.2**	**1.7**	**58.8%**	**60.8%**	**(% ICU)**	**Int #4**
	EBL	B	B	14.3	11.0	0.09	0.10		
	EBT/R	A	A	0.0	0.0	0.47	0.61		
	WBL	B	B	11.3	13.8	0.01	0.01		
	WBT/R	A	A	0.0	0.0	0.64	0.45		
	NBL/T	F	F	177.4	232.6	0.66	0.52		
	NBR	F	F	177.4	232.6	0.66	0.52		
	SBL/T	B	B	14.5	14.7	0.09	0.07		
	SBR	B	B	14.5	14.7	0.09	0.07		
Forest Drive & Bay Ridge Avenue/Hillsmere Drive	**Overall**	**C**	**D**	**34.1**	**36.5**	**0.65**	**0.71**		**Int #5**
	EBL	B	B	19.2	17.8	0.12	0.07		
	EBT	C	C	24.6	29.6	0.44	0.66		
	EBR	C	C	24.7	25.5	0.40	0.42		
	WBL	B	C	14.9	24.3	0.30	0.60		
	WBT	C	C	25.0	22.9	0.61	0.45		
	WBR	B	B	19.3	19.9	0.26	0.23		
	NBL	E	E	58.9	56.1	0.77	0.60		
	NBT/R	E	E	57.8	76.6	0.67	0.84		
	SBL	E	E	63.2	62.3	0.65	0.75		
	SBT/R	E	E	63.9	58.7	0.60	0.61		
Forest Hills Drive & Bricin Street	**Overall**	**A**	**A**	**3.3**	**2.6**	**27.8%**	**30.9%**	**(% ICU)**	**Int #6**
	EBL/T	A	A	2.6	1.3	0.02	0.02		
	WBL/T	A	A	0.0	0.0	0.10	0.09		
	SBL/R	B	B	10.2	10.8	0.11	0.11		
Forest Hills Drive & Thom Drive	**Overall**	**A**	**A**	**2.4**	**1.5**	**26.0%**	**26.0%**	**(% ICU)**	**Int #7**
	EBL/T/R	A	A	0.1	0.3	0.00	0.00		
	WBL/T/R	A	A	0.4	1.2	0.00	0.02		
	NBL/T/R	A	B	10.0	10.9	0.08	0.05		
	SBL/T/R	A	B	9.2	10.0	0.01	0.01		
Forest Hills Drive & Bay Ridge Avenue	**Overall**	**A**	**A**	**2.0**	**4.2**	**37.6%**	**47.4%**	**(% ICU)**	**Int #8**
	EBL	C	D	17.1	27.8	0.22	0.50		
	EBR	C	D	17.1	27.8	0.22	0.50		
	NBL	A	A	8.3	8.9	0.04	0.06		
	NBT	A	A	0.0	0.0	0.28	0.27		
	SBT/R	A	A	0.0	0.0	0.25	0.34		
Bricin Street & Janwall Street	**Overall**	**A**	**A**	**5.0**	**4.2**	**20.1%**	**16.1%**	**(% ICU)**	**Int #9**
	EBL/T/R	A	A	3.0	1.1	0.02	0.01		
	WBL/T/R	A	A	2.5	3.3	0.02	0.01		
	NBL/T/R	B	A	10.1	9.0	0.08	0.04		
	SBL/T/R	A	A	8.5	9.5	0.00	0.01		

SIGNALIZED INTERSECTION

UNSIGNALIZED INTERSECTION

Notes:

1. Intersection Capacity Utilization (ICU) reported for unsignalized intersections. The ICU compares the current volume to the intersection's ultimate capacity and is reported in percent.

Traffic Impact Analysis	Results of Existing Conditions Analysis	**Exhibit 4**
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Section 5 Background Conditions

5.1 Annual Growth

The growth in regional traffic is considered for the purposes of developing the base traffic volumes in the projected build year for the opening of the site. Maryland State Highway Administration (SHA) provides Average Daily Traffic (ADT) volumes along major roadways throughout the State; however, data is not available for any roadways in the vicinity of the site. Given that ADT data is unavailable and the site is located on a peninsula, a 1% growth in traffic was assumed.

5.2 Base Traffic Volumes

The resulting 2021 Base Peak Hour Volumes are shown on **Exhibit 5**. Note that growth was applied to all thru traffic along both Forest Drive and Forest Hills Drive. In addition, growth was applied to the southbound right-turn movements at the intersections of Forest Drive at Forest Hills Avenue and Bay Ridge Avenue at Forest Hills Avenue in order to account for growth in cut-thru traffic. Lastly, growth was applied to all movements at the intersection of Forest Drive and Bay Ridge Avenue/Hillsmere Avenue.

5.3 Approved Background Developments

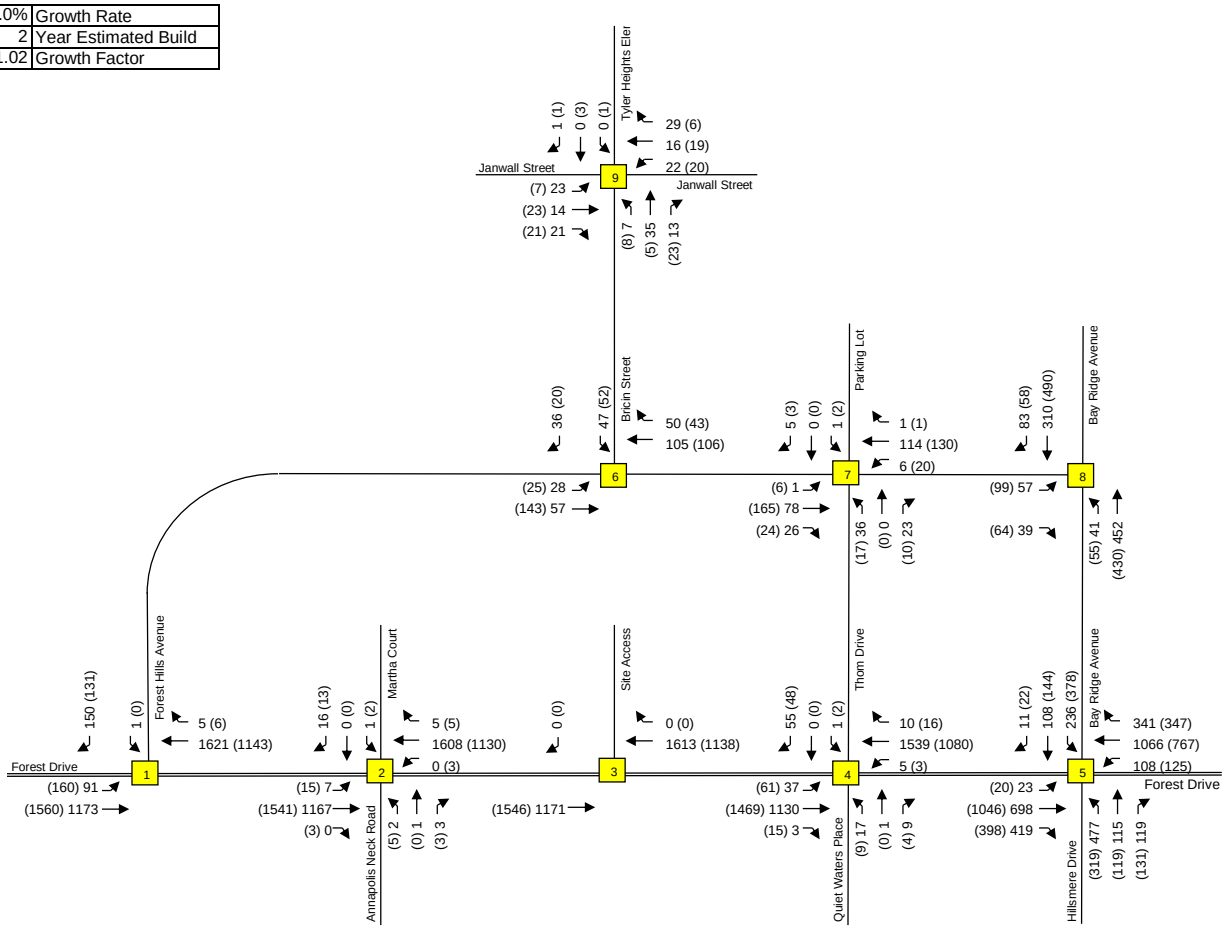
The City of Annapolis requested that seven background projects be included in this traffic study. Those projects are:

1. Parkside Preserve
2. Tyler Heights Elementary School
3. Griscom Square
4. 1415 Forest Drive
5. 1503 Forest Drive
6. Bay Village Assisted Living Facility
7. Lidl Supermarket

The combined weekday AM and PM peak hour traffic volumes from the developments are shown in **Exhibit 6**. A summary of trip generation and assignment for each background development can be found in Appendix D.

Note that a signal is proposed at the intersection of Forest Drive and Annapolis Neck Road/Martha Court as part of the Parkside Preserve development. It was assumed that this signal will be constructed and operational under Background Conditions.

1.0%	Growth Rate
2	Year Estimated Build
1.02	Growth Factor



Traffic Impact Analysis	Base Peak Hour Traffic Volumes	**Exhibit 5**
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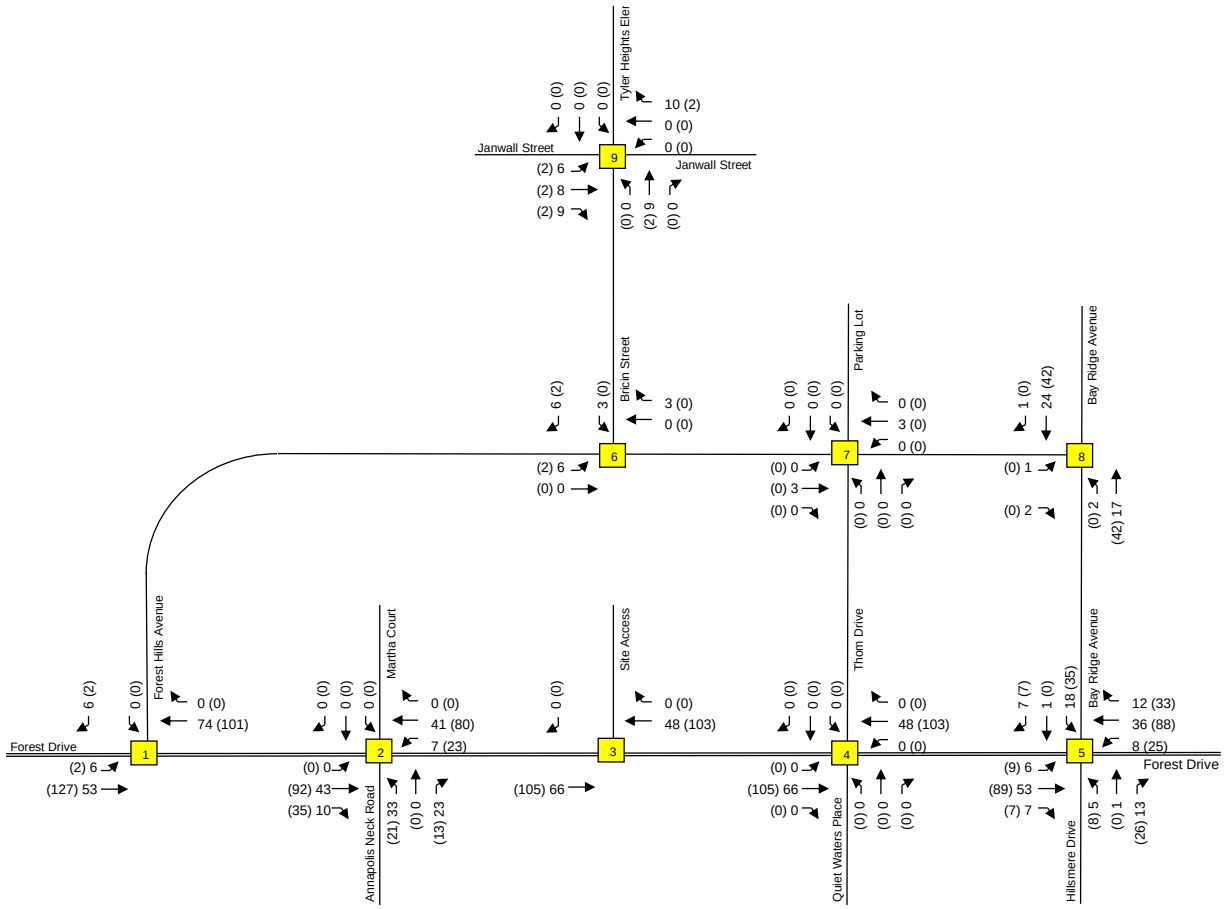

Traffic Impact Analysis	Trips Generated by Background Developments	**Exhibit 6**
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5.4 Background Peak Hour Traffic Volumes

The combined Background Condition peak hour traffic volumes consider the base volumes added to the trip assignments for the approved background developments. These volumes are shown in **Exhibit 7**.

5.5 Background Conditions Analysis Results

Exhibit 8 summarizes the results of the LOS analysis using the background traffic volumes shown on Exhibit 7. All signalized intersections operate at overall LOS D or better. Additionally, all movements at unsignalized intersections operate at LOS D or better with the exception of the northbound movements at Forest Drive and Thom Drive, and the eastbound movements at Forest Hills Drive and Bay Ridge Avenue. While several movements at unsignalized intersections operate below LOS D, all unsignalized intersections operate at overall LOS C or better with an Intersection Capacity Utilization (ICU) of less than 75%. Note that ICU compares the current volume at the intersection to the intersection's ultimate capacity. The Synchro analysis worksheets for Background Conditions are included in Appendix E.

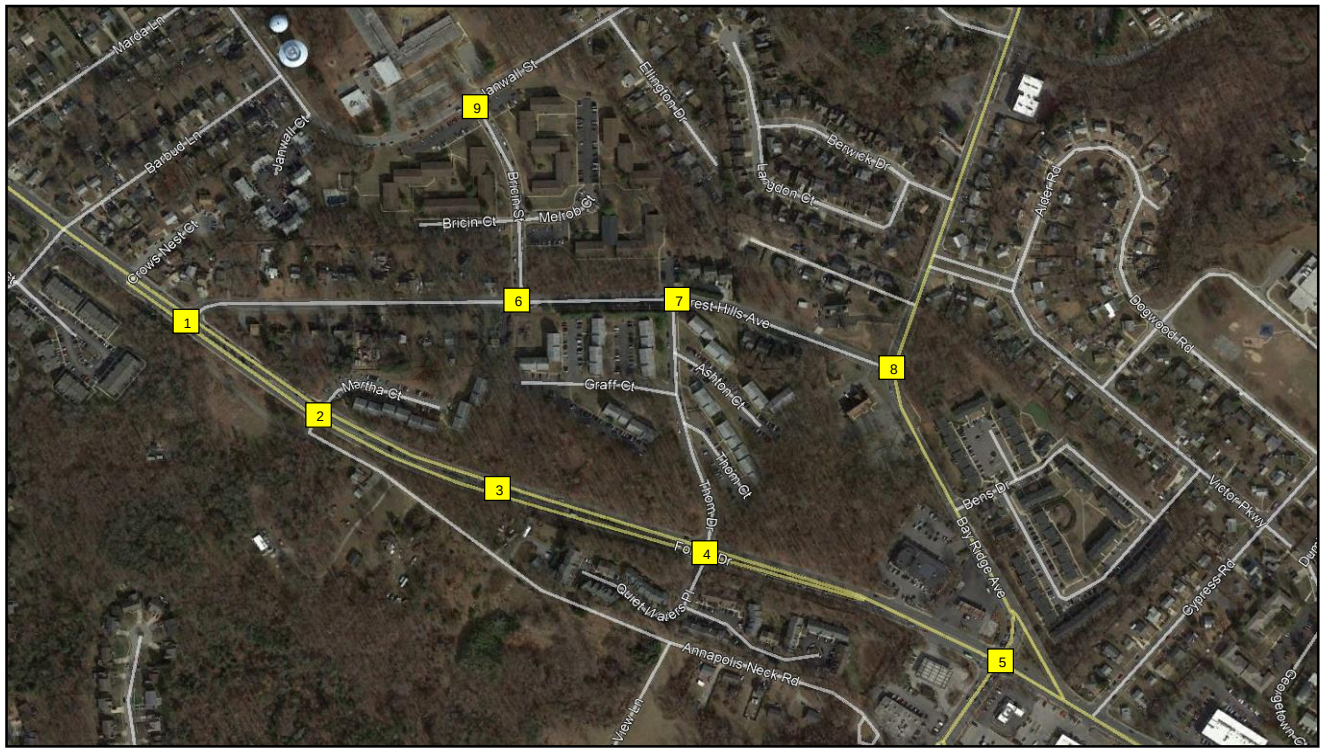
5.6 Programmed Transportation Improvements

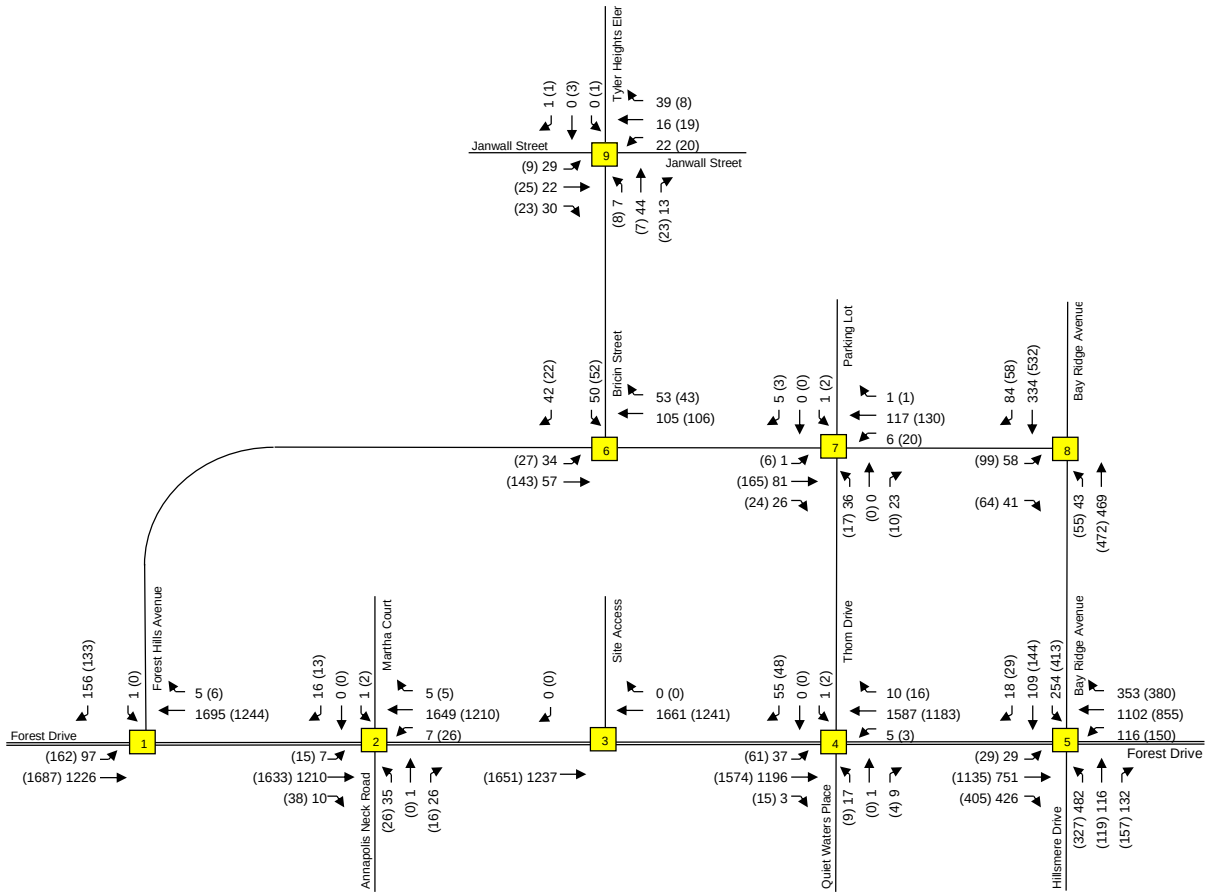
A review of both Maryland Department of Transportation's Consolidated Transportation Program and Anne Arundel County's Capital Improvement Projects was conducted, and no programmed transportation improvements were found that would impact any of the study roadways.

5.7 Transit and Bicycle Improvements

There are several improvements for existing transit including more direct routes, shorter trips, fewer transfers and better service frequency that are identified in the Maryland Transit Administration's 2010 Transit Development Plan for the City of Annapolis. The City of Annapolis 2011 Bicycle Master Plan also identifies a range several improvements including:

- Bay Ridge Avenue – Bike lanes are proposed between Forest Drive and Victor Parkway. Shared lane markings are proposed north of Victor Parkway.
- Hillsmere Drive – Bike lanes are proposed between Forest Drive and Annapolis Neck Road. Shared lane makings are proposed south of Annapolis Neck Road.
- Annapolis Neck Road – Shared lane markings are proposed between Forest Drive and Hillsmere Drive.





Traffic Impact Analysis	Background Peak Hour Traffic Volumes	**Exhibit 7**
LENHART TRAFFIC CONSULTING, INC. 645 BALTIMORE ANNAPOLIS BLVD, SUITE 214 SEVERNA PARK, MD 21146 www.lenharttraffic.com	Key: xx = AM Peak Vol's (xx) = PM Peak Vol's	

	Movement	LOS AM	LOS PM	Delay AM	Delay PM	v/c Ratio AM	v/c Ratio PM		
Forest Drive & Forest Hills Avenue	**Overall**	**C**	**B**	**1.7**	**1.4**	**72.1%**	**61.8%**	**(% ICU)**	**Int #1**
	EBL	C	C	20.5	15.2	0.31	0.33		
	EBT	A	A	0.0	0.0	0.39	0.54		
	WBT/R	A	A	0.0	0.0	0.72	0.53		
	SBL/R	C	B	22.2	14.8	0.45	0.28		
Forest Drive & Annapolis Neck Road/Martha Court	**Overall**	**A**	**A**	**4.1**	**4.1**	**0.61**	**0.59**		**Int #2**
	EBL	A	A	4.6	2.5	0.05	0.05		
	EBT/R	A	A	3.7	4.6	0.45	0.61		
	WBL	A	A	0.8	0.8	0.03	0.12		
	WBT/R	A	A	1.5	0.7	0.61	0.44		
	NBL/T/R	E	E	69.0	65.9	0.53	0.03		
	SBL/T/R	E	E	61.5	65.7	0.01	0.01		
Forest Drive & Site Access	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**(% ICU)**	**Int #3**
	WBT/R	N/A	N/A	N/A	N/A	N/A	N/A		
	SBR	N/A	N/A	N/A	N/A	N/A	N/A		
Forest Drive & Thom Drive	**Overall**	**B**	**C**	**3.4**	**2.6**	**60.9%**	**64.5%**	**(% ICU)**	**Int #4**
	EBL	C	B	15.2	11.7	0.10	0.11		
	EBT/R	A	A	0.0	0.0	0.51	0.67		
	WBL	B	C	11.9	15.0	0.01	0.01		
	WBT/R	A	A	0.0	0.0	0.68	0.50		
	NBL/T	F	F	320.3	455.9	0.92	0.82		
	NBR	F	F	320.3	455.9	0.92	0.82		
	SBL/T	C	C	15.9	17.2	0.09	0.10		
	SBR	C	C	15.9	17.2	0.09	0.10		
Forest Drive & Bay Ridge Avenue/Hillsmere Drive	**Overall**	**C**	**D**	**34.7**	**39.5**	**0.69**	**0.87**		**Int #5**
	EBL	C	C	20.6	20.3	0.18	0.13		
	EBT	C	C	24.4	31.4	0.49	0.77		
	EBR	C	C	22.5	25.7	0.44	0.47		
	WBL	B	E	16.8	55.9	0.37	0.85		
	WBT	C	C	27.5	25.8	0.67	0.54		
	WBR	C	C	20.8	21.6	0.29	0.26		
	NBL	E	E	58.8	55.1	0.78	0.60		
	NBT/R	E	F	59.3	85.9	0.71	0.91		
	SBL	E	E	62.7	64.0	0.66	0.80		
	SBT/R	E	E	62.9	58.2	0.60	0.62		
Forest Hills Drive & Bricin Street	**Overall**	**A**	**A**	**3.6**	**2.6**	**29.0%**	**31.4%**	**(% ICU)**	**Int #6**
	EBL/T	A	A	3.0	1.3	0.03	0.02		
	WBL/T	A	A	0.0	0.0	0.10	0.10		
	SBL/R	B	B	10.3	10.9	0.13	0.12		
Forest Hills Drive & Thom Drive	**Overall**	**A**	**A**	**2.4**	**1.5**	**26.3%**	**26.2%**	**(% ICU)**	**Int #7**
	EBL/T/R	A	A	0.1	0.3	0.00	0.00		
	WBL/T/R	A	A	0.4	1.1	0.00	0.02		
	NBL/T/R	B	B	10.0	10.9	0.08	0.05		
	SBL/T/R	A	B	9.2	10.1	0.01	0.01		
Forest Hills Drive & Bay Ridge Avenue	**Overall**	**A**	**A**	**2.1**	**5.3**	**39.4%**	**50.3%**	**(% ICU)**	**Int #8**
	EBL	C	E	18.5	38.3	0.25	0.64		
	EBR	C	E	18.5	38.3	0.25	0.64		
	NBL	A	A	8.4	9.1	0.04	0.06		
	NBT	A	A	0.0	0.0	0.30	0.30		
	SBT/R	A	A	0.0	0.0	0.27	0.38		
Bricin Street & Janwall Street	**Overall**	**A**	**A**	**4.8**	**4.2**	**22.5%**	**15.7%**	**(% ICU)**	**Int #9**
	EBL/T/R	A	A	2.8	1.2	0.02	0.01		
	WBL/T/R	A	A	2.2	3.2	0.02	0.01		
	NBL/T/R	B	A	10.5	9.1	0.10	0.05		
	SBL/T/R	A	A	8.5	9.6	0.00	0.01		

SIGNALIZED INTERSECTION

UNSIGNALIZED INTERSECTION

Notes:

1. Intersection Capacity Utilization (ICU) reported for unsignalized intersections. The ICU compares the current volume to the intersection's ultimate capacity and is reported in percent.

Traffic Impact Analysis	Results of Background Conditions Analysis	**Exhibit 8**
LENHART TRAFFIC CONSULTING, INC. 645 BALTIMORE ANNAPOLIS BLVD, SUITE 214 SEVERNA PARK, MD 21146 www.lenharttraffic.com		

Section 6 Site Generated Traffic

6.1 Site Trip Generation

This Traffic Impact Analysis was requested by the City of Annapolis Department of Planning and Zoning for a proposed Kiddie Academy located along the north side of Forest Drive just west of Thom Drive. The proposed Kiddie Academy will occupy 10,320 square feet and accommodate up to 145 students. The purpose of the study is to evaluate the traffic impacts of the proposed project and determine any improvements to mitigate adverse impacts.

The trip rates and totals are shown on **Exhibit 9** and were obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Note that the manual provides trip generation estimates based on both square footage and number of students. The number of trips were calculated based on both 10,320 square feet and 145 students, and the higher of the two trip projections was utilized.

6.2 Site Trip Distribution and Trip Assignment

The trip assignment for the proposed Kiddie Academy development is shown on **Exhibits 10a through 10b.**

Trip Generation Rates

	Trip Distribution (In/Out)
Day Care Center (ITE-565, ksf)	
Morning Trips = 11.00 x ksf	53/47
Evening Trips = 11.12 x ksf	47/53
Day Care Center (Students, ITE-565)	**Trip Distribution (In/Out)**
Morning Trips = 0.66 x Students + 8.42	53/47
Ln(Evening Trips) = 0.87 x Ln(Students) + 0.29	47/53

Trip Generation Totals

				AM Peak			PM Peak		
				In	Out	Total	In	Out	Total
LU Code 565	Day Care Center (ITE-565, ksf)	10,320	sf	60	54	114	54	61	115
LU Code 565	Day Care Center (Students, ITE-565)	145	students	55	49	104	47	54	101
	Higher of the Two ITE Trip Projections:			**60**	**54**	**114**	**54**	**61**	**115**

NOTE: Trip Generation Rates obtained from the ITE Trip Generation Manual, 10th Edition

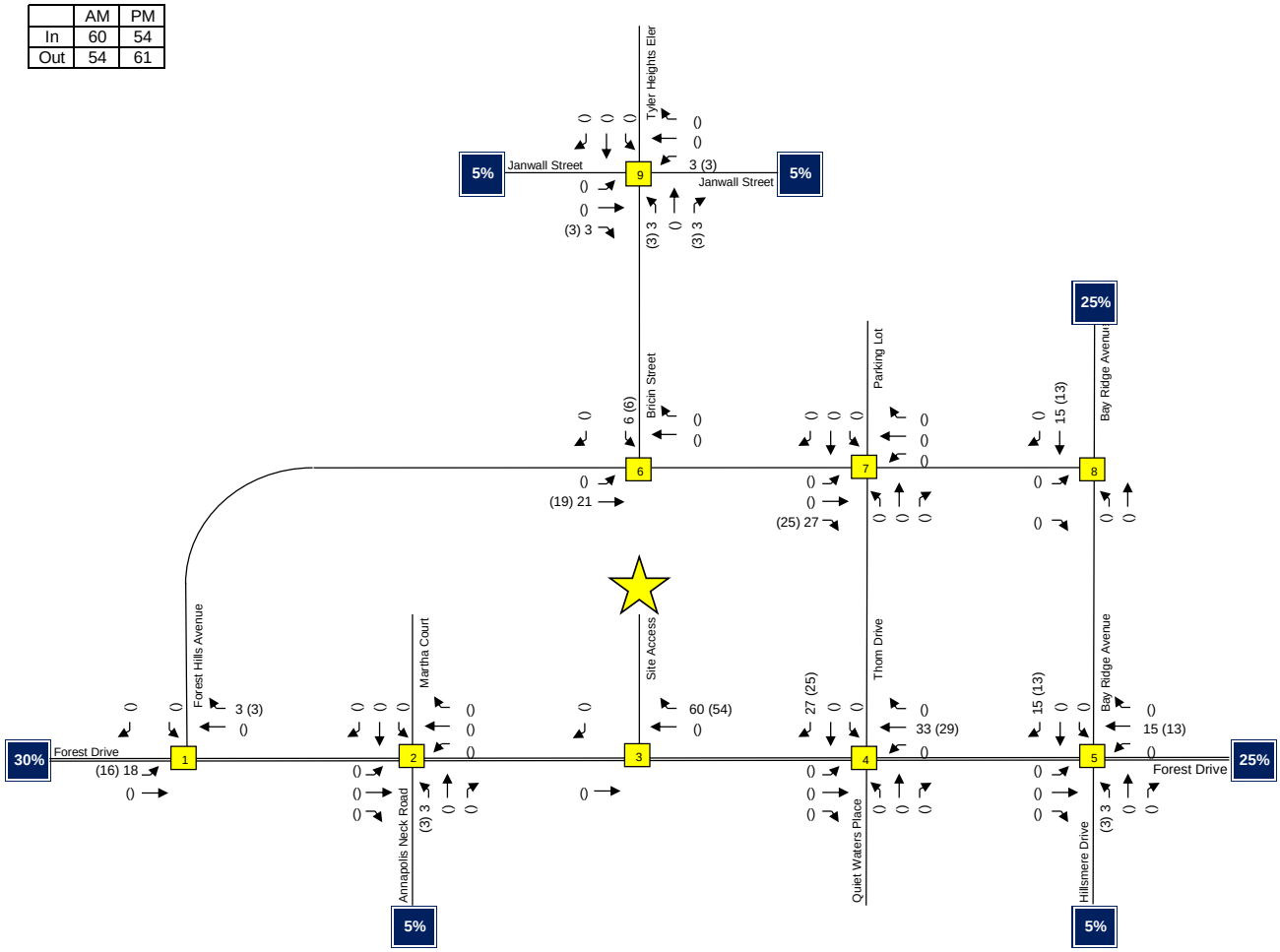
Traffic Impact Analysis

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Trip Generation for Site

Exhibit 9

	AM	PM
In	60	54
Out	54	61



Traffic Impact Analysis

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

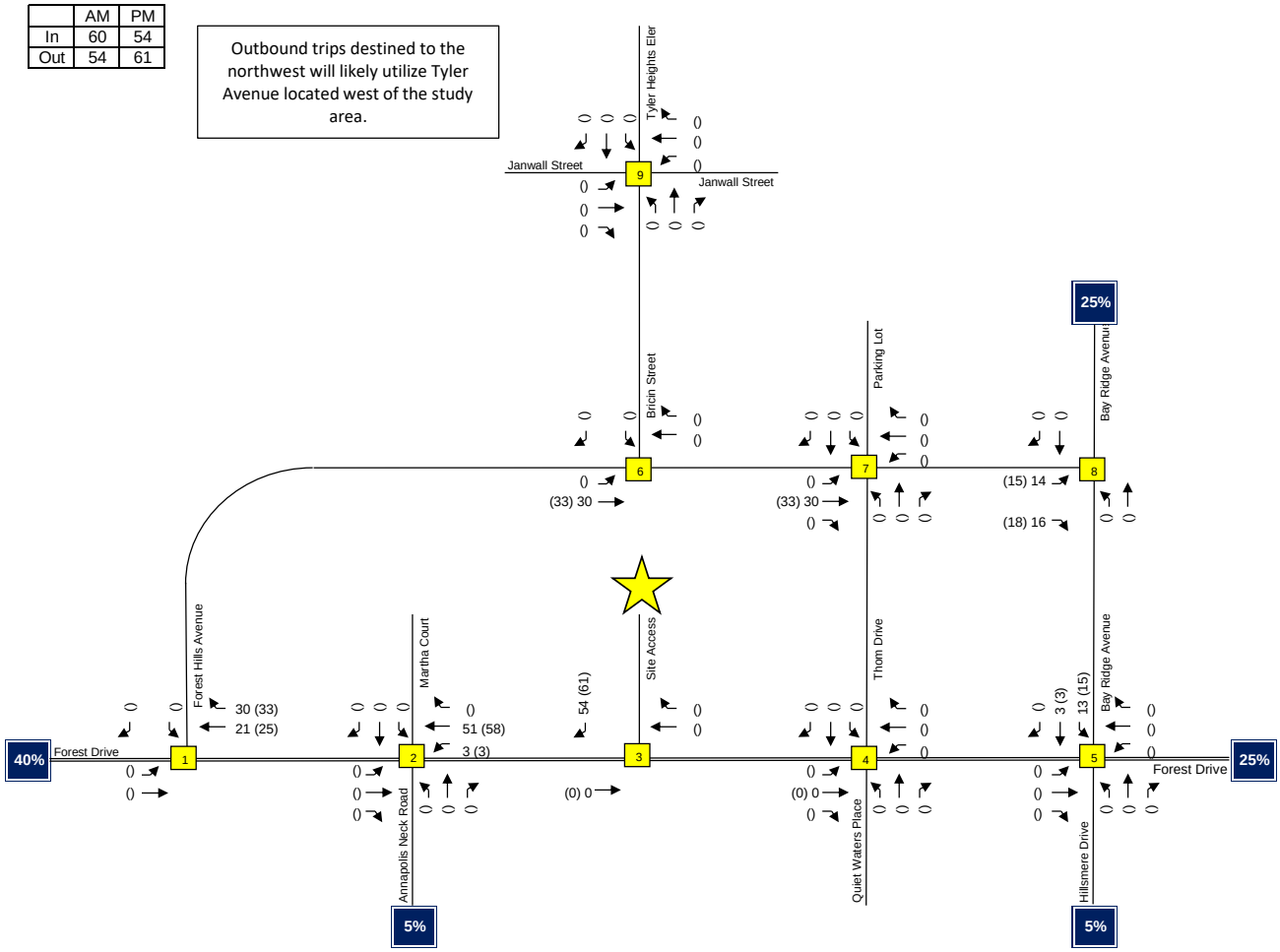
Inbound Trip Assignment for Proposed Site

Key: xx = AM Peak Vol's (xx) = PM Peak Vol's

Exhibit 10a

	AM	PM
In	60	54
Out	54	61

Outbound trips destined to the northwest will likely utilize Tyler Avenue located west of the study area.



Traffic Impact Analysis

LENHART TRAFFIC CONSULTING, INC.
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SEVERNA PARK, MD 21146
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Outbound Trip Assignment for Proposed Site

Key: xx = AM Peak Vol's (xx) = PM Peak Vol's

Exhibit 10b

Section 7 Total Traffic Conditions

7.1 Total Traffic Volumes

The Total Peak Hour Traffic Volumes were developed by combining the background peak hour volumes with the proposed new site trips generated by the Kiddie Academy development as shown on **Exhibit 11**.

7.2 Level of Service Analysis

The Synchro files were updated for the projected Total Peak Hour Traffic Volumes and the traffic signal timing, phasing and roadway geometrics remained the same as under Background Conditions.

7.3 Total Conditions Analysis Results

Exhibit 12 summarizes the results of the LOS analysis under Total Conditions. All signalized intersections continue to operate at overall LOS D or better. Additionally, all movements at unsignalized intersections continue to operate at LOS D or better with the exception of the northbound movements at Forest Drive and Thom Drive, and the eastbound movements at Forest Hills Drive and Bay Ridge Avenue.

Note that the movements at unsignalized intersections that operate below LOS D under Total Conditions also operate below LOS D under Background Conditions. In addition, an analysis of Intersection Capacity Utilization (ICU) was conducted as shown below. The ICU compares the current volume at the intersection to the intersection's ultimate capacity.

Forest Drive at Thom Drive

	AM Peak Hour - ICU	PM Peak Hour - ICU
Background Conditions	60.9%	64.5%
Total Conditions	63.5%	64.5%

As shown in the table above, the ICU at the intersection of Forest Drive at Thom Drive increases by less than 3% during the AM Peak hour and stays the same during the PM Peak hour. Under Total Conditions, the intersection continues to operate at overall Intersection Capacity Utilization of LOS C or better.

Forest Hills Drive at Bay Ridge Avenue

	AM Peak Hour - ICU	PM Peak Hour - ICU
Background Conditions	39.4%	50.3%
Total Conditions	40.8%	51.9%

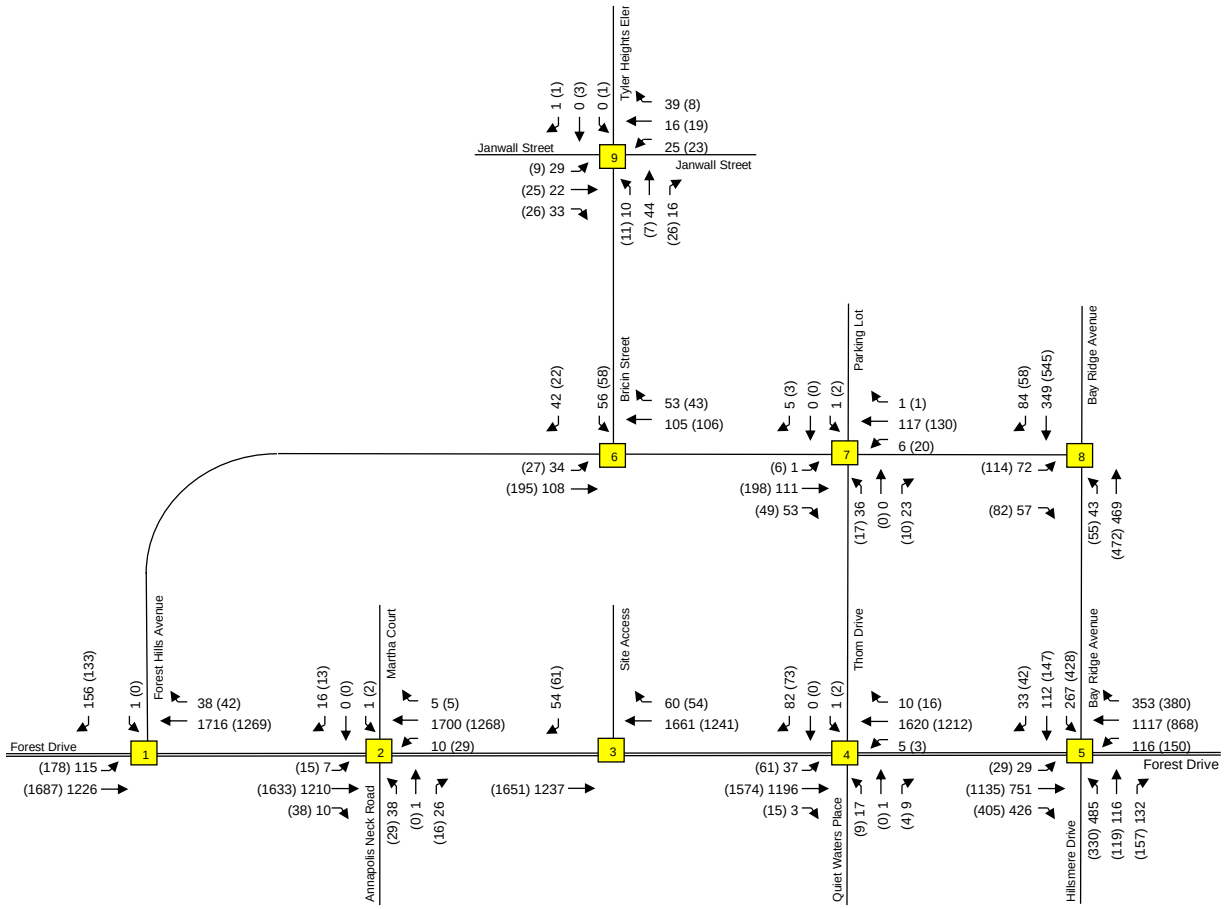
As shown in the table above, the ICU at the intersection Forest Hills Drive at Bay

Ridge Avenue increases by less than 1.5% during the AM Peak hour and less than 2.0% during the PM Peak hour. Under Total Conditions, the intersection continues to operate at overall Intersection Capacity Utilization of LOS A or better. The Synchro analysis worksheets for Total Conditions are included in Appendix F.

Note that delays at stop-controlled intersections along minor street movements are not uncommon, particularly at locations where a minor street meets a major roadway. The Synchro analysis worksheets for Total Conditions are included in Appendix F.

7.4 Traffic Control Needs

No significant traffic control improvements are recommended. However, it is recommended that "No U-turn" signage be installed at the intersections of Forest Drive and Annapolis Neck Road, and Forest Drive at Thom Drive given the limited space available for drivers to perform U-turns. See Section 9.1 which details site circulation for more details.



Traffic Impact Analysis	Total Peak Hour Traffic Volumes	**Exhibit 11**
LENHART TRAFFIC CONSULTING, INC. 645 BALTIMORE ANNAPOLIS BLVD, SUITE 214 SEVERNA PARK, MD 21146 www.lenharttraffic.com	Key: xx = AM Peak Vol's (xx) = PM Peak Vol's	

	Movement	LOS AM	LOS PM	Delay AM	Delay PM	v/c Ratio AM	v/c Ratio PM		
Forest Drive & Forest Hills Avenue	**Overall**	**D**	**C**	**2.0**	**1.5**	**74.0%**	**64.5%**	**(% ICU)**	**Int #1**
	EBL	C	C	23.6	16.7	0.39	0.39		
	EBT	A	A	0.0	0.0	0.39	0.54		
	WBT/R	A	A	0.0	0.0	0.73	0.54		
	SBL/R	C	C	24.3	15.2	0.48	0.29		
Forest Drive & Annapolis Neck Road/Martha Court	**Overall**	**A**	**A**	**4.6**	**4.2**	**0.63**	**0.60**		**Int #2**
	EBL	A	A	5.5	2.6	0.05	0.05		
	EBT/R	A	A	4.3	4.7	0.46	0.61		
	WBL	A	A	1.2	1.2	0.03	0.14		
	WBT/R	A	A	1.7	0.9	0.63	0.46		
	NBL/T/R	E	E	70.3	65.9	0.55	0.03		
	SBL/T/R	E	E	61.2	65.6	0.01	0.01		
Forest Drive & Site Access	**Overall**	**B**	**A**	**0.4**	**0.3**	**57.8%**	**49.0%**	**(% ICU)**	**Int #3**
	WBT/R	A	A	0.0	0.0	0.71	0.53		
	SBR	C	C	22.3	16.5	0.22	0.17		
Forest Drive & Thom Drive	**Overall**	**B**	**C**	**3.9**	**2.9**	**63.5%**	**64.5%**	**(% ICU)**	**Int #4**
	EBL	C	B	15.6	12.0	0.11	0.11		
	EBT/R	A	A	0.0	0.0	0.51	0.67		
	WBL	B	C	11.9	15.0	0.01	0.01		
	WBT/R	A	A	0.0	0.0	0.69	0.52		
	NBL/T	F	F	369.0	508.1	1.01	0.88		
	NBR	F	F	369.0	508.1	1.01	0.88		
	SBL/T	B	C	15.0	15.5	0.13	0.11		
	SBR	B	C	15.0	15.5	0.13	0.11		
Forest Drive & Bay Ridge Avenue/Hillsmere Drive	**Overall**	**D**	**D**	**35.2**	**40.0**	**0.70**	**0.88**		**Int #5**
	EBL	C	C	21.1	20.4	0.19	0.13		
	EBT	C	C	24.1	31.4	0.50	0.77		
	EBR	C	C	22.0	25.8	0.44	0.47		
	WBL	B	E	17.0	58.0	0.37	0.86		
	WBT	C	C	28.1	26.1	0.68	0.54		
	WBR	C	C	21.0	21.8	0.29	0.26		
	NBL	E	E	59.5	55.2	0.79	0.61		
	NBT/R	E	F	59.7	85.9	0.71	0.91		
	SBL	E	E	62.2	65.3	0.67	0.82		
	SBT/R	E	E	65.3	60.3	0.66	0.67		
Forest Hills Drive & Bricin Street	**Overall**	**A**	**A**	**3.4**	**2.5**	**32.0%**	**34.5%**	**(% ICU)**	**Int #6**
	EBL/T	A	A	2.0	1.1	0.03	0.02		
	WBL/T	A	A	0.0	0.0	0.10	0.10		
	SBL/R	B	B	10.7	11.4	0.15	0.13		
Forest Hills Drive & Thom Drive	**Overall**	**A**	**A**	**2.1**	**1.3**	**26.6%**	**27.3%**	**(% ICU)**	**Int #7**
	EBL/T/R	A	A	0.0	0.2	0.00	0.00		
	WBL/T/R	A	A	0.4	1.2	0.01	0.02		
	NBL/T/R	B	B	10.4	11.4	0.09	0.05		
	SBL/T/R	A	B	9.3	10.3	0.01	0.01		
Forest Hills Drive & Bay Ridge Avenue	**Overall**	**A**	**A**	**2.7**	**7.5**	**40.8%**	**51.9%**	**(% ICU)**	**Int #8**
	EBL	C	E	19.5	48.2	0.31	0.75		
	EBR	C	E	19.5	48.2	0.31	0.75		
	NBL	A	A	8.4	9.1	0.04	0.06		
	NBT	A	A	0.0	0.0	0.30	0.30		
	SBT/R	A	A	0.0	0.0	0.28	0.39		
Bricin Street & Janwall Street	**Overall**	**A**	**A**	**5.0**	**4.3**	**23.7%**	**17.0%**	**(% ICU)**	**Int #9**
	EBL/T/R	A	A	2.7	1.2	0.02	0.01		
	WBL/T/R	A	A	2.4	3.4	0.02	0.02		
	NBL/T/R	B	A	10.6	9.2	0.10	0.05		
	SBL/T/R	A	A	8.5	9.7	0.00	0.01		

SIGNALIZED INTERSECTION

UNSIGNALIZED INTERSECTION

Notes:

1. Intersection Capacity Utilization (ICU) reported for unsignalized intersections. The ICU compares the current volume to the intersection's ultimate capacity and is reported in percent.

Traffic Impact Analysis	Results of Total Conditions Analysis	**Exhibit 12**
LENHART TRAFFIC CONSULTING, INC. 645 BALTIMORE ANNAPOLIS BLVD, SUITE 214 SEVERNA PARK, MD 21146 www.lenharttraffic.com		

Section 8 Roadway and Intersection Improvements

8.1 Transportation Demand Management (TDM) Strategies

No TDM strategies are required.

8.2 Site Plan/Land Use Updates

See Section 9.1 detailing site circulation.

8.3 Roadway Improvements

No roadway improvements are recommended.

8.4 Operational Improvements

See Section 7.4 detailing traffic control needs.

8.5 Access Management Opportunities

No access management is required as a result of the proposed Kiddie Academy development.

Section 9 Site Circulation and Parking

9.1 Site Circulation

The site is currently undeveloped and is proposed to be developed with a 10,320 square foot Kiddie Academy that will accommodate up to 145 students. The site will be accessed via one driveway along westbound Forest Drive. At the location of the proposed access, Forest Drive is a divided roadway and therefore, access to the site will be via a right-in/right-out. Note that the adjacent intersections of Forest Drive at Annapolis Neck Road and Forest Drive at Thom Drive do not provide adequate space for drivers to/from the site to safely make U-turns. Per Chapter 2 of the AASHTO Green Book, 6th Edition, the minimum radius for a passenger car to safely perform a U-turn is 23.8 feet (diameter of 47.6 feet). The adjacent intersections of Forest Drive at Annapolis Neck Road and Forest Drive at Thom Drive only provide a 35-foot width (diameter) for U-turns, which is not considered adequate. Therefore, inbound vehicles to the site from the west and outbound vehicles destined to the east will utilize Forest Hills Avenue in lieu of making a U-turn along Forest Drive, and the trip assignments shown on Exhibits 10a-b reflect this assumption. Based on these findings, it is recommended that "No U-turn" signage be installed at these locations prior to the completion of the development.

9.2 Parking

The City of Annapolis requires one (1) parking space per five (5) students at a daycare. Based on the initial maximum number of students proposed to be accommodated on site, 145 students, a variance from City of Annapolis parking requirements was initially requested for the site to reduce the number of spaces from the City's requirement of 29 spaces to a total of 25 spaces. However, the maximum number of students proposed was subsequently reduced to 112 students, which was the basis for the June 10th revision to this study, as requested by the County, which focuses on reviewing the number of parking spaces proposed. As part of this revision to the study, it must be clarified that the 112-student maximum proposed for the site would require 24 parking spaces per City of Annapolis Code and the site is proposed to include 25 parking spaces, thereby meeting code requirements. However, City Staff requested that a more detailed review of parking be completed due to concerns about the potential for on-site operations to impact adjacent-street traffic operations.

The Synchro/SimTraffic software utilized for this study does not have the capability to accurately model on-site queuing for the type of pick-off/drop-off operation

associated with a day-care facility. Therefore, in an effort to estimate pick-up/drop-off and associated parking recommendations for the site, an article from the ITE Journal entitled Parking and Trip Generation Characteristics for Day-Care Facilities was reviewed, and is included in Appendix A. In addition, recommendations from the ITE Parking Generation Manual, 5th Edition, were reviewed for comparison.

The ITE Journal article, Parking and Trip Generation Characteristics for Day-Care Facilities, provides an equation for estimating the maximum number of pick-up/drop-off spaces required as a function of the number of students at the facility. The equation for facilities with greater than 45 students is $Y = 8 + X/40$, where Y = the maximum number of spaces required for student pick-up/drop-off, and X = the number of students at the facility. For this site there are proposed to be up to 112 students enrolled at the facility, which equates to a maximum of 11 spaces required for peak pick-up/drop-off operations on site.

Based on the site layout, which does not include a dedicated pick up/drop off area, it is anticipated that parents picking up and dropping off their children will park in an available parking spot and walk into the building. The site plan includes 25 parking spaces, of which a maximum of 11 would be necessary during peak pick-up/drop-off periods based on the above. This leaves 14 parking spaces for employees of the facility during the peak pick-up/drop-off periods.

A chart detailing the number of employees on the site during each hour was obtained and is included in Appendix A. It is assumed that the peak drop-off period would correspond to the hours of 7:30-8:30 AM on the chart. According to the chart, there will be a maximum of 14 employees present during this period. As noted above, there are 14 parking spaces available for employees during peak pick-up/drop-off, so the site would have enough parking during this period. The peak pick-up period is assumed to correspond to the hours of 4:30-5:30 PM on the chart. During this period there will be a maximum of 16 employees, potentially exceeding the maximum parking spaces available. It is important to note that the maximum number of parking spaces needed is based on the assumption that each employee travels individually by car and parks on site, which may or may not be the case, so it is possible that the proposed 25 spaces is adequate. One additional note with regard to the above, during the middle of the day the chart shows there will be 22 employees on site, however pick-up and drop-off operations are limited during the middle of the day, so the number of employees would guide the number of spaces needed and the 25 spaces proposed is, therefore, likely to be adequate during the middle of the day.

As an alternate methodology to assess the number of parking spaces, the ITE Parking

Generation Manual, 5th Edition, was consulted. The ITE Parking Generation Manual provides an equation to determine the *total* number of parking spaces to support both pick-up/drop-off operations and employee parking as a function of the number of employees on site. The equation documents that 1.22 spaces are recommended per employee, based on studies conducted at other day-care facilities. Based on this equation, assuming the 22 employees present throughout the majority of the day, the site would be suggested to have approximately 27 parking spaces. As such, the results of this methodology are relatively consistent with the methodology described above, which concluded 25-27 spaces.

It is important to note that even if the number of parking spaces provided on site is not enough to accommodate the pick-up/drop-off operations and employee parking described above, there appears to be space for 2-3 vehicles to queue within the site without any impact to adjacent roadways. As such, in the event a vehicle is required to wait for an available space, it is unlikely that traffic along Forest Drive would be impacted.

It should also be noted that, based on information provided by City staff, the maximum number of employees present during the peak pick-up/drop-off periods (referenced above and shown on the chart in Appendix A) is based on full student enrollment which may not be reached for several years. It is, therefore, likely that parking in the interim period between opening and full enrollment would be adequate. Parking operations could be monitored for issues as full enrollment is reached and, should issues be observed, possible options for improvement could include:

- Transportation demand management (TDM) measures for employees such as rideshare programs, offset shift times, and/or utilization of alternate modes of transportation;
- active on-site parking management such as implementation of an employee parking coordinator who is responsible for facilitating and monitoring pick-up/drop-off operations as well as employee parking; and/or
- additional parking spaces on site.

In conclusion, given that the site appears to be on the borderline of having the necessary number of parking spaces, it is recommended that the site plan be modified, if feasible, to include one to two additional parking spaces, or that the site be monitored for implementation of TDM or on-site parking management measures as full build out is reached. However, given that the site does not require a variance for the number of proposed parking spaces, it is also possible that the site could be approved as proposed.

Section 10 Conclusions / Recommendations

10.1 Results of Analysis

This Traffic Impact Analysis was requested by the City of Annapolis Department of Planning and Zoning for a proposed Kiddie Academy located along the north side of Forest Drive just west of Thom Drive. The proposed Kiddie Academy will occupy 10,320 square feet and accommodate up to 145 students. The purpose of the study is to evaluate the traffic impacts of the proposed project and determine any improvements to mitigate adverse impacts.

10.2 Key Study Findings and Recommendations

Key findings from this Traffic Impact Analysis include the following:

- All signalized intersections operate at overall LOS D or better. Additionally, all movements at unsignalized intersections operate at LOS D or better with the exception of the southbound movements at Forest Drive at Forest Hills Avenue, and the northbound movements at Forest Drive at Annapolis Neck Road/Martha Court and Forest Drive at Thom Drive.
- Under Background Conditions, all signalized intersections operate at overall LOS D or better. Additionally, all movements at unsignalized intersections operate at LOS D or better with the exception of the northbound movements at Forest Drive and Thom Drive, and the eastbound movements at Forest Hills Drive and Bay Ridge Avenue. While several movements at unsignalized intersections operate below LOS D, all unsignalized intersections operate at overall LOS C or better based upon Intersection Capacity Utilization (ICU).
- Under Total Conditions, all signalized intersections continue to operate at overall LOS D or better. Additionally, all movements at unsignalized intersections continue to operate at LOS D or better with the exception of the northbound movements at Forest Drive and Thom Drive, and the eastbound movements at Forest Hills Drive and Bay Ridge Avenue.
    - The movements at unsignalized intersections that operate below LOS D under Total Conditions also operate below LOS D under Background Conditions. In addition, the intersections with movements that operate below LOS D operate overall at LOS C or better.
    - In addition, delays along minor street movements are not uncommon, particularly at locations where a minor street meets a major roadway.
- It is recommended that "No U-turn" signage be installed at the adjacent intersections of Forest Drive at Annapolis Neck Road and Forest Drive at Thom

Drive given the limited median width for drivers to make U-turns along Forest Drive.

- All of the study intersections will continue to operate at overall LOS "D" or better, and the proposed development will have minimal impact on the adjacent street network and overall intersection delay.

Appendix A

Scoping Materials
Supplemental Information

City of Annapolis
DEPARTMENT OF PLANNING AND ZONING
145 Gorman Street, 3rd Floor, Annapolis, Maryland 21401
Chartered 1708 Annapolis 410-263-7961 • FAX 410-263-1129 • MD Relay (711)

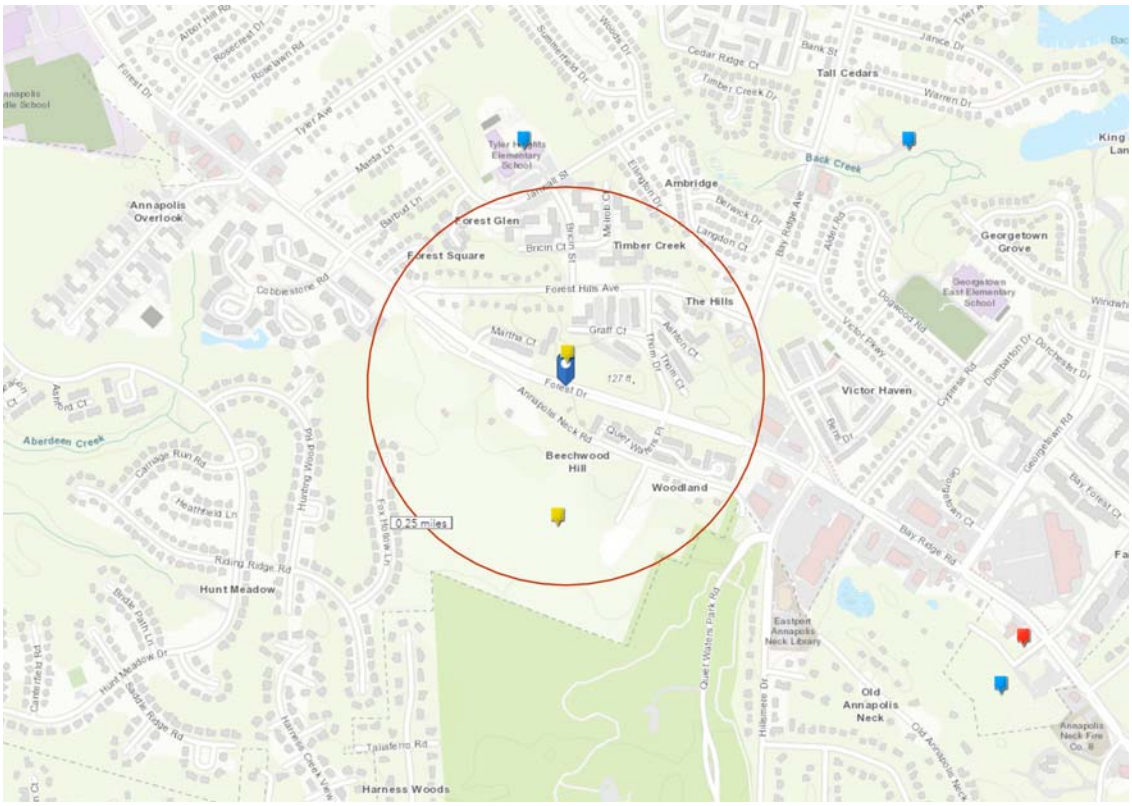
SCOPE OF SERVICES

January 28, 2019

The City of Annapolis' Department of Planning and Zoning is requesting a proposal for a Traffic Impact Analysis for a proposed daycare, known as Kiddie Academy, that will be 10,230 square feet.

The study should include, at the minimum, the following intersections:

- Site access
- Forest Hills Ave. and Forest Drive
- Martha Court and Forest Drive
- Annapolis Neck Rd. and Forest Drive (future traffic signal for Parkside Preserve)
- Thom Drive and Forest Drive
- Forest Hills Ave. and Bay Ridge Ave.
- Thom Dr. and Forest Hills Ave.
- Bricin Street and Forest Hills Ave.
- Janwall Street and Bricin Street
- Hillsmere Dr., Forest Dr. and Bay Ridge Ave.



The study should also evaluate future routing of traffic to Kiddie Academy, using the applicant's proposed circulation plan.

The deliverable for this Traffic Impact Analysis will be an analysis of impacts of the proposed project, taking into account other projects currently underway. The study will be completed in accordance with City Code Section 22.21.010 "Traffic impact analyses." The attached *Policies and Guidelines for Traffic Impact Analysis for Proposed Development in the City of Annapolis* provides detailed guidance. The study will consist of an existing conditions analysis, including traffic counts, as well as an analysis of traffic impacts for a proposed development. Please include delay approach and lane group capacities for each road segment as well as average LOS intersection output.

The deliverable for the phase shall be a written report with appropriate graphics or illustrations and an executive summary. The report should have the following format:

1. Introduction and Summary;
2. Proposed Development, including Site Location and Land Use;
3. Study Area, which should be defined as appropriate to understand the impacts on the surrounding area of development of the site;
4. Existing Conditions Analysis;
5. Site-Generated Traffic;
6. Total Traffic Analysis;
7. Roadway and Intersection Improvements;
8. Site Circulation and Impact on Existing Road Circulation
9. Conclusions;
10. Recommendations; and
11. Appendices, including traffic counts, capacity analyses worksheets, and traffic mitigation plans if applicable.

Data analysis should utilize Synchro software (HCM output) for intersection capacity analysis. SimTraffic will be required to be used to evaluate proposed improvements (5 runs with a seed of zero) by showing queuing and blocking and/or travel time (if appropriate). SimTraffic may also be required to be used to evaluate queuing and delay in existing, background, and total conditions.

Revisions may be required to address City of Annapolis, Anne Arundel County, and SHA comments, as applicable.

A list of development projects underway will be provided to the consultant. Background developments to be considered could include:

- Parkside Preserve, Annapolis Neck Road, Residential Planned Development 44 SF + 86 TH = 130 units. Planned Development approved. To apply for building permits
- Tyler Heights Elementary School, 200 Janwall Street, Site design plan review for renovation and 44,000 sq. ft. addition to the existing school. Site Design Plan approved. Building permits issued
- Griscom Square Tyler Ave/Bay Ridge Ave Residential Planned Development 12 SF dwellings. Phase 1 under construction. To apply for building permits for phase 2.
- 1415 Forest Drive Site Design Plan Review for a proposed 2-story, 2,986 sf footprint (4,938 gfa), addition to the existing 1-story, 4,057 sf, commercial building. Under construction
- 1503 Forest Drive, new building with 18,900 sq. ft. office and 2780 retail. Under construction.
- Bay Village Assisted Living Bay. Village Dr., Special Exception full-service assisted living facility with 72 assisted living units and 16 memory care units. Under construction

- Lidl Supermarket, Bay Ridge Road and Edgewood Road, 36,710 sq. ft. grocery store

Additionally, an annual growth rate in traffic to build year, typically between 1-4%, should be applied. The consultant should determine the growth factor through verification of historical trends in traffic. This and trip distribution should be verified with the department before the analysis is completed.

Counts should be undertaken during weekday AM and PM peak hours. A meeting may be required to discuss the scope and then the findings with the development team and representatives from the Planning and Zoning Department.

Please identify additional scope components or if any part of the scope needs to be amended.

Please email questions to:

Sally Nash, Chief of Comprehensive Planning
Department of Planning and Zoning
145 Gorman Street, 3rd Floor
Annapolis, MD 21401
snash@annapolis.gov
Phone: 410-260-2200

ONSITE TREES:

TREE INVENTORY OF TREES GREATER THAN 24" DBH

TREE	#COMMON NAME	SCIENTIFIC NAME	DBH (IN.)	CONDITION
A1	WHITE OAK	QUERCUS ALBA	30	FAIR
A2	TULIP POPLAR	LIRIODENDRON TULIPIFERA	28	GOOD
A3	CHESNUT OAK	QUERCUS PRINUS	28	GOOD
A4	CHESNUT OAK	QUERCUS PRINUS	22	FAIR
A5	CHESNUT OAK	QUERCUS PRINUS	27	GOOD
A6	RED MAPLE	ACER RUBRUM	14	GOOD
A7	CHESNUT OAK	QUERCUS PRINUS	44	POOR
A8	WHITE OAK	QUERCUS ALBA	36	FAIR
A9	CHESNUT OAK	QUERCUS PRINUS	26	FAIR/POOR
A10	WHITE OAK	QUERCUS ALBA	37	FAIR
A11	CHESNUT OAK	QUERCUS PRINUS	28	FAIR
A12	N RED OAK	QUERCUS RUBRA	37	FAIR/GOOD
A13	N RED OAK	QUERCUS RUBRA	39	FAIR
B1	TULIP POPLAR	LIRIODENDRON TULIPIFERA	13	GOOD
B2	AMERICAN BEECH	FAGUS GANDIFOLIA	20	GOOD
B3	TULIP POPLAR	LIRIODENDRON TULIPIFERA	28	FAIR
B4	TULIP POPLAR	LIRIODENDRON TULIPIFERA	24	GOOD
B5	WHITE OAK	QUERCUS ALBA	23	FAIR
B6	TULIP POPLAR	LIRIODENDRON TULIPIFERA	26	FAIR
B7	CHESNUT OAK	QUERCUS PRINUS	27	GOOD
B8	TULIP POPLAR	LIRIODENDRON TULIPIFERA	22	FAIR
B9	BLACK OAK	QUERCUS VELUTINA	29	GOOD
B10	CHESNUT OAK	QUERCUS PRINUS	30	GOOD
B11	TULIP POPLAR	LIRIODENDRON TULIPIFERA	22	GOOD
B12	TULIP POPLAR	LIRIODENDRON TULIPIFERA	21	FAIR
B13	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	20	FAIR
B14	CHESNUT OAK	QUERCUS PRINUS	23	GOOD
B15	TULIP POPLAR	LIRIODENDRON TULIPIFERA	19	POOR
B16	BLACK OAK	QUERCUS VELUTINA	30	GOOD
B17	CHESNUT OAK	QUERCUS PRINUS	20	GOOD
B18	TULIP POPLAR	LIRIODENDRON TULIPIFERA	21	FAIR
B19	TULIP POPLAR	LIRIODENDRON TULIPIFERA	26	POOR
B20	TULIP POPLAR	LIRIODENDRON TULIPIFERA	29	POOR
B21	N RED OAK	QUERCUS RUBRA	38	POOR
B22	N RED OAK	QUERCUS RUBRA	41	DEAD
B23	CHESNUT OAK	QUERCUS PRINUS	28	GOOD
B24	N RED OAK	QUERCUS RUBRA	39	POOR
B25	TULIP POPLAR	LIRIODENDRON TULIPIFERA	33	POOR
B26	N RED OAK	QUERCUS RUBRA	38	POOR
B27	N RED OAK	QUERCUS RUBRA	35	DEAD
B28	TULIP POPLAR	LIRIODENDRON TULIPIFERA	18	FAIR
C1	CHESNUT OAK	QUERCUS PRINUS	8	
C2	CHESNUT OAK	QUERCUS PRINUS	6	
C3	N RED OAK	QUERCUS RUBRA	10	
C4	TULIP POPLAR	LIRIODENDRON TULIPIFERA	8	
C5	N RED OAK	QUERCUS RUBRA	40	
C6	N RED OAK	QUERCUS RUBRA	4	
C7	CHESNUT OAK	QUERCUS PRINUS	8	
C8	CHESNUT OAK	QUERCUS PRINUS	4	
C9	TULIP POPLAR	LIRIODENDRON TULIPIFERA	6	
C10	N RED OAK	QUERCUS RUBRA	8	
C11	N RED OAK	QUERCUS RUBRA	6	

OFFSITE TREES WITHIN 15' OF LOD:

TREE	#COMMON NAME	SCIENTIFIC NAME	DBH (IN.)	CONDITION
1	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	9	GOOD
2	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	10.5	FAIR
3	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	10.5	GOOD
4	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	6.5	GOOD
5	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	7.5	GOOD
6	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	7	GOOD
7	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	11	GOOD
8	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	7.5	GOOD
9	WHITE OAK	QUERCUS ALBA	8.5	GOOD
10	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	8.5	GOOD
11	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	10	GOOD
12	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	8.5	GOOD
13	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	13	GOOD
14	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	12	GOOD
15	TULIP POPLAR	LIRIODENDRON TULIPIFERA	23.5	GOOD
16	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	10	GOOD
17	TULIP POPLAR	LIRIODENDRON TULIPIFERA	28	GOOD
18	SWEETGUM	LIQUIDAMBAR STYRACIFLUA	6.5	GOOD
19	TULIP POPLAR	LIRIODENDRON TULIPIFERA	23.5	GOOD
20	TULIP POPLAR	LIRIODENDRON TULIPIFERA	25.5	GOOD
21	TULIP POPLAR	LIRIODENDRON TULIPIFERA	11,11,13	GOOD
22	TULIP POPLAR	LIRIODENDRON TULIPIFERA	19.5	GOOD
23	TULIP POPLAR	LIRIODENDRON TULIPIFERA	32	GOOD
24	CHESNUT OAK	QUERCUS PRINUS	19	GOOD
25	TULIP POPLAR	LIRIODENDRON TULIPIFERA	28	GOOD
26	CHESNUT OAK	QUERCUS PRINUS	24	GOOD
27	N RED OAK	QUERCUS RUBRA	31.5	GOOD
28	TULIP POPLAR	LIRIODENDRON TULIPIFERA	26.5	GOOD

1 EXISTING CONDITIONS
SCALE: 1" = 20'

LEGEND:

A. EXISTING CONTOUR — 108
B. PROPERTY LINE
C. EDGE OF PAVEMENT
D. TREE PRESERVATION LINE
E. EXISTING TREE LINE
F. ZONING
G. EXISTING BUILDING
H. OFFSITE TREE & CRITICAL ROOT ZONE

NOTE:

THE INFORMATION PRESENTED HERE WAS ORIGINALLY SUBMITTED AND APPROVED BY THE CITY OF ANNAPOLIS AS PROJECT #F02014-002 (THOMAS WOODS RESIDENTIAL DEVELOPMENT). APPROVED FOREST STAND DELINEATION PLAN FROM 10/2012 IS INCLUDED FOR REFERENCE AT THE END OF THIS PLAN SET.

MAPPED SOIL TYPES:

ACCORDING TO ANNE ARUNDEL COUNTY SOILS MAPS #30 & #34 THIS SITE LIES WITHIN THE FOLLOWING SOIL TYPES:

SYMBOL	SOIL NAME/DESCRIPTION	SOIL GROUP	HYDRICNON	K FACTOR
AnD	ANNAPOLIS FINE SANDY LOAM, 5 -10% SLOPES	C	N	0.24
AuD	ANNAPOLIS - URBAN LAND COMPLEX, 5 -15% SLOPES	C	N	0.24

KIDDIE ACADEMY
EDUCATIONAL CHILD CARE

KIDDIE ACADEMY

ANNAPOLIS, MD

EDUCATIONAL CHILD CARE

Project Status

wendel
Centerpointe Corporate Park
376 Boston Post, Suite 200
Williamsville, NY 14221
www.wendelcorporates.com
p716.688.0766 f716.631.8025
Wendel WG Architecture, Engineering, Surveying and Landscape Architecture, P.C.

PROGRESS PRINT
01/02/2019
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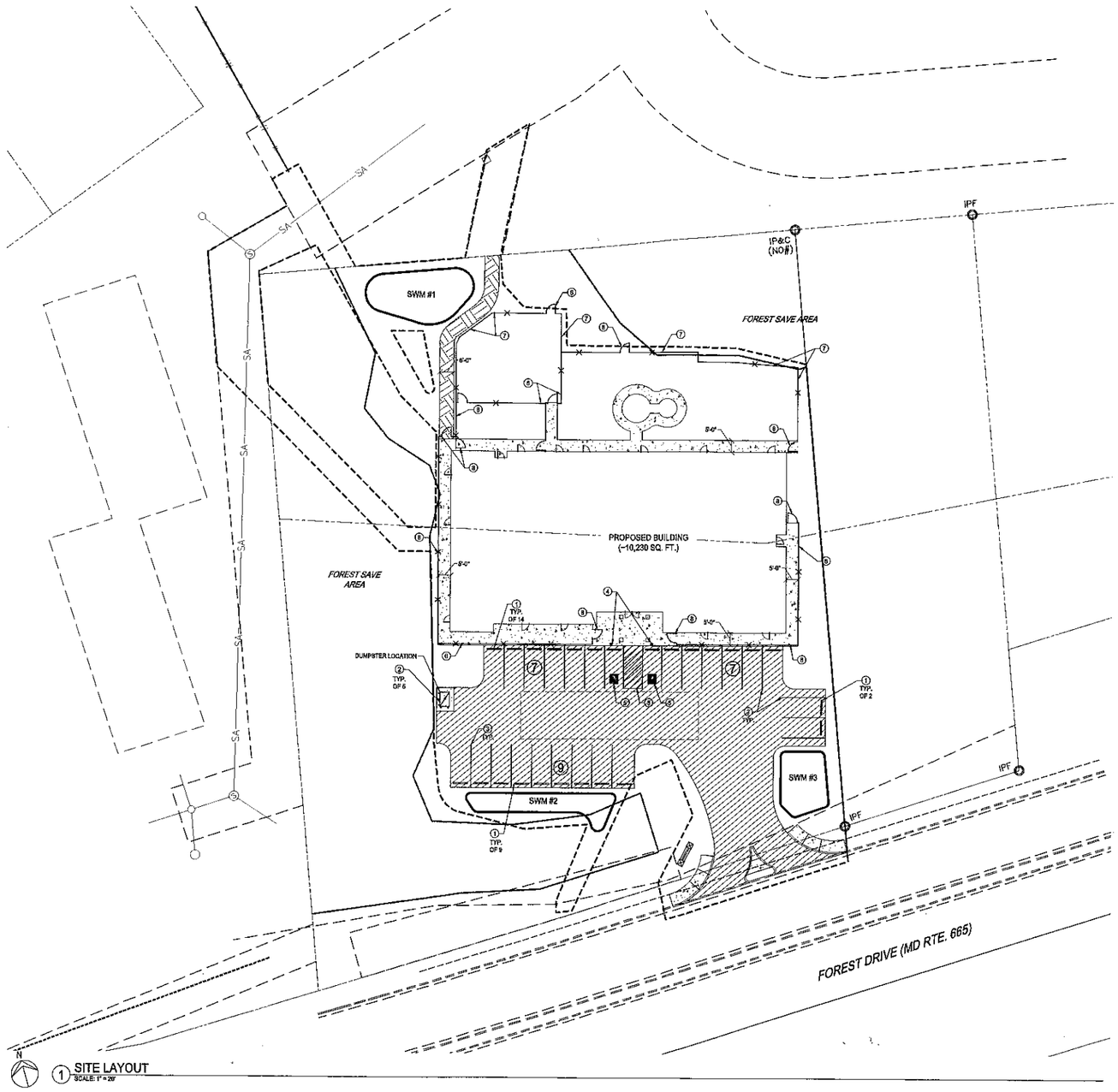
NO.	REVISIONS	DATE

DWG. TITLE
EXISTING CONDITIONS

GENERIC SCALE BAR
0 1' 2'
SCALE BAR SHOWN IS BASED ON THE ORIGINAL DRAWING. IF PRINTING PAPER OR TYPE IS NOT, ADJUST ACCORDINGLY

DATE	JANUARY 2019
SCALE	AS NOTED
DWN.	JAC CHK. BMR
PROJ. No.	495501
DWG. No.	C101



1 SITE LAYOUT
SCALE: 1" = 20'

SITE TABULATIONS:

TOTAL EXISTING SITE AREA: P. 509 = 62, 749 SF OR 1.4405 AC

NOTE: A PORTION OF THE SUBJECT PROPERTY SHOWN HEREON IS ERRONEOUSLY IDENTIFIED ON TAX MAP 56C, BLK 0 AS BEING PART OF PARCEL 525. ALL OF THE SUBJECT PROPERTY IS IDENTIFIED HEREON AS PARCEL 509, WHICH REFLECTS CURRENT OWNERSHIP PER THE TITLE DEED.

DEED REFERENCE AND TAX ACCOUNT: P.509 - 2146804/06-060-90018218

REQUIRED OPEN SPACE AREA: 26% OF 62,479 SF = 12, 549 SF
PROPOSED OPEN SPACE AREA: 20,865 SF = 33.3% OF 62,749 SF

REQUIRED PARKING = ONE PARKING SPACER PER 5 CHILDREN (SECTION 21.66.030 FOR DAY CARE CENTERS).

FOR 145 CHILDREN, PARKING SPACES REQUIRED = 29 SPACES

PROVIDED PARKING = 23 SPACES

DEVELOPER IS REQUESTING VARIANCE FOR LESS PARKING AS PER THEIR NEEDS AT THE SITE.

LEGEND:

A. PROPERTY LINE
B. PROPOSED CONCRETE SIDEWALKS
C. PROPOSED ASPHALT PAVEMENT
D. STORM WATER AREAS
E. LIMITS OF DISTURBANCE
F. TREE PRESERVATION LINE
G. PROPOSED TRAILWAY

⑨ SITE LAYOUT NOTES:

1. CONCRETE CURB STOPS; RE: C501.
2. CONCRETE BOLLARD; RE: 4, C501.
3. 4" YELLOW STRIPING; RE: C501.
4. ACCESSIBLE PARKING SIGN; RE: 6, C501.
5. ACCESSIBLE PARKING SYMBOL AND STRIPING; RE: 2 & 3, C501.
6. 4' FENCE
7. 6' FENCE
8. FENCE GATE

GENERAL SITE NOTES:

EROSION AND SEDIMENT CONTROL SHALL BE CONTINUED AS SHOWN ON MASS GRADING AND SEDIMENT CONTROL PLAN APPROVED BY THE CITY OF ANNAPOLIS AS PROJECT #PD2014-062. THIS PLAN FROM 12/2012 IS INCLUDED FOR REFERENCE AT THE END OF THIS PLAN SET.

KIDDIE ACADEMY
EDUCATIONAL CHILD CARE

KIDDIE ACADEMY

ANNAPOLIS, MD

EDUCATIONAL CHILD CARE

Project Status

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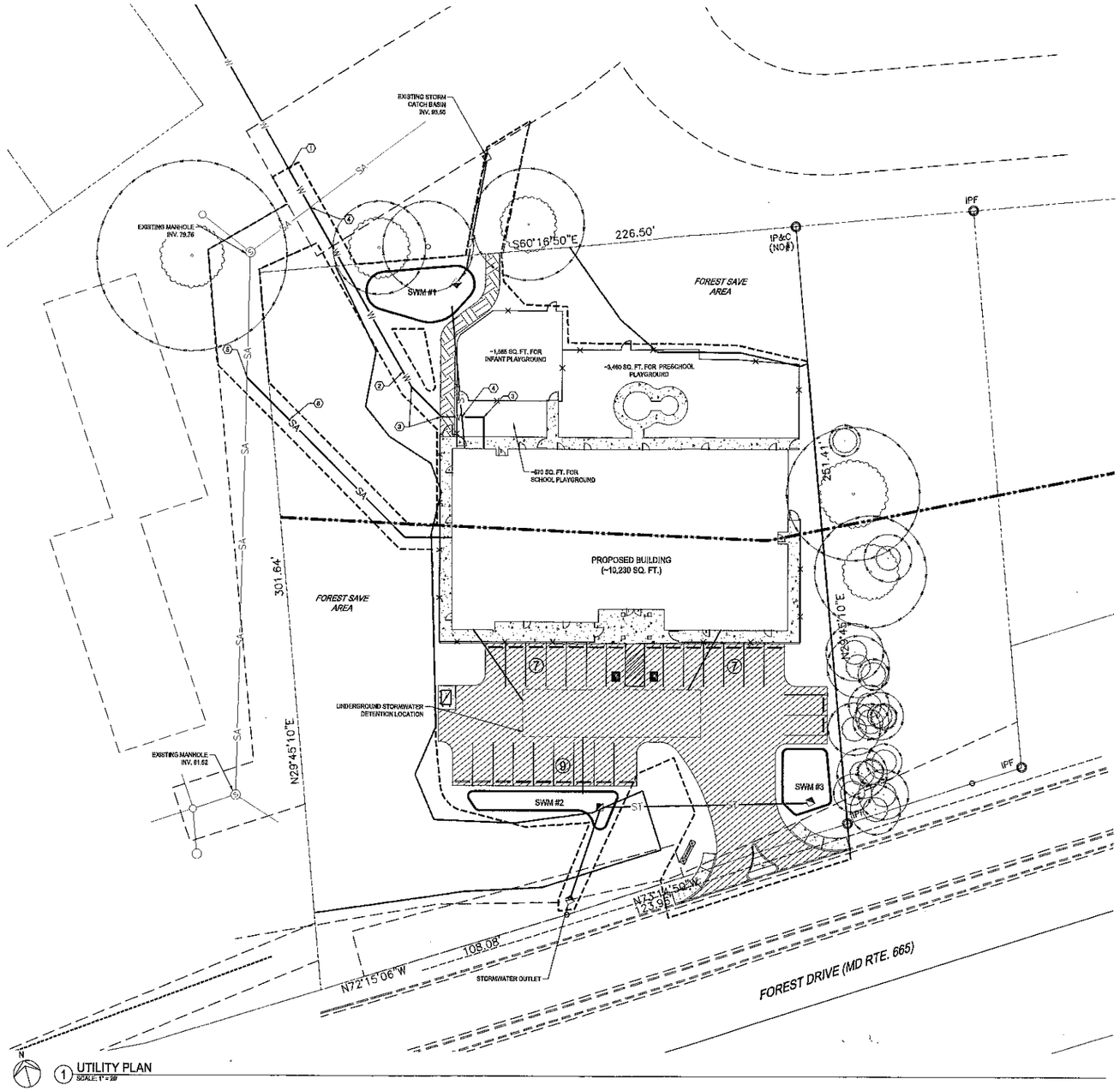
NO.	REVISIONS	DATE

DWG. TITLE

SITE LAYOUT

0 1" 2"
GRAPHIC SCALE BAR
SCALE BAR SHOWS THE ACTUAL SIZE OF THE DRAWING. DRAWING IF NOT THE SAME AS THE SHEET, ALWAYS ACCURATE

DATE	JANUARY 2019
SCALE	AS NOTED
DWN.	JAC CHK. SMR
PROJ. No.	4438B1
DWG. No.	C201



1 UTILITY PLAN
SCALE: 1" = 20'

LEGEND:

A.	PROPOSED WATER PIPE	W
B.	PROPOSED SANITARY PIPE	SA
C.	PROPOSED STORM PIPE	ST
D.	STORM WATER AREAS	

UTILITY NOTES:

1. 8" WATERLINE CONNECTION TO EXISTING 6" WATERLINE THROUGH 20' UTILITY EASEMENT (P.B.42 P.40 P.No.2315)
2. 8" D.I.P. WATERLINE.
3. HORIZONTAL BEND.
4. UTILITY CROSSING.
5. SANITARY SEWER CONNECTION TO EXISTING SANITARY SEWER THROUGH 20' UTILITY EASEMENT (P.B.42 P.40 P.No.2315) INV. 80.16
6. 6" SANITARY SEWER

KIDDIE ACADEMY
EDUCATIONAL CHILD CARE

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ANNAPOLIS, MD

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NO.	REVISIONS	DATE

DWG. TITLE
UTILITY PLAN

GENERIC SCALE BAR
0 1" 2"
SCALE BAR SHOWNE TWO INCHES OF THE ORIGINAL DRAWING. IF NOT TWO INCHES ON THIS SHEET, ADJUST ACCORDINGLY.

DATE JANUARY 2019
SCALE AS NOTED
DWN. JAC CHK. BMR
PROJ. No. 483901
DWG. No.
C202

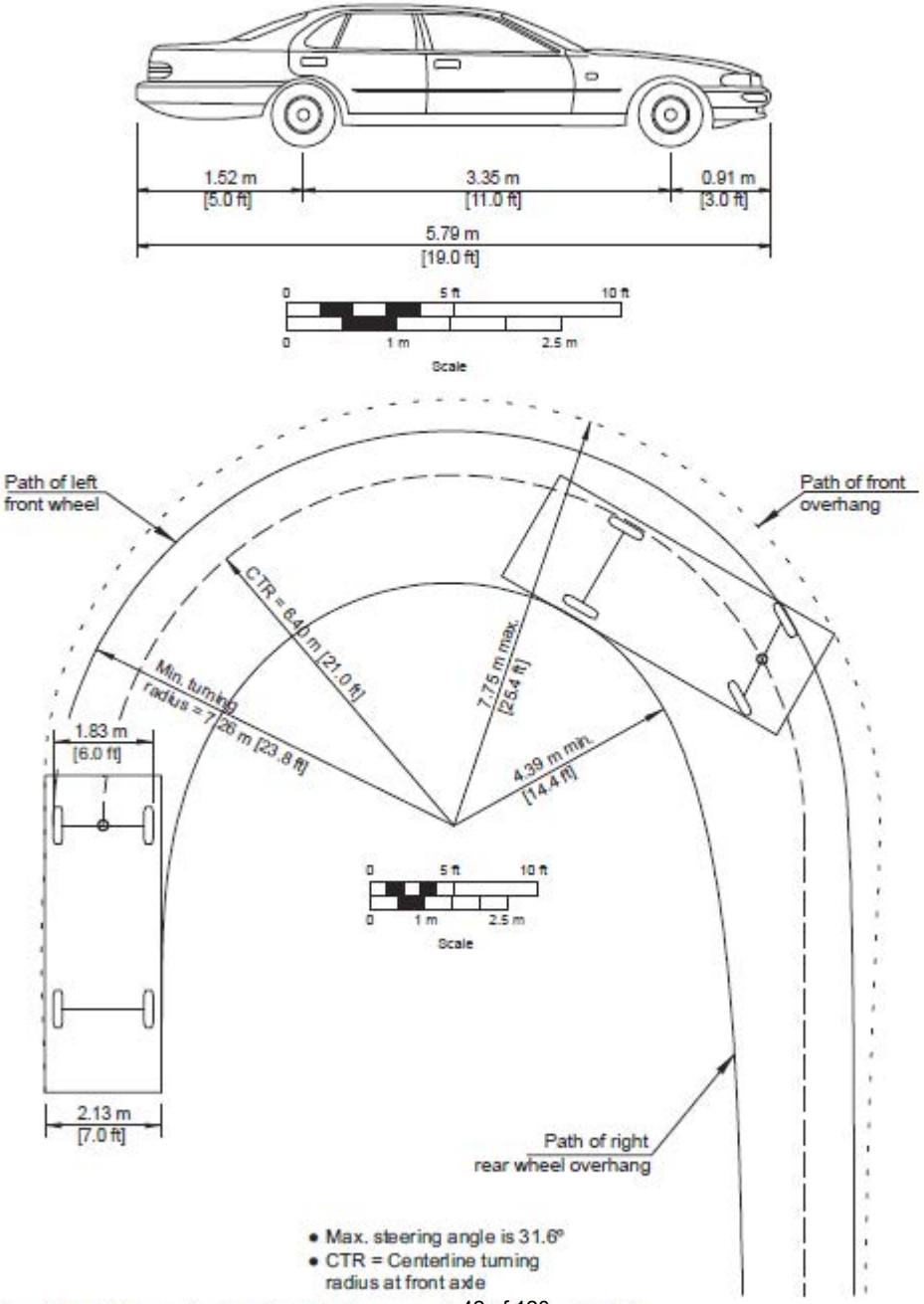


Figure 2-1. Minimum Turning Path for Passenger Car (P) Design Vehicle

Tyler Heights ES - Revitalization

Administrative Data

Architect:	TCA
Construction Manager:	Heery International, Inc.
Scope of Work:	The design and construction for the revitalization of Tyler Heights Elementary School.
Phase of Work:	Construction

Vital Statistics

	Before	After
State Rated Capacity	479	549
Gross Square Footage	45,813	84,896

Current Status

Percent Complete: 5%

Tyler Heights ES is a 7 phase project.
Phase 1 -Site preparation - 100% Complete
Phase 2 - New 12 Classroom North Wing addition and Gym/Cafetorium is 15% complete. The City of Annapolis building and grading permits have been received. Site utilities have started and are 20% complete. Gym/Cafeteria Addition footings are 80% complete. Masonry foundation walls are 25% complete.
Phases 3 and 4 - Will include renovation of existing South Wing classrooms and Media Center.
Phase 5 - Will include renovation of existing West Wing classrooms.
Phase 6 - Will include construction of interior West Wing classroom and the addition of site work.
Phase 7 - Will include remaining Site work.

Project Schedule

	Approved EdSpec	Current	Actual
Educational Specifications	May-16	May-16	May-16
Feasibility Study	Oct-16	Oct-16	Oct-16
Schematic Design	Sep-17	Apr-17	May-17
Design Development	Dec-17	Jul-17	Sep-17
Construction Documents	Aug-18	Jan-18	May-18
Bid Award	Feb-19	Aug-18	Sep-18
Start Construction	Apr-19	Oct-18	
Occupancy	Aug-21	Jan-21	

Fiscal Data

	Approved Budget	Current Appropriation	Encumbered
Plans & Engineering	$3,464,000	$3,464,000	$3,226,900
Construction	$30,015,000	$15,007,000	$13,225,319
FFE	$2,137,000		
Project Support	$1,481,000	$592,000	$124,798
Total	$37,097,000	$19,063,000	$16,577,017

From: Sally Nash <snash@annapolis.gov>
Sent: Thursday, May 16, 2019 2:33 PM
To: Nick Driban <ndriban@LENHARTTRAFFIC.COM>
Subject: Re: Kiddie Academy Comments

Thanks, Nick, I have sent this around for review. Here is info on the number of employees:

Does the below chart answer the question? This is based off full capacity which we won't meet for a few years either.

Hour	# of Employees	# of Managers
6:30-7:30	4	1
7:30-8:30	13	1
8:30-9:30	21	2
9:30-10:30	20	2
10:30-11:30	20	2
11:30-12:30	20	2
12:30-1:30	20	2
1:30-2:30	20	2
2:30-3:30	20	2
3:30-4:30	18	1
4:30-5:30	15	1
5:30-6:30	4	1

Appendix B

Traffic Counts

Weekday Morning Peak Hour (7 am - 9 am)

	N/A Northbound					Forest Hills Avenue Southbound					Forest Drive Eastbound					Forest Drive Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
7:00-7:15					0	0	0		38	0	0	16	116		0	0		372	0	0	542
7:15-7:30					0	0	0		38	0	0	21	124		0	0		315	2	0	500
7:30-7:45					0	0	0		35	0	0	25	178		0	0		331	1	0	570
7:45-8:00					0	0	0		43	0	0	19	304		0	0		390	1	0	757
8:00-8:15					0	0	0		42	0	0	18	358		0	0		417	2	0	837
8:15-8:30					0	0	1		31	0	0	24	274		0	0		460	2	0	792
8:30-8:45					0	0	0		31	0	0	28	214		0	0		322	0	0	595
8:45-9:00					0	0	0		40	2	0	36	230		0	0		352	4	0	662
Hourly Totals																					
7:00-8:00					0	0	0		154	0	0	81	722		0	0		1408	4	0	2369
7:15-8:15					0	0	0		158	0	0	83	964		0	0		1453	6	0	2664
7:30-8:30					0	0	1		151	0	0	86	1114		0	0		1598	6	0	2956
7:45-8:45					0	0	1		147	0	0	89	1150		0	0		1589	5	0	2981
8:00-9:00					0	0	1		144	2	0	106	1076		0	0		1551	8	0	2886
AM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
7:45-8:45					**0**	**0**	**1**		**147**	**0**	**0**	**89**	**1150**		**0**	**0**		**1589**	**5**	**0**	**2981**

Weekday Evening Peak Hour (4 pm - 6 pm)

	N/A Northbound					Forest Hills Avenue Southbound					Forest Drive Eastbound					Forest Drive Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
4:00-4:15					0	0	1		34	0	0	41	366		0	0		297	3	0	742
4:15-4:30					0	0	0		32	0	0	37	314		0	0		291	3	0	677
4:30-4:45					0	0	0		33	0	0	47	320		0	0		297	0	0	697
4:45-5:00					0	0	0		20	0	0	34	354		0	0		250	1	0	659
5:00-5:15					0	0	0		34	0	0	36	411		0	0		313	1	0	795
5:15-5:30					0	0	0		31	1	0	50	356		0	0		272	0	0	709
5:30-5:45					0	0	0		39	0	0	43	394		0	0		285	4	0	765
5:45-6:00					0	0	0		24	0	0	28	368		0	0		250	1	0	671
Hourly Totals																					
4:00-5:00					0	0	1		119	0	0	159	1354		0	0		1135	7	0	2775
4:15-5:15					0	0	0		119	0	0	154	1399		0	0		1151	5	0	2828
4:30-5:30					0	0	0		118	1	0	167	1441		0	0		1132	2	0	2860
4:45-5:45					0	0	0		124	1	0	163	1515		0	0		1120	6	0	2928
5:00-6:00					0	0	0		128	1	0	157	1529		0	0		1120	6	0	2940
PM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
5:00-6:00					**0**	**0**	**0**		**128**	**1**	**0**	**157**	**1529**		**0**	**0**		**1120**	**6**	**0**	**2940**

Peak Hour
Turning Movement Count

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Intersection:	Forest Drive at Forest Hills Avenue
Weather:	Clear
Count by:	Count CAM ZW
Count Day/Date:	February 14th 2019
County:	Anne Arundel

Weekday Morning Peak Hour (7 am - 9 am)

	Annapolis Neck Road Northbound					Martha Court Southbound					Forest Drive Eastbound					Forest Drive Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
7:00-7:15	0	0	0	0	0	0	0	0	5	0	0	2	114	0	0	0	0	367	1	0	489
7:15-7:30	0	0	0	1	0	0	0	0	9	0	0	1	123	0	0	0	0	308	1	0	443
7:30-7:45	0	1	0	0	0	0	0	0	7	0	0	0	178	0	0	0	0	324	2	0	512
7:45-8:00	0	0	0	2	0	0	0	0	6	0	0	3	301	0	0	0	0	385	1	0	698
8:00-8:15	0	2	1	1	2	0	1	0	4	0	0	0	358	0	0	0	0	413	0	0	780
8:15-8:30	0	0	0	0	0	0	0	0	3	1	0	2	273	0	0	0	0	459	2	0	739
8:30-8:45	0	0	0	0	0	0	0	0	3	0	0	2	212	0	0	0	0	319	2	0	538
8:45-9:00	0	1	1	0	0	0	0	0	2	2	0	1	229	0	0	0	0	353	2	0	589
Hourly Totals																					
7:00-8:00	0	1	0	3	0	0	0	0	27	0	0	6	716	0	0	0	0	1384	5	0	2142
7:15-8:15	0	3	1	4	2	0	1	0	26	0	0	4	960	0	0	0	0	1430	4	0	2433
7:30-8:30	0	3	1	3	2	0	1	0	20	1	0	5	1110	0	0	0	0	1581	5	0	2729
7:45-8:45	0	2	1	3	2	0	1	0	16	1	0	7	1144	0	0	0	0	1576	5	0	2755
8:00-9:00	0	3	2	1	2	0	1	0	12	3	0	5	1072	0	0	0	0	1544	6	0	2646
AM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
7:45-8:45	**0**	**2**	**1**	**3**	**2**	**0**	**1**	**0**	**16**	**1**	**0**	**7**	**1144**	**0**	**0**	**0**	**0**	**1576**	**5**	**0**	**2755**

Weekday Evening Peak Hour (4 pm - 6 pm)

	Annapolis Neck Road Northbound					Martha Court Southbound					Forest Drive Eastbound					Forest Drive Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
4:00-4:15	0	0	0	0	0	0	1	0	4	0	0	2	364	1	0	0	0	296	3	0	671
4:15-4:30	0	0	0	1	2	0	0	0	4	0	0	3	311	0	0	0	0	290	0	0	609
4:30-4:45	0	0	0	1	0	0	0	0	1	0	0	2	317	1	0	0	0	296	3	0	621
4:45-5:00	0	0	1	1	0	0	0	0	1	0	0	0	352	2	0	0	1	250	1	0	609
5:00-5:15	0	1	0	1	0	0	0	0	3	0	0	2	408	1	0	0	0	310	4	0	730
5:15-5:30	0	1	0	1	2	0	0	0	2	0	0	2	353	1	0	0	0	269	0	0	629
5:30-5:45	0	1	0	0	1	0	1	0	5	0	0	7	386	1	0	0	2	283	1	0	687
5:45-6:00	0	2	0	1	1	0	1	0	3	0	0	4	364	0	0	0	1	246	0	0	622
Hourly Totals																					
4:00-5:00	0	0	1	3	2	0	1	0	10	0	0	7	1344	4	0	0	1	1132	7	0	2510
4:15-5:15	0	1	1	4	2	0	0	0	9	0	0	7	1388	4	0	0	1	1146	8	0	2569
4:30-5:30	0	2	1	4	2	0	0	0	7	0	0	6	1430	5	0	0	1	1125	8	0	2589
4:45-5:45	0	3	1	3	3	0	1	0	11	0	0	11	1499	5	0	0	3	1112	6	0	2655
5:00-6:00	0	5	0	3	4	0	2	0	13	0	0	15	1511	3	0	0	3	1108	5	0	2668
PM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
5:00-6:00	**0**	**5**	**0**	**3**	**4**	**0**	**2**	**0**	**13**	**0**	**0**	**15**	**1511**	**3**	**0**	**0**	**3**	**1108**	**5**	**0**	**2668**

Peak Hour
Turning Movement Count

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Intersection:	Forest Drive at Martha Court
Weather:	Clear
Count by:	Count CAM ZW
Count Day/Date:	February 14th 2019
County:	Anne Arundel

Weekday Morning Peak Hour (7 am - 9 am)

	Quiet Waters Place Northbound					Thom Drive Southbound					Forest Drive Eastbound					Forest Drive Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
7:00-7:15	0	5	0	0	0	0	1	0	15	0	0	4	110	0	0	0	0	348	0	0	483
7:15-7:30	0	2	0	0	1	0	1	0	10	0	0	1	123	0	0	0	0	297	0	0	434
7:30-7:45	0	5	0	3	0	0	1	0	14	0	0	1	176	1	0	0	1	307	0	0	509
7:45-8:00	0	4	0	6	1	0	1	0	12	0	0	7	295	1	0	0	3	370	3	0	702
8:00-8:15	0	3	1	1	0	0	0	0	16	0	0	9	351	0	0	0	2	394	4	0	781
8:15-8:30	0	5	0	1	1	0	0	0	18	0	0	15	257	1	0	0	0	438	3	0	738
8:30-8:45	0	5	0	1	1	0	0	0	9	0	0	6	205	1	0	0	0	307	0	0	534
8:45-9:00	0	1	0	0	1	0	2	0	11	1	0	6	222	1	0	0	1	343	5	0	592
Hourly Totals																					
7:00-8:00	0	16	0	9	2	0	4	0	51	0	0	13	704	2	0	0	4	1322	3	0	2128
7:15-8:15	0	14	1	10	2	0	3	0	52	0	0	18	945	2	0	0	6	1368	7	0	2426
7:30-8:30	0	17	1	11	2	0	2	0	60	0	0	32	1079	3	0	0	6	1509	10	0	2730
7:45-8:45	0	17	1	9	3	0	1	0	55	0	0	37	1108	3	0	0	5	1509	10	0	2755
8:00-9:00	0	14	1	3	3	0	2	0	54	1	0	36	1035	3	0	0	3	1482	12	0	2645
AM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
7:45-8:45	**0**	**17**	**1**	**9**	**3**	**0**	**1**	**0**	**55**	**0**	**0**	**37**	**1108**	**3**	**0**	**0**	**5**	**1509**	**10**	**0**	**2755**

Weekday Evening Peak Hour (4 pm - 6 pm)

	Quiet Waters Place Northbound					Thom Drive Southbound					Forest Drive Eastbound					Forest Drive Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
4:00-4:15	0	2	0	0	1	0	0	0	10	0	0	6	356	3	0	0	2	287	5	0	671
4:15-4:30	0	2	0	0	2	0	0	0	8	0	0	9	303	0	0	0	1	280	6	0	609
4:30-4:45	0	1	0	1	0	0	0	0	16	0	0	11	305	2	0	0	0	282	4	0	622
4:45-5:00	0	1	0	1	0	0	1	0	8	0	0	7	342	4	0	0	1	243	2	0	610
5:00-5:15	0	1	0	1	2	0	1	0	21	0	0	17	386	6	0	0	0	292	3	0	728
5:15-5:30	0	2	0	2	0	0	1	0	10	0	0	18	331	5	0	0	3	257	6	0	635
5:30-5:45	0	3	0	1	0	0	0	0	6	0	0	16	368	3	0	0	0	277	3	0	677
5:45-6:00	0	3	0	0	1	0	0	0	11	0	0	10	355	1	0	0	0	233	4	0	617
Hourly Totals																					
4:00-5:00	0	6	0	2	3	0	1	0	42	0	0	33	1306	9	0	0	4	1092	17	0	2512
4:15-5:15	0	5	0	3	4	0	2	0	53	0	0	44	1336	12	0	0	2	1097	15	0	2569
4:30-5:30	0	5	0	5	2	0	3	0	55	0	0	53	1364	17	0	0	4	1074	15	0	2595
4:45-5:45	0	7	0	5	2	0	3	0	45	0	0	58	1427	18	0	0	4	1069	14	0	2650
5:00-6:00	0	9	0	4	3	0	2	0	48	0	0	61	1440	15	0	0	3	1059	16	0	2657
PM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
5:00-6:00	**0**	**9**	**0**	**4**	**3**	**0**	**2**	**0**	**48**	**0**	**0**	**61**	**1440**	**15**	**0**	**0**	**3**	**1059**	**16**	**0**	**2657**

Peak Hour
Turning Movement Count

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Intersection:	Forest Drive at Thom Drive
Weather:	Clear
Count by:	Count CAM ZW
Count Day/Date:	February 14th 2019
County:	Anne Arundel

Weekday Morning Peak Hour (7 am - 9 am)

	Hillsmere Drive Northbound					Bay Ridge Avenue Southbound					Forest Drive Eastbound					Forest Drive Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
7:00-7:15	0	87	6	12	1	0	28	8	2	0	0	1	94	16	0	0	9	259	63	0	585
7:15-7:30	0	61	10	12	0	0	40	9	2	0	0	0	104	20	0	0	10	234	99	1	601
7:30-7:45	0	76	38	6	0	0	41	6	6	0	0	3	138	39	0	0	17	226	92	1	688
7:45-8:00	0	79	19	28	0	0	55	24	4	0	0	7	183	112	0	0	26	293	87	0	917
8:00-8:15	0	132	29	33	0	0	72	41	1	0	0	5	168	179	0	0	45	267	69	1	1041
8:15-8:30	0	161	38	37	0	0	43	21	2	0	0	4	177	77	0	0	16	278	93	3	947
8:30-8:45	0	96	27	19	0	0	61	20	4	0	0	7	156	43	0	0	19	207	85	0	744
8:45-9:00	0	86	15	34	0	0	47	19	4	1	0	10	169	45	0	0	12	259	102	1	802
Hourly Totals																					
7:00-8:00	0	303	73	58	1	0	164	47	14	0	0	11	519	187	0	0	62	1012	341	2	2791
7:15-8:15	0	348	96	79	0	0	208	80	13	0	0	15	593	350	0	0	98	1020	347	3	3247
7:30-8:30	0	448	124	104	0	0	211	92	13	0	0	19	666	407	0	0	104	1064	341	5	3593
7:45-8:45	0	468	113	117	0	0	231	106	11	0	0	23	684	411	0	0	106	1045	334	4	3649
8:00-9:00	0	475	109	123	0	0	223	101	11	1	0	26	670	344	0	0	92	1011	349	5	3534
AM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
7:45-8:45	**0**	**468**	**113**	**117**	**0**	**0**	**231**	**106**	**11**	**0**	**0**	**23**	**684**	**411**	**0**	**0**	**106**	**1045**	**334**	**4**	**3649**

Weekday Evening Peak Hour (4 pm - 6 pm)

	Hillsmere Drive Northbound					Bay Ridge Avenue Southbound					Forest Drive Eastbound					Forest Drive Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
4:00-4:15	0	61	28	30	0	0	73	32	5	3	0	6	244	106	0	0	19	228	86	3	918
4:15-4:30	0	74	22	24	1	0	67	24	9	0	0	5	200	98	0	0	26	204	76	3	829
4:30-4:45	0	66	24	26	2	0	68	30	9	1	0	5	228	73	0	0	24	211	74	0	838
4:45-5:00	0	73	32	36	0	0	103	36	4	0	0	4	253	87	0	0	24	169	87	5	908
5:00-5:15	0	84	20	42	0	0	79	43	7	2	0	5	281	102	0	0	32	204	86	7	985
5:15-5:30	0	72	29	27	1	0	106	39	7	0	0	5	236	93	3	0	40	187	76	1	917
5:30-5:45	0	84	36	23	3	0	83	23	4	1	0	6	255	108	1	0	27	192	91	6	932
5:45-6:00	0	72	25	34	1	0	80	38	4	0	0	5	255	95	0	0	22	161	69	0	860
Hourly Totals																					
4:00-5:00	0	274	106	116	3	0	311	122	27	4	0	20	925	364	0	0	93	812	323	11	3493
4:15-5:15	0	297	98	128	3	0	317	133	29	3	0	19	962	360	0	0	106	788	323	15	3560
4:30-5:30	0	295	105	131	3	0	356	148	27	3	0	19	998	355	3	0	120	771	323	13	3648
4:45-5:45	0	313	117	128	4	0	371	141	22	3	0	20	1025	390	4	0	123	752	340	19	3742
5:00-6:00	0	312	110	126	5	0	348	143	22	3	0	21	1027	398	4	0	121	744	322	14	3694
PM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
4:45-5:45	**0**	**313**	**117**	**128**	**4**	**0**	**371**	**141**	**22**	**3**	**0**	**20**	**1025**	**390**	**4**	**0**	**123**	**752**	**340**	**19**	**3742**

Peak Hour
Turning Movement Count

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Intersection:	Forest Drive at Bay Ridge Avenue
Weather:	Clear
Count by:	DSS
Count Day/Date:	February 14th 2019
County:	Anne Arundel

Weekday Morning Peak Hour (7 am - 9 am)

	N/A Northbound					Bricin Street Southbound					Forest Hills Avenue Eastbound					Forest Hills Avenue Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
7:00-7:15					0	0	3		6	1	0	2	17		0	0		31	6	0	65
7:15-7:30					0	0	4		7	1	0	1	20		1	0		36	7	0	75
7:30-7:45					0	0	6		2	0	0	3	24		0	0		32	7	1	74
7:45-8:00					0	0	11		6	2	0	5	19		0	0		32	7	0	80
8:00-8:15					0	0	5		10	0	0	5	9		0	0		27	9	1	65
8:15-8:30					0	0	4		6	0	0	9	18		0	0		22	8	0	67
8:30-8:45					0	0	7		4	0	0	5	13		0	0		24	16	15	69
8:45-9:00					0	0	31		16	0	0	9	16		0	0		30	17	15	119
Hourly Totals																					
7:00-8:00					0	0	24		21	4	0	11	80		1	0		131	27	1	294
7:15-8:15					0	0	26		25	3	0	14	72		1	0		127	30	2	294
7:30-8:30					0	0	26		24	2	0	22	70		0	0		113	31	2	286
7:45-8:45					0	0	27		26	2	0	24	59		0	0		105	40	16	281
8:00-9:00					0	0	47		36	0	0	28	56		0	0		103	50	31	320
AM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
8:00-9:00					**0**	**0**	**47**		**36**	**0**	**0**	**28**	**56**		**0**	**0**		**103**	**50**	**31**	**320**

Weekday Evening Peak Hour (4 pm - 6 pm)

	N/A Northbound					Bricin Street Southbound					Forest Hills Avenue Eastbound					Forest Hills Avenue Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
4:00-4:15					0	0	13		4	0	0	2	43		0	0		34	10	0	106
4:15-4:30					0	0	8		4	0	0	8	32		0	0		28	9	3	89
4:30-4:45					0	0	18		7	0	1	9	44		0	0		23	12	1	114
4:45-5:00					0	0	13		5	0	0	5	21		0	0		19	12	3	75
5:00-5:15					0	0	8		6	0	0	7	32		0	0		32	8	0	93
5:15-5:30					0	0	11		5	0	0	9	37		0	0		28	7	2	97
5:30-5:45					0	0	10		8	0	0	9	35		0	0		20	8	0	90
5:45-6:00					0	0	12		8	0	0	5	25		0	0		29	8	0	87
Hourly Totals																					
4:00-5:00					0	0	52		20	0	1	24	140		0	0		104	43	7	384
4:15-5:15					0	0	47		22	0	1	29	129		0	0		102	41	7	371
4:30-5:30					0	0	50		23	0	1	30	134		0	0		102	39	6	379
4:45-5:45					0	0	42		24	0	0	30	125		0	0		99	35	5	355
5:00-6:00					0	0	41		27	0	0	30	129		0	0		109	31	2	367
PM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
4:00-5:00					**0**	**0**	**52**		**20**	**0**	**1**	**24**	**140**		**0**	**0**		**104**	**43**	**7**	**384**

Peak Hour
Turning Movement Count

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Intersection:	Forest Hills Avenue at Bricin Street
Weather:	Clear
Count by:	Count CAM ZW
Count Day/Date:	February 14th 2019
County:	Anne Arundel

Weekday Morning Peak Hour (7 am - 9 am)

	Thom Drive Northbound					Parking Lot Southbound					Forest Hills Avenue Eastbound					Forest Hills Avenue Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
7:00-7:15	0	3	0	4	0	0	0	1	1	0	0	1	18	1	0	0	1	33	0	0	63
7:15-7:30	0	6	0	3	0	0	0	0	1	0	0	1	22	1	0	0	5	36	0	0	75
7:30-7:45	0	5	0	2	0	0	0	0	1	0	0	0	22	8	0	0	1	33	0	0	72
7:45-8:00	0	8	0	4	0	0	0	0	1	0	0	1	25	4	0	0	2	30	0	0	75
8:00-8:15	0	6	0	7	0	0	1	0	2	0	0	0	9	5	0	0	0	28	0	0	58
8:15-8:30	0	3	0	6	0	0	0	0	1	0	0	0	19	3	0	0	2	26	0	0	60
8:30-8:45	0	10	0	5	2	0	0	0	1	0	0	0	15	5	0	0	2	29	0	2	67
8:45-9:00	0	17	0	5	2	0	0	0	1	0	0	1	33	13	0	0	2	29	1	5	102
Hourly Totals																					
7:00-8:00	0	22	0	13	0	0	0	1	4	0	0	3	87	14	0	0	9	132	0	0	285
7:15-8:15	0	25	0	16	0	0	1	0	5	0	0	2	78	18	0	0	8	127	0	0	280
7:30-8:30	0	22	0	19	0	0	1	0	5	0	0	1	75	20	0	0	5	117	0	0	265
7:45-8:45	0	27	0	22	2	0	1	0	5	0	0	1	68	17	0	0	6	113	0	2	260
8:00-9:00	0	36	0	23	4	0	1	0	5	0	0	1	76	26	0	0	6	112	1	7	287
AM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
8:00-9:00	**0**	**36**	**0**	**23**	**4**	**0**	**1**	**0**	**5**	**0**	**0**	**1**	**76**	**26**	**0**	**0**	**6**	**112**	**1**	**7**	**287**

Weekday Evening Peak Hour (4 pm - 6 pm)

	Thom Drive Northbound					Parking Lot Southbound					Forest Hills Avenue Eastbound					Forest Hills Avenue Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
4:00-4:15	0	2	0	2	2	0	0	0	0	0	0	1	47	8	5	0	7	42	0	4	109
4:15-4:30	0	4	0	1	0	0	0	0	1	0	0	1	35	4	0	0	5	32	1	5	84
4:30-4:45	0	5	0	4	2	0	0	0	2	1	0	1	54	7	1	0	7	28	0	1	108
4:45-5:00	0	6	0	3	0	0	2	0	0	0	0	3	26	5	0	0	1	25	0	0	71
5:00-5:15	0	9	0	4	0	0	0	0	1	0	0	0	33	7	0	0	0	30	1	0	85
5:15-5:30	0	4	0	5	0	0	2	0	0	0	0	0	42	6	0	0	0	31	0	0	90
5:30-5:45	0	4	0	4	1	0	0	0	1	0	0	0	40	5	0	0	2	23	2	1	81
5:45-6:00	0	6	0	6	0	0	0	0	2	1	0	1	28	8	0	0	0	29	0	1	80
Hourly Totals																					
4:00-5:00	0	17	0	10	4	0	2	0	3	1	0	6	162	24	6	0	20	127	1	10	372
4:15-5:15	0	24	0	12	2	0	2	0	4	1	0	5	148	23	1	0	13	115	2	6	348
4:30-5:30	0	24	0	16	2	0	4	0	3	1	0	4	155	25	1	0	8	114	1	1	354
4:45-5:45	0	23	0	16	1	0	4	0	2	0	0	3	141	23	0	0	3	109	3	1	327
5:00-6:00	0	23	0	19	1	0	2	0	4	1	0	1	143	26	0	0	2	113	3	2	336
PM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
4:00-5:00	**0**	**17**	**0**	**10**	**4**	**0**	**2**	**0**	**3**	**1**	**0**	**6**	**162**	**24**	**6**	**0**	**20**	**127**	**1**	**10**	**372**

Peak Hour
Turning Movement Count

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Intersection:	Forest Hills Avenue at Thom Drive
Weather:	Clear
Count by:	Count CAM ZW
Count Day/Date:	February 14th 2019
County:	Anne Arundel

Weekday Morning Peak Hour (7 am - 9 am)

	Bay Ridge Avenue Northbound					Bay Ridge Avenue Southbound					Forest Hills Avenue Eastbound					N/A Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
7:00-7:15	0	10	60		0	0		37	24	0	0	16		6	4					0	153
7:15-7:30	0	18	91		0	0		53	23	0	0	16		9	0					0	210
7:30-7:45	0	10	123		0	0		54	24	0	0	13		11	0					0	235
7:45-8:00	0	10	103		0	0		96	22	0	0	17		12	0					0	260
8:00-8:15	0	9	94		0	0		85	19	0	0	9		8	0					0	224
8:15-8:30	0	12	123		0	0		69	16	0	0	17		8	0					0	245
8:30-8:45	0	18	101		0	0		80	13	0	0	12		8	0					0	232
8:45-9:00	0	13	114		0	0		63	18	0	0	27		11	0					0	246
Hourly Totals																					
7:00-8:00	0	48	377		0	0		240	93	0	0	62		38	4					0	858
7:15-8:15	0	47	411		0	0		288	88	0	0	55		40	0					0	929
7:30-8:30	0	41	443		0	0		304	81	0	0	56		39	0					0	964
7:45-8:45	0	49	421		0	0		330	70	0	0	55		36	0					0	961
8:00-9:00	0	52	432		0	0		297	66	0	0	65		35	0					0	947
AM Peak Hour	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
	U-Turn	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
7:30-8:30	**0**	**41**	**443**		**0**	**0**		**304**	**81**	**0**	**0**	**56**		**39**	**0**					**0**	**964**

Weekday Evening Peak Hour (4 pm - 6 pm)

	Bay Ridge Avenue Northbound					Bay Ridge Avenue Southbound					Forest Hills Avenue Eastbound					N/A Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
4:00-4:15	0	14	106		0	0		109	35	0	0	30		19	2					3	313
4:15-4:30	0	16	87		0	0		91	21	0	0	19		17	1					2	251
4:30-4:45	0	16	87		0	0		105	19	0	0	37		21	0					0	285
4:45-5:00	0	15	108		1	0		107	11	0	0	16		15	0					1	272
5:00-5:15	0	12	99		0	0		149	18	0	0	18		19	0					4	315
5:15-5:30	0	19	91		0	0		116	12	0	0	30		19	2					2	287
5:30-5:45	0	9	124		0	0		108	16	0	0	33		11	1					3	301
5:45-6:00	0	10	89		0	0		98	19	0	0	17		17	0					0	250
Hourly Totals																					
4:00-5:00	0	61	388		1	0		412	86	0	0	102		72	3					6	1121
4:15-5:15	0	59	381		1	0		452	69	0	0	90		72	1					7	1123
4:30-5:30	0	62	385		1	0		477	60	0	0	101		74	2					7	1159
4:45-5:45	0	55	422		1	0		480	57	0	0	97		64	3					10	1175
5:00-6:00	0	50	403		0	0		471	65	0	0	98		66	3					9	1153
PM Peak Hour	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
	U-Turn	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
4:45-5:45	**0**	**55**	**422**		**1**	**0**		**480**	**57**	**0**	**0**	**97**		**64**	**3**					**10**	**1175**

Peak Hour
Turning Movement Count

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Intersection:	Bay Ridge Avenue at Forest Hills Avenue
Weather:	Clear
Count by:	DSS
Count Day/Date:	February 14th 2019
County:	Anne Arundel

Weekday Morning Peak Hour (7 am - 9 am)

	Bricin Street Northbound					Tyler Heights Elementary School Southbound					Janwall Street Eastbound					Janwall Street Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
7:00-7:15	0	4	0	3	3	0	0	0	0	3	0	0	2	1	0	0	4	4	0	3	18
7:15-7:30	0	4	3	6	0	0	1	0	0	0	0	3	2	2	0	0	6	3	1	0	31
7:30-7:45	0	4	4	5	0	0	0	0	1	0	0	14	0	3	0	0	6	9	2	0	48
7:45-8:00	0	8	0	3	0	0	0	0	2	1	0	5	1	4	0	0	8	0	2	0	33
8:00-8:15	0	4	1	7	2	0	0	0	0	0	0	3	1	2	0	0	8	5	0	0	31
8:15-8:30	0	2	5	3	0	0	0	0	1	0	0	5	2	3	0	0	5	5	4	1	35
8:30-8:45	0	0	4	1	7	0	0	0	0	0	0	3	0	3	0	0	6	4	4	47	25
8:45-9:00	0	1	25	2	23	0	0	0	0	0	0	12	11	13	0	0	3	2	21	55	90
Hourly Totals																					
7:00-8:00	0	20	7	17	3	0	1	0	3	4	0	22	5	10	0	0	24	16	5	3	130
7:15-8:15	0	20	8	21	2	0	1	0	3	1	0	25	4	11	0	0	28	17	5	0	143
7:30-8:30	0	18	10	18	2	0	0	0	4	1	0	27	4	12	0	0	27	19	8	1	147
7:45-8:45	0	14	10	14	9	0	0	0	3	1	0	16	4	12	0	0	27	14	10	48	124
8:00-9:00	0	7	35	13	32	0	0	0	1	0	0	23	14	21	0	0	22	16	29	103	181
AM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
8:00-9:00	**0**	**7**	**35**	**13**	**32**	**0**	**0**	**0**	**1**	**0**	**0**	**23**	**14**	**21**	**0**	**0**	**22**	**16**	**29**	**103**	**181**

Weekday Evening Peak Hour (4 pm - 6 pm)

	Bricin Street Northbound					Tyler Heights Elementary School Southbound					Janwall Street Eastbound					Janwall Street Westbound					
Time:	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	U-Turn	Left	Thru	Right	Peds	Total
4:00-4:15	0	2	0	7	0	0	1	1	0	0	0	1	3	14	0	0	4	5	0	0	38
4:15-4:30	0	3	1	5	2	0	0	0	1	0	0	2	7	3	0	0	2	7	1	2	32
4:30-4:45	0	2	2	6	0	0	0	1	0	0	0	3	10	4	1	0	7	4	3	12	42
4:45-5:00	0	1	2	5	1	0	0	1	0	0	0	1	3	0	2	0	7	3	2	2	25
5:00-5:15	0	1	6	2	0	0	0	0	0	0	0	4	4	6	0	0	3	1	6	5	33
5:15-5:30	0	6	1	4	0	0	0	0	0	0	0	1	3	5	0	0	11	3	2	7	36
5:30-5:45	0	4	2	4	1	0	0	2	0	1	0	0	2	3	1	0	5	1	1	2	24
5:45-6:00	0	4	0	7	0	0	0	0	0	1	0	0	4	5	0	0	8	5	0	0	33
Hourly Totals																					
4:00-5:00	0	8	5	23	3	0	1	3	1	0	0	7	23	21	3	0	20	19	6	16	137
4:15-5:15	0	7	11	18	3	0	0	2	1	0	0	10	24	13	3	0	19	15	12	21	132
4:30-5:30	0	10	11	17	1	0	0	2	0	0	0	9	20	15	3	0	28	11	13	26	136
4:45-5:45	0	12	11	15	2	0	0	3	0	1	0	6	12	14	3	0	26	8	11	16	118
5:00-6:00	0	15	9	17	1	0	0	2	0	2	0	5	13	19	1	0	27	10	9	14	126
PM	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					
Peak Hour	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**U-Turn**	**Left**	**Thru**	**Right**	**Peds**	**Total**
4:00-5:00	**0**	**8**	**5**	**23**	**3**	**0**	**1**	**3**	**1**	**0**	**0**	**7**	**23**	**21**	**3**	**0**	**20**	**19**	**6**	**16**	**137**

Peak Hour
Turning Movement Count

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
www.lenharttraffic.com

Intersection:	Janwall Street at Bricin Street
Weather:	Clear
Count by:	Count CAM ZW
Count Day/Date:	February 14th 2019
County:	Anne Arundel

Appendix C

Existing Conditions Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	89	1150	1589	5	1	147
Future Volume (Veh/h)	89	1150	1589	5	1	147
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	97	1250	1727	5	1	160
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1732				2548	866
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1732				2548	866
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	73				94	46
cM capacity (veh/h)	360				16	297

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	97	625	625	1151	581	161
Volume Left	97	0	0	0	0	1
Volume Right	0	0	0	0	5	160
cSH	360	1700	1700	1700	1700	267
Volume to Capacity	0.27	0.37	0.37	0.68	0.34	0.60
Queue Length 95th (ft)	27	0	0	0	0	89
Control Delay (s)	18.6	0.0	0.0	0.0	0.0	36.9
Lane LOS	C					E
Approach Delay (s)	1.3			0.0		36.9
Approach LOS						E

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1144	0	0	1576	5	2	1	3	1	0	16
Future Volume (Veh/h)	7	1144	0	0	1576	5	2	1	3	1	0	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	1243	0	0	1713	5	2	1	3	1	0	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1718			1243			2132	2977	622	2356	2974	859
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1718			1243			2132	2977	622	2356	2974	859
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			92	93	99	94	100	94
cM capacity (veh/h)	365			556			26	14	430	17	14	300

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	8	829	414	0	1142	576	6	18
Volume Left	8	0	0	0	0	0	2	1
Volume Right	0	0	0	0	0	5	3	17
cSH	365	1700	1700	1700	1700	1700	38	157
Volume to Capacity	0.02	0.49	0.24	0.00	0.67	0.34	0.16	0.11
Queue Length 95th (ft)	2	0	0	0	0	0	13	9
Control Delay (s)	15.1	0.0	0.0	0.0	0.0	0.0	116.8	30.8
Lane LOS	C						F	D
Approach Delay (s)	0.1			0.0			116.8	30.8
Approach LOS							F	D

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1148	1581	0	0	0
Future Volume (Veh/h)	0	1148	1581	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1248	1718	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1718				2342	859
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1718				2342	859
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	365				30	300

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	624	624	1145	573	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.67	0.34	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	1108	3	5	1509	10	17	1	9	1	0	55
Future Volume (Veh/h)	37	1108	3	5	1509	10	17	1	9	1	0	55
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	1204	3	5	1640	11	18	1	10	1	0	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1024							
pX, platoon unblocked	0.77						0.77	0.77		0.77	0.77	0.77
vC, conflicting volume	1651			1207			2116	2946	604	2338	2942	826
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1244			1207			1849	2930	604	2138	2925	169
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			99			39	90	98	94	100	91
cM capacity (veh/h)	427			574			30	10	442	18	10	649

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	40	803	404	5	1093	558	29	61
Volume Left	40	0	0	5	0	0	18	1
Volume Right	0	0	3	0	0	11	10	60
cSH	427	1700	1700	574	1700	1700	44	660
Volume to Capacity	0.09	0.47	0.24	0.01	0.64	0.33	0.66	0.09
Queue Length 95th (ft)	8	0	0	1	0	0	63	8
Control Delay (s)	14.3	0.0	0.0	11.3	0.0	0.0	177.4	14.5
Lane LOS	B			B			F	B
Approach Delay (s)	0.5			0.0			177.4	14.5
Approach LOS							F	B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	684	411	106	1045	334	468	113	117	231	106	11
Future Volume (vph)	23	684	411	106	1045	334	468	113	117	231	106	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1721		3433	1836	
Flt Permitted	0.17	1.00	1.00	0.27	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	311	3539	1583	497	3539	1583	3433	1721		3433	1836	
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)	25	743	447	115	1136	363	509	123	127	251	115	12
RTOR Reduction (vph)	0	0	146	0	0	145	0	27	0	0	3	0
Lane Group Flow (vph)	25	743	301	115	1136	218	509	223	0	251	124	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		8	8		7	7	
Permitted Phases	6		6	2		2						
Actuated Green, G (s)	71.5	67.5	67.5	82.2	73.2	73.2	27.0	27.0		15.8	15.8	
Effective Green, g (s)	71.5	67.5	67.5	82.2	73.2	73.2	27.0	27.0		15.8	15.8	
Actuated g/C Ratio	0.51	0.48	0.48	0.59	0.52	0.52	0.19	0.19		0.11	0.11	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	1706	763	380	1850	827	662	331		387	207	
v/s Ratio Prot	0.00	0.21		c0.02	c0.32		c0.15	0.13		c0.07	0.07	
v/s Ratio Perm	0.06		0.19	0.16		0.14						
v/c Ratio	0.12	0.44	0.40	0.30	0.61	0.26	0.77	0.67		0.65	0.60	
Uniform Delay, d1	18.9	23.8	23.2	14.5	23.5	18.5	53.5	52.4		59.4	59.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.8	1.5	0.5	1.5	0.8	5.4	5.4		3.7	4.8	
Delay (s)	19.2	24.6	24.7	14.9	25.0	19.3	58.9	57.8		63.2	63.9	
Level of Service	B	C	C	B	C	B	E	E		E	E	
Approach Delay (s)		24.5			23.0			58.5			63.4	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	56	103	50	47	36
Future Volume (Veh/h)	28	56	103	50	47	36
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	61	112	54	51	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	166				260	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	166				260	139
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				93	96
cM capacity (veh/h)	1412				713	909

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	91	166	90
Volume Left	30	0	51
Volume Right	0	54	39
cSH	1412	1700	787
Volume to Capacity	0.02	0.10	0.11
Queue Length 95th (ft)	2	0	10
Control Delay (s)	2.6	0.0	10.2
Lane LOS	A		B
Approach Delay (s)	2.6	0.0	10.2
Approach LOS			B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	76	26	6	112	1	36	0	23	1	0	5
Future Volume (Veh/h)	1	76	26	6	112	1	36	0	23	1	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	83	28	7	122	1	39	0	25	1	0	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	123			111			240	236	97	260	250	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	123			111			240	236	97	260	250	122
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	100	97	100	100	99
cM capacity (veh/h)	1464			1479			707	661	959	672	650	929

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	112	130	64	6
Volume Left	1	7	39	1
Volume Right	28	1	25	5
cSH	1464	1479	788	873
Volume to Capacity	0.00	0.00	0.08	0.01
Queue Length 95th (ft)	0	0	7	1
Control Delay (s)	0.1	0.4	10.0	9.2
Lane LOS	A	A	A	A
Approach Delay (s)	0.1	0.4	10.0	9.2
Approach LOS			A	A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	56	39	41	443	304	81
Future Volume (Veh/h)	56	39	41	443	304	81
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	42	45	482	330	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1068		
pX, platoon unblocked						
vC, conflicting volume	946	374	418			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	946	374	418			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	94	96			
cM capacity (veh/h)	279	672	1141			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	103	45	482	418
Volume Left	61	45	0	0
Volume Right	42	0	0	88
cSH	471	1141	1700	1700
Volume to Capacity	0.22	0.04	0.28	0.25
Queue Length 95th (ft)	21	3	0	0
Control Delay (s)	17.1	8.3	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	17.1	0.7		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	14	21	22	16	29	7	35	13	0	0	1
Future Volume (Veh/h)	23	14	21	22	16	29	7	35	13	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	15	23	24	17	32	8	38	14	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	49			38			158	174	26	190	169	33
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	49			38			158	174	26	190	169	33
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			99	95	99	100	100	100
cM capacity (veh/h)	1558			1572			787	697	1049	710	701	1041

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	63	73	60	1
Volume Left	25	24	8	0
Volume Right	23	32	14	1
cSH	1558	1572	769	1041
Volume to Capacity	0.02	0.02	0.08	0.00
Queue Length 95th (ft)	1	1	6	0
Control Delay (s)	3.0	2.5	10.1	8.5
Lane LOS	A	A	B	A
Approach Delay (s)	3.0	2.5	10.1	8.5
Approach LOS			B	A

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	157	1529	1120	6	0	128
Future Volume (Veh/h)	157	1529	1120	6	0	128
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	171	1662	1217	7	0	139
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1224				2394	612
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1224				2394	612
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	70				100	68
cM capacity (veh/h)	565				20	436

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	171	831	831	811	413	139
Volume Left	171	0	0	0	0	0
Volume Right	0	0	0	0	7	139
cSH	565	1700	1700	1700	1700	436
Volume to Capacity	0.30	0.49	0.49	0.48	0.24	0.32
Queue Length 95th (ft)	32	0	0	0	0	34
Control Delay (s)	14.1	0.0	0.0	0.0	0.0	17.1
Lane LOS	B					C
Approach Delay (s)	1.3			0.0		17.1
Approach LOS						C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	1511	3	3	1108	5	5	0	3	2	0	13
Future Volume (Veh/h)	15	1511	3	3	1108	5	5	0	3	2	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	1642	3	3	1204	5	5	0	3	2	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1209			1645			2298	2890	822	2068	2890	604
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1209			1645			2298	2890	822	2068	2890	604
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			75	100	99	93	100	97
cM capacity (veh/h)	573			389			20	15	317	30	15	441

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	16	1095	550	3	803	406	8	16
Volume Left	16	0	0	3	0	0	5	2
Volume Right	0	0	3	0	0	5	3	14
cSH	573	1700	1700	389	1700	1700	30	163
Volume to Capacity	0.03	0.64	0.32	0.01	0.47	0.24	0.26	0.10
Queue Length 95th (ft)	2	0	0	1	0	0	21	8
Control Delay (s)	11.5	0.0	0.0	14.3	0.0	0.0	161.6	29.4
Lane LOS	B			B			F	D
Approach Delay (s)	0.1			0.0			161.6	29.4
Approach LOS							F	D

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1516	1116	0	0	0
Future Volume (Veh/h)	0	1516	1116	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1648	1213	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1213				2037	606
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1213				2037	606
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	571				49	440

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	824	824	809	404	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.48	0.48	0.48	0.24	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	1440	15	3	1059	16	9	0	4	2	0	48
Future Volume (Veh/h)	61	1440	15	3	1059	16	9	0	4	2	0	48
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	1565	16	3	1151	17	10	0	4	2	0	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1024							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	1168			1581			2286	2879	790	2080	2878	584
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	855			1581			2165	2858	790	1923	2858	172
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			48	100	99	94	100	93
cM capacity (veh/h)	667			412			19	13	333	31	13	719

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	66	1043	538	3	767	401	14	54
Volume Left	66	0	0	3	0	0	10	2
Volume Right	0	0	16	0	0	17	4	52
cSH	667	1700	1700	412	1700	1700	27	747
Volume to Capacity	0.10	0.61	0.32	0.01	0.45	0.24	0.52	0.07
Queue Length 95th (ft)	8	0	0	1	0	0	41	6
Control Delay (s)	11.0	0.0	0.0	13.8	0.0	0.0	232.6	14.7
Lane LOS	B			B			F	B
Approach Delay (s)	0.4			0.0			232.6	14.7
Approach LOS							F	B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	1025	390	123	752	340	313	117	128	371	141	22
Future Volume (vph)	20	1025	390	123	752	340	313	117	128	371	141	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1717		3433	1825	
Flt Permitted	0.28	1.00	1.00	0.13	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	519	3539	1583	248	3539	1583	3433	1717		3433	1825	
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)	22	1114	424	134	817	370	340	127	139	403	153	24
RTOR Reduction (vph)	0	0	102	0	0	182	0	28	0	0	4	0
Lane Group Flow (vph)	22	1114	322	134	817	188	340	238	0	403	173	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		8	8		7	7	
Permitted Phases	6		6	2		2						
Actuated Green, G (s)	71.2	67.2	67.2	79.0	71.1	71.1	23.0	23.0		21.9	21.9	
Effective Green, g (s)	71.2	67.2	67.2	79.0	71.1	71.1	23.0	23.0		21.9	21.9	
Actuated g/C Ratio	0.51	0.48	0.48	0.56	0.51	0.51	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	299	1698	759	225	1797	803	563	282		537	285	
v/s Ratio Prot	0.00	c0.31		c0.03	0.23		0.10	c0.14		c0.12	0.09	
v/s Ratio Perm	0.04		0.20	0.30		0.12						
v/c Ratio	0.07	0.66	0.42	0.60	0.45	0.23	0.60	0.84		0.75	0.61	
Uniform Delay, d1	17.7	27.6	23.8	20.1	22.0	19.2	54.3	56.7		56.4	55.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.0	1.7	4.2	0.8	0.7	1.8	19.8		5.8	3.6	
Delay (s)	17.8	29.6	25.5	24.3	22.9	19.9	56.1	76.6		62.3	58.7	
Level of Service	B	C	C	C	C	B	E	E		E	E	
Approach Delay (s)		28.3			22.2			65.1			61.2	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	140	104	43	52	20
Future Volume (Veh/h)	25	140	104	43	52	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	152	113	47	57	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	160				342	136
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	160				342	136
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				91	98
cM capacity (veh/h)	1419				641	912

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	179	160	79
Volume Left	27	0	57
Volume Right	0	47	22
cSH	1419	1700	699
Volume to Capacity	0.02	0.09	0.11
Queue Length 95th (ft)	1	0	10
Control Delay (s)	1.3	0.0	10.8
Lane LOS	A		B
Approach Delay (s)	1.3	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	162	24	20	127	1	17	0	10	2	0	3
Future Volume (Veh/h)	6	162	24	20	127	1	17	0	10	2	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	176	26	22	138	1	18	0	11	2	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	139			202			388	386	189	396	398	138
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	139			202			388	386	189	396	398	138
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			97	100	99	100	100	100
cM capacity (veh/h)	1445			1370			559	537	853	547	528	910

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	209	161	29	5
Volume Left	7	22	18	2
Volume Right	26	1	11	3
cSH	1445	1370	643	719
Volume to Capacity	0.00	0.02	0.05	0.01
Queue Length 95th (ft)	0	1	4	1
Control Delay (s)	0.3	1.2	10.9	10.0
Lane LOS	A	A	B	B
Approach Delay (s)	0.3	1.2	10.9	10.0
Approach LOS			B	B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	97	64	55	422	480	57
Future Volume (Veh/h)	97	64	55	422	480	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	105	70	60	459	522	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1068		
pX, platoon unblocked						
vC, conflicting volume	1132	553	584			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1132	553	584			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	87	94			
cM capacity (veh/h)	211	533	991			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	175	60	459	584
Volume Left	105	60	0	0
Volume Right	70	0	0	62
cSH	352	991	1700	1700
Volume to Capacity	0.50	0.06	0.27	0.34
Queue Length 95th (ft)	66	5	0	0
Control Delay (s)	27.8	8.9	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	27.8	1.0		0.0
Approach LOS	D			

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

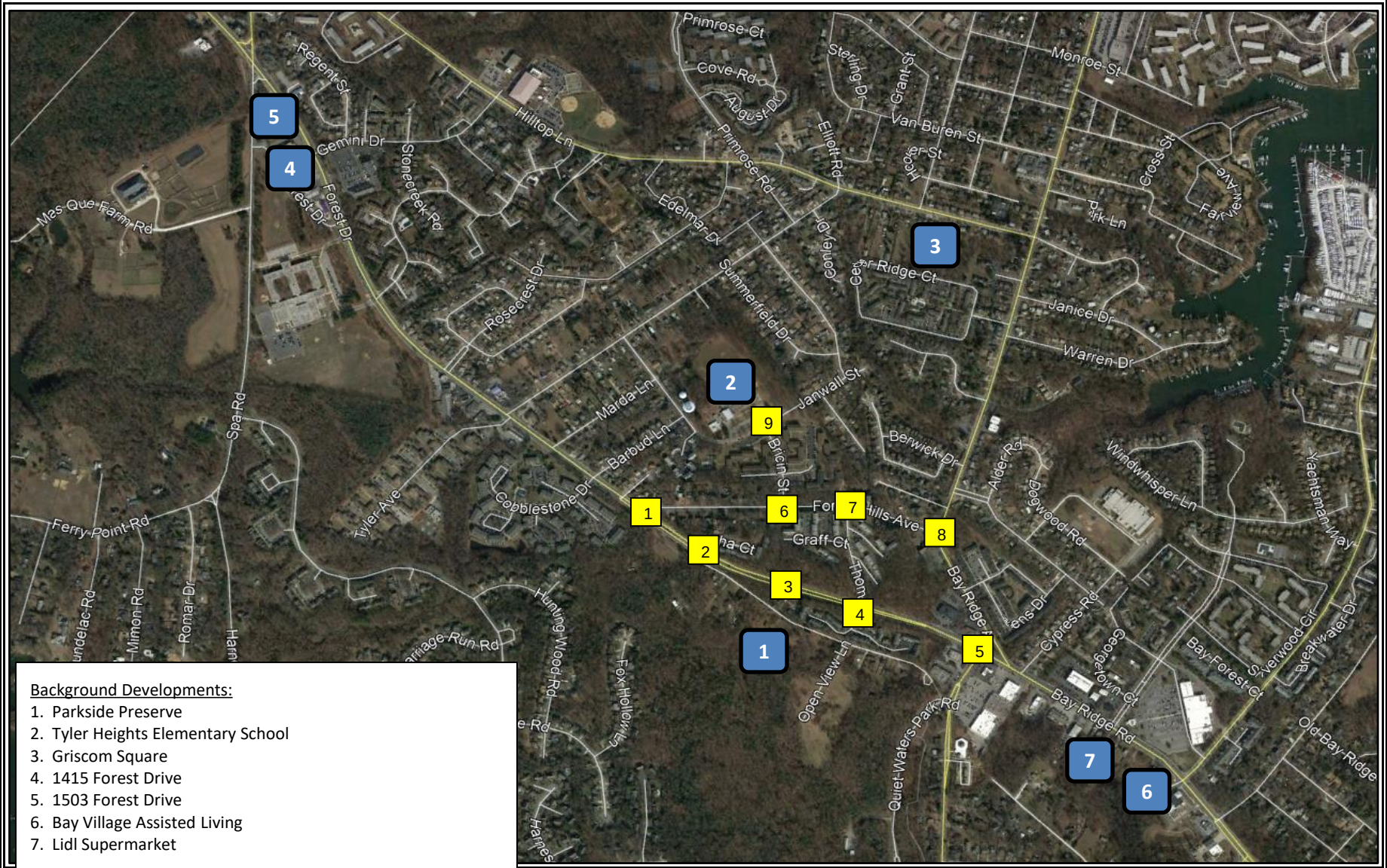
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	23	21	20	19	6	8	5	23	1	3	1
Future Volume (Veh/h)	7	23	21	20	19	6	8	5	23	1	3	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	25	23	22	21	7	9	5	25	1	3	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	28			48			124	124	36	148	132	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			48			124	124	36	148	132	24
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	99	98	100	100	100
cM capacity (veh/h)	1585			1559			835	751	1036	784	744	1052

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	56	50	39	5
Volume Left	8	22	9	1
Volume Right	23	7	25	1
cSH	1585	1559	938	799
Volume to Capacity	0.01	0.01	0.04	0.01
Queue Length 95th (ft)	0	1	3	0
Control Delay (s)	1.1	3.3	9.0	9.5
Lane LOS	A	A	A	A
Approach Delay (s)	1.1	3.3	9.0	9.5
Approach LOS			A	A

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D

Background Development Information



Background Developments:

1. Parkside Preserve
2. Tyler Heights Elementary School
3. Griscom Square
4. 1415 Forest Drive
5. 1503 Forest Drive
6. Bay Village Assisted Living
7. Lidl Supermarket

Traffic Impact Analysis

LENHART TRAFFIC CONSULTING, INC.
645 BALTIMORE ANNAPOLIS BLVD, SUITE 214
SEVERNA PARK, MD 21146
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Site Location Map

Exhibit D1

ITE Formulas Used for Background Developments

Single-Family Detached (ITE-210, Units)	**Trip Distribution (In/Out)**
Morning Trips = 0.74 x Units	25/75
Evening Trips = 0.99 x Units	63/37
Multifamily Housing, Low-Rise (ITE-220, Units)	**Trip Distribution (In/Out)**
Morning Trips = 0.46 x Units	23/77
Evening Trips = 0.56 x Units	63/37
Elementary School (ITE-520, ksf)	**Trip Distribution (In/Out)**
Morning Trips = 0.67 x students	54/46
Evening Trips = 0.17 x students	48/52
Shopping Center (General Urban/Suburban, ksf, ITE-820)	**Trip Distribution (In/Out)**
Morning Trips = 0.94 x ksf	62/38
Evening Trips = 3.81 x ksf	48/52
General Office (ksf, ITE-710)	**Trip Distribution (In/Out)**
Morning Trips = 1.16 x ksf	86/14
Evening Trips = 1.15 x ksf	16/84
Assisted Living (ITE-254, Beds)	**Trip Distribution (In/Out)**
Morning Trips = 0.19 x Beds	63/37
Evening Trips = 0.26 x Beds	38/62
Supermarket (ksf, ITE-850)	**Trip Distribution (In/Out)**
Morning Trips = 3.82 x ksf	60/40
Evening Trips = 9.24 x ksf	51/49

Traffic Impact Analysis	ITE Formulas Used for Background Developments	**Exhibit D2**
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Background Development	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
1. Parkside Preserve						
44 Single Family Detached Units	8	25	33	28	16	44
86 Townhouse Units	9	31	40	30	18	48
Total	**17**	**56**	**73**	**58**	**34**	**92**
2. Tyler Heights Elementary School						
70 student increase in capactiy	25	22	47	6	6	12
Total	**25**	**22**	**47**	**6**	**6**	**12**
3. Griscom Square						
12 Townhouse Units	1	5	6	4	3	7
Total	**1**	**5**	**6**	**4**	**3**	**7**
4. 1415 Forest Drive						
4,938 square feet of office	5	1	6	1	5	6
Total	**5**	**1**	**6**	**1**	**5**	**6**
5. 1503 Forest Drive						
18,900 square feet of office	19	3	22	4	18	22
2,780 square feet of retail	2	1	3	5	6	11
Total	**21**	**4**	**25**	**9**	**24**	**33**
6. Bay Village Assisted Living Facility						
88 Beds	11	6	17	9	14	23
Total	**11**	**6**	**17**	**9**	**14**	**23**
7. Lidl Supermarket						
36,710 square feet of supermarket	84	56	140	173	166	339
Total	**84**	**56**	**140**	**173**	**166**	**339**
Total Trips for All Developments	**164**	**150**	**314**	**260**	**252**	**512**

Traffic Impact Analysis

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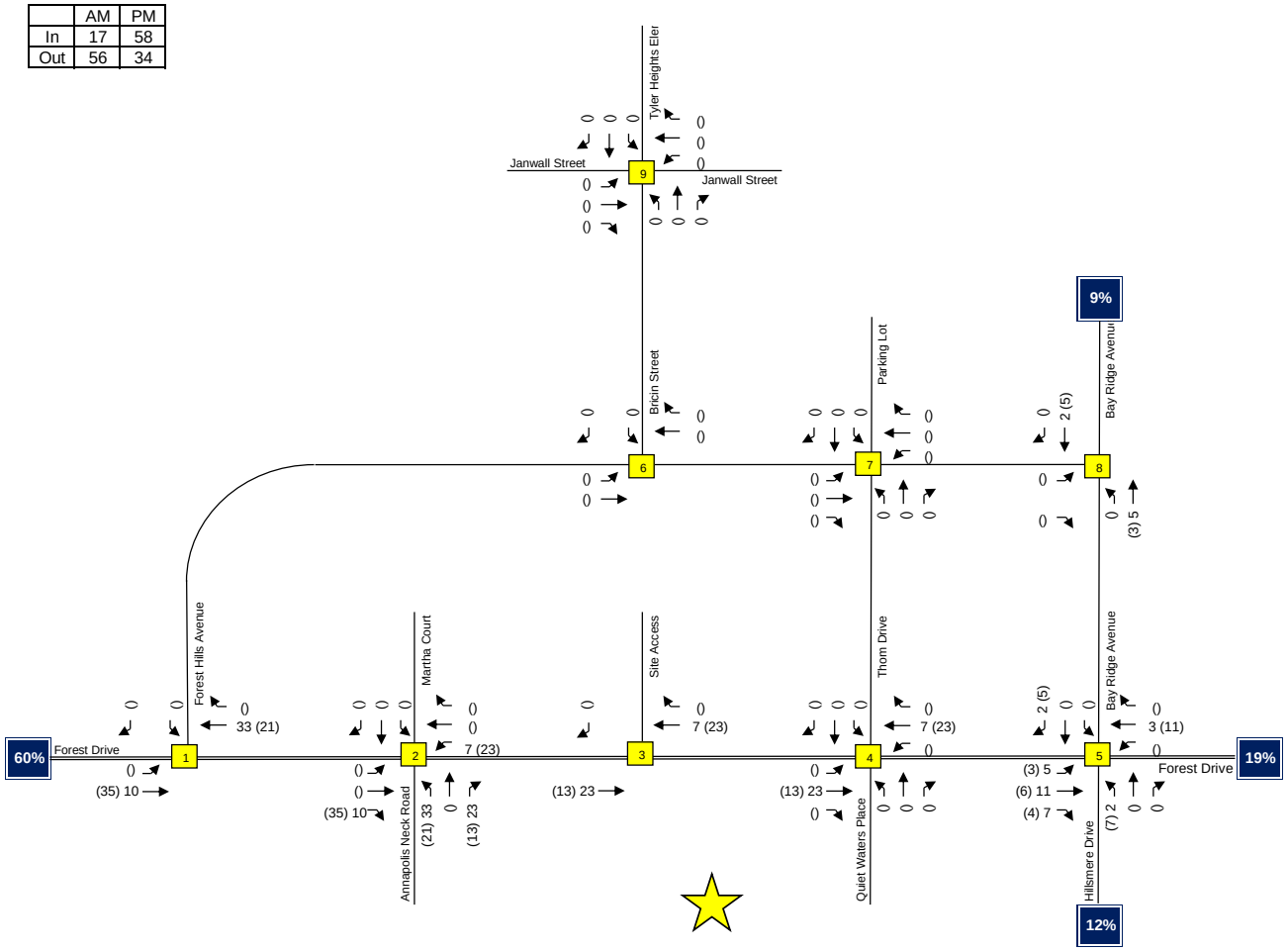
Trip Generation for
Background Developments

Exhibit D3

	AM	PM
In	17	58
Out	56	34



*Note that Trip Assignment was taken directly from the Lidl Annapolis TIA

Traffic Impact Analysis

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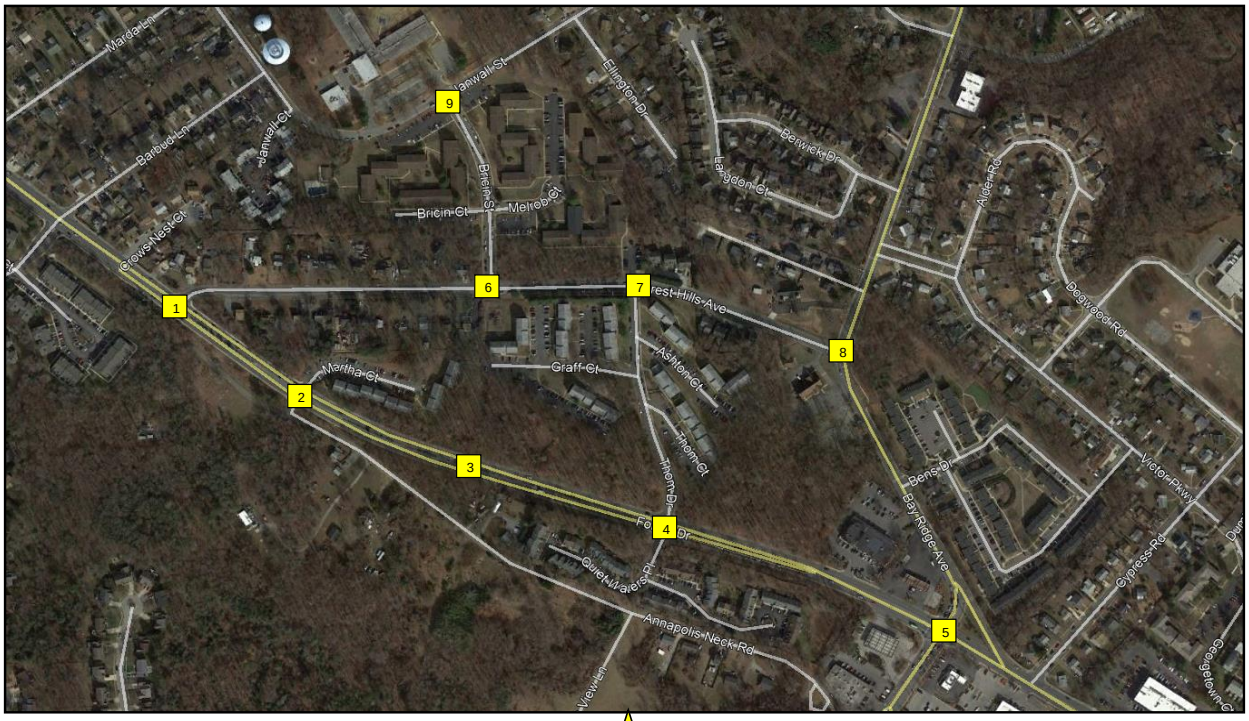
Trip Assignment for
Background Development 1

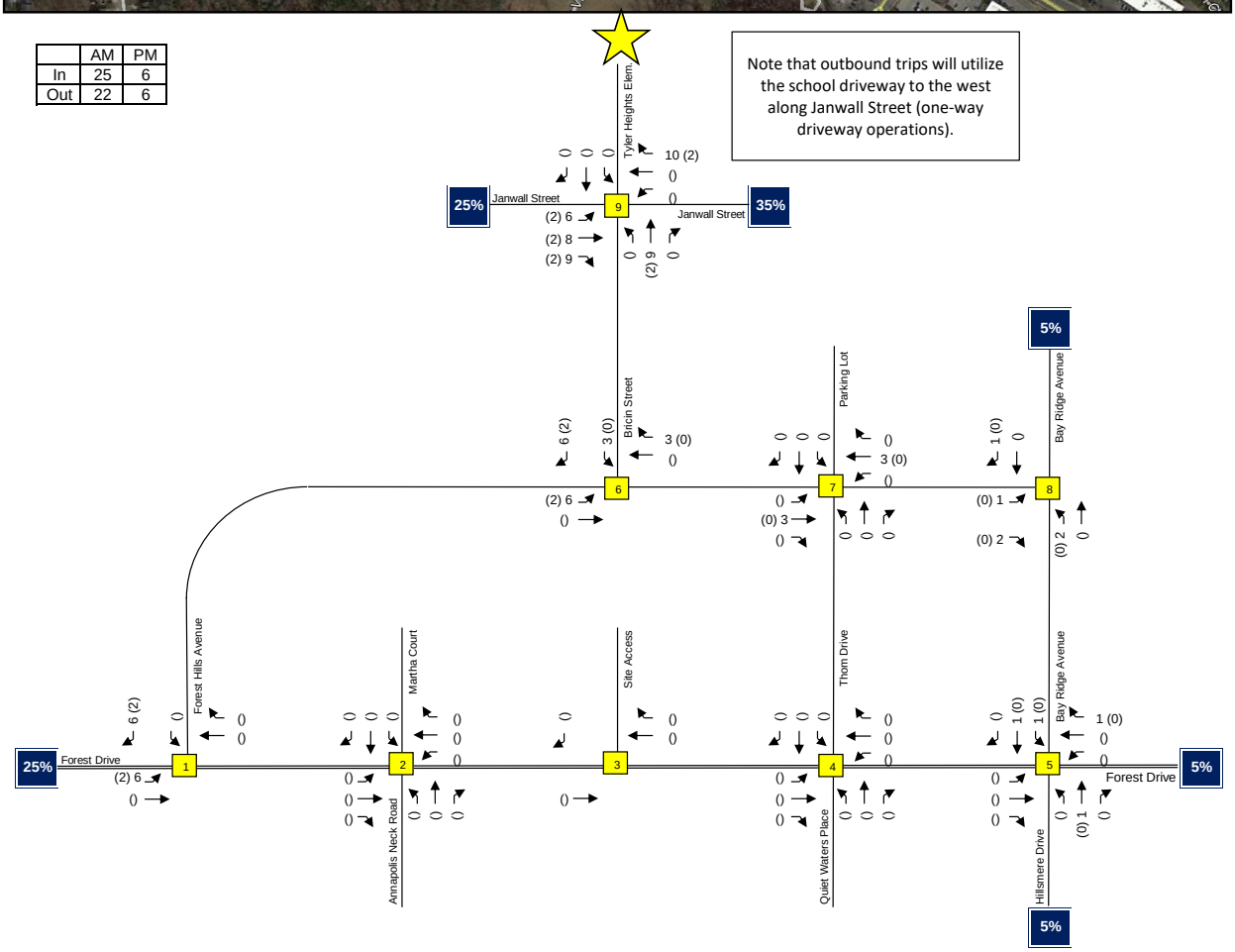
Key: xx = AM Peak Vol's (xx) = PM Peak Vol's

Exhibit D4



	AM	PM
In	25	6
Out	22	6

Note that outbound trips will utilize the school driveway to the west along Janwall Street (one-way driveway operations).



Traffic Impact Analysis

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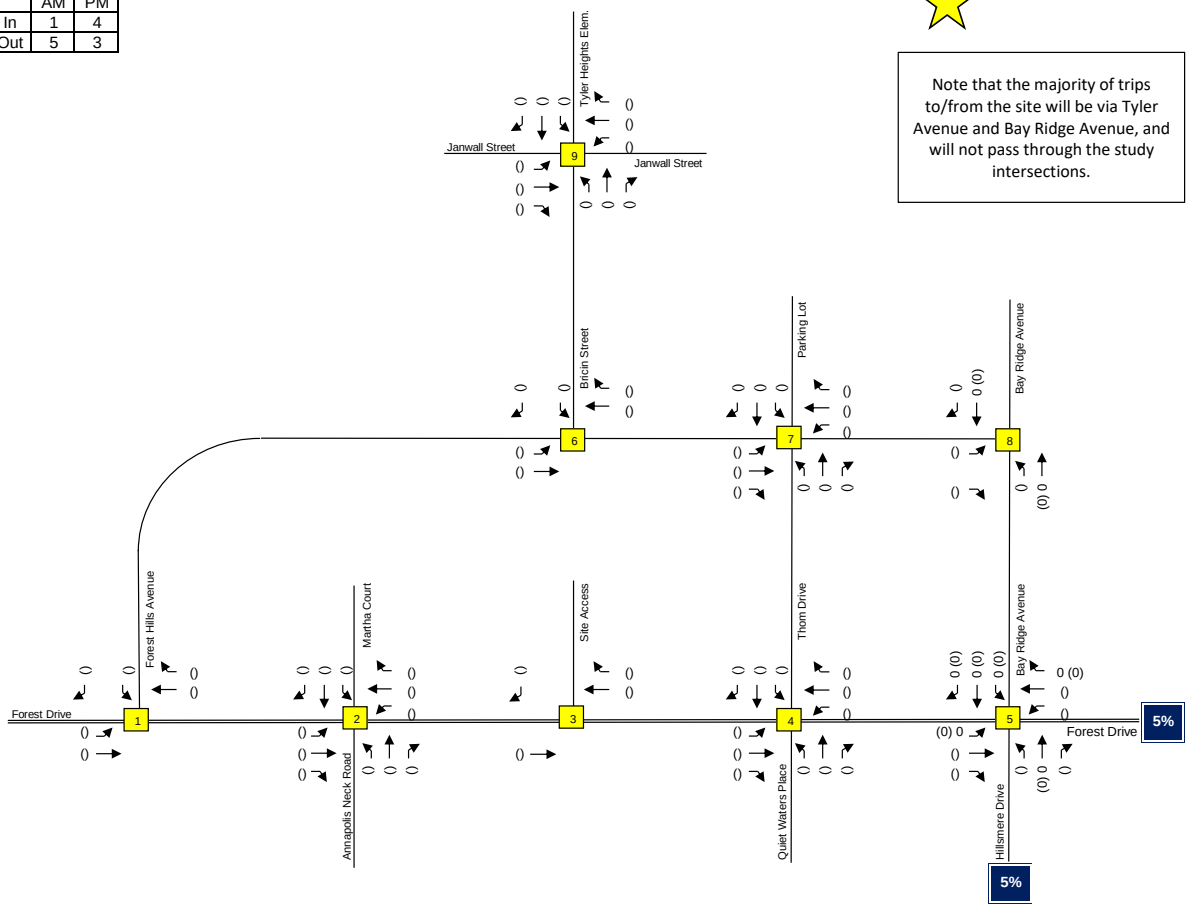
Trip Assignment for
Background Development 2

Key: xx = AM Peak Vol's (xx) = PM Peak Vol's

Exhibit D5

	AM	PM
In	1	4
Out	5	3

Note that the majority of trips to/from the site will be via Tyler Avenue and Bay Ridge Avenue, and will not pass through the study intersections.



Traffic Impact Analysis

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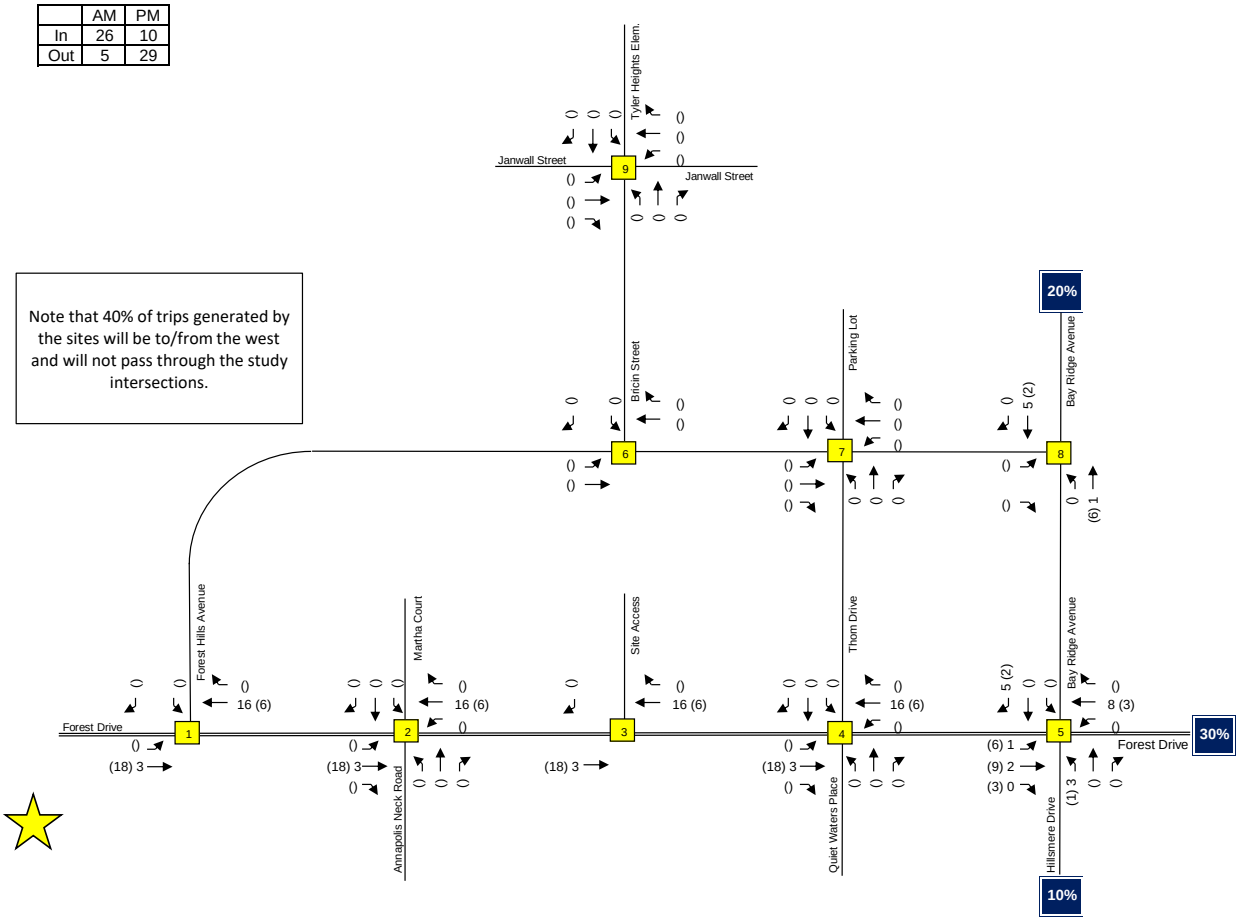
Trip Assignment for
Background Development 3

Key: xx = AM Peak Vol's (xx) = PM Peak Vol's

Exhibit D6

	AM	PM
In	26	10
Out	5	29

Note that 40% of trips generated by the sites will be to/from the west and will not pass through the study intersections.



Traffic Impact Analysis

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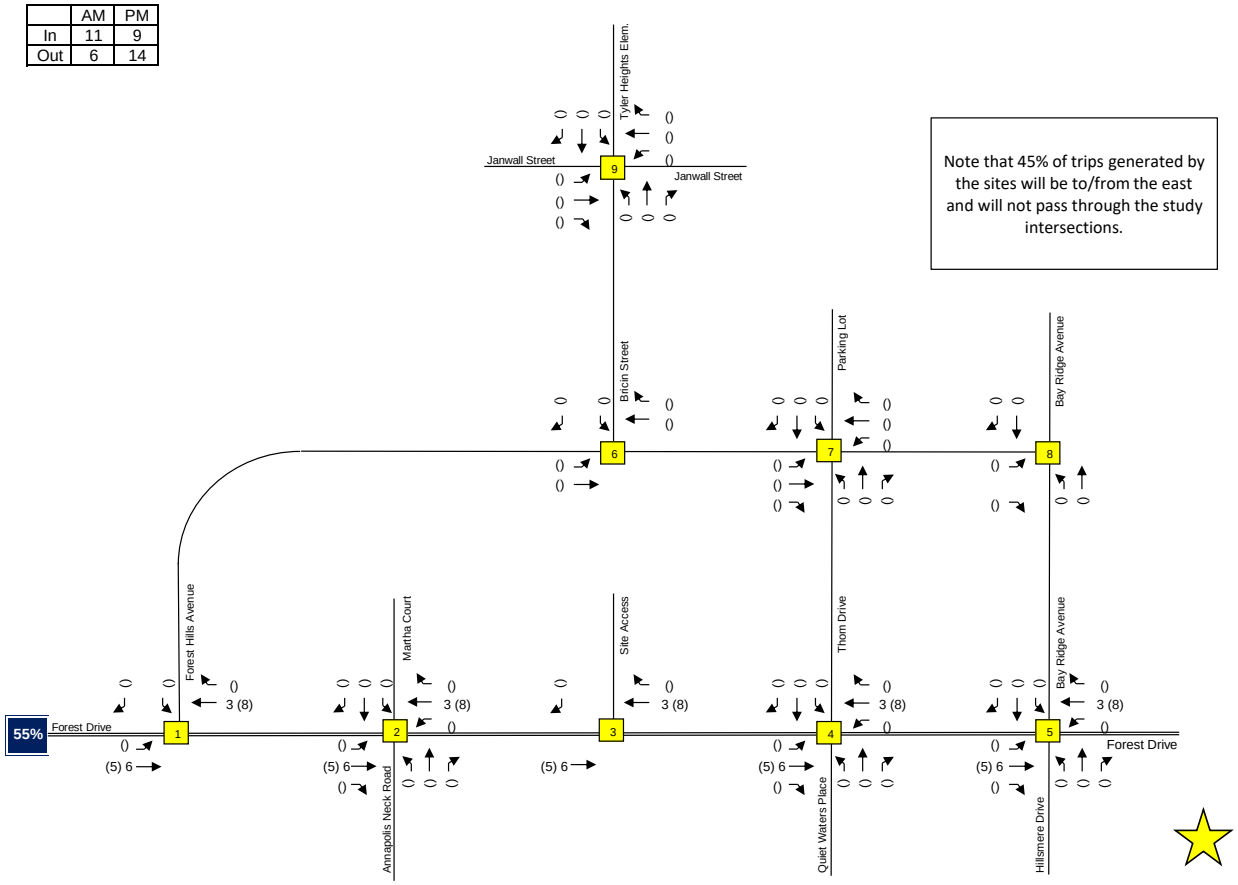
Trip Assignment for
Background Developments 4 & 5

Key: xx = AM Peak Vol's (xx) = PM Peak Vol's

Exhibit D7

	AM	PM
In	11	9
Out	6	14

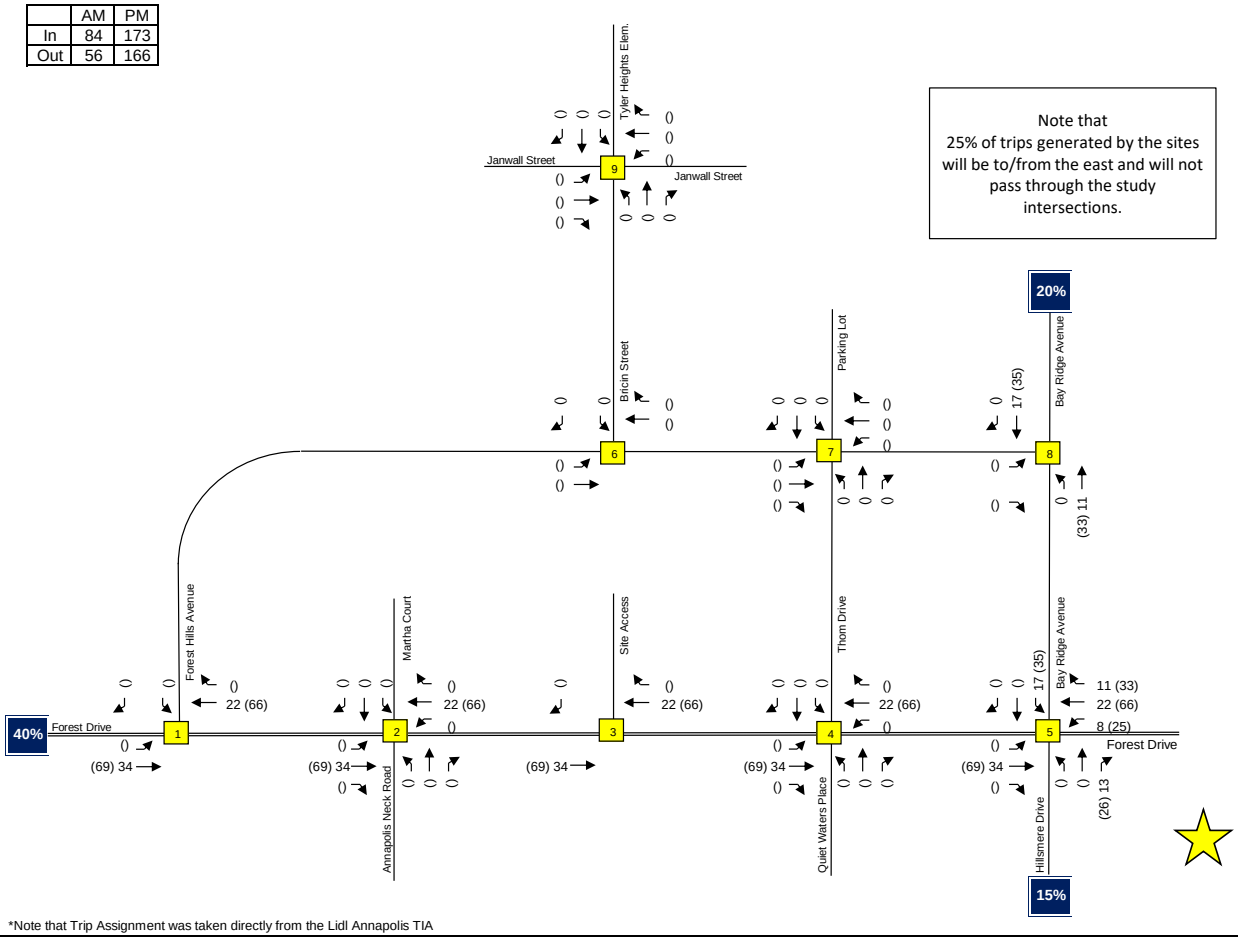


Note that 45% of trips generated by the sites will be to/from the east and will not pass through the study intersections.

*Note that Trip Assignment was taken directly from the Lidl Annapolis TIA

Traffic Impact Analysis	Trip Assignment for Background Development 6	**Exhibit D8**
LENHART TRAFFIC CONSULTING, INC. 645 BALTIMORE ANNAPOLIS BLVD, SUITE 214 SEVERNA PARK, MD 21146 www.lenharttraffic.com	Key: xx = AM Peak Vol's (xx) = PM Peak Vol's	

	AM	PM
In	84	173
Out	56	166



Note that
25% of trips generated by the sites will be to/from the east and will not pass through the study intersections.

*Note that Trip Assignment was taken directly from the Lidl Annapolis TIA

Traffic Impact Analysis

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Trip Assignment for
Background Development 7

Key: xx = AM Peak Vol's (xx) = PM Peak Vol's

Exhibit D9

Appendix E

Background Conditions Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	97	1226	1695	5	1	156
Future Volume (Veh/h)	97	1226	1695	5	1	156
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	105	1333	1842	5	1	170
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			545			
pX, platoon unblocked	0.80				0.80	0.80
vC, conflicting volume	1847				2721	924
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1558				2651	403
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	69				90	64
cM capacity (veh/h)	336				10	477

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	105	666	666	1228	619	171
Volume Left	105	0	0	0	0	1
Volume Right	0	0	0	0	5	170
cSH	336	1700	1700	1700	1700	377
Volume to Capacity	0.31	0.39	0.39	0.72	0.36	0.45
Queue Length 95th (ft)	33	0	0	0	0	57
Control Delay (s)	20.5	0.0	0.0	0.0	0.0	22.3
Lane LOS	C					C
Approach Delay (s)	1.5			0.0		22.3
Approach LOS						C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1210	10	7	1649	5	35	1	26	1	0	16
Future Volume (vph)	7	1210	10	7	1649	5	35	1	26	1	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.94			0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.97			1.00	
Satd. Flow (prot)	1770	3535		1770	3538			1709			1621	
Flt Permitted	0.10	1.00		0.20	1.00			0.81			0.99	
Satd. Flow (perm)	184	3535		370	3538			1431			1609	
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)	8	1315	11	8	1792	5	38	1	28	1	0	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	20	0	0	17	0
Lane Group Flow (vph)	8	1326	0	8	1797	0	0	47	0	0	1	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	116.5	116.5		116.4	116.4			8.9			8.9	
Effective Green, g (s)	116.5	116.5		116.4	116.4			8.9			8.9	
Actuated g/C Ratio	0.83	0.83		0.83	0.83			0.06			0.06	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	166	2941		318	2941			90			102	
v/s Ratio Prot	0.00	c0.38		0.00	c0.51							
v/s Ratio Perm	0.04			0.02				c0.03			0.00	
v/c Ratio	0.05	0.45		0.03	0.61			0.53			0.01	
Uniform Delay, d1	4.5	3.2		2.9	4.0			63.5			61.4	
Progression Factor	1.00	1.00		0.28	0.19			1.00			1.00	
Incremental Delay, d2	0.1	0.5		0.0	0.7			5.5			0.0	
Delay (s)	4.6	3.7		0.8	1.5			69.0			61.5	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		3.7			1.5			69.0			61.5	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1237	1661	0	0	0
Future Volume (Veh/h)	0	1237	1661	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1345	1805	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		719				
pX, platoon unblocked					0.89	
vC, conflicting volume	1805				2478	902
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1805				2414	902
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	337				24	280

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	672	672	1203	602	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.40	0.40	0.71	0.35	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	1196	3	5	1587	10	17	1	9	1	0	55
Future Volume (Veh/h)	37	1196	3	5	1587	10	17	1	9	1	0	55
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	1300	3	5	1725	11	18	1	10	1	0	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1024							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	1736			1303			2254	3128	652	2471	3124	868
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1293			1303			1993	3172	652	2286	3167	121
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			19	85	98	92	100	91
cM capacity (veh/h)	394			527			22	7	411	13	7	672

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	40	867	436	5	1150	586	29	61
Volume Left	40	0	0	5	0	0	18	1
Volume Right	0	0	3	0	0	11	10	60
cSH	394	1700	1700	527	1700	1700	31	683
Volume to Capacity	0.10	0.51	0.26	0.01	0.68	0.34	0.92	0.09
Queue Length 95th (ft)	8	0	0	1	0	0	79	7
Control Delay (s)	15.2	0.0	0.0	11.9	0.0	0.0	320.3	15.9
Lane LOS	C			B			F	C
Approach Delay (s)	0.5			0.0			320.3	15.9
Approach LOS							F	C

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	751	426	116	1102	353	482	116	132	254	109	18
Future Volume (vph)	29	751	426	116	1102	353	482	116	132	254	109	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1714		3433	1822	
Flt Permitted	0.14	1.00	1.00	0.23	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	262	3539	1583	427	3539	1583	3433	1714		3433	1822	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	816	463	126	1198	384	524	126	143	276	118	20
RTOR Reduction (vph)	0	0	141	0	0	150	0	30	0	0	4	0
Lane Group Flow (vph)	32	816	322	126	1198	234	524	239	0	276	134	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		8	8		7	7	
Permitted Phases	6		6	2		2						
Actuated Green, G (s)	69.5	65.3	65.3	80.4	71.2	71.2	27.6	27.6		17.0	17.0	
Effective Green, g (s)	69.5	65.3	65.3	80.4	71.2	71.2	27.6	27.6		17.0	17.0	
Actuated g/C Ratio	0.50	0.47	0.47	0.57	0.51	0.51	0.20	0.20		0.12	0.12	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	175	1650	738	342	1799	805	676	337		416	221	
v/s Ratio Prot	0.01	0.23		c0.03	c0.34		c0.15	0.14		c0.08	0.07	
v/s Ratio Perm	0.09		0.20	0.18		0.15						
v/c Ratio	0.18	0.49	0.44	0.37	0.67	0.29	0.78	0.71		0.66	0.60	
Uniform Delay, d1	20.7	25.9	25.0	16.1	25.6	19.8	53.3	52.5		58.8	58.3	
Progression Factor	0.97	0.90	0.83	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.0	1.7	0.7	2.0	0.9	5.6	6.9		4.0	4.6	
Delay (s)	20.6	24.4	22.5	16.8	27.5	20.8	58.8	59.3		62.7	62.9	
Level of Service	C	C	C	B	C	C	E	E		E	E	
Approach Delay (s)		23.6			25.2			59.0			62.8	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	57	105	53	50	42
Future Volume (Veh/h)	34	57	105	53	50	42
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	62	114	58	54	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	172				279	143
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172				279	143
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				92	95
cM capacity (veh/h)	1405				692	905

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	99	172	100
Volume Left	37	0	54
Volume Right	0	58	46
cSH	1405	1700	776
Volume to Capacity	0.03	0.10	0.13
Queue Length 95th (ft)	2	0	11
Control Delay (s)	3.0	0.0	10.3
Lane LOS	A		B
Approach Delay (s)	3.0	0.0	10.3
Approach LOS			B

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	81	26	6	117	1	36	0	23	1	0	5
Future Volume (Veh/h)	1	81	26	6	117	1	36	0	23	1	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	88	28	7	127	1	39	0	25	1	0	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	128			116			250	246	102	270	260	128
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	128			116			250	246	102	270	260	128
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	100	97	100	100	99
cM capacity (veh/h)	1458			1473			696	653	953	661	641	923

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	117	135	64	6
Volume Left	1	7	39	1
Volume Right	28	1	25	5
cSH	1458	1473	778	866
Volume to Capacity	0.00	0.00	0.08	0.01
Queue Length 95th (ft)	0	0	7	1
Control Delay (s)	0.1	0.4	10.0	9.2
Lane LOS	A	A	B	A
Approach Delay (s)	0.1	0.4	10.0	9.2
Approach LOS			B	A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	41	43	469	334	84
Future Volume (Veh/h)	58	41	43	469	334	84
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	63	45	47	510	363	91
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1068		
pX, platoon unblocked						
vC, conflicting volume	1012	408	454			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012	408	454			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	75	93	96			
cM capacity (veh/h)	254	643	1107			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	108	47	510	454
Volume Left	63	47	0	0
Volume Right	45	0	0	91
cSH	435	1107	1700	1700
Volume to Capacity	0.25	0.04	0.30	0.27
Queue Length 95th (ft)	24	3	0	0
Control Delay (s)	18.5	8.4	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	18.5	0.7		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	22	30	22	16	39	7	44	13	0	0	1
Future Volume (Veh/h)	29	22	30	22	16	39	7	44	13	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	24	33	24	17	42	8	48	14	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	59			57			192	212	40	228	207	38
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	59			57			192	212	40	228	207	38
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			99	93	99	100	100	100
cM capacity (veh/h)	1545			1547			747	661	1031	659	665	1034

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	89	83	70	1
Volume Left	32	24	8	0
Volume Right	33	42	14	1
cSH	1545	1547	722	1034
Volume to Capacity	0.02	0.02	0.10	0.00
Queue Length 95th (ft)	2	1	8	0
Control Delay (s)	2.8	2.2	10.5	8.5
Lane LOS	A	A	B	A
Approach Delay (s)	2.8	2.2	10.5	8.5
Approach LOS			B	A

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	162	1687	1244	6	0	133
Future Volume (Veh/h)	162	1687	1244	6	0	133
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	176	1834	1352	7	0	145
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			545			
pX, platoon unblocked	0.91				0.91	0.91
vC, conflicting volume	1359				2624	680
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1190				2586	441
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	67				100	72
cM capacity (veh/h)	528				12	511

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	176	917	917	901	458	145
Volume Left	176	0	0	0	0	0
Volume Right	0	0	0	0	7	145
cSH	528	1700	1700	1700	1700	511
Volume to Capacity	0.33	0.54	0.54	0.53	0.27	0.28
Queue Length 95th (ft)	36	0	0	0	0	29
Control Delay (s)	15.2	0.0	0.0	0.0	0.0	14.8
Lane LOS	C					B
Approach Delay (s)	1.3			0.0		14.8
Approach LOS						B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1633	38	26	1210	5	26	0	16	2	0	13
Future Volume (vph)	15	1633	38	26	1210	5	26	0	16	2	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	3527		1770	3537			1714			1633	
Flt Permitted	0.18	1.00		0.11	1.00			0.80			0.97	
Satd. Flow (perm)	344	3527		206	3537			1416			1586	
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)	16	1775	41	28	1315	5	28	0	17	2	0	14
RTOR Reduction (vph)	0	1	0	0	0	0	0	44	0	0	15	0
Lane Group Flow (vph)	16	1815	0	28	1320	0	0	1	0	0	1	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	117.7	117.7		119.6	119.6			4.5			4.5	
Effective Green, g (s)	117.7	117.7		119.6	119.6			4.5			4.5	
Actuated g/C Ratio	0.84	0.84		0.85	0.85			0.03			0.03	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	313	2965		224	3021			45			50	
v/s Ratio Prot	0.00	c0.51		0.00	c0.37							
v/s Ratio Perm	0.04			0.10				c0.00			0.00	
v/c Ratio	0.05	0.61		0.12	0.44			0.03			0.01	
Uniform Delay, d1	2.4	3.7		4.8	2.4			65.6			65.6	
Progression Factor	1.00	1.00		0.13	0.12			1.00			1.00	
Incremental Delay, d2	0.1	1.0		0.2	0.4			0.3			0.1	
Delay (s)	2.5	4.6		0.8	0.7			65.9			65.7	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		4.6			0.7			65.9			65.7	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1651	1241	0	0	0
Future Volume (Veh/h)	0	1651	1241	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1795	1349	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		719				
pX, platoon unblocked					0.80	
vC, conflicting volume	1349				2246	674
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1349				2060	674
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	506				38	397

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	898	898	899	450	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.53	0.53	0.53	0.26	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	1574	15	3	1183	16	9	0	4	2	0	48
Future Volume (Veh/h)	61	1574	15	3	1183	16	9	0	4	2	0	48
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	1711	16	3	1286	17	10	0	4	2	0	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1024							
pX, platoon unblocked	0.82						0.82	0.82		0.82	0.82	0.82
vC, conflicting volume	1303			1727			2500	3160	864	2288	3160	652
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	926			1727			2389	3196	864	2130	3195	129
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			99			19	100	99	90	100	93
cM capacity (veh/h)	601			362			12	7	298	21	7	733

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	66	1141	586	3	857	446	14	54
Volume Left	66	0	0	3	0	0	10	2
Volume Right	0	0	16	0	0	17	4	52
cSH	601	1700	1700	362	1700	1700	17	558
Volume to Capacity	0.11	0.67	0.34	0.01	0.50	0.26	0.82	0.10
Queue Length 95th (ft)	9	0	0	1	0	0	53	8
Control Delay (s)	11.7	0.0	0.0	15.0	0.0	0.0	455.9	17.2
Lane LOS	B			C			F	C
Approach Delay (s)	0.4			0.0			455.9	17.2
Approach LOS							F	C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	1135	405	150	855	380	327	119	157	413	144	29
Future Volume (vph)	29	1135	405	150	855	380	327	119	157	413	144	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1703		3433	1815	
Flt Permitted	0.23	1.00	1.00	0.09	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	423	3539	1583	159	3539	1583	3433	1703		3433	1815	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	1234	440	163	929	413	355	129	171	449	157	32
RTOR Reduction (vph)	0	0	100	0	0	210	0	34	0	0	5	0
Lane Group Flow (vph)	32	1234	340	163	929	203	355	266	0	449	184	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		8	8		7	7	
Permitted Phases	6		6	2		2						
Actuated Green, G (s)	67.9	63.8	63.8	77.7	68.7	68.7	24.2	24.2		23.0	23.0	
Effective Green, g (s)	67.9	63.8	63.8	77.7	68.7	68.7	24.2	24.2		23.0	23.0	
Actuated g/C Ratio	0.49	0.46	0.46	0.56	0.49	0.49	0.17	0.17		0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	244	1612	721	191	1736	776	593	294		563	298	
v/s Ratio Prot	0.00	0.35		c0.05	0.26		0.10	c0.16		c0.13	0.10	
v/s Ratio Perm	0.06		0.21	c0.42		0.13						
v/c Ratio	0.13	0.77	0.47	0.85	0.54	0.26	0.60	0.91		0.80	0.62	
Uniform Delay, d1	20.0	31.8	26.4	26.9	24.6	20.8	53.4	56.8		56.3	54.4	
Progression Factor	1.01	0.89	0.90	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	2.9	1.8	29.0	1.2	0.8	1.6	29.1		7.7	3.8	
Delay (s)	20.3	31.4	25.7	55.9	25.8	21.6	55.1	85.9		64.0	58.2	
Level of Service	C	C	C	E	C	C	E	F		E	E	
Approach Delay (s)		29.7			27.9			69.2			62.3	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	143	106	43	52	22
Future Volume (Veh/h)	27	143	106	43	52	22
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	155	115	47	57	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	162				352	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	162				352	138
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				91	97
cM capacity (veh/h)	1417				633	910

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	184	162	81
Volume Left	29	0	57
Volume Right	0	47	24
cSH	1417	1700	696
Volume to Capacity	0.02	0.10	0.12
Queue Length 95th (ft)	2	0	10
Control Delay (s)	1.3	0.0	10.9
Lane LOS	A		B
Approach Delay (s)	1.3	0.0	10.9
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	165	24	20	130	1	17	0	10	2	0	3
Future Volume (Veh/h)	6	165	24	20	130	1	17	0	10	2	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	179	26	22	141	1	18	0	11	2	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	142			205			394	392	192	402	404	142
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	142			205			394	392	192	402	404	142
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			97	100	99	100	100	100
cM capacity (veh/h)	1441			1366			554	533	850	542	524	906

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	212	164	29	5
Volume Left	7	22	18	2
Volume Right	26	1	11	3
cSH	1441	1366	639	714
Volume to Capacity	0.00	0.02	0.05	0.01
Queue Length 95th (ft)	0	1	4	1
Control Delay (s)	0.3	1.1	10.9	10.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.3	1.1	10.9	10.1
Approach LOS			B	B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	99	64	55	472	532	58
Future Volume (Veh/h)	99	64	55	472	532	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	70	60	513	578	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1068		
pX, platoon unblocked						
vC, conflicting volume	1242	610	641			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1242	610	641			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	40	86	94			
cM capacity (veh/h)	180	495	943			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	178	60	513	641
Volume Left	108	60	0	0
Volume Right	70	0	0	63
cSH	279	943	1700	1700
Volume to Capacity	0.64	0.06	0.30	0.38
Queue Length 95th (ft)	101	5	0	0
Control Delay (s)	38.3	9.1	0.0	0.0
Lane LOS	E	A		
Approach Delay (s)	38.3	1.0		0.0
Approach LOS	E			

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	25	23	20	19	8	8	7	23	1	3	1
Future Volume (Veh/h)	9	25	23	20	19	8	8	7	23	1	3	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	27	25	22	21	9	9	8	25	1	3	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	30			52			132	134	40	158	142	26
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	30			52			132	134	40	158	142	26
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	99	98	100	100	100
cM capacity (veh/h)	1583			1554			824	742	1032	770	734	1050

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	62	52	42	5
Volume Left	10	22	9	1
Volume Right	25	9	25	1
cSH	1583	1554	914	789
Volume to Capacity	0.01	0.01	0.05	0.01
Queue Length 95th (ft)	0	1	4	0
Control Delay (s)	1.2	3.2	9.1	9.6
Lane LOS	A	A	A	A
Approach Delay (s)	1.2	3.2	9.1	9.6
Approach LOS			A	A

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	15.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F

Total Conditions Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	1226	1716	38	1	156
Future Volume (Veh/h)	115	1226	1716	38	1	156
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	1333	1865	41	1	170
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			545			
pX, platoon unblocked	0.78				0.78	0.78
vC, conflicting volume	1906				2802	953
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1598				2746	376
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	61				87	65
cM capacity (veh/h)	317				8	485

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	125	666	666	1243	663	171
Volume Left	125	0	0	0	0	1
Volume Right	0	0	0	0	41	170
cSH	317	1700	1700	1700	1700	354
Volume to Capacity	0.39	0.39	0.39	0.73	0.39	0.48
Queue Length 95th (ft)	45	0	0	0	0	63
Control Delay (s)	23.6	0.0	0.0	0.0	0.0	24.3
Lane LOS	C					C
Approach Delay (s)	2.0			0.0		24.3
Approach LOS						C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1210	10	10	1700	5	38	1	26	1	0	16
Future Volume (vph)	7	1210	10	10	1700	5	38	1	26	1	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.97			1.00	
Satd. Flow (prot)	1770	3535		1770	3538			1712			1621	
Flt Permitted	0.09	1.00		0.20	1.00			0.81			0.99	
Satd. Flow (perm)	169	3535		364	3538			1426			1610	
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)	8	1315	11	11	1848	5	41	1	28	1	0	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	19	0	0	17	0
Lane Group Flow (vph)	8	1326	0	11	1853	0	0	51	0	0	1	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	114.2	114.2		116.1	116.1			9.2			9.2	
Effective Green, g (s)	114.2	114.2		116.1	116.1			9.2			9.2	
Actuated g/C Ratio	0.82	0.82		0.83	0.83			0.07			0.07	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	151	2883		332	2934			93			105	
v/s Ratio Prot	0.00	c0.38		0.00	c0.52							
v/s Ratio Perm	0.04			0.03				c0.04			0.00	
v/c Ratio	0.05	0.46		0.03	0.63			0.55			0.01	
Uniform Delay, d1	5.3	3.8		3.3	4.3			63.4			61.1	
Progression Factor	1.00	1.00		0.34	0.21			1.00			1.00	
Incremental Delay, d2	0.1	0.5		0.0	0.8			6.9			0.0	
Delay (s)	5.5	4.3		1.2	1.7			70.3			61.2	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		4.3			1.7			70.3			61.2	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	4.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1237	1661	60	0	54
Future Volume (Veh/h)	0	1237	1661	60	0	54
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1345	1805	65	0	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		719				
pX, platoon unblocked					0.88	
vC, conflicting volume	1805				2510	935
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1805				2444	935
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	78
cM capacity (veh/h)	337				23	267

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	672	672	1203	667	59
Volume Left	0	0	0	0	0
Volume Right	0	0	0	65	59
cSH	1700	1700	1700	1700	267
Volume to Capacity	0.40	0.40	0.71	0.39	0.22
Queue Length 95th (ft)	0	0	0	0	21
Control Delay (s)	0.0	0.0	0.0	0.0	22.3
Lane LOS					C
Approach Delay (s)	0.0		0.0		22.3
Approach LOS					C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	1196	3	5	1620	10	17	1	9	1	0	82
Future Volume (Veh/h)	37	1196	3	5	1620	10	17	1	9	1	0	82
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	1300	3	5	1761	11	18	1	10	1	0	89
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1024							
pX, platoon unblocked	0.73						0.73	0.73		0.73	0.73	0.73
vC, conflicting volume	1772			1303			2272	3164	652	2507	3160	886
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1325			1303			2007	3223	652	2328	3218	117
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			99			11	84	98	91	100	87
cM capacity (veh/h)	379			527			20	6	411	11	6	669

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	40	867	436	5	1174	598	29	90
Volume Left	40	0	0	5	0	0	18	1
Volume Right	0	0	3	0	0	11	10	89
cSH	379	1700	1700	527	1700	1700	29	677
Volume to Capacity	0.11	0.51	0.26	0.01	0.69	0.35	1.01	0.13
Queue Length 95th (ft)	9	0	0	1	0	0	83	11
Control Delay (s)	15.6	0.0	0.0	11.9	0.0	0.0	369.0	15.0
Lane LOS	C			B			F	B
Approach Delay (s)	0.5			0.0			369.0	15.0
Approach LOS							F	B

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	63.5%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	751	426	116	1117	353	485	116	132	267	112	33
Future Volume (vph)	29	751	426	116	1117	353	485	116	132	267	112	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1714		3433	1799	
Flt Permitted	0.13	1.00	1.00	0.23	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	251	3539	1583	424	3539	1583	3433	1714		3433	1799	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	816	463	126	1214	384	527	126	143	290	122	36
RTOR Reduction (vph)	0	0	142	0	0	149	0	30	0	0	8	0
Lane Group Flow (vph)	32	816	321	126	1214	235	527	239	0	290	150	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		8	8		7	7	
Permitted Phases	6		6	2		2						
Actuated Green, G (s)	68.9	64.8	64.8	79.9	70.8	70.8	27.4	27.4		17.7	17.7	
Effective Green, g (s)	68.9	64.8	64.8	79.9	70.8	70.8	27.4	27.4		17.7	17.7	
Actuated g/C Ratio	0.49	0.46	0.46	0.57	0.51	0.51	0.20	0.20		0.13	0.13	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	168	1638	732	339	1789	800	671	335		434	227	
v/s Ratio Prot	0.01	0.23		c0.03	c0.34		c0.15	0.14		c0.08	0.08	
v/s Ratio Perm	0.09		0.20	0.19		0.15						
v/c Ratio	0.19	0.50	0.44	0.37	0.68	0.29	0.79	0.71		0.67	0.66	
Uniform Delay, d1	21.2	26.2	25.3	16.4	26.0	20.1	53.5	52.6		58.3	58.3	
Progression Factor	0.97	0.88	0.80	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.0	1.7	0.7	2.1	0.9	6.0	7.1		3.9	7.0	
Delay (s)	21.1	24.1	22.0	17.0	28.1	21.0	59.5	59.7		62.2	65.3	
Level of Service	C	C	C	B	C	C	E	E		E	E	
Approach Delay (s)		23.3			25.7			59.6			63.3	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	35.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	108	105	53	56	42
Future Volume (Veh/h)	34	108	105	53	56	42
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	117	114	58	61	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	172				334	143
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172				334	143
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	95
cM capacity (veh/h)	1405				644	905

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	154	172	107
Volume Left	37	0	61
Volume Right	0	58	46
cSH	1405	1700	735
Volume to Capacity	0.03	0.10	0.15
Queue Length 95th (ft)	2	0	13
Control Delay (s)	2.0	0.0	10.7
Lane LOS	A		B
Approach Delay (s)	2.0	0.0	10.7
Approach LOS			B

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	111	53	6	117	1	36	0	23	1	0	5
Future Volume (Veh/h)	1	111	53	6	117	1	36	0	23	1	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	121	58	7	127	1	39	0	25	1	0	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	128			179			298	294	150	318	322	128
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	128			179			298	294	150	318	322	128
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			94	100	97	100	100	99
cM capacity (veh/h)	1458			1397			647	614	896	614	592	923

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	180	135	64	6
Volume Left	1	7	39	1
Volume Right	58	1	25	5
cSH	1458	1397	726	851
Volume to Capacity	0.00	0.01	0.09	0.01
Queue Length 95th (ft)	0	0	7	1
Control Delay (s)	0.0	0.4	10.4	9.3
Lane LOS	A	A	B	A
Approach Delay (s)	0.0	0.4	10.4	9.3
Approach LOS			B	A

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	72	57	43	469	349	84
Future Volume (Veh/h)	72	57	43	469	349	84
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	62	47	510	379	91
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1068		
pX, platoon unblocked						
vC, conflicting volume	1028	424	470			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1028	424	470			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	90	96			
cM capacity (veh/h)	248	630	1092			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	140	47	510	470
Volume Left	78	47	0	0
Volume Right	62	0	0	91
cSH	445	1092	1700	1700
Volume to Capacity	0.31	0.04	0.30	0.28
Queue Length 95th (ft)	33	3	0	0
Control Delay (s)	19.5	8.4	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	19.5	0.7		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	22	33	25	16	39	10	44	16	0	0	1
Future Volume (Veh/h)	29	22	33	25	16	39	10	44	16	0	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	24	36	27	17	42	11	48	17	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	59			60			199	219	42	239	216	38
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	59			60			199	219	42	239	216	38
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			99	93	98	100	100	100
cM capacity (veh/h)	1545			1544			737	654	1029	645	656	1034

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	86	76	1
Volume Left	32	27	11	0
Volume Right	36	42	17	1
cSH	1545	1544	725	1034
Volume to Capacity	0.02	0.02	0.10	0.00
Queue Length 95th (ft)	2	1	9	0
Control Delay (s)	2.7	2.4	10.6	8.5
Lane LOS	A	A	B	A
Approach Delay (s)	2.7	2.4	10.6	8.5
Approach LOS			B	A

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	178	1687	1269	42	0	133
Future Volume (Veh/h)	178	1687	1269	42	0	133
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	193	1834	1379	46	0	145
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			545			
pX, platoon unblocked	0.90				0.90	0.90
vC, conflicting volume	1425				2705	712
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1246				2672	453
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	61				100	71
cM capacity (veh/h)	498				10	498

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	193	917	917	919	506	145
Volume Left	193	0	0	0	0	0
Volume Right	0	0	0	0	46	145
cSH	498	1700	1700	1700	1700	498
Volume to Capacity	0.39	0.54	0.54	0.54	0.30	0.29
Queue Length 95th (ft)	45	0	0	0	0	30
Control Delay (s)	16.7	0.0	0.0	0.0	0.0	15.2
Lane LOS	C					C
Approach Delay (s)	1.6			0.0		15.2
Approach LOS						C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1633	38	29	1268	5	29	0	16	2	0	13
Future Volume (vph)	15	1633	38	29	1268	5	29	0	16	2	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	3527		1770	3537			1719			1633	
Flt Permitted	0.17	1.00		0.11	1.00			0.79			0.96	
Satd. Flow (perm)	320	3527		205	3537			1409			1580	
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)	16	1775	41	32	1378	5	32	0	17	2	0	14
RTOR Reduction (vph)	0	1	0	0	0	0	0	47	0	0	15	0
Lane Group Flow (vph)	16	1815	0	32	1383	0	0	2	0	0	1	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	117.5	117.5		119.5	119.5			4.6			4.6	
Effective Green, g (s)	117.5	117.5		119.5	119.5			4.6			4.6	
Actuated g/C Ratio	0.84	0.84		0.85	0.85			0.03			0.03	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	293	2960		224	3019			46			51	
v/s Ratio Prot	0.00	c0.51		0.00	c0.39							
v/s Ratio Perm	0.04			0.12				c0.00			0.00	
v/c Ratio	0.05	0.61		0.14	0.46			0.03			0.01	
Uniform Delay, d1	2.5	3.7		4.9	2.5			65.6			65.5	
Progression Factor	1.00	1.00		0.20	0.17			1.00			1.00	
Incremental Delay, d2	0.1	1.0		0.3	0.4			0.3			0.1	
Delay (s)	2.6	4.7		1.2	0.9			65.9			65.6	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		4.7			0.9			65.9			65.6	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1651	1241	54	0	61
Future Volume (Veh/h)	0	1651	1241	54	0	61
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1795	1349	59	0	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		719				
pX, platoon unblocked					0.80	
vC, conflicting volume	1349				2276	704
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1349				2095	704
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	83
cM capacity (veh/h)	506				36	379

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	898	898	899	509	66
Volume Left	0	0	0	0	0
Volume Right	0	0	0	59	66
cSH	1700	1700	1700	1700	379
Volume to Capacity	0.53	0.53	0.53	0.30	0.17
Queue Length 95th (ft)	0	0	0	0	16
Control Delay (s)	0.0	0.0	0.0	0.0	16.5
Lane LOS					C
Approach Delay (s)	0.0		0.0		16.5
Approach LOS					C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	1574	15	3	1212	16	9	0	4	2	0	73
Future Volume (Veh/h)	61	1574	15	3	1212	16	9	0	4	2	0	73
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	1711	16	3	1317	17	10	0	4	2	0	79
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1024							
pX, platoon unblocked	0.81						0.81	0.81		0.81	0.81	0.81
vC, conflicting volume	1334			1727			2516	3191	864	2319	3190	667
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	952			1727			2404	3235	864	2163	3234	132
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			99			12	100	99	90	100	89
cM capacity (veh/h)	584			362			11	7	298	19	7	726

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	66	1141	586	3	878	456	14	81
Volume Left	66	0	0	3	0	0	10	2
Volume Right	0	0	16	0	0	17	4	79
cSH	584	1700	1700	362	1700	1700	16	744
Volume to Capacity	0.11	0.67	0.34	0.01	0.52	0.27	0.88	0.11
Queue Length 95th (ft)	10	0	0	1	0	0	54	9
Control Delay (s)	12.0	0.0	0.0	15.0	0.0	0.0	508.1	15.5
Lane LOS	B			C			F	C
Approach Delay (s)	0.4			0.0			508.1	15.5
Approach LOS							F	C

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	1135	405	150	868	380	330	119	157	428	147	42
Future Volume (vph)	29	1135	405	150	868	380	330	119	157	428	147	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1703		3433	1800	
Flt Permitted	0.22	1.00	1.00	0.08	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	410	3539	1583	158	3539	1583	3433	1703		3433	1800	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	1234	440	163	943	413	359	129	171	465	160	46
RTOR Reduction (vph)	0	0	100	0	0	211	0	34	0	0	8	0
Lane Group Flow (vph)	32	1234	340	163	943	202	359	266	0	465	198	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		8	8		7	7	
Permitted Phases	6		6	2		2						
Actuated Green, G (s)	67.8	63.7	63.7	77.4	68.5	68.5	24.2	24.2		23.2	23.2	
Effective Green, g (s)	67.8	63.7	63.7	77.4	68.5	68.5	24.2	24.2		23.2	23.2	
Actuated g/C Ratio	0.48	0.46	0.46	0.55	0.49	0.49	0.17	0.17		0.17	0.17	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	238	1610	720	189	1731	774	593	294		568	298	
v/s Ratio Prot	0.00	0.35		c0.05	0.27		0.10	c0.16		c0.14	0.11	
v/s Ratio Perm	0.06		0.21	c0.42		0.13						
v/c Ratio	0.13	0.77	0.47	0.86	0.54	0.26	0.61	0.91		0.82	0.67	
Uniform Delay, d1	20.1	31.9	26.5	27.1	24.9	20.9	53.5	56.8		56.4	54.8	
Progression Factor	1.01	0.89	0.90	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	2.9	1.8	30.9	1.2	0.8	1.8	29.1		9.0	5.5	
Delay (s)	20.4	31.4	25.8	58.0	26.1	21.8	55.2	85.9		65.3	60.3	
Level of Service	C	C	C	E	C	C	E	F		E	E	
Approach Delay (s)		29.8			28.4			69.2			63.8	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	40.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	195	106	43	58	22
Future Volume (Veh/h)	27	195	106	43	58	22
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	212	115	47	63	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	162				408	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	162				408	138
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				89	97
cM capacity (veh/h)	1417				587	910

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	241	162	87
Volume Left	29	0	63
Volume Right	0	47	24
cSH	1417	1700	650
Volume to Capacity	0.02	0.10	0.13
Queue Length 95th (ft)	2	0	12
Control Delay (s)	1.1	0.0	11.4
Lane LOS	A		B
Approach Delay (s)	1.1	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	198	49	20	130	1	17	0	10	2	0	3
Future Volume (Veh/h)	6	198	49	20	130	1	17	0	10	2	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	215	53	22	141	1	18	0	11	2	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	142			268			444	442	242	452	468	142
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	142			268			444	442	242	452	468	142
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			96	100	99	100	100	100
cM capacity (veh/h)	1441			1296			514	499	797	502	482	906

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	275	164	29	5
Volume Left	7	22	18	2
Volume Right	53	1	11	3
cSH	1441	1296	594	686
Volume to Capacity	0.00	0.02	0.05	0.01
Queue Length 95th (ft)	0	1	4	1
Control Delay (s)	0.2	1.2	11.4	10.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	1.2	11.4	10.3
Approach LOS			B	B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	114	82	55	472	545	58
Future Volume (Veh/h)	114	82	55	472	545	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	124	89	60	513	592	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1068		
pX, platoon unblocked						
vC, conflicting volume	1256	624	655			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1256	624	655			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	30	82	94			
cM capacity (veh/h)	177	486	932			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	213	60	513	655
Volume Left	124	60	0	0
Volume Right	89	0	0	63
cSH	283	932	1700	1700
Volume to Capacity	0.75	0.06	0.30	0.39
Queue Length 95th (ft)	140	5	0	0
Control Delay (s)	48.2	9.1	0.0	0.0
Lane LOS	E	A		
Approach Delay (s)	48.2	1.0		0.0
Approach LOS	E			

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	25	26	23	19	8	11	7	26	1	3	1
Future Volume (Veh/h)	9	25	26	23	19	8	11	7	26	1	3	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	27	28	25	21	9	12	8	28	1	3	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	30			55			139	141	41	168	150	26
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	30			55			139	141	41	168	150	26
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			99	99	97	100	100	100
cM capacity (veh/h)	1583			1550			814	733	1030	754	725	1050

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	65	55	48	5
Volume Left	10	25	12	1
Volume Right	28	9	28	1
cSH	1583	1550	908	779
Volume to Capacity	0.01	0.02	0.05	0.01
Queue Length 95th (ft)	0	1	4	0
Control Delay (s)	1.2	3.4	9.2	9.7
Lane LOS	A	A	A	A
Approach Delay (s)	1.2	3.4	9.2	9.7
Approach LOS			A	A

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	17.0%	ICU Level of Service	A
Analysis Period (min)	15		