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Memorandum

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To: Mr. Dean Vincent, P.E.
Senior Vice President, Construction
East-West Partners
6101 Walkers Ferry Lane
Suffolk, Virginia 23435

From: Carlin Hebert, P.E.
Alex Shoemaker, P.E.
Kimley-Horn and Associates, Inc.

Date: May 6, 2015

Subject: Carrollton Boulevard (U.S. 17) and Sugar Hill Road
Signal Warrant Analysis Memorandum – Full Build Out
KHA Project # 116131009

Introduction

Kimley-Horn and Associates, Inc. has been retained by East-West Partners to conduct an intersection analysis for the intersection of Carrollton Boulevard (U.S. Route 17) and Sugar Hill Road in Isle of Wight County, Virginia. This analysis serves as an update to the Carrollton Boulevard (U.S. 17) and Sugar Hill Road Signal Warrant Analysis Memorandum (July 9, 2014) and expands upon the previous traffic signal warrant analysis. This new analysis incorporates updated traffic volumes as well as the trip generation for the full build-out of the residential development of Founders Pointe.

As part of the Founders Pointe development, specific thresholds were identified to establish when additional traffic analysis would be required throughout the development process. Having reached all of the interim thresholds, the goal of this analysis is to determine an ultimate recommendation for the appropriateness of a traffic signal at the Carrollton Boulevard and Sugar Hill Road intersection. In addition to reviewing the traffic signal warrant and operational conditions at the intersection, the following adjacent signalized intersections were included in the updated analysis to review traffic progression along the corridor.

- Carrollton Boulevard at Cedar Grove Road
- Carrollton Boulevard at Ashby Way/Omera Drive

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Data Collection

For this analysis, additional data collection was conducted during an average weekday to capture representative traffic conditions. Twelve-hour turning movement counts were conducted previously for the intersection of Sugar Hill Road and Carrollton Boulevard in January 2014 and eight-hour counts were conducted on March 3, 2015 at the two adjacent signalized intersections. Additionally, time gaps were recorded at the Sugar Hill Road intersection on March 17, 2015 to record the time between vehicles along Carrollton Boulevard. The results from the updated turning movement counts and recorded time gaps are included as an **Attachment** to this memorandum for reference.

Background Traffic and Trip Generation

Since traffic data was collected from two different time periods, the 2014 turning movement counts were adjusted to correspond to the 2015 existing conditions using a 1.25% per year growth rate developed as part of the *Isle of Wight County Brewer's Neck Corridor Study*. In addition, this growth rate was used to grow the 2015 existing traffic volumes on Carrollton Boulevard as the background traffic for use in the 2018 full build-out conditions.

A trip generation analysis was conducted for the remaining unbuilt/unoccupied homes to estimate traffic demands at full build-out of the site. The trip generation assumed that 100 single family homes remain unbuilt/unoccupied on the Founders Pointe Site with all remaining sites currently occupied. The Institute of Transportation Engineers (ITE) *Trip Generation Manual* (9th Edition) was used to determine the number of trips expected to be generated by the addition of the 100 remaining single family homes. Results from the trip generation analysis are summarized in **Table 1**. Site traffic was assigned to the roadway network based on the distributions used for the original Founders' Pointe Traffic Impact Analysis, with approximately 65% of the site traffic entering/exiting the site from the north on Carrollton Boulevard and 35% to/from the south on Carrollton Boulevard.

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Table 1 Trip Generation

ITE Code	Description	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
210	Single-Family Detached Housing	100 Dwelling Units	*1,040*	*20*	*60*	*80*	*66*	*39*	*105*
Total New Site Trips			**1,040**	**20**	**60**	**80**	**66**	**39**	**105**

Source: Trip Generation Manual, 9th Edition

Operational Analysis

Operational analyses were performed using *Synchro 8.0* for the study area intersections to determine the level of service (LOS), consistent with the methodologies provided in the Highway Capacity Manual (*HCM*), to evaluate existing as well as future intersection movement level of service and delay. For this analysis, the following scenarios were examined:

- 2015 Existing Condition
- 2018 Build Condition
  - Includes the assignment of traffic generated by the full build-out of the Founders Pointe Site
- 2018 Build with Sugar Hill Road Signalized
  - Includes the assignment of traffic generated by the full build-out of the Founders Pointe Site
  - All signals along Carrollton Boulevard were assumed to be coordinated as part of the VDOT ERO Arterial Communications Upgrades

The results for the LOS and delay analysis are shown in **Tables 2 – 4**. Peak hour traffic volume figures and detailed analysis output results are included as an **Attachment**.

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Table 2 Carrollton Boulevard and Ashby Way/Omera Drive

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)								
		Eastbound		Westbound	Northbound			Southbound		
		LT	TH/RT	LT/TH/RT	LT	TH	RT	LT	TH	RT
AM Peak Hour										
Existing	B (18.8)	C (34.5)	C (32.1)	C (34.0)	E (55.8)	B (16.6)	B (13.3)	D (38.6)	B (14.4)	B (11.4)
2018 Build	B (18.6)	D (35.2)	C (33.1)	C (34.9)	E (56.7)	B (16.6)	B (12.9)	D (39.6)	B (14.2)	B (11.1)
2018 Build with Signal	B (14.0)	D (40.5)	D (38.1)	D (41.1)	C (32.7)	A (4.7)	B (12.1)	D (44.1)	B (13.5)	B (10.4)
PM Peak Hour										
Existing	C (25.0)	D (39.7)	D (37.6)	D (37.1)	D (44.0)	C (23.2)	B (17.3)	D (45.3)	C (20.2)	B (15.2)
2018 Build	C (23.3)	D (43.1)	D (39.7)	D (36.6)	D (44.4)	C (21.4)	B (15.8)	D (44.6)	B (18.5)	B (13.7)
2018 Build with Signal	B (17.4)	D (43.2)	D (40.4)	D (40.9)	C (27.8)	A (7.2)	B (14.7)	D (46.5)	B (17.4)	B (12.6)

As shown in **Table 2**, this intersection generally operates at acceptable levels of service under existing conditions. It should be noted that the northbound left-turn movement operates at a LOS E during the AM peak hour; however, the movement serves only 45 vehicles per hour, indicating that the impacts from this delay are minimal.

Under 2018 build conditions, the intersection is expected to continue operating at acceptable LOS during the AM and PM peak periods with only minimal increases in delay and no change to LOS. With the installation of a traffic signal at the adjacent Carrollton Boulevard/Sugar Hill Road intersection and the coordination of signals along Carrollton Boulevard, the overall operation of the intersection continues to operate as acceptable levels with improvement anticipated for the northbound approach due to the implementation of a coordinated traffic signal system along Carrolton Boulevard.

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Table 3 Carrollton Boulevard and Sugar Hill Road

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)								
		Eastbound	Westbound		Northbound			Southbound		
		LT/TH/RT	LT	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour										
Existing	A (2.3)	C (17.3)	C (19.2)	B (10.9)	A (8.9)	A (0.0)	A (0.0)	A (8.7)	A (0.0)	A (0.0)
2018 Build	A (3.0)	C (19.2)	C (22.1)	B (11.4)	A (9.0)	A (0.0)	A (0.0)	A (8.8)	A (0.0)	A (0.0)
2018 Build with Signal	B (19.3)	D (43.4)	D (38.7)	D (35.6)	D (53.6)	C (28.8)	C (25.7)	B (11.8)	A (5.7)	A (5.7)
PM Peak Hour										
Existing	A (1.9)	C (17.4)	D (25.1)	B (11.8)	A (9.0)	A (0.0)	A (0.0)	B (10.2)	A (0.0)	A (0.0)
2018 Build	A (2.6)	C (19.7)	D (31.7)	B (12.3)	A (9.0)	A (0.0)	A (0.0)	B (10.8)	A (0.0)	A (0.0)
2018 Build with Signal	B (19.1)	D (43.5)	D (38.7)	D (37.1)	D (53.4)	C (30.4)	C (22.9)	B (13.4)	A (3.8)	A (3.8)

As shown in **Table 3**, this intersection is expected to operate at an acceptable overall level of service (LOS A) in the existing as well as the 2018 build conditions with all movements operating at LOS D or better. Delay is expected in increase under build conditions due to the additional site traffic associated with the currently unbuilt homes in Founders Pointe.

If a traffic signal is installed at this intersection, it is expected that overall intersection delay will increase and overall LOS will deteriorate from LOS A to LOS B forth both peak periods. This is primarily due to the creation of delay for the major street through movements which are the heaviest movements at the intersections and are currently free-flowing under two-way STOP control. Installation of a traffic signal is also expected to create additional delay for the westbound Sugar Hill Road approach.

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Table 4 Carrollton Boulevard and Cedar Grove Road

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)				
		Eastbound	Northbound		Southbound	
		LT/RT	LT	TH	TH	RT
AM Peak Hour						
Existing	A (9.1)	C (21.6)	C (28.0)	A (4.5)	A (9.8)	A (7.7)
2018 Build	A (9.1)	C (21.9)	C (28.4)	A (4.6)	A (9.9)	A (7.7)
2018 Build with Signal	A (7.5)	D (39.1)	D (48.2)	A (3.8)	A (4.1)	A (1.9)
PM Peak Hour						
Existing	A (6.8)	C (26.7)	C (28.6)	A (3.2)	A (7.9)	A (6.4)
2018 Build	A (6.7)	C (27.2)	C (29.1)	A (3.2)	A (7.8)	A (6.3)
2018 Build with Signal	A (4.8)	D (40.9)	D (42.5)	A (2.9)	A (2.9)	A (0.9)

As shown in **Table 4**, this intersection is expected to operate at an acceptable LOS for all movements in the existing and future 2018 conditions. With the addition of a traffic signal installed at Sugar Hill Road and the coordination of signals along Carrollton Boulevard, the intersection continues to operate at acceptable levels with only minor changes to delay and LOS associated with optimization of split times.

Traffic Signal Warrant Analysis

Traffic signal warrant analyses were performed for the intersection of Carrollton Boulevard and Sugar Hill Road, consistent with the methodologies provided in the Manual on Uniform Traffic Control Devices (*MUTCD)*, to evaluate the need for traffic signalization under existing traffic conditions. According to the *MUTCD*, a traffic control signal should not be installed unless one or more of the signal warrants are met.

Under each warrant analysis, 2018 build out volumes were used to determine if the volume thresholds provided in the *MUTCD* were met with the additional site traffic. Due to the relatively high operational speed of traffic along mainline Carrollton Boulevard, (i.e., 55 mph posted speed limit) this signal warrant analysis included both the left-turn and right-turn volumes from the minor street approach (Sugar Hill Road). The signal warrant analysis excluded northbound mainline right-turn traffic because an exclusive right-turn lane is available for this movement. Therefore it

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was assumed that these right-turning vehicles do not impact intersection traffic flow. To account for the additional development site traffic, daily trips were distributed to the turning movement counts using hourly variation percentages. Research published in the *ITE Journal* provides guidance on updated hourly distribution percentages for residential uses and is included as an **Attachment** for reference. [1]

The warrants used in this analysis are as follows:

- **Warrant 1** (Eight-Hour Vehicular Volume) - is satisfied if **ONE** of the following conditions exists for any eight hours of an average day:
  - ***Condition A*** (Minimum Vehicular Volume) - volumes meet or exceed the necessary hourly thresholds for any eight hours of an average day. Thresholds may be modified based on vehicle speeds and population of the local community.
  - ***Condition B*** (Interruption of Continuous Traffic) - volumes meet or exceed the necessary hourly thresholds for any eight hours of an average day. Thresholds may be modified based on vehicle speeds and population of the local community.
  - ***Combination of Condition A and B*** - intended to be used where Conditions A and B are not individually met and where volume thresholds may be reduced based on anticipated traffic delay at the intersection.
- **Warrant 2** (Four-Hour Vehicular Volume) - volumes meet or exceed the necessary hourly thresholds for any four hours of an average day. Thresholds are typically higher than those for Warrant 1 and may be applicable when high traffic volumes are concentrated over a shorter time period (less than eight hours). The thresholds may also be modified based on vehicle speeds and population of the local community.
- **Warrant 3** (Peak Hour Volume) - volumes meet or exceed the necessary hourly thresholds for any one hour of an average day. This warrant should only be applied in unusual cases where an area is expected to discharge a large volume of traffic over a short period of time. The thresholds may also be modified based on vehicle speeds and population of the local community.

[1] Zinnerman, Aaron T. "Hourly Variation in Trip Generation for Office and Residential Uses." *ITE Journal* January 2015.

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- **Warrant 7** (Crash Experience) – the intersection must meet all of the following three criteria:
  - Volumes meet or exceed necessary hourly thresholds for eight hours of an average day.
  - Five or more crashes of types susceptible to correction by a traffic control signal have occurred within a 12-month period.
  - Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce crash frequency.

These warrants are based on existing mainline and minor street traffic volumes, projected site traffic from the build out, existing number of travel lanes, approach turn-lanes, and mainline posted speed limit. The results of the signal warrant analyses are provided in the tables below with complete tables outlining the traffic volumes used in an **Attachment** with this memorandum. The previous warrant analysis results are also presented in following tables for reference.

When assessing warrant criteria for Warrant 7 (i.e., Crash Experience), the most recent three years of available data (2011-2013) indicated that no more than four crashes occurred at the intersection within any given 12-month period . Furthermore, several of crashes were likely not susceptible to correction by a traffic control signal (e.g., sideswipe, and rear-end). Since the minimum criteria for number of crashes for Warrant 7 is five, this warrant is not met.

Table 5: Warrant 1 – Eight-Hour Vehicular Volume Results

Scenario	Warrant 1 - Condition A		Warrant 1 - Condition B		Combination of Warrants 1A and 1B		
	Hours Requirements	Warrant Satisfied	Hours Requirements	Warrant Satisfied	Hours Requirements (both needed)		Warrant Satisfied
					1A	1B	
Previous Analysis (2014)	1 out of 8	No	6 out of 8	No	2 out of 8	8 out of 8	No
New Analysis (2015)	2 out of 8	No	**12 out of 8**	**Yes**	6 out of 8	12 out of 8	No

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Table 6: Warrant 2 – Four-Hour Vehicular Volumes Results

Scenario	Warrant 2	
	Hours Requirements	Warrant Satisfied
Previous Analysis (2014)	**6 out of 4**	**Yes**
New Analysis (2015)	**6 out of 4**	**Yes**

Table 7: Warrant 3 – Peak Hour Vehicular Volumes Results

Scenario	Warrant 3	
	Hours Requirements	Warrant Satisfied
Previous Analysis (2014)	**1 out of 1**	**Yes**
New Analysis (2015)	**5 out of 1**	**Yes**

Based on the findings of this warrant analysis, future traffic volumes are expected to satisfy Warrant 1 (Condition B), Warrant 2, and Warrant 3. It should also be noted that the MUTCD indicates, "the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal." Therefore it is important to consider multiple factors contributing to the operational conditions at the intersection in determining the appropriateness of a traffic signal installation, not simply the MUTCD volume thresholds.

Gap Analysis

Two signalized intersections (i.e. Omera Drive/Ashby Way and Cedar Grove Road) are located approximately 1,800 feet north and 1,400 feet south of the Sugar Hill Road intersection along Carrollton Boulevard, respectively. It is expected that gaps are frequently created in the mainline traffic flow due to interruptions created by the traffic signals and that these gaps would provide opportunities for vehicles to make turning movements to/from Sugar Hill Road with minimal delay. Therefore, a vehicle gap analysis was conducted on Carrollton Boulevard at its intersection with Sugar Hill Road in order to determine the availability of these gaps in traffic for movements traveling to/from the subject site. Data was collected from 7:00 am to 9:00 am and 4:00 pm to 6:00 pm on March 17, 2015. As part of the analysis, acceptable critical and follow up gap times were determined for westbound left turning vehicles from Sugar Hill Road, based upon procedures outlined in the 2010 *Highway Capacity Manual*. The critical and follow up gap times are used to

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determine the number of acceptable gaps available at the study location. The critical gap represents the time required for a single vehicle to be able to make the left turning maneuver from the STOP-controlled minor street approach. The follow up gap represents the amount of required time it would take the second vehicle in the queue to complete a turning maneuver following the first vehicle taking advantage of the time available from the critical gap.

Results from the gap study are shown below in **Table 8** below. Field observations show that the majority of left-turning vehicles from Sugar Hill Road complete a two-stage left-turn by first crossing northbound traffic on Carrollton Boulevard (stage 1) and then utilizing the median refuge to wait for an acceptable gap in southbound traffic (stage 2). As can be seen in the table, the number of critical gaps far surpasses the westbound left-turn demand at Sugar Hill Road.

Table 8: Gap Study

Movement	Weekday Peak Hour	Acceptable Critical Gap Time (seconds)	Number of Acceptable Gaps	Existing WB Lefts (Vehicles from Sugar Hill Rd)	Sufficient Gaps
2-Stage Minor Street (WB) Left-Turn – Stage 1	AM	5.9	181	71	Yes
	PM		155	29	Yes
2-Stage Minor Street (WB) Left-Turn – Stage 2	AM	5.9	149	71	Yes
	PM		116	29	Yes
1-Stage Minor Street (WB) Left-Turn	AM	6.9	135	71	Yes
	PM		83	29	Yes

Based upon the gap analysis, it appears that there are sufficient gaps in traffic available in the existing traffic stream on Carrollton Boulevard to accommodate left-turning vehicles from Sugar Hill Road. These gaps are sufficient whether drivers choose to make a two-stage or one-stage left-turn movement. It is expected as traffic increases for the future conditions, that these gaps will continue to be available for vehicles exiting from Sugar Hill Road due to the interruptions in traffic flow created by the adjacent traffic signals. It should be noted, however, as the volume of traffic increases on Carrollton Boulevard for future conditions, the length of acceptable gaps in traffic may change as a result of greater demand and modifications to traffic signal timings.

Detailed data collected as part of the gap study is also included as an **Attachment**.

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Access Management Regulations

Due to the presence of two signalized intersection adjacent to the study intersection, the Virginia Department of Transportation (VDOT) *Road Design Manual Appendix F* was used to determine spacing requirements for installation of a traffic signal at Sugar Hill Road. Appendix F provides guidance for design and construction of intersections which includes spacing requirements as dictated by VDOT's access management regulations. Table 2-2 of Appendix F provides guidance for intersection spacing as follows:

Minimum Spacing Standards for Commercial Entrances, Intersections, and Median Crossovers

Highway Functional Classification	Legal Speed Limit (mph)①	Minimum Centerline to Centerline Spacing (Distance) in Feet			
		Spacing from Signalized Intersections to Other Signalized Intersections ②	Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections& Full Median Crossovers ③	Spacing from Full Access Entrances & Directional Median to Other Full Access Entrances and Any Intersection or Median Crossover ④	Spacing from Partial Access One or Two Way Entrances to Any Type of Entrance, Intersection or Median Crossover ⑤
Principal Arterial	≤ 30 mph 35 to 45 mph ≥ 50 mph	1,050 1,320 2,640	880 1,050 1,320	440 565 750	250 305 495
Minor Arterial	≤ 30 mph 35 to 45 mph ≥ 50 mph	880 1,050 1,320	660 660 1,050	355 470 555	200 250 425
Collector	≤ 30 mph 35 to 45 mph ≥ 50 mph	660 660 1,050	440 440 660	225 335 445	200 250 360
Local Street⑥	Commercial entrance spacing: See Figure 4-11.				

TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ENTRANCES, INTERSECTIONS AND MEDIAN CROSSOVERS ⑦

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Because Carrollton Boulevard is a principal arterial with a posted speed limit of 55 mph, the required spacing between signalized intersections would be ½ mile or 2,640 feet. The existing spacing between the Sugar Hill Road intersection and the adjacent Omera Drive/Ashby Way and Cedar Grove Road intersections is 1,800 and 1,400 feet, respectively which falls well short of the VDOT requirements. Therefore, if a traffic signal were installed at Sugar Hill Road it would not meet access management requirements.

Conclusions

This purpose of this study is to determine the appropriateness of a traffic signal at the Carrollton Boulevard (U.S. Route 17) and Sugar Hill Road intersection including consideration for the remaining approved but unbuilt single family homes within the Founders Pointe development. Based upon the operational, signal warrant, access management, and gap analyses completed, the following conclusions are made:

- Installing a traffic signal increases delay at Sugar Hill Road and has little impact to the overall operation of the study area corridor.
- Traffic signal Warrant 1 (Condition B), Warrant 2, and Warrant 3 are expected to be satisfied when considering the additional site traffic associated with Founders Pointe.
- No significant crash history occurred at the intersection from 2011-2013.
- The gap analysis indicates sufficient gaps in traffic flow to accommodate vehicles turning left from Sugar Hill Road onto Carrollton Boulevard.
- A traffic signal at Sugar Hill Road would not meet VDOT access management requirements.

Based up on the above findings, it is therefore recommended that a traffic signal not be installed at the Carrollton Boulevard and Sugar Hill Road intersection. A signal would provide little improvement for the minor street approaches while increasing delay for Carrolton Boulevard. A gap analysis suggests that vehicles have adequate opportunities to make the critical left-turn movement from Sugar Hill Road to Carrolton Boulevard without undue delay.

If there are any questions or we can provide any further analysis, please do not hesitate to contact us.

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Attachments:

1) 12-Hour Turning Movement Counts, January 14, 2014
2) Peak Hour Turning Movement Counts, March 3, 2015
3) Peak Hour Volume Figures
4) Synchro Output Tables
5) Traffic Signal Volume Warrant Analysis Worksheet
6) Gap Study Data

Attachment 1

12-Hour Turning Movement Counts, January 14, 2014

Peggy Malone & Associates, Inc.

File Name : Rt. 17 and Sugar Hill Rd.
Site Code :
Start Date : 1/14/2014
Page No : 1

Groups Printed- Car

	Business Driveway Eastbound					Sugar Hill Rd. Westbound					Rt. 17/Carrollton Blvd. Northbound					Rt. 17/Carrollton Blvd. Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	0	0	0	0	5	0	16	0	21	1	55	0	0	56	2	78	0	0	80	157
06:15 AM	0	0	0	0	0	11	0	19	0	30	0	104	2	0	106	0	126	0	0	126	262
06:30 AM	0	0	0	0	0	8	0	17	0	25	0	84	1	0	85	4	140	0	0	144	254
06:45 AM	0	0	0	0	0	10	0	20	0	30	0	98	4	0	102	2	135	1	0	138	270
Total	0	0	0	0	0	34	0	72	0	106	1	341	7	0	349	8	479	1	0	488	943
07:00 AM	0	0	0	0	0	8	0	33	0	41	2	107	3	0	112	10	123	1	0	134	287
07:15 AM	1	0	0	0	1	22	0	27	0	49	0	104	8	0	112	9	149	0	0	158	320
07:30 AM	0	0	1	0	1	24	0	28	0	52	1	116	2	0	119	10	168	0	0	178	350
07:45 AM	1	0	0	0	1	15	0	27	0	42	0	120	1	0	121	10	128	0	0	138	302
Total	2	0	1	0	3	69	0	115	0	184	3	447	14	0	464	39	568	1	0	608	1259
08:00 AM	0	0	0	0	0	14	0	22	0	36	0	101	0	0	101	6	105	0	0	111	248
08:15 AM	1	0	0	0	1	18	0	23	0	41	0	87	5	0	92	3	85	0	0	88	222
08:30 AM	0	0	0	0	0	6	0	17	0	23	0	88	3	0	91	11	112	0	0	123	237
08:45 AM	0	0	0	0	0	9	0	15	0	24	0	88	2	0	90	11	113	0	0	124	238
Total	1	0	0	0	1	47	0	77	0	124	0	364	10	0	374	31	415	0	0	446	945
09:00 AM	0	0	0	0	0	4	0	6	0	10	0	83	3	0	86	10	101	0	0	111	207
09:15 AM	0	0	0	0	0	4	0	12	0	16	0	55	6	0	61	5	79	0	0	84	161
09:30 AM	0	0	0	0	0	7	0	16	0	23	0	64	2	0	66	7	93	0	0	100	189
09:45 AM	0	0	0	0	0	7	0	12	0	19	0	71	4	0	75	8	88	0	0	96	190
Total	0	0	0	0	0	22	0	46	0	68	0	273	15	0	288	30	361	0	0	391	747
10:00 AM	0	0	0	0	0	10	0	8	0	18	0	52	12	0	64	11	80	0	0	91	173
10:15 AM	0	0	0	0	0	3	0	6	0	9	0	56	4	0	60	7	73	0	0	80	149
10:30 AM	0	0	0	0	0	1	0	12	0	13	0	66	3	0	69	10	87	0	0	97	179
10:45 AM	0	0	0	0	0	4	0	7	0	11	1	74	4	0	79	9	83	0	0	92	182
Total	0	0	0	0	0	18	0	33	0	51	1	248	23	0	272	37	323	0	0	360	683
11:00 AM	0	0	0	0	0	5	0	4	0	9	1	60	7	0	68	3	85	0	0	88	165
11:15 AM	0	0	0	0	0	6	0	9	0	15	0	69	6	0	75	9	91	0	0	100	190
11:30 AM	0	0	0	0	0	8	0	11	0	19	0	116	3	0	119	2	79	0	0	81	219
11:45 AM	1	0	0	0	1	6	0	9	0	15	0	78	4	0	82	6	89	0	0	95	193
Total	1	0	0	0	1	25	0	33	0	58	1	323	20	0	344	20	344	0	0	364	767
12:00 PM	0	0	0	0	0	4	0	5	0	9	1	78	9	0	88	13	57	0	0	70	167
12:15 PM	0	0	0	0	0	3	0	8	0	11	0	84	10	0	94	9	93	0	0	102	207
12:30 PM	0	0	0	0	0	11	0	4	0	15	2	64	5	0	71	12	86	0	0	98	184
12:45 PM	0	0	0	0	0	6	0	5	0	11	0	95	7	0	102	15	86	0	0	101	214
Total	0	0	0	0	0	24	0	22	0	46	3	321	31	0	355	49	322	0	0	371	772
01:00 PM	0	0	0	0	0	3	0	8	0	11	0	81	7	0	88	10	65	0	0	75	174
01:15 PM	0	0	1	0	1	8	0	9	0	17	0	84	3	0	87	12	90	1	0	103	208
01:30 PM	0	0	0	0	0	0	0	4	0	4	0	70	12	0	82	9	70	0	0	79	165
01:45 PM	0	0	0	0	0	3	0	7	0	10	0	107	5	0	112	10	93	0	0	103	225
Total	0	0	1	0	1	14	0	28	0	42	0	342	27	0	369	41	318	1	0	360	772
02:00 PM	0	0	0	0	0	5	0	9	0	14	2	70	5	0	77	8	67	0	0	75	166
02:15 PM	0	0	0	0	0	3	0	10	0	13	1	101	5	0	107	8	98	0	0	106	226
02:30 PM	0	0	0	0	0	10	0	12	0	22	0	78	1	0	79	10	65	0	0	75	176
02:45 PM	0	0	0	0	0	4	0	7	0	11	0	104	4	0	108	15	89	0	0	104	223
Total	0	0	0	0	0	22	0	38	0	60	3	353	15	0	371	41	319	0	0	360	791
03:00 PM	0	0	0	0	0	11	0	13	0	24	0	113	6	0	119	18	105	0	0	123	266
03:15 PM	0	0	0	0	0	5	1	11	0	17	3	113	13	0	129	24	114	0	0	138	284
03:30 PM	1	1	0	0	2	1	0	20	0	21	1	148	12	0	161	17	99	0	0	116	300
03:45 PM	0	0	0	0	0	3	0	12	0	15	0	153	11	0	164	23	127	0	0	150	329
Total	1	1	0	0	2	20	1	56	0	77	4	527	42	0	573	82	445	0	0	527	1179
04:00 PM	0	0	0	0	0	2	0	11	0	13	0	134	9	0	143	26	157	0	0	183	339
04:15 PM	0	0	0	0	0	5	0	13	0	18	0	172	12	0	184	28	153	1	0	182	384
04:30 PM	1	0	0	0	1	9	0	13	0	22	0	155	19	0	174	28	172	0	0	200	397
04:45 PM	0	0	1	0	1	8	0	19	0	27	0	140	18	0	158	32	170	0	0	202	388
Total	1	0	1	0	2	24	0	56	0	80	0	601	58	0	659	114	652	1	0	767	1508
05:00 PM	0	0	0	0	0	6	0	25	0	31	1	178	12	0	191	38	161	0	0	199	421
05:15 PM	0	0	0	0	0	1	0	10	0	11	1	145	15	0	161	32	148	0	0	180	352
05:30 PM	0	0	0	0	0	8	0	15	0	23	0	123	20	0	143	36	141	1	0	178	344
05:45 PM	0	0	0	0	0	7	0	19	0	26	0	126	17	0	143	31	134	0	0	165	334
Total	0	0	0	0	0	22	0	69	0	91	2	572	64	0	638	137	584	1	0	722	1451
Grand Total	6	1	3	0	10	341	1	645	0	987	18	4712	326	0	5056	629	5130	5	0	5764	11817
Apprch %	60	10	30	0		34.5	0.1	65.3	0		0.4	93.2	6.4	0		10.9	89	0.1	0		
Total %	0.1	0	0	0	0.1	2.9	0	5.5	0	8.4	0.2	39.9	2.8	0	42.8	5.3	43.4	0	0	48.8	

Peggy Malone & Associates, Inc.

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	Business Driveway Eastbound				Sugar Hill Rd. Westbound				Rt. 17/Carrollton Blvd. Northbound				Rt. 17/Carrollton Blvd. Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	8	0	**33**	41	**2**	107	3	112	**10**	123	**1**	134	287
07:15 AM	**1**	0	0	**1**	22	0	27	49	0	104	**8**	112	9	149	0	158	320
07:30 AM	0	0	**1**	1	**24**	0	28	**52**	1	116	2	119	10	**168**	0	**178**	**350**
07:45 AM	1	0	0	1	15	0	27	42	0	**120**	1	**121**	10	128	0	138	302
Total Volume	2	0	1	3	69	0	115	184	3	447	14	464	39	568	1	608	1259
% App. Total	66.7	0	33.3		37.5	0	62.5		0.6	96.3	3		6.4	93.4	0.2		
PHF	.500	.000	.250	.750	.719	.000	.871	.885	.375	.931	.438	.959	.975	.845	.250	.854	.899
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	5	0	13	18	0	172	12	184	28	153	**1**	182	384
04:30 PM	**1**	0	0	**1**	**9**	0	13	22	0	155	**19**	174	28	**172**	0	200	397
04:45 PM	0	0	**1**	1	8	0	19	27	0	140	18	158	32	170	0	**202**	388
05:00 PM	0	0	0	0	6	0	**25**	**31**	**1**	**178**	12	**191**	**38**	161	0	199	**421**
Total Volume	1	0	1	2	28	0	70	98	1	645	61	707	126	656	1	783	1590
% App. Total	50	0	50		28.6	0	71.4		0.1	91.2	8.6		16.1	83.8	0.1		
PHF	.250	.000	.250	.500	.778	.000	.700	.790	.250	.906	.803	.925	.829	.953	.250	.969	.944

Peggy Malone & Associates, Inc.

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Groups Printed- Truck

	Business Driveway Eastbound					Sugar Hill Rd. Westbound					Rt. 17/Carrollton Blvd. Northbound					Rt. 17/Carrollton Blvd. Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	3	0	0	3	5
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	0	5	0	0	5	8
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	1	5	0	0	6	8
06:45 AM	0	0	0	0	0	2	0	2	0	4	0	7	1	0	8	0	6	0	0	6	18
Total	0	0	0	0	0	2	0	2	0	4	0	12	3	0	15	1	19	0	0	20	39
07:00 AM	0	0	0	0	0	0	0	1	0	1	0	7	2	0	9	1	1	0	0	2	12
07:15 AM	0	0	0	0	0	1	0	1	0	2	0	9	0	0	9	0	4	0	0	4	15
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	4	0	0	4	8
07:45 AM	0	0	0	0	0	1	0	1	0	2	0	9	2	0	11	1	6	0	0	7	20
Total	0	0	0	0	0	2	0	3	0	5	0	29	4	0	33	2	15	0	0	17	55
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	3	0	0	3	9
08:15 AM	0	0	0	0	0	0	0	3	0	3	0	11	0	0	11	1	5	0	0	6	20
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	5	0	0	5	10
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	1	9	0	0	10	16
Total	0	0	0	0	0	0	0	3	0	3	0	28	0	0	28	2	22	0	0	24	55
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	1	9	0	0	10	16
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	16	2	0	18	0	6	0	0	6	24
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	8	0	0	8	14
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	9	1	0	10	1	8	0	0	9	19
Total	0	0	0	0	0	0	0	0	0	0	0	37	3	0	40	2	31	0	0	33	73
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	5	0	0	5	10
10:15 AM	0	0	0	0	0	1	0	0	0	1	0	14	1	0	15	1	4	0	0	5	21
10:30 AM	0	0	0	0	0	1	0	0	0	1	0	6	0	0	6	0	9	0	0	9	16
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	13	0	0	13	0	9	0	0	9	22
Total	0	0	0	0	0	2	0	0	0	2	0	38	1	0	39	1	27	0	0	28	69
11:00 AM	0	0	0	0	0	0	0	1	0	1	0	5	2	0	7	0	12	0	0	12	20
11:15 AM	0	0	0	0	0	2	0	2	0	4	0	10	0	0	10	0	7	0	0	7	21
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	0	4	0	0	4	11
11:45 AM	0	0	0	0	0	0	0	1	0	1	0	4	0	0	4	1	7	0	0	8	13
Total	0	0	0	0	0	2	0	4	0	6	0	26	2	0	28	1	30	0	0	31	65
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	6	1	0	7	0	5	0	0	5	12
12:15 PM	0	0	0	0	0	0	0	1	0	1	0	7	0	0	7	1	7	0	0	8	16
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	2	0	0	2	6
12:45 PM	0	0	0	0	0	0	0	1	0	1	0	8	0	0	8	0	5	0	0	5	14
Total	0	0	0	0	0	0	0	2	0	2	0	25	1	0	26	1	19	0	0	20	48
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	9	0	0	9	14
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	6	1	0	7	1	7	0	0	8	15
01:30 PM	0	0	0	0	0	0	0	1	0	1	0	4	3	0	7	0	7	0	0	7	15
01:45 PM	0	0	0	0	0	1	0	0	0	1	0	8	0	0	8	0	8	0	0	8	17
Total	0	0	0	0	0	1	0	1	0	2	0	23	4	0	27	1	31	0	0	32	61
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	5	0	0	5	11
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	4	0	0	4	12
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	2	0	0	2	8
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	6	0	0	6	12
Total	0	0	0	0	0	0	0	0	0	0	0	26	0	0	26	0	17	0	0	17	43
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	6	0	0	6	8
03:15 PM	0	0	0	0	0	0	0	2	0	2	0	4	3	0	7	0	9	0	0	9	18
03:30 PM	0	0	0	0	0	1	0	1	0	2	0	5	0	0	5	0	10	0	0	10	17
03:45 PM	0	0	0	0	0	1	0	0	0	1	0	3	0	0	3	1	3	0	0	4	8
Total	0	0	0	0	0	2	0	3	0	5	0	14	3	0	17	1	28	0	0	29	51
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	5	1	0	6	1	7	0	0	8	14
04:15 PM	0	0	0	0	0	1	0	1	0	2	0	6	1	0	7	0	10	0	0	10	19
04:30 PM	0	0	1	0	1	0	0	2	0	2	0	4	0	0	4	1	6	1	0	8	15
04:45 PM	0	0	0	0	0	0	0	2	0	2	0	4	0	0	4	0	2	0	0	2	8
Total	0	0	1	0	1	1	0	5	0	6	0	19	2	0	21	2	25	1	0	28	56
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	1	3	0	0	4	10
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	6	0	0	6	8
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	4
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	3
Total	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	1	15	0	0	16	25
Grand Total	0	0	1	0	1	12	0	23	0	35	0	286	23	0	309	15	279	1	0	295	640
Apprch %	0	0	100	0		34.3	0	65.7	0		0	92.6	7.4	0		5.1	94.6	0.3	0		
Total %	0	0	0.2	0	0.2	1.9	0	3.6	0	5.5	0	44.7	3.6	0	48.3	2.3	43.6	0.2	0	46.1	

Peggy Malone & Associates, Inc.

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	Business Driveway Eastbound				Sugar Hill Rd. Westbound				Rt. 17/Carrollton Blvd. Northbound				Rt. 17/Carrollton Blvd. Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:15 AM																	
10:15 AM	0	0	0	0	**1**	0	0	**1**	0	**14**	1	**15**	**1**	4	0	5	21
10:30 AM	0	0	0	0	1	0	0	1	0	6	0	6	0	9	0	9	16
10:45 AM	0	0	0	0	0	0	0	0	0	13	0	13	0	9	0	9	**22**
11:00 AM	0	0	0	0	0	0	**1**	1	0	5	**2**	7	0	**12**	0	**12**	20
Total Volume	0	0	0	0	2	0	1	3	0	38	3	41	1	34	0	35	79
% App. Total	0	0	0		66.7	0	33.3		0	92.7	7.3		2.9	97.1	0		
PHF	.000	.000	.000	.000	.500	.000	.250	.750	.000	.679	.375	.683	.250	.708	.000	.729	.898
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	0	0	0	0	0	0	0	0	0	5	0	5	0	**9**	0	**9**	14
01:15 PM	0	0	0	0	0	0	0	0	0	6	1	7	**1**	7	0	8	15
01:30 PM	0	0	0	0	0	0	**1**	**1**	0	4	**3**	7	0	7	0	7	15
01:45 PM	0	0	0	0	**1**	0	0	1	0	**8**	0	**8**	0	8	0	8	**17**
Total Volume	0	0	0	0	1	0	1	2	0	23	4	27	1	31	0	32	61
% App. Total	0	0	0		50	0	50		0	85.2	14.8		3.1	96.9	0		
PHF	.000	.000	.000	.000	.250	.000	.250	.500	.000	.719	.333	.844	.250	.861	.000	.889	.897

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Groups Printed- Combined

	Business Driveway Eastbound					Sugar Hill Rd. Westbound					Rt. 17/Carrollton Blvd. Northbound					Rt. 17/Carrollton Blvd. Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	0	0	0	0	5	0	16	0	21	1	57	0	0	58	2	81	0	0	83	162
06:15 AM	0	0	0	0	0	11	0	19	0	30	0	106	3	0	109	0	131	0	0	131	270
06:30 AM	0	0	0	0	0	8	0	17	0	25	0	85	2	0	87	5	145	0	0	150	262
06:45 AM	0	0	0	0	0	12	0	22	0	34	0	105	5	0	110	2	141	1	0	144	288
Total	0	0	0	0	0	36	0	74	0	110	1	353	10	0	364	9	498	1	0	508	982
07:00 AM	0	0	0	0	0	8	0	34	0	42	2	114	5	0	121	11	124	1	0	136	299
07:15 AM	1	0	0	0	1	23	0	28	0	51	0	113	8	0	121	9	153	0	0	162	335
07:30 AM	0	0	1	0	1	24	0	28	0	52	1	120	2	0	123	10	172	0	0	182	358
07:45 AM	1	0	0	0	1	16	0	28	0	44	0	129	3	0	132	11	134	0	0	145	322
Total	2	0	1	0	3	71	0	118	0	189	3	476	18	0	497	41	583	1	0	625	1314
08:00 AM	0	0	0	0	0	14	0	22	0	36	0	107	0	0	107	6	108	0	0	114	257
08:15 AM	1	0	0	0	1	18	0	26	0	44	0	98	5	0	103	4	90	0	0	94	242
08:30 AM	0	0	0	0	0	6	0	17	0	23	0	93	3	0	96	11	117	0	0	128	247
08:45 AM	0	0	0	0	0	9	0	15	0	24	0	94	2	0	96	12	122	0	0	134	254
Total	1	0	0	0	1	47	0	80	0	127	0	392	10	0	402	33	437	0	0	470	1000
09:00 AM	0	0	0	0	0	4	0	6	0	10	0	89	3	0	92	11	110	0	0	121	223
09:15 AM	0	0	0	0	0	4	0	12	0	16	0	71	8	0	79	5	85	0	0	90	185
09:30 AM	0	0	0	0	0	7	0	16	0	23	0	70	2	0	72	7	101	0	0	108	203
09:45 AM	0	0	0	0	0	7	0	12	0	19	0	80	5	0	85	9	96	0	0	105	209
Total	0	0	0	0	0	22	0	46	0	68	0	310	18	0	328	32	392	0	0	424	820
10:00 AM	0	0	0	0	0	10	0	8	0	18	0	57	12	0	69	11	85	0	0	96	183
10:15 AM	0	0	0	0	0	4	0	6	0	10	0	70	5	0	75	8	77	0	0	85	170
10:30 AM	0	0	0	0	0	2	0	12	0	14	0	72	3	0	75	10	96	0	0	106	195
10:45 AM	0	0	0	0	0	4	0	7	0	11	1	87	4	0	92	9	92	0	0	101	204
Total	0	0	0	0	0	20	0	33	0	53	1	286	24	0	311	38	350	0	0	388	752
11:00 AM	0	0	0	0	0	5	0	5	0	10	1	65	9	0	75	3	97	0	0	100	185
11:15 AM	0	0	0	0	0	8	0	11	0	19	0	79	6	0	85	9	98	0	0	107	211
11:30 AM	0	0	0	0	0	8	0	11	0	19	0	123	3	0	126	2	83	0	0	85	230
11:45 AM	1	0	0	0	1	6	0	10	0	16	0	82	4	0	86	7	96	0	0	103	206
Total	1	0	0	0	1	27	0	37	0	64	1	349	22	0	372	21	374	0	0	395	832
12:00 PM	0	0	0	0	0	4	0	5	0	9	1	84	10	0	95	13	62	0	0	75	179
12:15 PM	0	0	0	0	0	3	0	9	0	12	0	91	10	0	101	10	100	0	0	110	223
12:30 PM	0	0	0	0	0	11	0	4	0	15	2	68	5	0	75	12	88	0	0	100	190
12:45 PM	0	0	0	0	0	6	0	6	0	12	0	103	7	0	110	15	91	0	0	106	228
Total	0	0	0	0	0	24	0	24	0	48	3	346	32	0	381	50	341	0	0	391	820
01:00 PM	0	0	0	0	0	3	0	8	0	11	0	86	7	0	93	10	74	0	0	84	188
01:15 PM	0	0	1	0	1	8	0	9	0	17	0	90	4	0	94	13	97	1	0	111	223
01:30 PM	0	0	0	0	0	0	0	5	0	5	0	74	15	0	89	9	77	0	0	86	180
01:45 PM	0	0	0	0	0	4	0	7	0	11	0	115	5	0	120	10	101	0	0	111	242
Total	0	0	1	0	1	15	0	29	0	44	0	365	31	0	396	42	349	1	0	392	833
02:00 PM	0	0	0	0	0	5	0	9	0	14	2	76	5	0	83	8	72	0	0	80	177
02:15 PM	0	0	0	0	0	3	0	10	0	13	1	109	5	0	115	8	102	0	0	110	238
02:30 PM	0	0	0	0	0	10	0	12	0	22	0	84	1	0	85	10	67	0	0	77	184
02:45 PM	0	0	0	0	0	4	0	7	0	11	0	110	4	0	114	15	95	0	0	110	235
Total	0	0	0	0	0	22	0	38	0	60	3	379	15	0	397	41	336	0	0	377	834
03:00 PM	0	0	0	0	0	11	0	13	0	24	0	115	6	0	121	18	111	0	0	129	274
03:15 PM	0	0	0	0	0	5	1	13	0	19	3	117	16	0	136	24	123	0	0	147	302
03:30 PM	1	1	0	0	2	2	0	21	0	23	1	153	12	0	166	17	109	0	0	126	317
03:45 PM	0	0	0	0	0	4	0	12	0	16	0	156	11	0	167	24	130	0	0	154	337
Total	1	1	0	0	2	22	1	59	0	82	4	541	45	0	590	83	473	0	0	556	1230
04:00 PM	0	0	0	0	0	2	0	11	0	13	0	139	10	0	149	27	164	0	0	191	353
04:15 PM	0	0	0	0	0	6	0	14	0	20	0	178	13	0	191	28	163	1	0	192	403
04:30 PM	1	0	1	0	2	9	0	15	0	24	0	159	19	0	178	29	178	1	0	208	412
04:45 PM	0	0	1	0	1	8	0	21	0	29	0	144	18	0	162	32	172	0	0	204	396
Total	1	0	2	0	3	25	0	61	0	86	0	620	60	0	680	116	677	2	0	795	1564
05:00 PM	0	0	0	0	0	6	0	25	0	31	1	184	12	0	197	39	164	0	0	203	431
05:15 PM	0	0	0	0	0	1	0	10	0	11	1	147	15	0	163	32	154	0	0	186	360
05:30 PM	0	0	0	0	0	8	0	15	0	23	0	123	20	0	143	36	145	1	0	182	348
05:45 PM	0	0	0	0	0	7	0	19	0	26	0	127	17	0	144	31	136	0	0	167	337
Total	0	0	0	0	0	22	0	69	0	91	2	581	64	0	647	138	599	1	0	738	1476
Grand Total	6	1	4	0	11	353	1	668	0	1022	18	4998	349	0	5365	644	5409	6	0	6059	12457
Apprch %	54.5	9.1	36.4	0		34.5	0.1	65.4	0		0.3	93.2	6.5	0		10.6	89.3	0.1	0		
Total %	0	0	0	0	0.1	2.8	0	5.4	0	8.2	0.1	40.1	2.8	0	43.1	5.2	43.4	0	0	48.6	

Peggy Malone & Associates, Inc.

File Name : Rt. 17 and Sugar Hill Rd.
Site Code :
Start Date : 1/14/2014
Page No : 2

	Business Driveway Eastbound				Sugar Hill Rd. Westbound				Rt. 17/Carrollton Blvd. Northbound				Rt. 17/Carrollton Blvd. Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	8	0	**34**	42	**2**	114	5	121	**11**	124	**1**	136	299
07:15 AM	**1**	0	0	**1**	23	0	28	51	0	113	**8**	121	9	153	0	162	335
07:30 AM	0	0	**1**	1	**24**	0	28	**52**	1	120	2	123	10	**172**	0	**182**	**358**
07:45 AM	1	0	0	1	16	0	28	44	0	**129**	3	**132**	11	134	0	145	322
Total Volume	2	0	1	3	71	0	118	189	3	476	18	497	41	583	1	625	1314
% App. Total	66.7	0	33.3		37.6	0	62.4		0.6	95.8	3.6		6.6	93.3	0.2		
PHF	.500	.000	.250	.750	.740	.000	.868	.909	.375	.922	.563	.941	.932	.847	.250	.859	.918
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	6	0	14	20	0	178	13	191	28	163	**1**	192	403
04:30 PM	**1**	0	**1**	**2**	**9**	0	15	24	0	159	**19**	178	29	**178**	1	**208**	412
04:45 PM	0	0	1	1	8	0	21	29	0	144	18	162	32	172	0	204	396
05:00 PM	0	0	0	0	6	0	**25**	**31**	**1**	**184**	12	**197**	**39**	164	0	203	**431**
Total Volume	1	0	2	3	29	0	75	104	1	665	62	728	128	677	2	807	1642
% App. Total	33.3	0	66.7		27.9	0	72.1		0.1	91.3	8.5		15.9	83.9	0.2		
PHF	.250	.000	.500	.375	.806	.000	.750	.839	.250	.904	.816	.924	.821	.951	.500	.970	.952

Attachment 2

Peak Hour Turning Movement Counts, March 3, 2015

Peggy Malone & Associates, Inc.
(888) 247-8602

File Name : TM1-Carrolton Blvd. and Cedar Grove Rd. AM
Site Code :
Start Date : 3/3/2015
Page No : 1

Groups Printed- Car

	Carrolton Blvd. Southbound					Carrolton Blvd. Northbound				Cedar Grove Rd. Eastbound				
Start Time	Right	Thru	U-turns	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
06:30 AM	0	116	0	0	116	86	2	0	88	11	16	0	27	231
06:45 AM	1	152	0	0	153	84	1	0	85	4	18	0	22	260
Total	1	268	0	0	269	170	3	0	173	15	34	0	49	491
07:00 AM	1	124	0	0	125	94	3	0	97	10	26	0	36	258
07:15 AM	4	164	0	0	168	85	1	0	86	14	14	0	28	282
07:30 AM	7	156	0	0	163	104	0	0	104	12	19	0	31	298
07:45 AM	2	133	1	0	136	106	5	0	111	1	23	0	24	271
Total	14	577	1	0	592	389	9	0	398	37	82	0	119	1109
08:00 AM	1	117	0	0	118	111	0	0	111	6	18	0	24	253
08:15 AM	3	125	1	0	129	87	3	0	90	4	10	0	14	233
Grand Total	19	1087	2	0	1108	757	15	0	772	62	144	0	206	2086
Apprch %	1.7	98.1	0.2	0		98.1	1.9	0		30.1	69.9	0		
Total %	0.9	52.1	0.1	0	53.1	36.3	0.7	0	37	3	6.9	0	9.9	

	Carrolton Blvd. Southbound				Carrolton Blvd. Northbound			Cedar Grove Rd. Eastbound			
Start Time	Right	Thru	U-turns	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:00 AM											
07:00 AM	1	124	0	125	94	3	97	10	**26**	**36**	258
07:15 AM	4	**164**	0	**168**	85	1	86	**14**	14	28	282
07:30 AM	**7**	156	0	163	104	0	104	12	19	31	**298**
07:45 AM	2	133	**1**	136	**106**	**5**	**111**	1	23	24	271
Total Volume	14	577	1	592	389	9	398	37	82	119	1109
% App. Total	2.4	97.5	0.2		97.7	2.3		31.1	68.9		
PHF	.500	.880	.250	.881	.917	.450	.896	.661	.788	.826	.930

Peggy Malone & Associates, Inc.
(888) 247-8602

File Name : TM1-Carrolton Blvd. and Cedar Grove Rd. AM
Site Code :
Start Date : 3/3/2015

Groups Printed- Truck

	Carrolton Blvd. Southbound					Carrolton Blvd. Northbound				Cedar Grove Rd. Eastbound				
Start Time	Right	Thru	U-turns	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
06:30 AM	2	3	0	0	5	3	0	0	3	0	0	0	0	8
06:45 AM	0	4	0	0	4	5	0	0	5	0	2	0	2	11
Total	2	7	0	0	9	8	0	0	8	0	2	0	2	19
07:00 AM	1	2	0	0	3	6	0	0	6	0	0	0	0	9
07:15 AM	0	0	0	0	0	9	0	0	9	1	0	0	1	10
07:30 AM	0	5	0	0	5	5	1	0	6	0	0	0	0	11
07:45 AM	3	10	0	0	13	8	0	0	8	0	1	0	1	22
Total	4	17	0	0	21	28	1	0	29	1	1	0	2	52
08:00 AM	0	6	0	0	6	9	0	0	9	1	2	0	3	18
08:15 AM	1	9	0	0	10	7	0	0	7	0	0	0	0	17
Grand Total	7	39	0	0	46	52	1	0	53	2	5	0	7	106
Apprch %	15.2	84.8	0	0		98.1	1.9	0		28.6	71.4	0		
Total %	6.6	36.8	0	0	43.4	49.1	0.9	0	50	1.9	4.7	0	6.6	

	Carrolton Blvd. Southbound				Carrolton Blvd. Northbound			Cedar Grove Rd. Eastbound			
Start Time	Right	Thru	U-turns	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:30 AM											
07:30 AM	0	5	0	5	5	**1**	6	0	0	0	11
07:45 AM	**3**	**10**	0	**13**	8	0	8	0	1	1	**22**
08:00 AM	0	6	0	6	**9**	0	**9**	**1**	**2**	**3**	18
08:15 AM	1	9	0	10	7	0	7	0	0	0	17
Total Volume	4	30	0	34	29	1	30	1	3	4	68
% App. Total	11.8	88.2	0		96.7	3.3		25	75		
PHF	.333	.750	.000	.654	.806	.250	.833	.250	.375	.333	.773

Peggy Malone & Associates, Inc.
(888) 247-8602

File Name : TM1-Carrolton Blvd. and Cedar Grove Rd. AM
Site Code :
Start Date : 3/3/2015
Page No : 1

Groups Printed- Combined

	Carrolton Blvd. Southbound					Carrolton Blvd. Northbound				Cedar Grove Rd. Eastbound				
Start Time	Right	Thru	U-turns	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
06:30 AM	2	119	0	0	121	89	2	0	91	11	16	0	27	239
06:45 AM	1	156	0	0	157	89	1	0	90	4	20	0	24	271
Total	3	275	0	0	278	178	3	0	181	15	36	0	51	510
07:00 AM	2	126	0	0	128	100	3	0	103	10	26	0	36	267
07:15 AM	4	164	0	0	168	94	1	0	95	15	14	0	29	292
07:30 AM	7	161	0	0	168	109	1	0	110	12	19	0	31	309
07:45 AM	5	143	1	0	149	114	5	0	119	1	24	0	25	293
Total	18	594	1	0	613	417	10	0	427	38	83	0	121	1161
08:00 AM	1	123	0	0	124	120	0	0	120	7	20	0	27	271
08:15 AM	4	134	1	0	139	94	3	0	97	4	10	0	14	250
Grand Total	26	1126	2	0	1154	809	16	0	825	64	149	0	213	2192
Apprch %	2.3	97.6	0.2	0		98.1	1.9	0		30	70	0		
Total %	1.2	51.4	0.1	0	52.6	36.9	0.7	0	37.6	2.9	6.8	0	9.7	

	Carrolton Blvd. Southbound				Carrolton Blvd. Northbound			Cedar Grove Rd. Eastbound			
Start Time	Right	Thru	U-turns	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:15 AM											
07:15 AM	4	**164**	0	**168**	94	1	95	**15**	14	29	292
07:30 AM	**7**	161	0	168	109	1	110	12	19	**31**	**309**
07:45 AM	5	143	**1**	149	114	**5**	119	1	**24**	25	293
08:00 AM	1	123	0	124	**120**	0	**120**	7	20	27	271
Total Volume	17	591	1	609	437	7	444	35	77	112	1165
% App. Total	2.8	97	0.2		98.4	1.6		31.2	68.8		
PHF	.607	.901	.250	.906	.910	.350	.925	.583	.802	.903	.943

Peggy Malone & Associates, Inc.
(888) 247-8602

File Name : TM1-Carrolton Blvd. and Cedar Grove Rd. PM
Site Code :
Start Date : 3/3/2015
Page No : 1

Groups Printed- Car

	Carrolton Blvd. Southbound					Carrolton Blvd. Northbound				Cedar Grove Rd. Eastbound				
Start Time	Right	Thru	U-turns	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
04:00 PM	22	137	0	0	159	151	6	0	157	3	6	0	9	325
04:15 PM	21	167	0	0	188	149	6	0	155	4	9	0	13	356
04:30 PM	20	164	2	0	186	157	3	0	160	3	7	0	10	356
04:45 PM	16	172	1	0	189	167	10	0	177	6	7	0	13	379
Total	79	640	3	0	722	624	25	0	649	16	29	0	45	1416
05:00 PM	33	163	1	0	197	175	9	0	184	1	9	0	10	391
05:15 PM	14	139	0	0	153	171	9	0	180	3	14	0	17	350
05:30 PM	14	164	0	0	178	166	9	0	175	1	11	0	12	365
05:45 PM	26	119	0	0	145	183	9	0	192	7	10	0	17	354
Total	87	585	1	0	673	695	36	0	731	12	44	0	56	1460
Grand Total	166	1225	4	0	1395	1319	61	0	1380	28	73	0	101	2876
Apprch %	11.9	87.8	0.3	0		95.6	4.4	0		27.7	72.3	0		
Total %	5.8	42.6	0.1	0	48.5	45.9	2.1	0	48	1	2.5	0	3.5	

	Carrolton Blvd. Southbound				Carrolton Blvd. Northbound			Cedar Grove Rd. Eastbound			
Start Time	Right	Thru	U-turns	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:45 PM											
04:45 PM	16	**172**	**1**	189	167	**10**	177	**6**	7	13	379
05:00 PM	**33**	163	1	**197**	**175**	9	**184**	1	9	10	**391**
05:15 PM	14	139	0	153	171	9	180	3	**14**	**17**	350
05:30 PM	14	164	0	178	166	9	175	1	11	12	365
Total Volume	77	638	2	717	679	37	716	11	41	52	1485
% App. Total	10.7	89	0.3		94.8	5.2		21.2	78.8		
PHF	.583	.927	.500	.910	.970	.925	.973	.458	.732	.765	.949

Peggy Malone & Associates, Inc.
(888) 247-8602

File Name : TM1-Carrolton Blvd. and Cedar Grove Rd. PM
Site Code :
Start Date : 3/3/2015

Groups Printed- Truck

	Carrolton Blvd. Southbound					Carrolton Blvd. Northbound				Cedar Grove Rd. Eastbound				
Start Time	Right	Thru	U-turns	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
04:00 PM	0	7	0	0	7	5	0	0	5	0	1	0	1	13
04:15 PM	1	5	0	0	6	6	0	0	6	0	0	0	0	12
04:30 PM	2	3	0	0	5	5	0	0	5	1	0	0	1	11
04:45 PM	0	3	0	0	3	8	0	0	8	0	2	0	2	13
Total	3	18	0	0	21	24	0	0	24	1	3	0	4	49
05:00 PM	0	6	0	0	6	2	0	0	2	0	0	0	0	8
05:15 PM	0	1	0	0	1	6	0	0	6	0	0	0	0	7
05:30 PM	0	2	0	0	2	3	0	0	3	0	0	0	0	5
05:45 PM	0	1	0	0	1	2	0	0	2	0	0	0	0	3
Total	0	10	0	0	10	13	0	0	13	0	0	0	0	23
Grand Total	3	28	0	0	31	37	0	0	37	1	3	0	4	72
Apprch %	9.7	90.3	0	0		100	0	0		25	75	0		
Total %	4.2	38.9	0	0	43.1	51.4	0	0	51.4	1.4	4.2	0	5.6	

	Carrolton Blvd. Southbound				Carrolton Blvd. Northbound			Cedar Grove Rd. Eastbound			
Start Time	Right	Thru	U-turns	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:00 PM											
04:00 PM	0	**7**	0	**7**	5	0	5	0	1	1	**13**
04:15 PM	1	5	0	6	6	0	6	0	0	0	12
04:30 PM	**2**	3	0	5	5	0	5	**1**	0	1	11
04:45 PM	0	3	0	3	**8**	0	**8**	0	**2**	**2**	13
Total Volume	3	18	0	21	24	0	24	1	3	4	49
% App. Total	14.3	85.7	0		100	0		25	75		
PHF	.375	.643	.000	.750	.750	.000	.750	.250	.375	.500	.942

Peggy Malone & Associates, Inc.
(888) 247-8602

File Name : TM1-Carrolton Blvd. and Cedar Grove Rd. PM
Site Code :
Start Date : 3/3/2015

Groups Printed- Combined

	Carrolton Blvd. Southbound					Carrolton Blvd. Northbound				Cedar Grove Rd. Eastbound				
Start Time	Right	Thru	U-turns	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
04:00 PM	22	144	0	0	166	156	6	0	162	3	7	0	10	338
04:15 PM	22	172	0	0	194	155	6	0	161	4	9	0	13	368
04:30 PM	22	167	2	0	191	162	3	0	165	4	7	0	11	367
04:45 PM	16	175	1	0	192	175	10	0	185	6	9	0	15	392
Total	82	658	3	0	743	648	25	0	673	17	32	0	49	1465
05:00 PM	33	169	1	0	203	177	9	0	186	1	9	0	10	399
05:15 PM	14	140	0	0	154	177	9	0	186	3	14	0	17	357
05:30 PM	14	166	0	0	180	169	9	0	178	1	11	0	12	370
05:45 PM	26	120	0	0	146	185	9	0	194	7	10	0	17	357
Total	87	595	1	0	683	708	36	0	744	12	44	0	56	1483
Grand Total	169	1253	4	0	1426	1356	61	0	1417	29	76	0	105	2948
Apprch %	11.9	87.9	0.3	0		95.7	4.3	0		27.6	72.4	0		
Total %	5.7	42.5	0.1	0	48.4	46	2.1	0	48.1	1	2.6	0	3.6	

	Carrolton Blvd. Southbound				Carrolton Blvd. Northbound			Cedar Grove Rd. Eastbound			
Start Time	Right	Thru	U-turns	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:15 PM											
04:15 PM	22	172	0	194	155	6	161	4	**9**	13	368
04:30 PM	22	167	**2**	191	162	3	165	4	7	11	367
04:45 PM	16	**175**	1	192	175	**10**	185	**6**	9	**15**	392
05:00 PM	**33**	169	1	**203**	**177**	9	**186**	1	9	10	**399**
Total Volume	93	683	4	780	669	28	697	15	34	49	1526
% App. Total	11.9	87.6	0.5		96	4		30.6	69.4		
PHF	.705	.976	.500	.961	.945	.700	.937	.625	.944	.817	.956

Peggy Malone & Associates, Inc.
(888) 247-8602

File Name : TM2-Carrolton Blvd. and Ashby Way_Omera Dr. AM
Site Code :
Start Date : 3/3/2015

Groups Printed- Car

	Carrolton Blvd. Southbound					Omera Dr. Westbound					Carrolton Blvd. Northbound					Ashby Way Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	1	134	2	0	137	12	0	6	0	18	0	119	0	0	119	5	0	23	0	28	302
06:45 AM	1	128	11	0	140	5	0	9	0	14	0	117	2	0	119	5	2	15	0	22	295
Total	2	262	13	0	277	17	0	15	0	32	0	236	2	0	238	10	2	38	0	50	597
07:00 AM	5	148	15	0	168	16	0	7	0	23	3	145	4	0	152	5	1	9	0	15	358
07:15 AM	0	162	8	0	170	13	0	9	0	22	1	114	3	0	118	6	0	15	0	21	331
07:30 AM	1	100	6	0	107	19	0	7	0	26	0	148	1	0	149	2	4	7	0	13	295
07:45 AM	3	132	6	0	141	19	1	7	0	27	2	146	4	0	152	4	0	13	0	17	337
Total	9	542	35	0	586	67	1	30	0	98	6	553	12	0	571	17	5	44	0	66	1321
08:00 AM	1	131	10	0	142	13	0	6	0	19	3	136	7	0	146	2	0	7	0	9	316
08:15 AM	4	105	8	0	117	8	0	8	0	16	2	108	3	0	113	4	1	5	0	10	256
Grand Total	16	1040	66	0	1122	105	1	59	0	165	11	1033	24	0	1068	33	8	94	0	135	2490
Apprch %	1.4	92.7	5.9	0		63.6	0.6	35.8	0		1	96.7	2.2	0		24.4	5.9	69.6	0		
Total %	0.6	41.8	2.7	0	45.1	4.2	0	2.4	0	6.6	0.4	41.5	1	0	42.9	1.3	0.3	3.8	0	5.4	

	Carrolton Blvd. Southbound				Omera Dr. Westbound				Carrolton Blvd. Northbound				Ashby Way Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**5**	148	**15**	168	16	0	7	23	**3**	145	**4**	**152**	5	1	9	15	**358**
07:15 AM	0	**162**	8	**170**	13	0	**9**	22	1	114	3	118	**6**	0	**15**	**21**	331
07:30 AM	1	100	6	107	**19**	0	7	26	0	**148**	1	149	2	**4**	7	13	295
07:45 AM	3	132	6	141	19	**1**	7	**27**	2	146	4	152	4	0	13	17	337
Total Volume	9	542	35	586	67	1	30	98	6	553	12	571	17	5	44	66	1321
% App. Total	1.5	92.5	6		68.4	1	30.6		1.1	96.8	2.1		25.8	7.6	66.7		
PHF	.450	.836	.583	.862	.882	.250	.833	.907	.500	.934	.750	.939	.708	.313	.733	.786	.922

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File Name : TM2-Carrolton Blvd. and Ashby Way_Omera Dr. AM
Site Code :
Start Date : 3/3/2015

Groups Printed- Truck

	Carrolton Blvd. Southbound					Omera Dr. Westbound					Carrolton Blvd. Northbound					Ashby Way Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	0	3	0	0	3	0	0	0	0	0	0	1	1	0	2	0	0	1	0	1	6
06:45 AM	0	0	1	0	1	1	0	0	0	1	1	6	0	0	7	0	0	0	0	0	9
Total	0	3	1	0	4	1	0	0	0	1	1	7	1	0	9	0	0	1	0	1	15
07:00 AM	0	1	0	0	1	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	9
07:15 AM	2	7	1	0	10	1	0	0	0	1	0	10	0	0	10	1	0	0	0	1	22
07:30 AM	0	7	1	0	8	0	0	0	0	0	0	5	0	0	5	1	0	0	0	1	14
07:45 AM	0	6	1	0	7	0	0	1	0	1	0	8	0	0	8	0	0	0	0	0	16
Total	2	21	3	0	26	1	0	1	0	2	0	31	0	0	31	2	0	0	0	2	61
08:00 AM	0	7	1	0	8	1	0	0	0	1	1	8	0	0	9	0	0	0	0	0	18
08:15 AM	0	10	1	0	11	4	0	1	0	5	2	6	0	0	8	0	0	0	0	0	24
Grand Total	2	41	6	0	49	7	0	2	0	9	4	52	1	0	57	2	0	1	0	3	118
Apprch %	4.1	83.7	12.2	0		77.8	0	22.2	0		7	91.2	1.8	0		66.7	0	33.3	0		
Total %	1.7	34.7	5.1	0	41.5	5.9	0	1.7	0	7.6	3.4	44.1	0.8	0	48.3	1.7	0	0.8	0	2.5	

	Carrolton Blvd. Southbound				Omera Dr. Westbound				Carrolton Blvd. Northbound				Ashby Way Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	7	**1**	8	0	0	0	0	0	5	0	5	**1**	0	0	**1**	14
07:45 AM	0	6	1	7	0	0	**1**	1	0	**8**	0	8	0	0	0	0	16
08:00 AM	0	7	1	8	1	0	0	1	1	8	0	**9**	0	0	0	0	18
08:15 AM	0	**10**	1	**11**	**4**	0	1	**5**	**2**	6	0	8	0	0	0	0	**24**
Total Volume	0	30	4	34	5	0	2	7	3	27	0	30	1	0	0	1	72
% App. Total	0	88.2	11.8		71.4	0	28.6		10	90	0		100	0	0		
PHF	.000	.750	1.00	.773	.313	.000	.500	.350	.375	.844	.000	.833	.250	.000	.000	.250	.750

Peggy Malone & Associates, Inc.
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File Name : TM2-Carrolton Blvd. and Ashby Way_Omera Dr. AM
Site Code :
Start Date : 3/3/2015

Groups Printed- Combined

	Carrolton Blvd. Southbound					Omera Dr. Westbound					Carrolton Blvd. Northbound					Ashby Way Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	1	137	2	0	140	12	0	6	0	18	0	120	1	0	121	5	0	24	0	29	308
06:45 AM	1	128	12	0	141	6	0	9	0	15	1	123	2	0	126	5	2	15	0	22	304
Total	2	265	14	0	281	18	0	15	0	33	1	243	3	0	247	10	2	39	0	51	612
07:00 AM	5	149	15	0	169	16	0	7	0	23	3	153	4	0	160	5	1	9	0	15	367
07:15 AM	2	169	9	0	180	14	0	9	0	23	1	124	3	0	128	7	0	15	0	22	353
07:30 AM	1	107	7	0	115	19	0	7	0	26	0	153	1	0	154	3	4	7	0	14	309
07:45 AM	3	138	7	0	148	19	1	8	0	28	2	154	4	0	160	4	0	13	0	17	353
Total	11	563	38	0	612	68	1	31	0	100	6	584	12	0	602	19	5	44	0	68	1382
08:00 AM	1	138	11	0	150	14	0	6	0	20	4	144	7	0	155	2	0	7	0	9	334
08:15 AM	4	115	9	0	128	12	0	9	0	21	4	114	3	0	121	4	1	5	0	10	280
Grand Total	18	1081	72	0	1171	112	1	61	0	174	15	1085	25	0	1125	35	8	95	0	138	2608
Apprch %	1.5	92.3	6.1	0		64.4	0.6	35.1	0		1.3	96.4	2.2	0		25.4	5.8	68.8	0		
Total %	0.7	41.4	2.8	0	44.9	4.3	0	2.3	0	6.7	0.6	41.6	1	0	43.1	1.3	0.3	3.6	0	5.3	

	Carrolton Blvd. Southbound				Omera Dr. Westbound				Carrolton Blvd. Northbound				Ashby Way Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**5**	149	**15**	169	16	0	7	23	**3**	153	**4**	**160**	5	1	9	15	**367**
07:15 AM	2	**169**	9	**180**	14	0	**9**	23	1	124	3	128	**7**	0	**15**	**22**	353
07:30 AM	1	107	7	115	**19**	0	7	26	0	153	1	154	3	**4**	7	14	309
07:45 AM	3	138	7	148	19	**1**	8	**28**	2	**154**	4	160	4	0	13	17	353
Total Volume	11	563	38	612	68	1	31	100	6	584	12	602	19	5	44	68	1382
% App. Total	1.8	92	6.2		68	1	31		1	97	2		27.9	7.4	64.7		
PHF	.550	.833	.633	.850	.895	.250	.861	.893	.500	.948	.750	.941	.679	.313	.733	.773	.941

Peggy Malone & Associates, Inc.
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File Name : TM2-Carrolton Blvd. and Ashby Way_Omera Dr. PM
Site Code :
Start Date : 3/3/2015

Groups Printed- Car

	Carrolton Blvd. Southbound					Omera Dr. Westbound					Carrolton Blvd. Northbound					Ashby Way Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	8	168	22	0	198	21	1	9	0	31	1	152	10	0	163	8	1	9	0	18	410
04:15 PM	8	179	21	0	208	14	2	13	0	29	6	141	9	0	156	6	2	12	0	20	413
04:30 PM	14	209	22	0	245	10	1	11	0	22	4	167	14	0	185	3	2	11	0	16	468
04:45 PM	10	191	27	0	228	25	0	15	0	40	3	167	9	0	179	4	1	4	0	9	456
Total	40	747	92	0	879	70	4	48	0	122	14	627	42	0	683	21	6	36	0	63	1747
05:00 PM	18	196	30	0	244	16	2	10	0	28	5	189	13	0	207	5	0	6	0	11	490
05:15 PM	14	175	25	0	214	15	1	20	0	36	4	176	8	1	189	5	0	5	0	10	449
05:30 PM	14	156	14	0	184	25	0	9	0	34	1	169	6	0	176	4	0	10	0	14	408
05:45 PM	13	127	17	0	157	7	1	11	0	19	2	177	12	0	191	5	1	5	0	11	378
Total	59	654	86	0	799	63	4	50	0	117	12	711	39	1	763	19	1	26	0	46	1725
Grand Total	99	1401	178	0	1678	133	8	98	0	239	26	1338	81	1	1446	40	7	62	0	109	3472
Apprch %	5.9	83.5	10.6	0		55.6	3.3	41	0		1.8	92.5	5.6	0.1		36.7	6.4	56.9	0		
Total %	2.9	40.4	5.1	0	48.3	3.8	0.2	2.8	0	6.9	0.7	38.5	2.3	0	41.6	1.2	0.2	1.8	0	3.1	

	Carrolton Blvd. Southbound				Omera Dr. Westbound				Carrolton Blvd. Northbound				Ashby Way Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	14	**209**	22	**245**	10	1	11	22	4	167	**14**	185	3	**2**	**11**	**16**	468
04:45 PM	10	191	27	228	**25**	0	15	**40**	3	167	9	179	4	1	4	9	456
05:00 PM	**18**	196	**30**	244	16	**2**	10	28	**5**	**189**	13	**207**	**5**	0	6	11	**490**
05:15 PM	14	175	25	214	15	1	**20**	36	4	176	8	188	5	0	5	10	448
Total Volume	56	771	104	931	66	4	56	126	16	699	44	759	17	3	26	46	1862
% App. Total	6	82.8	11.2		52.4	3.2	44.4		2.1	92.1	5.8		37	6.5	56.5		
PHF	.778	.922	.867	.950	.660	.500	.700	.788	.800	.925	.786	.917	.850	.375	.591	.719	.950

Peggy Malone & Associates, Inc.
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File Name : TM2-Carrolton Blvd. and Ashby Way_Omera Dr. PM
Site Code :
Start Date : 3/3/2015

Groups Printed- Truck

	Carrolton Blvd. Southbound					Omera Dr. Westbound					Carrolton Blvd. Northbound					Ashby Way Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	1	5	0	0	6	0	0	0	0	0	0	5	0	0	5	1	0	0	0	1	12
04:15 PM	0	6	0	0	6	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	9
04:30 PM	0	1	0	0	1	1	0	0	0	1	1	4	0	0	5	0	0	0	0	0	7
04:45 PM	0	3	0	0	3	3	0	0	0	3	2	7	1	0	10	0	0	1	0	1	17
Total	1	15	0	0	16	4	0	0	0	4	3	19	1	0	23	1	0	1	0	2	45
05:00 PM	0	0	1	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
05:30 PM	0	4	0	0	4	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	6
05:45 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
Total	0	6	1	0	7	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	17
Grand Total	1	21	1	0	23	4	0	0	0	4	3	29	1	0	33	1	0	1	0	2	62
Apprch %	4.3	91.3	4.3	0		100	0	0	0		9.1	87.9	3	0		50	0	50	0		
Total %	1.6	33.9	1.6	0	37.1	6.5	0	0	0	6.5	4.8	46.8	1.6	0	53.2	1.6	0	1.6	0	3.2	

	Carrolton Blvd. Southbound				Omera Dr. Westbound				Carrolton Blvd. Northbound				Ashby Way Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	**1**	5	0	**6**	0	0	0	0	0	5	0	5	**1**	0	0	**1**	12
04:15 PM	0	**6**	0	6	0	0	0	0	0	3	0	3	0	0	0	0	9
04:30 PM	0	1	0	1	1	0	0	1	1	4	0	5	0	0	0	0	7
04:45 PM	0	3	0	3	**3**	0	0	**3**	**2**	**7**	**1**	**10**	0	0	**1**	1	**17**
Total Volume	1	15	0	16	4	0	0	4	3	19	1	23	1	0	1	2	45
% App. Total	6.2	93.8	0		100	0	0		13	82.6	4.3		50	0	50		
PHF	.250	.625	.000	.667	.333	.000	.000	.333	.375	.679	.250	.575	.250	.000	.250	.500	.662

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File Name : TM2-Carrolton Blvd. and Ashby Way_Omera Dr. PM
Site Code :
Start Date : 3/3/2015

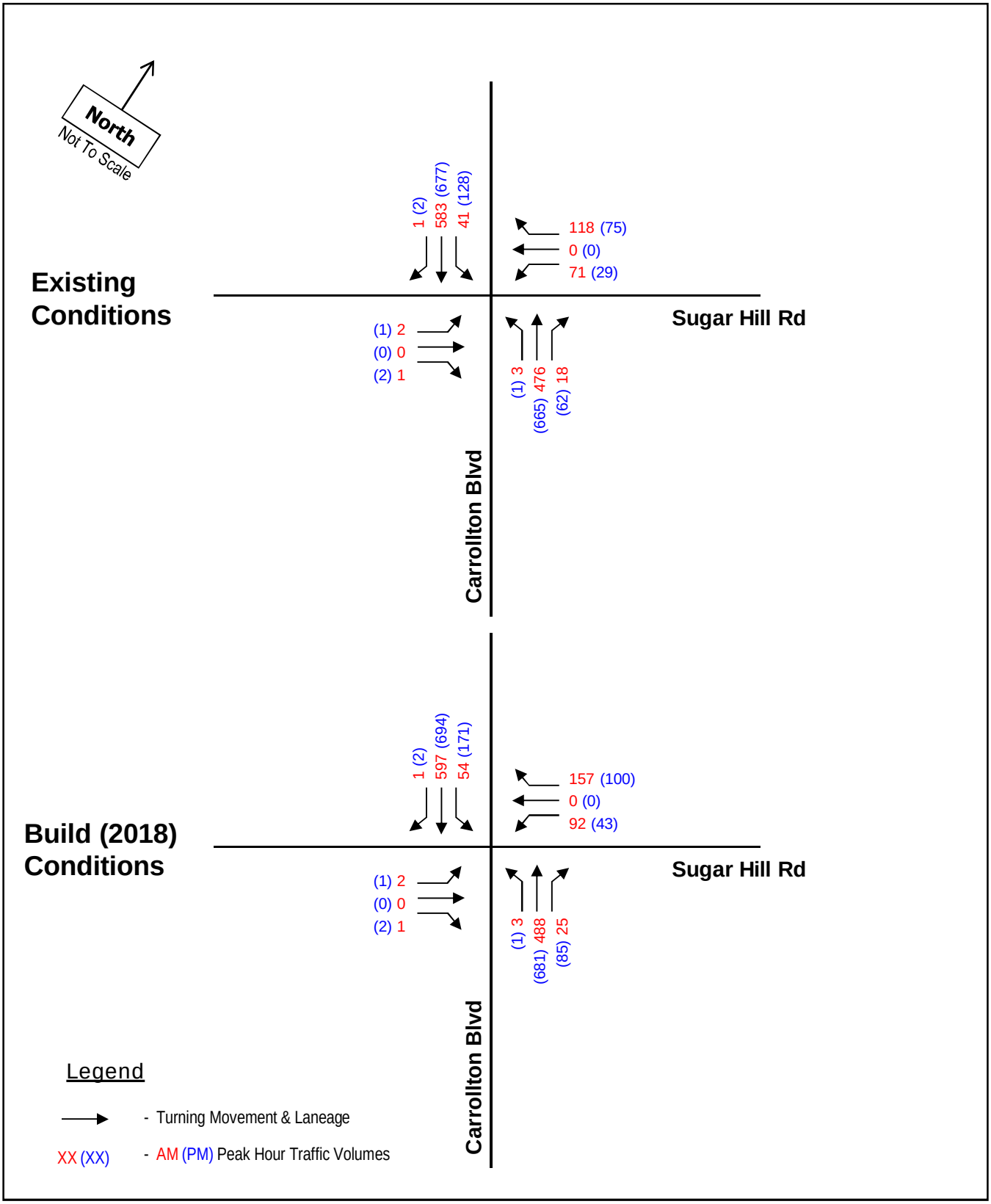
Groups Printed- Combined

	Carrolton Blvd. Southbound					Omera Dr. Westbound					Carrolton Blvd. Northbound					Ashby Way Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	9	173	22	0	204	21	1	9	0	31	1	157	10	0	168	9	1	9	0	19	422
04:15 PM	8	185	21	0	214	14	2	13	0	29	6	144	9	0	159	6	2	12	0	20	422
04:30 PM	14	210	22	0	246	11	1	11	0	23	5	171	14	0	190	3	2	11	0	16	475
04:45 PM	10	194	27	0	231	28	0	15	0	43	5	174	10	0	189	4	1	5	0	10	473
Total	41	762	92	0	895	74	4	48	0	126	17	646	43	0	706	22	6	37	0	65	1792
05:00 PM	18	196	31	0	245	16	2	10	0	28	5	192	13	0	210	5	0	6	0	11	494
05:15 PM	14	175	25	0	214	15	1	20	0	36	4	180	8	1	193	5	0	5	0	10	453
05:30 PM	14	160	14	0	188	25	0	9	0	34	1	171	6	0	178	4	0	10	0	14	414
05:45 PM	13	129	17	0	159	7	1	11	0	19	2	178	12	0	192	5	1	5	0	11	381
Total	59	660	87	0	806	63	4	50	0	117	12	721	39	1	773	19	1	26	0	46	1742
Grand Total	100	1422	179	0	1701	137	8	98	0	243	29	1367	82	1	1479	41	7	63	0	111	3534
Apprch %	5.9	83.6	10.5	0		56.4	3.3	40.3	0		2	92.4	5.5	0.1		36.9	6.3	56.8	0		
Total %	2.8	40.2	5.1	0	48.1	3.9	0.2	2.8	0	6.9	0.8	38.7	2.3	0	41.9	1.2	0.2	1.8	0	3.1	

	Carrolton Blvd. Southbound				Omera Dr. Westbound				Carrolton Blvd. Northbound				Ashby Way Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	14	**210**	22	**246**	11	1	11	23	**5**	171	**14**	190	3	**2**	**11**	**16**	475
04:45 PM	10	194	27	231	**28**	0	15	**43**	5	174	10	189	4	1	5	10	473
05:00 PM	**18**	196	**31**	245	16	**2**	10	28	5	**192**	13	**210**	**5**	0	6	11	**494**
05:15 PM	14	175	25	214	15	1	**20**	36	4	180	8	192	5	0	5	10	452
Total Volume	56	775	105	936	70	4	56	130	19	717	45	781	17	3	27	47	1894
% App. Total	6	82.8	11.2		53.8	3.1	43.1		2.4	91.8	5.8		36.2	6.4	57.4		
PHF	.778	.923	.847	.951	.625	.500	.700	.756	.950	.934	.804	.930	.850	.375	.614	.734	.959

Attachment 3

Peak Hour Volume Figures



Kimley»Horn	Sugar Hill Road Intersection Analysis Isle of Wight, VA	Existing (2014) and Build (2018) Volumes	FIGURE **1**

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

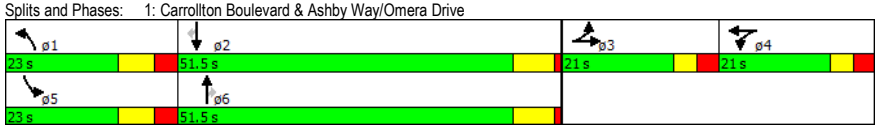
Attachment 4

Synchro Output Tables

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	5	19	31	1	68	12	584	6	38	563	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.879			0.908				0.850			0.850
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1805	1534	0	0	1672	0	1805	3438	1615	1671	3471	1369
Flt Permitted	0.950				0.985		0.950			0.950		
Satd. Flow (perm)	1805	1534	0	0	1672	0	1805	3438	1615	1671	3471	1369
Satd. Flow (RTOR)		25			75				159			159
Adj. Flow (vph)	57	6	25	35	1	76	13	621	6	45	662	13
Lane Group Flow (vph)	57	31	0	0	112	0	13	621	6	45	662	13
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Total Split (s)	21.0	21.0		21.0	21.0		23.0	51.5	51.5	23.0	51.5	51.5
Total Lost Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Act Effct Green (s)	10.1	10.1			10.1		9.0	31.5	31.5	9.5	37.7	37.7
Actuated g/C Ratio	0.15	0.15			0.15		0.13	0.46	0.46	0.14	0.55	0.55
v/c Ratio	0.21	0.12			0.36		0.05	0.39	0.01	0.19	0.34	0.02
Control Delay	35.0	18.3			18.7		36.9	20.6	0.0	36.3	14.6	0.0
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	18.3			18.7		36.9	20.6	0.0	36.3	14.6	0.0
LOS	D	B			B		D	C	A	D	B	A
Approach Delay		29.1			18.7			20.8			15.7	
Approach LOS		C			B			C			B	

Intersection Summary			
Cycle Length: 116.5			
Actuated Cycle Length: 68			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 52.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Carrollton Boulevard & Ashby Way/Omera Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	5	19	31	1	68	12	584	6	38	563	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.88			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1534			1672		1805	3438	1615	1671	3471	1369
Flt Permitted	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1534			1672		1805	3438	1615	1671	3471	1369
Peak-hour factor, PHF	0.77	0.77	0.77	0.89	0.89	0.89	0.94	0.94	0.94	0.85	0.85	0.85
Adj. Flow (vph)	57	6	25	35	1	76	13	621	6	45	662	13
RTOR Reduction (vph)	0	23	0	0	68	0	0	0	4	0	0	7
Lane Group Flow (vph)	57	8	0	0	44	0	13	621	2	45	662	6
Heavy Vehicles (%)	0%	0%	11%	3%	0%	1%	0%	5%	0%	8%	4%	18%
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	7.1	7.1			7.1		1.1	31.8	31.8	4.5	35.2	35.2
Effective Green, g (s)	7.1	7.1			7.1		1.1	31.8	31.8	4.5	35.2	35.2
Actuated g/C Ratio	0.09	0.09			0.09		0.01	0.41	0.41	0.06	0.46	0.46
Clearance Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Vehicle Extension (s)	4.0	4.0			4.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	166	141			154		25	1419	666	97	1586	625
v/s Ratio Prot	c0.03	0.01			c0.03		0.01	0.18		c0.03	c0.19	
v/s Ratio Perm									0.00			0.00
v/c Ratio	0.34	0.06			0.29		0.52	0.44	0.00	0.46	0.42	0.01
Uniform Delay, d1	32.8	31.9			32.6		37.7	16.2	13.3	35.1	14.0	11.4
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.2			1.4		18.1	0.5	0.0	3.5	0.4	0.0
Delay (s)	34.5	32.1			34.0		55.8	16.6	13.3	38.6	14.4	11.4
Level of Service	C	C			C		E	B	B	D	B	B
Approach Delay (s)		33.6			34.0			17.4			15.9	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	26.5	
Intersection Capacity Utilization	52.5%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	1	71	0	118	3	476	18	41	583	1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.966				0.850			0.850			
Flt Protected		0.964		0.950			0.950			0.950		
Satd. Flow (prot)	0	1769	0	1752	0	1568	1805	3406	1324	1719	3505	0
Flt Permitted		0.964		0.950			0.950			0.950		
Satd. Flow (perm)	0	1769	0	1752	0	1568	1805	3406	1324	1719	3505	0
Adj. Flow (vph)	3	0	1	78	0	130	3	506	19	48	678	1
Lane Group Flow (vph)	0	4	0	78	0	130	3	506	19	48	679	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 34.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	1	71	0	118	3	476	18	41	583	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.91	0.91	0.91	0.94	0.94	0.94	0.86	0.86	0.86
Hourly flow rate (vph)	3	0	1	78	0	130	3	506	19	48	678	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								Raised			Raised	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1163	1306	340	948	1287	253	679			526		
vC1, stage 1 conf vol	774	774		513	513							
vC2, stage 2 conf vol	389	532		436	774							
vCu, unblocked vol	1163	1306	340	948	1287	253	679			526		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	7.0	4.1			4.2		
tC, 2 stage (s)	6.5	5.5		6.6	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	76	100	83	100			95		
cM capacity (veh/h)	233	266	662	332	275	743	923			1017		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	4	78	130	3	253	253	19	48	452	227
Volume Left	3	78	0	3	0	0	0	48	0	0
Volume Right	1	0	130	0	0	0	19	0	0	1
cSH	297	332	743	923	1700	1700	1700	1017	1700	1700
Volume to Capacity	0.01	0.24	0.17	0.00	0.15	0.15	0.01	0.05	0.27	0.13
Queue Length 95th (ft)	1	22	16	0	0	0	0	4	0	0
Control Delay (s)	17.3	19.2	10.9	8.9	0.0	0.0	0.0	8.7	0.0	0.0
Lane LOS	C	C	B	A				A		
Approach Delay (s)	17.3	14.0		0.1				0.6		
Approach LOS	C	B								

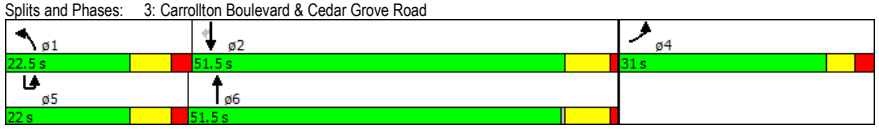
Intersection Summary					
Average Delay		2.3			
Intersection Capacity Utilization		34.8%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	77	35	7	437	0	591	17
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frt	0.958						0.850
Flt Protected	0.967		0.950				
Satd. Flow (prot)	1682	0	1583	3374	1900	3471	1369
Flt Permitted	0.967		0.950				
Satd. Flow (perm)	1682	0	1583	3374	1900	3471	1369
Satd. Flow (RTOR)	20						19
Adj. Flow (vph)	86	39	8	470	0	649	19
Lane Group Flow (vph)	125	0	8	470	0	649	19
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Total Split (s)	31.0		22.5	51.5	22.0	51.5	51.5
Total Lost Time (s)	6.0		7.5	6.5	7.0	6.5	6.5
Act Effct Green (s)	9.0		5.3	26.7		24.9	24.9
Actuated g/C Ratio	0.20		0.12	0.61		0.56	0.56
v/c Ratio	0.35		0.04	0.23		0.33	0.02
Control Delay	17.8		22.6	6.1		9.1	5.2
Queue Delay	0.0		0.0	0.0		0.0	0.0
Total Delay	17.8		22.6	6.1		9.1	5.2
LOS	B		C	A		A	A
Approach Delay	17.8			6.4		8.9	
Approach LOS	B			A		A	

Intersection Summary

Cycle Length: 105
Actuated Cycle Length: 44.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.35
Intersection Signal Delay: 8.9 — Intersection LOS: A
Intersection Capacity Utilization 33.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Carrollton Boulevard & Cedar Grove Road



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	77	35	7	437	0	591	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.5	6.5		6.5	6.5
Lane Util. Factor	1.00		1.00	0.95		0.95	1.00
Frt	0.96		1.00	1.00		1.00	0.85
Flt Protected	0.97		0.95	1.00		1.00	1.00
Satd. Flow (prot)	1682		1583	3374		3471	1369
Flt Permitted	0.97		0.95	1.00		1.00	1.00
Satd. Flow (perm)	1682		1583	3374		3471	1369
Peak-hour factor, PHF	0.90	0.90	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	86	39	8	470	0	649	19
RTOR Reduction (vph)	17	0	0	0	0	0	10
Lane Group Flow (vph)	108	0	8	470	0	649	9
Heavy Vehicles (%)	4%	6%	14%	7%	0%	4%	18%
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Actuated Green, G (s)	7.3		0.8	31.6		23.3	23.3
Effective Green, g (s)	7.3		0.8	31.6		23.3	23.3
Actuated g/C Ratio	0.14		0.02	0.61		0.45	0.45
Clearance Time (s)	6.0		7.5	6.5		6.5	6.5
Vehicle Extension (s)	3.0		2.0	5.0		5.0	5.0
Lane Grp Cap (vph)	238		24	2074		1573	620
v/s Ratio Prot	c0.06		0.01	c0.14		c0.19	
v/s Ratio Perm							0.01
v/c Ratio	0.45		0.33	0.23		0.41	0.01
Uniform Delay, d1	20.2		25.0	4.4		9.4	7.7
Progression Factor	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4		3.0	0.1		0.4	0.0
Delay (s)	21.6		28.0	4.5		9.8	7.7
Level of Service	C		C	A		A	A
Approach Delay (s)	21.6			4.9		9.8	
Approach LOS	C			A		A	

Intersection Summary

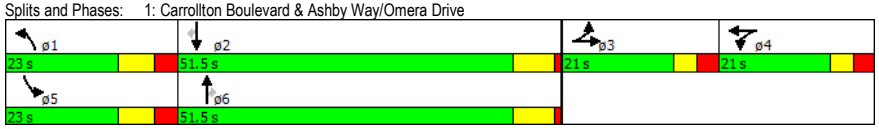
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	3	17	56	4	70	45	717	19	105	775	56
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.872			0.927				0.850			0.850
Flt Protected	0.950				0.979		0.950			0.950		
Satd. Flow (prot)	1736	1657	0	0	1670	0	1770	3505	1392	1787	3574	1615
Flt Permitted	0.950				0.979		0.950			0.950		
Satd. Flow (perm)	1736	1657	0	0	1670	0	1770	3505	1392	1787	3574	1615
Satd. Flow (RTOR)		23			41				159			159
Adj. Flow (vph)	37	4	23	74	5	92	48	771	20	111	816	59
Lane Group Flow (vph)	37	27	0	0	171	0	48	771	20	111	816	59
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Total Split (s)	21.0	21.0		21.0	21.0		23.0	51.5	51.5	23.0	51.5	51.5
Total Lost Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Act Effct Green (s)	10.0	10.0			13.2		9.9	30.8	30.8	11.9	36.1	36.1
Actuated g/C Ratio	0.12	0.12			0.16		0.12	0.37	0.37	0.14	0.43	0.43
v/c Ratio	0.18	0.12			0.57		0.23	0.60	0.03	0.44	0.53	0.07
Control Delay	43.8	20.9			39.0		44.8	26.4	0.1	45.6	21.5	0.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	20.9			39.0		44.8	26.4	0.1	45.6	21.5	0.2
LOS	D	C			D		D	C	A	D	C	A
Approach Delay		34.2			39.0			26.8			22.9	
Approach LOS		C			D			C			C	

Intersection Summary			
Cycle Length: 116.5			
Actuated Cycle Length: 83.3			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 26.2		Intersection LOS: C	
Intersection Capacity Utilization 59.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Carrollton Boulevard & Ashby Way/Omera Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	3	17	56	4	70	45	717	19	105	775	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	1657			1671		1770	3505	1392	1787	3574	1615
Flt Permitted	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1736	1657			1671		1770	3505	1392	1787	3574	1615
Peak-hour factor, PHF	0.73	0.73	0.73	0.76	0.76	0.76	0.93	0.93	0.93	0.95	0.95	0.95
Adj. Flow (vph)	37	4	23	74	5	92	48	771	20	111	816	59
RTOR Reduction (vph)	0	21	0	0	35	0	0	0	13	0	0	35
Lane Group Flow (vph)	37	6	0	0	136	0	48	771	7	111	816	24
Heavy Vehicles (%)	4%	0%	0%	0%	0%	6%	2%	3%	16%	1%	1%	0%
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	6.6	6.6			13.2		4.8	32.4	32.4	8.5	36.1	36.1
Effective Green, g (s)	6.6	6.6			13.2		4.8	32.4	32.4	8.5	36.1	36.1
Actuated g/C Ratio	0.08	0.08			0.15		0.06	0.37	0.37	0.10	0.41	0.41
Clearance Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Vehicle Extension (s)	4.0	4.0			4.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	131	125			252		97	1302	517	174	1479	668
v/s Ratio Prot	c0.02	0.00			c0.08		0.03	0.22		c0.06	c0.23	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.28	0.05			0.54		0.49	0.59	0.01	0.64	0.55	0.04
Uniform Delay, d1	38.1	37.4			34.2		40.0	22.1	17.3	37.9	19.4	15.2
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.2			2.9		3.9	1.1	0.0	7.5	0.8	0.0
Delay (s)	39.7	37.6			37.1		44.0	23.2	17.3	45.3	20.2	15.2
Level of Service	D	D			D		D	C	B	D	C	B
Approach Delay (s)		38.8			37.1			24.2			22.7	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	26.5
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	2	29	0	75	1	665	62	128	677	2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.916				0.850			0.850			
Flt Protected		0.982		0.950			0.950			0.950		
Satd. Flow (prot)	0	1302	0	1752	0	1509	1805	3505	1583	1770	3500	0
Flt Permitted		0.982		0.950			0.950			0.950		
Satd. Flow (perm)	0	1302	0	1752	0	1509	1805	3505	1583	1770	3500	0
Adj. Flow (vph)	3	0	5	35	0	89	1	723	67	132	698	2
Lane Group Flow (vph)	0	8	0	35	0	89	1	723	67	132	700	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 39.5%				ICU Level of Service A								
Analysis Period (min) 15												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	0	2	29	0	75	1	665	62	128	677	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.38	0.38	0.38	0.84	0.84	0.84	0.92	0.92	0.92	0.97	0.97	0.97
Hourly flow rate (vph)	3	0	5	35	0	89	1	723	67	132	698	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								Raised			Raised	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1416	1755	350	1343	1689	361	700			790		
vC1, stage 1 conf vol	963	963		725	725							
vC2, stage 2 conf vol	453	792		618	964							
vCu, unblocked vol	1416	1755	350	1343	1689	361	700			790		
tC, single (s)	7.5	6.5	7.9	7.6	6.5	7.0	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.6	5.5							
tF (s)	3.5	4.0	3.8	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	98	100	99	84	100	86	100			84		
cM capacity (veh/h)	160	159	526	213	190	621	906			826		

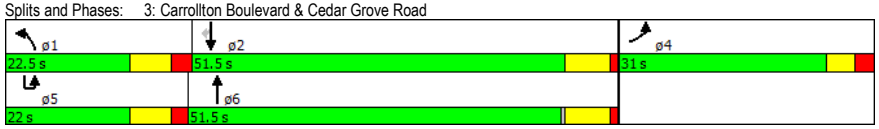
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	8	35	89	1	361	361	67	132	465	235
Volume Left	3	35	0	1	0	0	0	132	0	0
Volume Right	5	0	89	0	0	0	67	0	0	2
cSH	298	213	621	906	1700	1700	1700	826	1700	1700
Volume to Capacity	0.03	0.16	0.14	0.00	0.21	0.21	0.04	0.16	0.27	0.14
Queue Length 95th (ft)	2	14	12	0	0	0	0	14	0	0
Control Delay (s)	17.4	25.1	11.8	9.0	0.0	0.0	0.0	10.2	0.0	0.0
Lane LOS	C	D	B	A				B		
Approach Delay (s)	17.4	15.5		0.0				1.6		
Approach LOS	C	C								

Intersection Summary										
Average Delay			1.9							
Intersection Capacity Utilization			39.5%		ICU Level of Service				A	
Analysis Period (min)			15							

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	34	15	28	669	0	683	93
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frt	0.959						0.850
Flt Protected	0.966		0.950				
Satd. Flow (prot)	1656	0	1805	3505	1900	3539	1568
Flt Permitted	0.966		0.950				
Satd. Flow (perm)	1656	0	1805	3505	1900	3539	1568
Satd. Flow (RTOR)	18						97
Adj. Flow (vph)	41	18	30	712	0	711	97
Lane Group Flow (vph)	59	0	30	712	0	711	97
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Total Split (s)	31.0		22.5	51.5	22.0	51.5	51.5
Total Lost Time (s)	6.0		7.5	6.5	7.0	6.5	6.5
Act Effct Green (s)	8.0		5.9	38.5		34.0	34.0
Actuated g/C Ratio	0.16		0.12	0.78		0.69	0.69
v/c Ratio	0.21		0.14	0.26		0.29	0.09
Control Delay	19.5		26.1	3.8		8.3	3.2
Queue Delay	0.0		0.0	0.0		0.0	0.0
Total Delay	19.5		26.1	3.8		8.3	3.2
LOS	B		C	A		A	A
Approach Delay	19.5			4.7		7.7	
Approach LOS	B			A		A	

Intersection Summary			
Cycle Length: 105			
Actuated Cycle Length: 49.2			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.29			
Intersection Signal Delay: 6.8		Intersection LOS: A	
Intersection Capacity Utilization 39.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Carrollton Boulevard & Cedar Grove Road



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	34	15	28	669	0	683	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.5	6.5		6.5	6.5
Lane Util. Factor	1.00		1.00	0.95		0.95	1.00
Frt	0.96		1.00	1.00		1.00	0.85
Flt Protected	0.97		0.95	1.00		1.00	1.00
Satd. Flow (prot)	1656		1805	3505		3539	1568
Flt Permitted	0.97		0.95	1.00		1.00	1.00
Satd. Flow (perm)	1656		1805	3505		3539	1568
Peak-hour factor, PHF	0.82	0.82	0.94	0.94	0.96	0.96	0.96
Adj. Flow (vph)	41	18	30	712	0	711	97
RTOR Reduction (vph)	17	0	0	0	0	0	45
Lane Group Flow (vph)	42	0	30	712	0	711	52
Heavy Vehicles (%)	6%	7%	0%	3%	0%	2%	3%
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Actuated Green, G (s)	4.2		2.1	40.1		30.5	30.5
Effective Green, g (s)	4.2		2.1	40.1		30.5	30.5
Actuated g/C Ratio	0.07		0.04	0.71		0.54	0.54
Clearance Time (s)	6.0		7.5	6.5		6.5	6.5
Vehicle Extension (s)	3.0		2.0	5.0		5.0	5.0
Lane Grp Cap (vph)	122		66	2474		1900	841
v/s Ratio Prot	c0.03		0.02	c0.20		c0.20	
v/s Ratio Perm							0.03
v/c Ratio	0.35		0.45	0.29		0.37	0.06
Uniform Delay, d1	25.0		26.8	3.1		7.6	6.3
Progression Factor	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.7		1.8	0.1		0.3	0.1
Delay (s)	26.7		28.6	3.2		7.9	6.4
Level of Service	C		C	A		A	A
Approach Delay (s)	26.7			4.2		7.7	
Approach LOS	C			A		A	

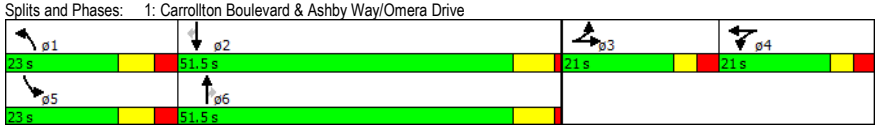
Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	5	19	31	1	68	12	634	6	38	587	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.882			0.908				0.850			0.850
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1805	1542	0	0	1672	0	1805	3438	1615	1671	3471	1369
Flt Permitted	0.950				0.985		0.950			0.950		
Satd. Flow (perm)	1805	1542	0	0	1672	0	1805	3438	1615	1671	3471	1369
Satd. Flow (RTOR)		22			75				159			159
Adj. Flow (vph)	52	6	22	35	1	76	13	674	6	45	691	13
Lane Group Flow (vph)	52	28	0	0	112	0	13	674	6	45	691	13
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Total Split (s)	21.0	21.0		21.0	21.0		23.0	51.5	51.5	23.0	51.5	51.5
Total Lost Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Act Effct Green (s)	10.0	10.0			10.2		9.0	33.3	33.3	9.6	39.5	39.5
Actuated g/C Ratio	0.14	0.14			0.15		0.13	0.48	0.48	0.14	0.57	0.57
v/c Ratio	0.20	0.12			0.36		0.06	0.41	0.01	0.20	0.35	0.02
Control Delay	36.4	19.7			19.2		38.2	20.4	0.0	37.5	14.3	0.0
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	19.7			19.2		38.2	20.4	0.0	37.5	14.3	0.0
LOS	D	B			B		D	C	A	D	B	A
Approach Delay		30.5			19.2			20.5			15.4	
Approach LOS		C			B			C			B	

Intersection Summary			
Cycle Length: 116.5			
Actuated Cycle Length: 69.7			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 18.6		Intersection LOS: B	
Intersection Capacity Utilization 53.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Carrollton Boulevard & Ashby Way/Omera Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	5	19	31	1	68	12	634	6	38	587	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.88			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1543			1672		1805	3438	1615	1671	3471	1369
Flt Permitted	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1543			1672		1805	3438	1615	1671	3471	1369
Peak-hour factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89	0.94	0.94	0.94	0.85	0.85	0.85
Adj. Flow (vph)	52	6	22	35	1	76	13	674	6	45	691	13
RTOR Reduction (vph)	0	20	0	0	68	0	0	0	3	0	0	7
Lane Group Flow (vph)	52	8	0	0	44	0	13	674	3	45	691	6
Heavy Vehicles (%)	0%	0%	11%	3%	0%	1%	0%	5%	0%	8%	4%	18%
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	7.0	7.0			7.1		1.1	33.6	33.6	4.5	37.0	37.0
Effective Green, g (s)	7.0	7.0			7.1		1.1	33.6	33.6	4.5	37.0	37.0
Actuated g/C Ratio	0.09	0.09			0.09		0.01	0.43	0.43	0.06	0.47	0.47
Clearance Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Vehicle Extension (s)	4.0	4.0			4.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	160	137			150		25	1467	689	95	1631	643
v/s Ratio Prot	c0.03	0.01			c0.03		0.01	c0.20		c0.03	c0.20	
v/s Ratio Perm									0.00			0.00
v/c Ratio	0.33	0.06			0.29		0.52	0.46	0.00	0.47	0.42	0.01
Uniform Delay, d1	33.6	32.8			33.5		38.5	16.1	12.9	36.0	13.8	11.1
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.2			1.5		18.1	0.5	0.0	3.7	0.4	0.0
Delay (s)	35.2	33.1			34.9		56.7	16.6	12.9	39.6	14.2	11.1
Level of Service	D	C			C		E	B	B	D	B	B
Approach Delay (s)		34.5			34.9			17.3			15.6	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	78.7	Sum of lost time (s)	26.5	
Intersection Capacity Utilization	53.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	1	92	0	157	3	488	25	54	597	1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.955				0.850			0.850			
Flt Protected		0.968		0.950			0.950			0.950		
Satd. Flow (prot)	0	1756	0	1752	0	1568	1805	3406	1324	1719	3505	0
Flt Permitted		0.968		0.950			0.950			0.950		
Satd. Flow (perm)	0	1756	0	1752	0	1568	1805	3406	1324	1719	3505	0
Adj. Flow (vph)	2	0	1	101	0	173	3	519	27	64	702	1
Lane Group Flow (vph)	0	3	0	101	0	173	3	519	27	64	703	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 36.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	1	92	0	157	3	488	25	54	597	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.94	0.94	0.94	0.85	0.85	0.85
Hourly flow rate (vph)	2	0	1	101	0	173	3	519	27	64	702	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								Raised			Raised	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1268	1382	352	1005	1356	260	704			546		
vC1, stage 1 conf vol	830	830		526	526							
vC2, stage 2 conf vol	438	552		479	831							
vCu, unblocked vol	1268	1382	352	1005	1356	260	704			546		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	7.0	4.1			4.2		
tC, 2 stage (s)	6.5	5.5		6.6	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	67	100	77	100			94		
cM capacity (veh/h)	197	245	650	311	256	736	903			999		

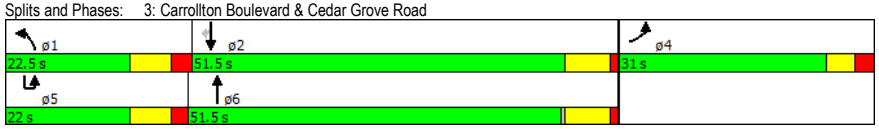
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	4	101	173	3	260	260	27	64	468	235
Volume Left	2	101	0	3	0	0	0	64	0	0
Volume Right	1	0	173	0	0	0	27	0	0	1
cSH	257	311	736	903	1700	1700	1700	999	1700	1700
Volume to Capacity	0.01	0.33	0.23	0.00	0.15	0.15	0.02	0.06	0.28	0.14
Queue Length 95th (ft)	1	34	23	0	0	0	0	5	0	0
Control Delay (s)	19.2	22.1	11.4	9.0	0.0	0.0	0.0	8.8	0.0	0.0
Lane LOS	C	C	B	A				A		
Approach Delay (s)	19.2	15.3		0.1				0.7		
Approach LOS	C	C								

Intersection Summary						
Average Delay	3.0					
Intersection Capacity Utilization	36.8%	ICU Level of Service			A	
Analysis Period (min)	15					

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	77	35	7	453	0	624	17
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frt	0.958						0.850
Flt Protected	0.967		0.950				
Satd. Flow (prot)	1682	0	1583	3374	1900	3471	1369
Flt Permitted	0.967		0.950				
Satd. Flow (perm)	1682	0	1583	3374	1900	3471	1369
Satd. Flow (RTOR)	20						19
Adj. Flow (vph)	86	39	8	487	0	686	19
Lane Group Flow (vph)	125	0	8	487	0	686	19
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Total Split (s)	31.0		22.5	51.5	22.0	51.5	51.5
Total Lost Time (s)	6.0		7.5	6.5	7.0	6.5	6.5
Act Effct Green (s)	9.2		5.4	27.3		25.5	25.5
Actuated g/C Ratio	0.21		0.12	0.61		0.57	0.57
v/c Ratio	0.35		0.04	0.24		0.35	0.02
Control Delay	18.2		23.3	6.1		9.1	5.2
Queue Delay	0.0		0.0	0.0		0.0	0.0
Total Delay	18.2		23.3	6.1		9.1	5.2
LOS	B		C	A		A	A
Approach Delay	18.2			6.4		9.0	
Approach LOS	B			A		A	

Intersection Summary			
Cycle Length: 105			
Actuated Cycle Length: 44.8			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 34.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Carrollton Boulevard & Cedar Grove Road



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	77	35	7	453	0	624	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.5	6.5		6.5	6.5
Lane Util. Factor	1.00		1.00	0.95		0.95	1.00
Frt	0.96		1.00	1.00		1.00	0.85
Flt Protected	0.97		0.95	1.00		1.00	1.00
Satd. Flow (prot)	1682		1583	3374		3471	1369
Flt Permitted	0.97		0.95	1.00		1.00	1.00
Satd. Flow (perm)	1682		1583	3374		3471	1369
Peak-hour factor, PHF	0.90	0.90	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	86	39	8	487	0	686	19
RTOR Reduction (vph)	17	0	0	0	0	0	10
Lane Group Flow (vph)	108	0	8	487	0	686	9
Heavy Vehicles (%)	4%	6%	14%	7%	0%	4%	18%
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Actuated Green, G (s)	7.4		0.8	32.3		24.0	24.0
Effective Green, g (s)	7.4		0.8	32.3		24.0	24.0
Actuated g/C Ratio	0.14		0.02	0.62		0.46	0.46
Clearance Time (s)	6.0		7.5	6.5		6.5	6.5
Vehicle Extension (s)	3.0		2.0	5.0		5.0	5.0
Lane Grp Cap (vph)	238		24	2087		1595	629
v/s Ratio Prot	c0.06		0.01	c0.14		c0.20	
v/s Ratio Perm							0.01
v/c Ratio	0.45		0.33	0.23		0.43	0.01
Uniform Delay, d1	20.5		25.4	4.4		9.5	7.7
Progression Factor	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4		3.0	0.1		0.4	0.0
Delay (s)	21.9		28.4	4.6		9.9	7.7
Level of Service	C		C	A		A	A
Approach Delay (s)	21.9			4.9		9.8	
Approach LOS	C			A		A	

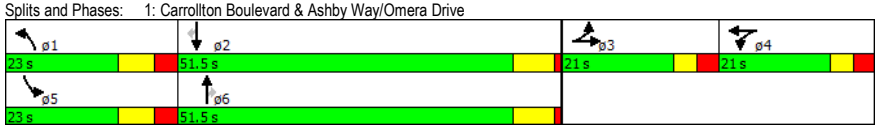
Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	3	17	56	4	70	45	756	19	105	833	56
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.875			0.928				0.850			0.850
Flt Protected	0.950				0.979		0.950			0.950		
Satd. Flow (prot)	1736	1662	0	0	1672	0	1770	3505	1392	1787	3574	1615
Flt Permitted	0.950				0.979		0.950			0.950		
Satd. Flow (perm)	1736	1662	0	0	1672	0	1770	3505	1392	1787	3574	1615
Satd. Flow (RTOR)		20			41				159			159
Adj. Flow (vph)	32	4	20	66	5	82	48	813	20	111	877	59
Lane Group Flow (vph)	32	24	0	0	153	0	48	813	20	111	877	59
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Total Split (s)	21.0	21.0		21.0	21.0		23.0	51.5	51.5	23.0	51.5	51.5
Total Lost Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Act Effct Green (s)	9.7	9.7			12.6		9.8	33.0	33.0	11.8	39.0	39.0
Actuated g/C Ratio	0.12	0.12			0.15		0.12	0.40	0.40	0.14	0.48	0.48
v/c Ratio	0.16	0.11			0.53		0.23	0.58	0.03	0.43	0.52	0.07
Control Delay	44.3	22.9			36.9		44.9	24.1	0.1	45.2	19.9	0.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	22.9			36.9		44.9	24.1	0.1	45.2	19.9	0.2
LOS	D	C			D		D	C	A	D	B	A
Approach Delay		35.2			36.9			24.7			21.5	
Approach LOS		D			D			C			C	

Intersection Summary			
Cycle Length: 116.5			
Actuated Cycle Length: 81.9			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 24.3		Intersection LOS: C	
Intersection Capacity Utilization 61.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Carrollton Boulevard & Ashby Way/Omera Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	3	17	56	4	70	45	756	19	105	833	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.88			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	1662			1672		1770	3505	1392	1787	3574	1615
Flt Permitted	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1736	1662			1672		1770	3505	1392	1787	3574	1615
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.93	0.93	0.93	0.95	0.95	0.95
Adj. Flow (vph)	32	4	20	66	5	82	48	813	20	111	877	59
RTOR Reduction (vph)	0	19	0	0	35	0	0	0	12	0	0	33
Lane Group Flow (vph)	32	5	0	0	118	0	48	813	8	111	877	26
Heavy Vehicles (%)	4%	0%	0%	0%	0%	6%	2%	3%	16%	1%	1%	0%
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	4.6	4.6			12.6		4.7	35.0	35.0	8.7	39.0	39.0
Effective Green, g (s)	4.6	4.6			12.6		4.7	35.0	35.0	8.7	39.0	39.0
Actuated g/C Ratio	0.05	0.05			0.14		0.05	0.40	0.40	0.10	0.45	0.45
Clearance Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Vehicle Extension (s)	4.0	4.0			4.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	91	87			241		95	1403	557	177	1594	720
v/s Ratio Prot	c0.02	0.00			c0.07		0.03	0.23		c0.06	c0.25	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.35	0.06			0.49		0.51	0.58	0.01	0.63	0.55	0.04
Uniform Delay, d1	40.0	39.3			34.4		40.2	20.5	15.8	37.8	17.8	13.6
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.4			2.1		4.2	0.9	0.0	6.8	0.7	0.0
Delay (s)	43.1	39.7			36.6		44.4	21.4	15.8	44.6	18.5	13.7
Level of Service	D	D			D		D	C	B	D	B	B
Approach Delay (s)		41.7			36.6			22.5			21.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	87.4	Sum of lost time (s)	26.5
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	2	43	0	100	1	681	85	171	694	2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.910				0.850			0.850			
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1276	0	1752	0	1509	1805	3505	1583	1770	3500	0
Flt Permitted		0.984		0.950			0.950			0.950		
Satd. Flow (perm)	0	1276	0	1752	0	1509	1805	3505	1583	1770	3500	0
Adj. Flow (vph)	1	0	2	51	0	118	1	740	92	176	715	2
Lane Group Flow (vph)	0	3	0	51	0	118	1	740	92	176	717	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	0	2	43	0	100	1	681	85	171	694	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92	0.97	0.97	0.97
Hourly flow rate (vph)	1	0	2	51	0	118	1	740	92	176	715	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								Raised			Raised	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1559	1904	359	1455	1812	370	718			833		
vC1, stage 1 conf vol	1069	1069		742	742							
vC2, stage 2 conf vol	490	835		713	1070							
vCu, unblocked vol	1559	1904	359	1455	1812	370	718			833		
tC, single (s)	7.5	6.5	7.9	7.6	6.5	7.0	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.6	5.5							
tF (s)	3.5	4.0	3.8	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	99	100	100	73	100	81	100			78		
cM capacity (veh/h)	121	125	518	184	162	613	893			796		

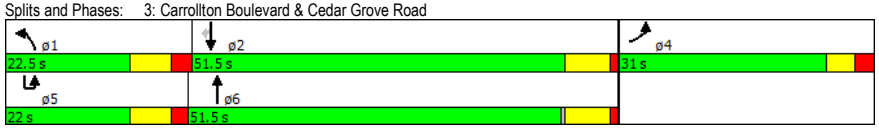
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	4	51	118	1	370	370	92	176	477	241
Volume Left	1	51	0	1	0	0	0	176	0	0
Volume Right	2	0	118	0	0	0	92	0	0	2
cSH	248	184	613	893	1700	1700	1700	796	1700	1700
Volume to Capacity	0.01	0.27	0.19	0.00	0.22	0.22	0.05	0.22	0.28	0.14
Queue Length 95th (ft)	1	27	18	0	0	0	0	21	0	0
Control Delay (s)	19.7	31.7	12.3	9.0	0.0	0.0	0.0	10.8	0.0	0.0
Lane LOS	C	D	B	A				B		
Approach Delay (s)	19.7	18.1		0.0				2.1		
Approach LOS	C	C								

Intersection Summary					
Average Delay	2.6				
Intersection Capacity Utilization	44.3%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	34	15	28	705	0	710	93
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frt	0.958						0.850
Flt Protected	0.967		0.950				
Satd. Flow (prot)	1656	0	1805	3505	1900	3539	1568
Flt Permitted	0.967		0.950				
Satd. Flow (perm)	1656	0	1805	3505	1900	3539	1568
Satd. Flow (RTOR)	18						97
Adj. Flow (vph)	40	18	30	750	0	740	97
Lane Group Flow (vph)	58	0	30	750	0	740	97
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Total Split (s)	31.0		22.5	51.5	22.0	51.5	51.5
Total Lost Time (s)	6.0		7.5	6.5	7.0	6.5	6.5
Act Effct Green (s)	8.0		6.0	39.4		34.9	34.9
Actuated g/C Ratio	0.16		0.12	0.79		0.70	0.70
v/c Ratio	0.21		0.14	0.27		0.30	0.09
Control Delay	20.0		26.8	3.7		8.2	3.1
Queue Delay	0.0		0.0	0.0		0.0	0.0
Total Delay	20.0		26.8	3.7		8.2	3.1
LOS	B		C	A		A	A
Approach Delay	20.0			4.6		7.6	
Approach LOS	B			A		A	

Intersection Summary			
Cycle Length: 105			
Actuated Cycle Length: 50.1			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 6.7		Intersection LOS: A	
Intersection Capacity Utilization 39.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Carrollton Boulevard & Cedar Grove Road



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	34	15	28	705	0	710	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.5	6.5		6.5	6.5
Lane Util. Factor	1.00		1.00	0.95		0.95	1.00
Frt	0.96		1.00	1.00		1.00	0.85
Flt Protected	0.97		0.95	1.00		1.00	1.00
Satd. Flow (prot)	1655		1805	3505		3539	1568
Flt Permitted	0.97		0.95	1.00		1.00	1.00
Satd. Flow (perm)	1655		1805	3505		3539	1568
Peak-hour factor, PHF	0.85	0.85	0.94	0.94	0.96	0.96	0.96
Adj. Flow (vph)	40	18	30	750	0	740	97
RTOR Reduction (vph)	17	0	0	0	0	0	44
Lane Group Flow (vph)	41	0	30	750	0	740	53
Heavy Vehicles (%)	6%	7%	0%	3%	0%	2%	3%
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Actuated Green, G (s)	4.2		2.1	41.0		31.4	31.4
Effective Green, g (s)	4.2		2.1	41.0		31.4	31.4
Actuated g/C Ratio	0.07		0.04	0.71		0.54	0.54
Clearance Time (s)	6.0		7.5	6.5		6.5	6.5
Vehicle Extension (s)	3.0		2.0	5.0		5.0	5.0
Lane Grp Cap (vph)	120		65	2490		1925	853
v/s Ratio Prot	c0.02		0.02	c0.21		c0.21	
v/s Ratio Perm							0.03
v/c Ratio	0.34		0.46	0.30		0.38	0.06
Uniform Delay, d1	25.4		27.2	3.1		7.6	6.2
Progression Factor	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.7		1.9	0.1		0.3	0.1
Delay (s)	27.2		29.1	3.2		7.8	6.3
Level of Service	C		C	A		A	A
Approach Delay (s)	27.2			4.2		7.7	
Approach LOS	C			A		A	

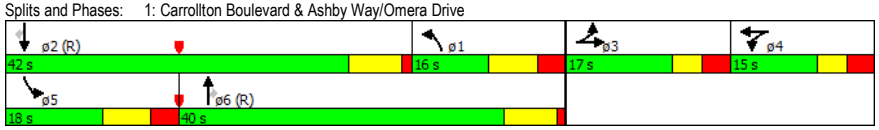
Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	5	19	31	1	68	12	634	6	38	587	11
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.882			0.908				0.850			0.850
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1805	1542	0	0	1672	0	1805	3438	1615	1671	3471	1369
Flt Permitted	0.950				0.985		0.950			0.950		
Satd. Flow (perm)	1805	1542	0	0	1672	0	1805	3438	1615	1671	3471	1369
Satd. Flow (RTOR)		22			76				206			206
Adj. Flow (vph)	52	6	22	35	1	76	13	674	6	45	691	13
Lane Group Flow (vph)	52	28	0	0	112	0	13	674	6	45	691	13
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Total Split (s)	17.0	17.0		15.0	15.0		16.0	40.0	40.0	18.0	42.0	42.0
Total Lost Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Act Effct Green (s)	9.3	9.3			8.7		8.2	50.2	50.2	8.6	57.0	57.0
Actuated g/C Ratio	0.10	0.10			0.10		0.09	0.56	0.56	0.10	0.63	0.63
v/c Ratio	0.28	0.16			0.49		0.08	0.35	0.01	0.28	0.31	0.01
Control Delay	40.8	20.1			23.0		24.2	4.9	0.0	42.4	12.1	0.0
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	20.1			23.0		24.2	4.9	0.0	42.4	12.1	0.0
LOS	D	C			C		C	A	A	D	B	A
Approach Delay		33.5			23.0			5.2			13.7	
Approach LOS		C			C			A			B	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 20 (22%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 11.7		Intersection LOS: B	
Intersection Capacity Utilization 53.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Carrollton Boulevard & Ashby Way/Omera Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	5	19	31	1	68	12	634	6	38	587	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.88			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1543			1672		1805	3438	1615	1671	3471	1369
Flt Permitted	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1543			1672		1805	3438	1615	1671	3471	1369
Peak-hour factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89	0.94	0.94	0.94	0.85	0.85	0.85
Adj. Flow (vph)	52	6	22	35	1	76	13	674	6	45	691	13
RTOR Reduction (vph)	0	20	0	0	70	0	0	0	3	0	0	6
Lane Group Flow (vph)	52	8	0	0	42	0	13	674	3	45	691	7
Heavy Vehicles (%)	0%	0%	11%	3%	0%	1%	0%	5%	0%	8%	4%	18%
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	7.7	7.7			7.1		1.8	43.3	43.3	5.4	46.9	46.9
Effective Green, g (s)	7.7	7.7			7.1		1.8	43.3	43.3	5.4	46.9	46.9
Actuated g/C Ratio	0.09	0.09			0.08		0.02	0.48	0.48	0.06	0.52	0.52
Clearance Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Vehicle Extension (s)	4.0	4.0			4.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	154	132			131		36	1654	776	100	1808	713
v/s Ratio Prot	c0.03	0.01			c0.03		0.01	c0.20		0.03	c0.20	
v/s Ratio Perm									0.00			0.00
v/c Ratio	0.34	0.06			0.32		0.36	0.41	0.00	0.45	0.38	0.01
Uniform Delay, d1	38.7	37.8			39.2		43.5	15.1	12.1	40.9	12.9	10.4
Progression Factor	1.00	1.00			1.00		0.62	0.27	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.3			1.9		5.7	0.7	0.0	3.2	0.6	0.0
Delay (s)	40.5	38.1			41.1		32.7	4.7	12.1	44.1	13.5	10.4
Level of Service	D	D			D		C	A	B	D	B	B
Approach Delay (s)		39.7			41.1			5.3			15.3	
Approach LOS		D			D			A			B	

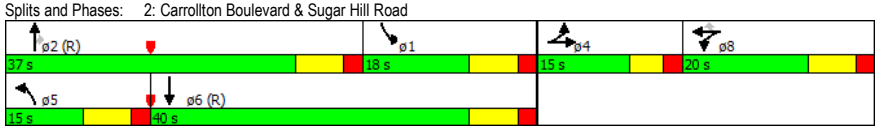
Intersection Summary				
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.5	
Intersection Capacity Utilization	53.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	1	92	0	157	3	488	25	54	597	1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.955				0.850			0.850			
Flt Protected		0.968			0.950		0.950			0.950		
Satd. Flow (prot)	0	1756	0	0	1752	1568	1805	3406	1324	1719	3505	0
Flt Permitted		0.968			0.950		0.950			0.950		
Satd. Flow (perm)	0	1756	0	0	1752	1568	1805	3406	1324	1719	3505	0
Satd. Flow (RTOR)		303				285			200			
Adj. Flow (vph)	2	0	1	101	0	173	3	519	27	64	702	1
Lane Group Flow (vph)	0	3	0	0	101	173	3	519	27	64	703	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8			2		6	
Total Split (s)	15.0	15.0		20.0	20.0	20.0	15.0	37.0	37.0	18.0	40.0	
Total Lost Time (s)		5.5			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Act Effct Green (s)		8.0			10.8	10.8	8.0	32.3	32.3	23.2	59.5	
Actuated g/C Ratio		0.09			0.12	0.12	0.09	0.36	0.36	0.26	0.66	
v/c Ratio		0.01			0.48	0.39	0.02	0.42	0.04	0.14	0.30	
Control Delay		0.0			44.2	2.7	45.3	20.5	0.1	15.4	4.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			44.2	2.7	45.3	20.5	0.1	15.4	4.6	
LOS		A			D	A	D	C	A	B	A	
Approach Delay		0.0			18.0			19.6			5.5	
Approach LOS		A			B			B			A	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 17 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 47.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Carrollton Boulevard & Sugar Hill Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	1	92	0	157	3	488	25	54	597	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1756			1752	1568	1805	3406	1324	1719	3504	
Flt Permitted		0.97			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1756			1752	1568	1805	3406	1324	1719	3504	
Peak-hour factor, PHF	0.85	0.85	0.85	0.91	0.91	0.91	0.94	0.94	0.94	0.85	0.85	0.85
Adj. Flow (vph)	2	0	1	101	0	173	3	519	27	64	702	1
RTOR Reduction (vph)	0	3	0	0	0	152	0	0	20	0	0	0
Lane Group Flow (vph)	0	0	0	0	101	21	3	519	7	64	703	0
Heavy Vehicles (%)	0%	0%	0%	3%	0%	3%	0%	6%	22%	5%	3%	0%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8			2		6	
Actuated Green, G (s)		1.6			10.8	10.8	1.6	22.3	22.3	28.8	49.5	
Effective Green, g (s)		1.6			10.8	10.8	1.6	22.3	22.3	28.8	49.5	
Actuated g/C Ratio		0.02			0.12	0.12	0.02	0.25	0.25	0.32	0.55	
Clearance Time (s)		5.5			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		31			210	188	32	843	328	550	1927	
v/s Ratio Prot		c0.00			c0.06		0.00	c0.15		0.04	c0.20	
v/s Ratio Perm						0.01			0.01			
v/c Ratio		0.00			0.48	0.11	0.09	0.62	0.02	0.12	0.36	
Uniform Delay, d1		43.4			37.0	35.3	43.5	30.0	25.6	21.6	11.4	
Progression Factor		1.00			1.00	1.00	1.20	0.85	1.00	0.53	0.45	
Incremental Delay, d2		0.0			1.7	0.3	1.3	3.3	0.1	0.4	0.5	
Delay (s)		43.4			38.7	35.6	53.6	28.8	25.7	11.8	5.7	
Level of Service		D			D	D	D	C	C	B	A	
Approach Delay (s)		43.4			36.7			28.8			6.2	
Approach LOS		D			D			C			A	

Intersection Summary				
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.5	
Intersection Capacity Utilization	47.7%	ICU Level of Service	A	
Analysis Period (min)	15			

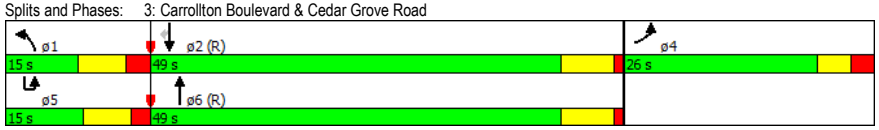
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	77	35	7	453	0	624	17
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frt	0.958						0.850
Flt Protected	0.967		0.950				
Satd. Flow (prot)	1682	0	1583	3374	1900	3471	1369
Flt Permitted	0.967		0.950				
Satd. Flow (perm)	1682	0	1583	3374	1900	3471	1369
Satd. Flow (RTOR)	23						19
Adj. Flow (vph)	86	39	8	487	0	686	19
Lane Group Flow (vph)	125	0	8	487	0	686	19
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Total Split (s)	26.0		15.0	49.0	15.0	49.0	49.0
Total Lost Time (s)	6.0		7.5	6.5	7.0	6.5	6.5
Act Effct Green (s)	11.0		5.3	66.5		63.7	63.7
Actuated g/C Ratio	0.12		0.06	0.74		0.71	0.71
v/c Ratio	0.55		0.09	0.20		0.28	0.02
Control Delay	38.8		41.9	4.1		3.5	1.2
Queue Delay	0.0		0.0	0.0		0.0	0.0
Total Delay	38.8		41.9	4.1		3.5	1.2
LOS	D		D	A		A	A
Approach Delay	38.8			4.8		3.4	
Approach LOS	D			A		A	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 19 (21%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 7.3 — Intersection LOS: A
Intersection Capacity Utilization 34.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Carrollton Boulevard & Cedar Grove Road



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	77	35	7	453	0	624	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.5	6.5		6.5	6.5
Lane Util. Factor	1.00		1.00	0.95		0.95	1.00
Frt	0.96		1.00	1.00		1.00	0.85
Flt Protected	0.97		0.95	1.00		1.00	1.00
Satd. Flow (prot)	1682		1583	3374		3471	1369
Flt Permitted	0.97		0.95	1.00		1.00	1.00
Satd. Flow (perm)	1682		1583	3374		3471	1369
Peak-hour factor, PHF	0.90	0.90	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	86	39	8	487	0	686	19
RTOR Reduction (vph)	20	0	0	0	0	0	7
Lane Group Flow (vph)	105	0	8	487	0	686	12
Heavy Vehicles (%)	4%	6%	14%	7%	0%	4%	18%
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Actuated Green, G (s)	11.0		1.2	66.5		57.8	57.8
Effective Green, g (s)	11.0		1.2	66.5		57.8	57.8
Actuated g/C Ratio	0.12		0.01	0.74		0.64	0.64
Clearance Time (s)	6.0		7.5	6.5		6.5	6.5
Vehicle Extension (s)	3.0		2.0	5.0		5.0	5.0
Lane Grp Cap (vph)	205		21	2493		2229	879
v/s Ratio Prot	c0.06		0.01	c0.14		c0.20	
v/s Ratio Perm							0.01
v/c Ratio	0.51		0.38	0.20		0.31	0.01
Uniform Delay, d1	37.0		44.0	3.6		7.2	5.8
Progression Factor	1.00		1.00	1.00		0.53	0.32
Incremental Delay, d2	2.1		4.2	0.2		0.3	0.0
Delay (s)	39.1		48.2	3.8		4.1	1.9
Level of Service	D		D	A		A	A
Approach Delay (s)	39.1			4.5		4.1	
Approach LOS	D			A		A	

Intersection Summary

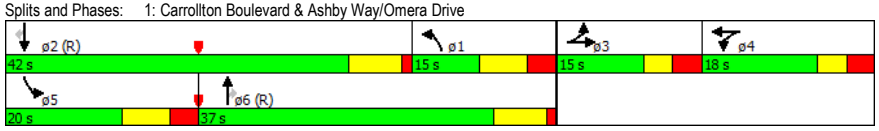
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	3	17	56	4	70	45	756	19	105	833	56
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.875			0.928				0.850			0.850
Flt Protected	0.950				0.979		0.950			0.950		
Satd. Flow (prot)	1736	1662	0	0	1672	0	1770	3505	1392	1787	3574	1615
Flt Permitted	0.950				0.979		0.950			0.950		
Satd. Flow (perm)	1736	1662	0	0	1672	0	1770	3505	1392	1787	3574	1615
Satd. Flow (RTOR)		20			53				206			206
Lane Group Flow (vph)	32	24	0	0	153	0	48	813	20	111	877	59
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Total Split (s)	15.0	15.0		18.0	18.0		15.0	37.0	37.0	20.0	42.0	42.0
Total Lost Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Act Effct Green (s)	8.4	8.4			10.7		7.8	42.8	42.8	10.4	48.7	48.7
Actuated g/C Ratio	0.09	0.09			0.12		0.09	0.48	0.48	0.12	0.54	0.54
v/c Ratio	0.20	0.14			0.63		0.32	0.49	0.03	0.54	0.45	0.06
Control Delay	40.6	20.3			36.0		26.1	7.3	0.1	47.1	17.4	0.1
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	20.3			36.0		26.1	7.3	0.1	47.1	17.4	0.1
LOS	D	C			D		C	A	A	D	B	A
Approach Delay		31.9			36.0			8.1			19.6	
Approach LOS		C			D			A			B	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 20 (22%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 16.4		Intersection LOS: B	
Intersection Capacity Utilization 61.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Carrollton Boulevard & Ashby Way/Omera Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	3	17	56	4	70	45	756	19	105	833	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.88			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	1662			1672		1770	3505	1392	1787	3574	1615
Flt Permitted	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1736	1662			1672		1770	3505	1392	1787	3574	1615
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.93	0.93	0.93	0.95	0.95	0.95
Adj. Flow (vph)	32	4	20	66	5	82	48	813	20	111	877	59
RTOR Reduction (vph)	0	19	0	0	47	0	0	0	11	0	0	31
Lane Group Flow (vph)	32	5	0	0	106	0	48	813	9	111	877	28
Heavy Vehicles (%)	4%	0%	0%	0%	0%	6%	2%	3%	16%	1%	1%	0%
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	5.2	5.2			10.7		4.6	38.8	38.8	8.8	43.0	43.0
Effective Green, g (s)	5.2	5.2			10.7		4.6	38.8	38.8	8.8	43.0	43.0
Actuated g/C Ratio	0.06	0.06			0.12		0.05	0.43	0.43	0.10	0.48	0.48
Clearance Time (s)	6.0	6.0			6.0		8.0	6.5	6.5	8.0	6.5	6.5
Vehicle Extension (s)	4.0	4.0			4.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	100	96			198		90	1511	600	174	1707	771
v/s Ratio Prot	c0.02	0.00			c0.06		0.03	c0.23		0.06	c0.25	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.32	0.05			0.54		0.53	0.54	0.01	0.64	0.51	0.04
Uniform Delay, d1	40.7	40.1			37.3		41.7	19.0	14.7	39.1	16.3	12.5
Progression Factor	1.00	1.00			1.00		0.54	0.32	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.3			3.5		5.4	1.2	0.0	7.5	1.1	0.1
Delay (s)	43.2	40.4			40.9		27.8	7.2	14.7	46.5	17.4	12.6
Level of Service	D	D			D		C	A	B	D	B	B
Approach Delay (s)		42.0			40.9			8.5			20.2	
Approach LOS		D			D			A			C	

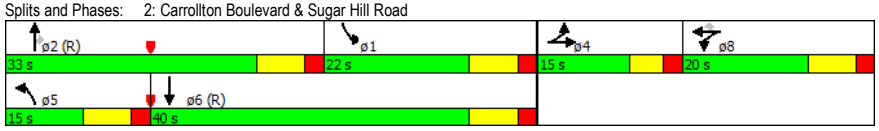
Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.5
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	2	43	0	100	1	681	85	171	694	2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.910				0.850			0.850			
Flt Protected		0.984			0.950		0.950			0.950		
Satd. Flow (prot)	0	1276	0	0	1752	1509	1805	3505	1583	1770	3500	0
Flt Permitted		0.984			0.950		0.950			0.950		
Satd. Flow (perm)	0	1276	0	0	1752	1509	1805	3505	1583	1770	3500	0
Satd. Flow (RTOR)		303				285			200			
Lane Group Flow (vph)	0	3	0	0	51	118	1	740	92	176	717	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8			2		6	
Total Split (s)	15.0	15.0		20.0	20.0	20.0	15.0	33.0	33.0	22.0	40.0	
Total Lost Time (s)		5.5			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Act Effct Green (s)		8.0			8.8	8.8	8.0	36.7	36.7	20.7	61.5	
Actuated g/C Ratio		0.09			0.10	0.10	0.09	0.41	0.41	0.23	0.68	
v/c Ratio		0.01			0.30	0.29	0.01	0.52	0.12	0.43	0.30	
Control Delay		0.0			42.0	1.8	46.0	20.6	0.3	18.0	2.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			42.0	1.8	46.0	20.6	0.3	18.0	2.9	
LOS		A			D	A	D	C	A	B	A	
Approach Delay		0.0			14.0			18.4			5.9	
Approach LOS		A			B			B			A	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 18 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 12.1		Intersection LOS: B	
Intersection Capacity Utilization 52.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Carrollton Boulevard & Sugar Hill Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	2	43	0	100	1	681	85	171	694	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt		0.91			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1275			1752	1509	1805	3505	1583	1770	3499	
Flt Permitted		0.98			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1275			1752	1509	1805	3505	1583	1770	3499	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	1	0	2	51	0	118	1	740	92	176	715	2
RTOR Reduction (vph)	0	3	0	0	0	106	0	0	65	0	0	0
Lane Group Flow (vph)	0	0	0	0	51	12	1	740	27	176	717	0
Heavy Vehicles (%)	0%	0%	50%	3%	0%	7%	0%	3%	2%	2%	3%	50%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8			2		6	
Actuated Green, G (s)		1.6			8.8	8.8	1.6	26.7	26.7	26.4	51.5	
Effective Green, g (s)		1.6			8.8	8.8	1.6	26.7	26.7	26.4	51.5	
Actuated g/C Ratio		0.02			0.10	0.10	0.02	0.30	0.30	0.29	0.57	
Clearance Time (s)		5.5			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		22			171	147	32	1039	469	519	2002	
v/s Ratio Prot		c0.00			c0.03		0.00	c0.21		0.10	c0.20	
v/s Ratio Perm						0.01			0.02			
v/c Ratio		0.00			0.30	0.08	0.03	0.71	0.06	0.34	0.36	
Uniform Delay, d1		43.4			37.7	36.9	43.4	28.2	22.7	25.0	10.4	
Progression Factor		1.00			1.00	1.00	1.22	0.93	1.00	0.47	0.32	
Incremental Delay, d2		0.0			1.0	0.2	0.4	4.1	0.2	1.6	0.5	
Delay (s)		43.5			38.7	37.1	53.4	30.4	22.9	13.4	3.8	
Level of Service		D			D	D	D	C	C	B	A	
Approach Delay (s)		43.5			37.6			29.6			5.7	
Approach LOS		D			D			C			A	

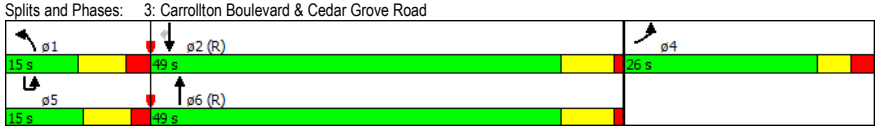
Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.5
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	34	15	28	705	0	710	93
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Frt	0.958						0.850
Flt Protected	0.967		0.950				
Satd. Flow (prot)	1656	0	1805	3505	1900	3539	1568
Flt Permitted	0.967		0.950				
Satd. Flow (perm)	1656	0	1805	3505	1900	3539	1568
Satd. Flow (RTOR)	18						97
Lane Group Flow (vph)	58	0	30	750	0	740	97
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		12	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9		9
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Total Split (s)	26.0		15.0	49.0	15.0	49.0	49.0
Total Lost Time (s)	6.0		7.5	6.5	7.0	6.5	6.5
Act Effct Green (s)	8.3		6.2	73.1		64.5	64.5
Actuated g/C Ratio	0.09		0.07	0.81		0.72	0.72
v/c Ratio	0.35		0.24	0.26		0.29	0.08
Control Delay	34.0		44.0	3.1		3.0	0.4
Queue Delay	0.0		0.0	0.0		0.0	0.0
Total Delay	34.0		44.0	3.1		3.0	0.4
LOS	C		D	A		A	A
Approach Delay	34.0			4.7		2.7	
Approach LOS	C			A		A	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 23 (26%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 4.7		Intersection LOS: A	
Intersection Capacity Utilization 39.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Carrollton Boulevard & Cedar Grove Road



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	34	15	28	705	0	710	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.5	6.5		6.5	6.5
Lane Util. Factor	1.00		1.00	0.95		0.95	1.00
Frt	0.96		1.00	1.00		1.00	0.85
Flt Protected	0.97		0.95	1.00		1.00	1.00
Satd. Flow (prot)	1655		1805	3505		3539	1568
Flt Permitted	0.97		0.95	1.00		1.00	1.00
Satd. Flow (perm)	1655		1805	3505		3539	1568
Peak-hour factor, PHF	0.85	0.85	0.94	0.94	0.96	0.96	0.96
Adj. Flow (vph)	40	18	30	750	0	740	97
RTOR Reduction (vph)	17	0	0	0	0	0	34
Lane Group Flow (vph)	41	0	30	750	0	740	63
Heavy Vehicles (%)	6%	7%	0%	3%	0%	2%	3%
Turn Type	Prot		Prot	NA	Prot	NA	Perm
Protected Phases	4		1	6	5	2	
Permitted Phases							2
Actuated Green, G (s)	6.9		4.2	70.6		58.9	58.9
Effective Green, g (s)	6.9		4.2	70.6		58.9	58.9
Actuated g/C Ratio	0.08		0.05	0.78		0.65	0.65
Clearance Time (s)	6.0		7.5	6.5		6.5	6.5
Vehicle Extension (s)	3.0		2.0	5.0		5.0	5.0
Lane Grp Cap (vph)	126		84	2749		2316	1026
v/s Ratio Prot	c0.02		0.02	c0.21		c0.21	
v/s Ratio Perm							0.04
v/c Ratio	0.33		0.36	0.27		0.32	0.06
Uniform Delay, d1	39.4		41.6	2.7		6.8	5.6
Progression Factor	1.00		1.00	1.00		0.38	0.14
Incremental Delay, d2	1.5		0.9	0.2		0.4	0.1
Delay (s)	40.9		42.5	2.9		2.9	0.9
Level of Service	D		D	A		A	A
Approach Delay (s)	40.9			4.4		2.7	
Approach LOS	D			A		A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Attachment 5

Traffic Signal Volume Warrant Analysis Worksheet

Founders Pointe

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Carrollton Boulevard / Sugar Hill Road

COUNT DATE: 1/14/2014

Volumes adjusted to 2018 and Added Site Trips

INTERSECTION CONDITION: 2018 Build Conditions

MAJOR STREET: US Route 17/Carrollton Boulevard - Northbound/Southbound Approach # OF APPROACH LANES: 3

MINOR STREET: Route 661/Sugar Hill Road/Driveway - Eastbound/Westbound Approach # OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST	MINOR ST		WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
										CONDITION A			CONDITION B				
	BOTH APPROACHES	HIGHEST APPROACH		MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES	NB/SB	EB	WB	420	140		630	70		336	112		504	56			
06:00 AM TO 07:00 AM	**887**	0	**140**	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
07:00 AM TO 08:00 AM	**1,138**	3	**236**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
08:00 AM TO 09:00 AM	**896**	1	**174**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:00 AM TO 10:00 AM	**764**	0	**102**	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
10:00 AM TO 11:30 AM	**705**	0	**82**	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
11:30 AM TO 12:30 PM	**778**	1	**94**	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
12:30 PM TO 01:30 PM	**776**	0	**76**	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
01:00 PM TO 02:00 PM	**793**	1	**74**	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
02:00 PM TO 03:00 PM	**800**	0	**91**	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
03:00 PM TO 04:00 PM	**1,155**	2	**115**	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
04:00 PM TO 05:00 PM	**1,481**	3	**119**	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
05:00 PM TO 06:00 PM	**1,389**	0	**125**	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM TO 07:00 PM	**0**	**0**	**0**														
	11,562	11	1,425			**2**			**12**			**6**			**12**	**6**	**5**
				8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED
				NOT SATISFIED			**SATISFIED**			**NOT SATISFIED**						**SATISFIED**	**SATISFIED**

WARRANT 1 -- Eight-Hour Vehicular Volume Warrant

Condition A : Minimum Vehicular Volume

Condition B : Interruption of Continuous Traffic

Combination : Combination of Condition A and Condition B

WARRANT 2 -- Four-Hour Vehicular Volume Warrant

WARRANT 3 -- Peak Hour Warrant

Attachment 6

Gap Study Data

Study Name Carrollton Blvd and Sugar Hill Rd Gap Study
Start Date 03/17/2015
Start Time 7:00 AM

Minor WB Left o Median Cut (Stage 1)

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 99.0	Critical Gaps (5.9 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
AM Peak																	
7:00 AM	20	13	7	9	5	2	6	1	3	4	1	1	0	6	45	111	156
7:15 AM	16	8	8	7	9	5	4	1	2	1	5	2	2	3	50	114	164
7:30 AM	27	12	8	9	6	2	4	0	3	2	2	0	1	7	45	96	141
7:45 AM	17	17	8	1	4	7	3	2	2	1	2	1	1	7	41	117	158
8:00 AM	29	8	11	6	2	3	3	4	1	3	1	2	0	8	45	106	151
8:15 AM	21	11	8	3	7	4	5	1	1	2	2	1	0	7	42	115	157
8:30 AM	12	9	1	9	9	2	2	1	3	3	0	1	1	9	41	124	165
8:45 AM	25	13	8	4	5	5	5	2	2	2	1	1	1	6	42	108	150
	167	91	59	48	47	30	32	12	17	18	14	9	6	53	351	891	1242
PM Peak																	
4:00 PM	28	14	11	7	5	5	1	2	3	4	1	1	0	4	45	93	138
4:15 PM	20	11	6	13	2	0	4	3	4	4	2	2	0	3	45	96	141
4:30 PM	41	20	9	5	2	6	4	1	2	3	3	0	3	0	38	74	112
4:45 PM	32	17	5	5	3	2	1	3	1	2	1	1	0	8	33	101	134
5:00 PM	32	12	4	10	3	6	2	3	2	0	3	2	1	3	39	87	126
5:15 PM	36	15	9	8	3	4	1	1	2	3	3	2	1	3	40	79	119
5:30 PM	29	11	9	4	3	7	3	2	2	1	3	2	2	3	41	97	138
5:45 PM	33	16	15	2	2	4	4	3	3	2	1	0	1	4	43	89	132
	251	116	68	54	23	34	20	18	19	19	17	10	8	28	324	716	1040

Study Name Carrollton Blvd and Sugar Hill Rd Gap Study
Start Date 03/17/2015
Start Time 7:00 AM

Minor WB Left from Median Cut (Stage 2)

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 99.0	Critical Gaps (5.9 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
AM Peak																	
7:00 AM	23	8	6	12	1	2	3	0	1	2	0	2	0	10	39	114	153
7:15 AM	21	10	8	1	5	2	3	2	3	0	1	0	3	8	36	121	157
7:30 AM	18	12	5	4	4	2	4	4	2	2	1	1	1	7	38	114	152
7:45 AM	18	12	12	3	2	1	4	0	1	1	0	3	1	8	36	104	140
8:00 AM	20	6	5	3	3	4	0	1	2	1	2	2	4	8	35	131	166
8:15 AM	28	11	3	7	3	2	1	2	1	2	3	0	0	9	33	117	150
8:30 AM	17	17	6	4	2	3	2	1	1	1	2	1	2	9	34	119	153
8:45 AM	26	9	5	6	2	3	3	3	2	1	1	2	1	7	37	110	147
	171	85	50	40	22	19	20	13	13	10	10	11	12	66	288	930	1218
PM Peak																	
4:00 PM	27	15	9	6	0	2	3	3	1	2	1	2	3	4	38	86	124
4:15 PM	39	15	2	4	2	3	3	2	0	5	0	1	1	4	27	87	114
4:30 PM	40	5	6	6	3	0	2	3	1	1	1	0	3	2	28	66	94
4:45 PM	43	9	4	5	6	2	1	1	1	0	0	1	0	6	27	89	116
5:00 PM	32	13	4	7	6	2	4	0	2	2	0	0	2	4	34	72	106
5:15 PM	29	14	4	6	1	4	3	2	0	1	1	0	1	8	32	98	130
5:30 PM	34	12	8	4	5	4	3	3	4	0	1	1	0	3	36	74	110
5:45 PM	24	12	5	5	2	2	4	3	3	1	0	0	0	7	32	98	130
	268	95	42	43	25	19	23	17	12	12	4	5	10	38	254	670	924

Study Name Carrollton Blvd and Sugar Hill Rd Gap Study
Start Date 03/17/2015
Start Time 7:00 AM

Westbound Left from Minor Overall (Stage 3)

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 99.0	Critical Gaps (6.9 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
AM Peak																	
7:00 AM	41	20	11	8	8	6	3	2	1	3	0	0	0	1	40	41	81
7:15 AM	43	22	12	4	6	5	4	2	0	2	2	1	0	1	30	52	82
7:30 AM	45	22	13	13	3	4	1	4	2	1	0	0	0	1	33	31	64
7:45 AM	37	22	16	4	5	2	4	1	0	2	3	1	1	0	32	46	78
8:00 AM	48	18	14	9	4	1	1	3	1	4	3	1	0	0	32	47	79
8:15 AM	44	25	8	6	6	5	1	2	1	1	1	0	0	3	28	47	75
8:30 AM	35	22	10	7	5	3	3	1	0	3	1	1	2	2	34	56	90
8:45 AM	51	11	8	13	6	3	5	3	1	1	1	1	0	0	40	38	78
	344	162	92	64	43	29	22	18	6	17	11	5	3	8	269	358	627
PM Peak																	
4:00 PM	51	21	18	6	9	3	1	0	1	1	0	0	0	0	31	21	52
4:15 PM	58	22	5	5	2	0	5	4	1	2	1	0	0	0	24	36	60
4:30 PM	58	15	15	1	2	4	0	1	0	2	0	0	0	0	16	14	30
4:45 PM	69	18	5	5	4	2	2	1	0	1	1	1	0	1	22	30	52
5:00 PM	59	15	8	7	5	3	1	1	1	1	0	0	1	0	21	22	43
5:15 PM	59	19	7	3	6	3	1	2	0	2	0	0	1	1	24	32	56
5:30 PM	56	19	8	5	3	3	3	0	4	0	0	1	0	0	24	28	52
5:45 PM	61	19	13	2	4	4	4	0	1	0	0	0	0	2	24	31	55
	471	148	79	34	35	22	17	9	8	9	2	2	2	4	186	214	400