Traffic Impact Study

Proposed Lendon Connector Residential Development
City of Lawrenceville, Gwinnett County, Georgia

May 14, 2020

MARC R. ACAMPORA, PE, LLC
TRAFFIC ENGINEERING

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study prepared for:

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Contents

Tables

Figures

Photographs

Introduction

This study assesses the traffic impact of a proposed residential development in the City of Lawrenceville, Georgia. The site is located along the south side of the Lendon Connector east of the ramps from Georgia State Route 316 (University Highway) and Collins Hill Road, as shown in the location map in Figure 1. The site will be developed with 361 multi-family residential units. One full-movement vehicular access will be provided on the south side of the Lendon Connector (an emergency access and an interparcel connection to future development are proposed at the eastern end of the site).

The purpose of this traffic impact study is to determine existing traffic operating conditions in the vicinity of the proposed development, project future traffic volumes, assess the impact of the subject development, then develop conclusions and recommendations to mitigate the project traffic impact and ensure safe and efficient existing and future traffic conditions in the vicinity of the project.

Figure 1 – Site Location Map

Existing Traffic Conditions

Existing traffic conditions in the vicinity of the proposed residential development were assessed. The following is a description of existing transportation facilities, traffic volumes, and intersection operations.

Description of Existing Roadways

The Lendon Connector is a short roadway segment connecting Collins Hill Road to the ramps to GA 316, then terminating a short distance to the east. The road is planned to eventually connect to Buford Drive. West of Collins Hill Road, the road is named Collins Industrial Way, which provides a major access point for Georgia Gwinnett College (GGC). The Lendon Connector has two lanes in each direction while Collins Industrial Way has one lane per direction. No posted speed limit was observed on the Lendon Connector while the posted speed limit on Collins Industrial Way is 25 mph. The terrain is gently rolling and both the eastbound approach and westbound approach have an uphill grade approaching Collins Hill Road.

University Highway (Georgia State Route 316) is an east/west limited access freeway that connects Interstate 85 to the outskirts of Athens. In the vicinity of the site, the road has two through lanes in each direction. There are eastbound ramps at GA 316 and Collins Hill Road, westbound ramps at GA 316 and the Lendon Connector, and a full interchange at GA 316 and Buford Drive. The terrain is level to very gently rolling and the posted speed limit in this area is 55 mph. In 2018 (the most recent year for which counts were available at study time) the Georgia Department of Transportation (Georgia DOT) recorded an Annual Average Daily Traffic (AADT) volume of 54,500 vehicles per day (vpd) on GA 316 at the Lendon Connector ramps.

Collins Hill Road is a north/south urban minor collector that begins at Old Peachtree Road, to the north, crosses GA 316 with ramps from/to eastbound GA 316, then continues to the south and changes names at Hurricane Shoals Road to Northdale Road before terminating at North Clayton Street. Near the Lendon Connector, Collins Hill Road has two through lanes per direction. There are northbound exclusive left and right turn lanes and a southbound left turn lane on Collins Hill Road at its signalized intersection with the Lendon Connector. The terrain is gently rolling, with a notable grade change over the bridge over GA 316, and the posted speed limit is 40 mph near Collins Industrial Way. The 2018 Georgia DOT AADT on Collins Hill Road south of Countryside Place (north of the study area) was 10,600 vpd.

Buford Drive (Georgia State Routes 20 and 124) is a generally north/south urban principal arterial that provides regional mobility through this portion of the state. In the vicinity of the proposed development, the road has three through lanes in each direction (two southbound and three northbound a short distance north of Lendon Lane, then two lanes per direction further north). There are exclusive left turn lanes in both directions on Buford Drive at its signalized intersection with Lendon Lane / Reynolds Road. The terrain along Buford Drive is level to very gently rolling in the study area and the posted speed limit is 45 mph. The 2018 Georgia DOT AADT on Buford Drive north of Lendon Lane was 50,300 vpd.

Pedestrian, Bicycle, and Transit Accessibility

There are sidewalks along both sides of all the major roads in the vicinity of the proposed residential development. A segment of sidewalk is missing on the west side of Buford Drive just north of Lendon Lane. There are crosswalks and pedestrian signals on all legs of both signalized study intersections. There is a striped designated bicycle lane on Collins Hill Road but it is only sporadically designated and not separated from the very busy adjacent lanes of traffic. The Bike Lane sign in the southwest corner of the Collins Hill Road / Collins Industrial Way intersection is broken off its post and on the ground. Gwinnett County Transit provides regularly-scheduled bus service in this area, with Bus Route 45 serving Collins Hill Road.

Photographs 1 through 6 show existing transportation conditions in the vicinity of the subject development.

Photograph 1 – Collins Industrial Way Facing East at Collins Hill Road

Photograph 2 –Collins Hill Road Facing South at Collins Hill Industrial Way / Lendon Connector

Photograph 3 – Southbound Collins Hill Road Showing Bike Lane and Damaged Sign

Photograph 4 – Lendon Connector Facing West from its Terminus East of GA 316 Ramps

Photograph 5 – Buford Drive Facing South at Lendon Lane

Photograph 6 – Lendon Lane Facing East at Buford Drive

Existing Traffic Volumes

The preparation of this traffic study coincided with the quarantining and statewide school closures due to the COVID-19 pandemic. The roads in the vicinity of the proposed residential development, and throughout the state, saw dramatic decreases in volumes. Therefore, existing traffic volume counts could not be collected. Previously-collected traffic volume counts were obtained from Gwinnett County at the following intersections:

1. Collins Hill Road at Collins Industrial Way / Lendon Connector
2. Buford Drive at Reynolds Road / Lendon Lane

The counts at Collins Hill Road were collected on Wednesday, September 28, 2016 while the counts at Buford Drive were collected on Tuesday, September 10, 2019. Both counts were collected through the morning and evening peak time periods and area schools were in standard session on the days on which the counts were recorded. From the count data, the highest four consecutive 15-minute interval volumes at each intersection, during each time period, were determined. These volumes make up the typical weekday a.m. and p.m. peak hour traffic volumes at that intersection on the date of the counts.

In addition to the intersection turning movement counts, Georgia DOT AADT volume counts were obtained on nearby roadways for the five years from 2014 through 2018 (the latest year for which counts were available at the time of this study). Table 1 presents the historic Georgia DOT counts and the annual growth rates between

the counts. Based on the historic growth trends, the counts at the two study intersections were adjusted to 2020 volumes under typical conditions. The volumes at the Collins Hill Road intersection were increased by 4.1% while no adjustment was applied to the counts at Buford Drive. This produces the calculated 2020 "existing" volumes at each intersection. The "existing" a.m. and p.m. peak hour turning movement volumes are shown in Figure 2. The raw count data is found in Appendix A.

Table 1 – Historic Georgia DOT Traffic Volume Counts and Annual Growth Rates

Year	Collins Hill S of Countryside	Annual Growth	Buford N of Lendon	Annual Growth	GA 316 at Lendon Cn	Annual Growth	H'cane Shls E of Collins	Annual Growth
Station ID	135-6663		135-0127		135-0247		135-0589	
2014	11,800		37,700		57,000		13,100	
2015	12,300	4.2%	46,100	22.3%	58,900	3.3%	13,700	4.6%
2016	12,600	2.4%	47,600	3.3%	48,600	-17.5%	14,000	2.2%
2017	12,900	2.4%	50,400	5.9%	50,900	4.7%	13,100	-6.4%
2018	10,600	-17.8%	50,300	-0.2%	54,500	7.1%	13,300	1.5%
Avg Growth		-2.6%		7.5%		-1.1%		0.4%

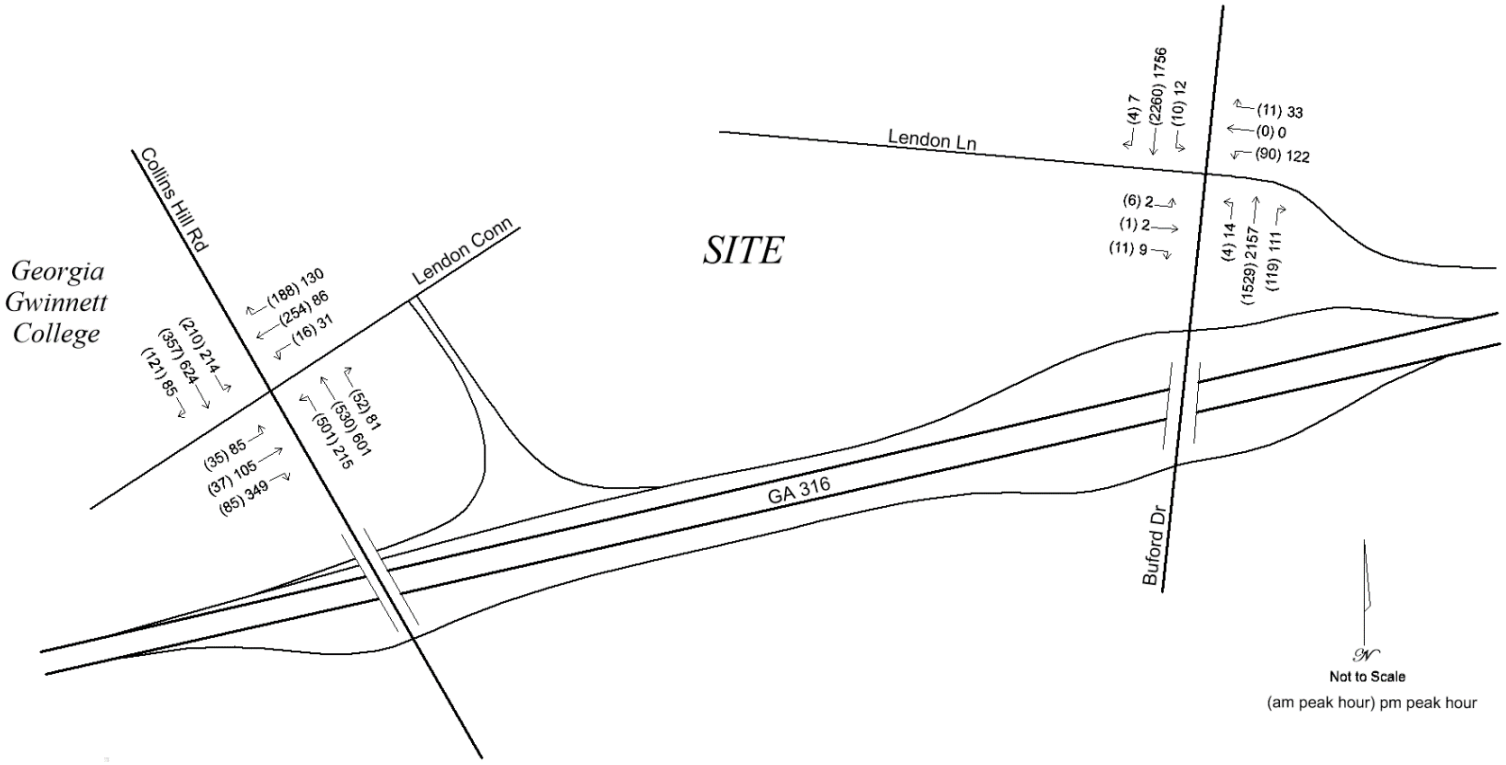

Figure 2 – Existing* Weekday A.M. and P.M. Peak Hour Traffic Volumes

*see text

Existing Intersection Operations

Existing traffic operations were analyzed at the counted intersections using Synchro software, version 10, in accordance with the methodology presented in the Transportation Research Board's 2016 *Highway Capacity Manual* (*HCM 6*). The results of the analysis are shown in Table 2. Computer printouts containing detailed results of the analysis are located in Appendix C. Levels of service and delays are provided for the overall intersection and for each approach or controlled movement. Intersections or approaches that "fail" (operate at LOS E or LOS F) are shown in bold type.

Table 2 – Existing Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. Collins Hill Road at Collins Industrial Way / Lendon Connector	C	30.0	D	44.4
northbound approach	C	25.8	C	21.8
southbound approach	C	27.2	C	26.1
eastbound approach	C	26.5	***F***	***124.5***
westbound approach	D	43.4	C	25.3
2. Buford Drive at Reynolds Road / Lendon Lane	B	10.1	B	11.5
northbound approach	A	7.2	B	10.4
southbound approach	A	9.0	A	8.7
eastbound approach	***E***	***64.3***	***E***	***63.9***
westbound approach	***E***	***57.9***	***E***	***55.3***

The existing analysis reveals generally acceptable operations at the two study intersections. The results show higher side street delays at both intersection due to the signal timing favoring the major streets (Collins Hill Road and Buford Drive). This is logical because the volumes on the major streets are notably higher than the side street approaches and, therefore, receive a higher proportion of allocation of the greentime on the signals. At Lendon Lane and Reynolds Road, the side street volumes that are experiencing the LOS E are relatively low. Allocating more greentime to those side street approaches would reduce those delays but would increase delays for many more vehicles on Buford Drive and is, therefore, not recommended.

At Collins Industrial Way /Lendon Connector, the side street approach volumes are higher than at Lendon Lane /Reynolds Road and this produces significant side street delays in the p.m. peak. The eastbound right turn volume from Collins Industrial Way is heavy but there is no exclusive right turn lane – the right turns are shared with the throughs, which precludes right turns on red once the through movements block the right turns. This geometry also precludes the addition of a right turn overlap phase on the signal which would provide a green arrow on the signal for those right turners concurrently with the protected phase of the northbound left turners from Collins Hill Road. Adding this eastbound right turn lane and overlap phase would allow all approaches to operate acceptably. However, there is a retaining wall on the northwest and southwest corners of this intersection that reduces the feasibility of widening Collins Industrial Way to add this right turn lane. Likewise, the southbound

right turn volumes on Collins Hill Road at Collins Industrial Way are sufficient to merit consideration of the addition of an exclusive right turn lane. However, the retaining wall for the Georgia Gwinnett College parking lot reduces the feasibility of constructing this lane. Additional greentime could be allocated to the side street approaches which would reduce these delays, but would increase delays on Collins Hill Road. These side street delays, and the potential mitigation identified, describe existing conditions in 2020, irrespective of whether or not the proposed residential development is built.

No-Build Traffic Conditions

A future "no-build" condition was developed to identify future traffic operations with other growth and development in the area, but not including the proposed residential development. This allows the traffic impact of the subject development to be isolated from the future conditions that will exist whether or not this project is developed.

No-Build Lanes and Traffic Control

A new roadway, the Lendon Connector, is proposed to extend from its current terminus, just east of the ramps from GA 316, to Buford Drive. This roadway will pass the subject residential development and intersect with Buford Drive at the existing signalized intersection with Lendon Lane and Reynolds Road. Lendon Lane, a local residential street, will tie into the new connector roadway just west of Buford Drive. The no-build analysis assumes that the Lendon Connector will be built by the time the subject residential development is built-out. Based on conceptual plans for this connector, the lane geometry assumed for the connector consists of one through lane per direction with a center two-way left turn lane (or a median with a westbound left turn lane at the project access, modeled the same way in the capacity analysis). The lane geometry and signal phasing at the Collins Hill Road / Lendon Connector intersection and the Buford Drive / Lendon Connector intersection were assumed to remain the same as existing.

No Build Traffic Volumes

The 2020 traffic volumes developed for the two study intersections were shifted, by movement, to account for travel patterns that are expected when the Lendon Connector is completed. For example, some eastbound trips on Collins Industrial Way that wish to travel on Buford Drive may currently turn left onto Collins Hill Road and some may currently turn right on Collins Hills Road then turn left onto GA 316, then exit at Buford Drive. Some of the current eastbound left turns and right turns were shifted to eastbound throughs from Collins Industrial Way to the Lendon Connector, then added to the eastbound approach of the Lendon Connector at Buford Drive. Adjustments were also made for other movements at the Buford Drive intersection to account for this shift. Similar shifts were made for other movement combinations between the two study intersections after they are connected.

The primary benefit of the Lendon Connector connecting through to Buford Drive will be east/west connectivity north of, and parallel to, GA 316. This connectivity will benefit trips entering and exiting Collins Industrial Way that wish to travel to and from the north on Buford Drive. Likewise, the connection will benefit trips entering and exiting Reynolds Road that wish to travel to and from the north on Collins Hill Road, though these trips will be much lower since there is less traffic on Reynolds Road than on Collins Industrial Way and less trip attraction to the north on Collins Hill Road than on Buford Drive. There will also be improved east/west mobility between areas just to the north on Collins Hill Road and areas to the north on Buford Drive, which trips may currently use GA 316 or Russell Road. Some of the small volume of trips generated by the homes on Lendon Lane may use the Lendon Connector to access Collins Hill Road and Collins Industrial Way. The Lendon Connector will provide excellent access for the proposed residential development that is the subject of this study, both to the east and west.

The shifted volumes at the two study intersections were then increased to account for general growth and development that will occur in the area while the proposed residential development is being constructed. Table 1 in this report identified historic traffic volume trends on roadway segments in the study area. Based on those trends, an annual growth rate of 2% was selected and applied to the counted volumes for a period of five years during which the proposed residential development is anticipated to be built and become operational. The overall growth rate of 2% for five years equates to a 10.4% growth rate. The shifted volumes increased by this growth rate produces the future no-build volumes at the study intersections. The traffic volume worksheets in Appendix A show the shifted volumes and the growth factor applied for each movement at each study intersection.

No-Build Intersection Operations

The study intersections were re-evaluated for the no-build condition using the no-build lane geometry and projected volumes as described above. The results of the analysis are shown in Table 3. Computer printouts containing detailed results of the no-build analysis are located in Appendix D. Levels of service and delays are provided for the overall intersection and for each approach or controlled movement. Intersections or approaches that "fail" (operate at LOS E or LOS F) are shown in bold type.

Table 3 – No-Build Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. Collins Hill Road at Collins Industrial Way / Lendon Connector	C	33.6	D	45.0
northbound approach	C	30.9	D	36.8
southbound approach	C	32.9	D	37.5
eastbound approach	C	26.2	***F***	***88.2***
westbound approach	D	39.9	C	20.1
2. Buford Drive at Reynolds Road / Lendon Connector	B	14.3	B	19.0
northbound approach	A	8.3	B	15.3
southbound approach	B	11.9	B	14.1
eastbound approach	***E***	***66.2***	***E***	***60.8***
westbound approach	***E***	***61.8***	***E***	***59.7***

As would be expected, delays will increase at both intersections due to the increases in background traffic volumes. However, delays on some approaches will decrease due to the shifting in volumes due to the completion of the Lendon Connector. The eastbound approach of the Lendon Connector at Buford Drive will incur comparably-high delays per vehicle as the existing low-volume Lendon Lane approach, but those delays will be incurred by more vehicles due to the connection through to Collins Hill Road. As with the existing analysis, these results describe conditions that will existing whether or not the proposed residential project is developed.

Project Traffic Characteristics

This section describes the anticipated traffic characteristics of the proposed residential development, including a site description, how much traffic the project will generate, and where that traffic will travel.

Project Description

The site will be developed with 361 multi-family residential units. One full-movement vehicular access will be provided on the south side of the Lendon Connector (an emergency access and an interparcel connection to future development are proposed at the eastern end of the site). The site plan is presented in Figure 3.

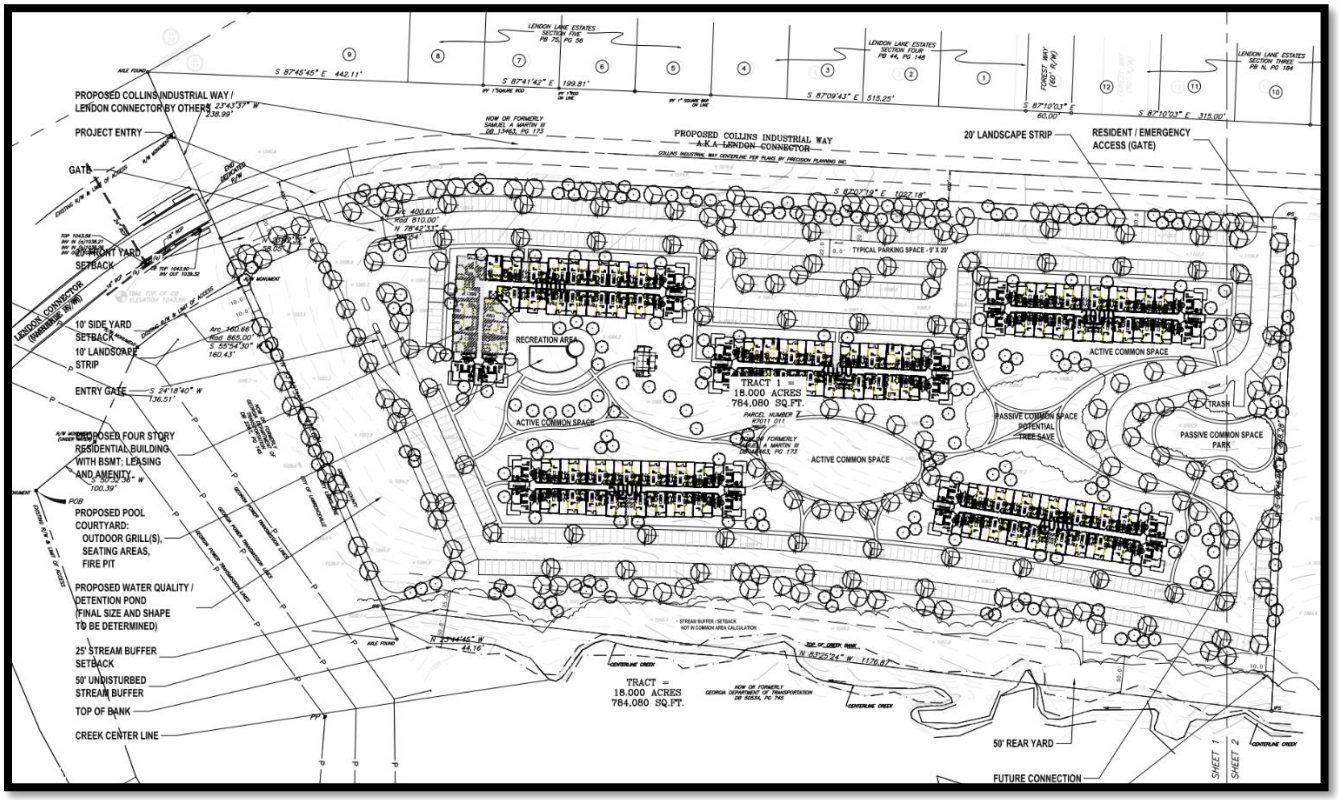

Figure 3 – Site Plan

Trip Generation

The volume of traffic that will be generated by the proposed residential development was calculated using the equations in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition with Supplement* (the current edition). ITE Land Use 221 – Multi-Family Housing (Mid-Rise) was chosen as representative of the proposed use.

For comparison purposes, the trips that would be generated by this site was alternatively developed with an office park, were also calculated. The trip generation for the proposed residential development, and a comparison with an alternative office park development, is summarized in Table 4.

Table 4 – Lendon Connector Residential Development Trip Generation

Land Use	ITE Code	Size	A.M. Peak Hour			P.M. Peak Hour			24-Hour
			In	Out	Total	In	Out	Total	2-Way
Multi-Family Housing (Mid-Rise)	221	361 units	31	89	120	93	59	152	1,966
Alternative Office Park		540,000 ft²	692	86	778	40	538	578	6,000

The project will generate 120 new trips in the morning peak hour, 152 new trips in the evening peak hour, and 1,966 new daily trips.

If the site were developed with an office park, it would generate significantly more trips than the proposed residential development. The traffic flows of an office development would be generally opposite those of a residential use. Residential trips will heavily favor the outbound direction in the morning while office trips will favor inbound in the morning. Conversely, residential trips will favor inbound in the evening while office trips will be heavily outbound.

Trip Distribution and Assignment

The trip distribution percentages indicate what proportion of the project's new trips will travel to and from various directions. The trip distribution percentages were developed based on the locations and proximity of likely trip origins and destinations and the routes of travel to and from those areas. The project trips will travel during the peak times primarily to employment centers such as downtown Lawrenceville, the Pleasant Hill Road corridor, Gainesville, and Atlanta. Other project trips will be made to schools, including nearby Georgia Gwinnett College, and retail shopping. Figure 4 shows the project trip distribution percentages and the trips that will be generated solely by the project. Appendix A includes traffic volume worksheets that show the project trips assigned by movement at each study intersection and the project access.

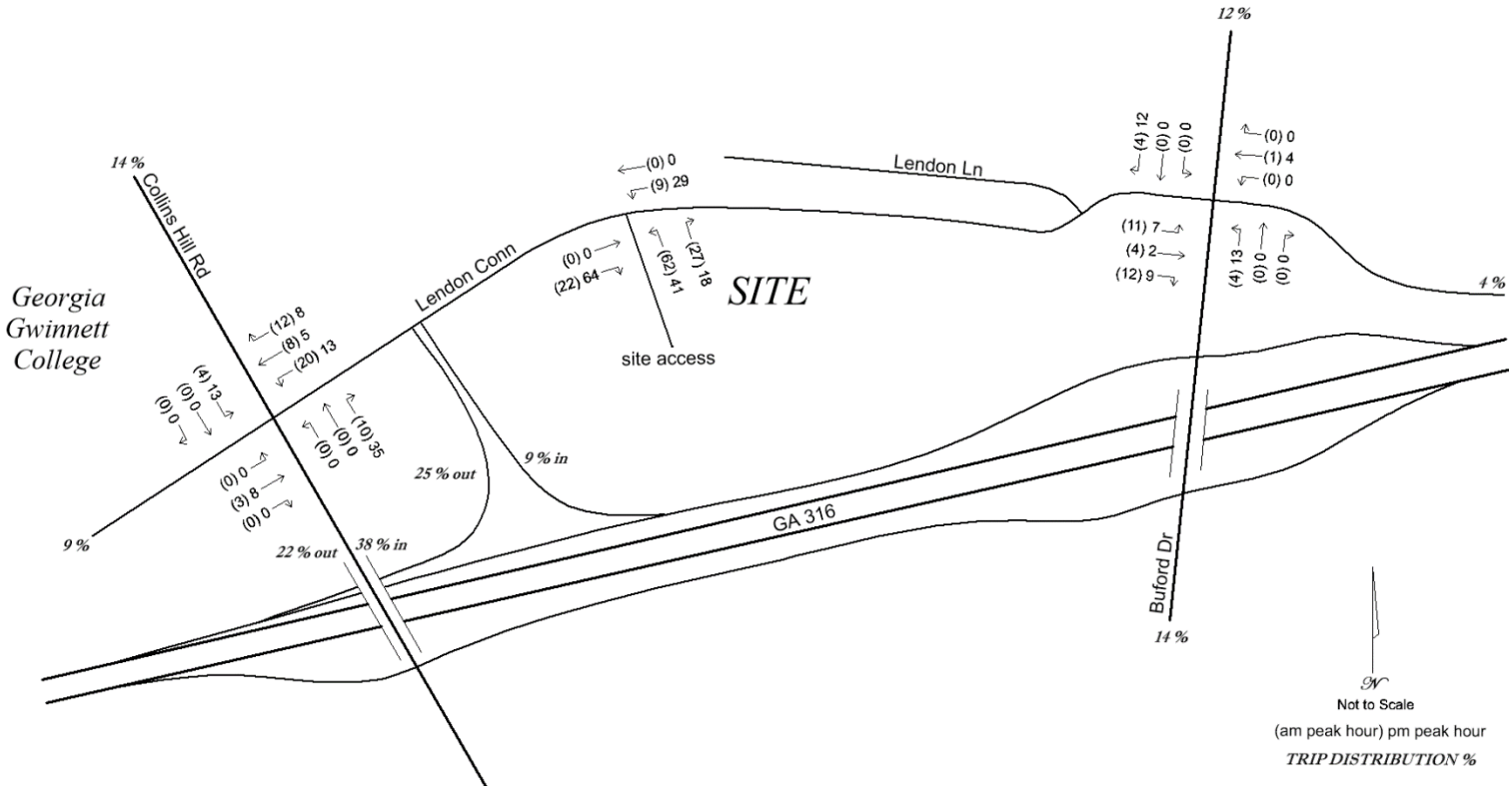

Figure 4 – Weekday A.M. and P.M. Peak Hour Site Trips and Trip Distribution Percentages

Future Traffic Conditions

A future "build" condition was developed for the anticipated project build-out year of 2025. The build volumes consist of the no-build volumes plus the trips that will be generated by the proposed residential development. The build volumes are shown in Figure 5.

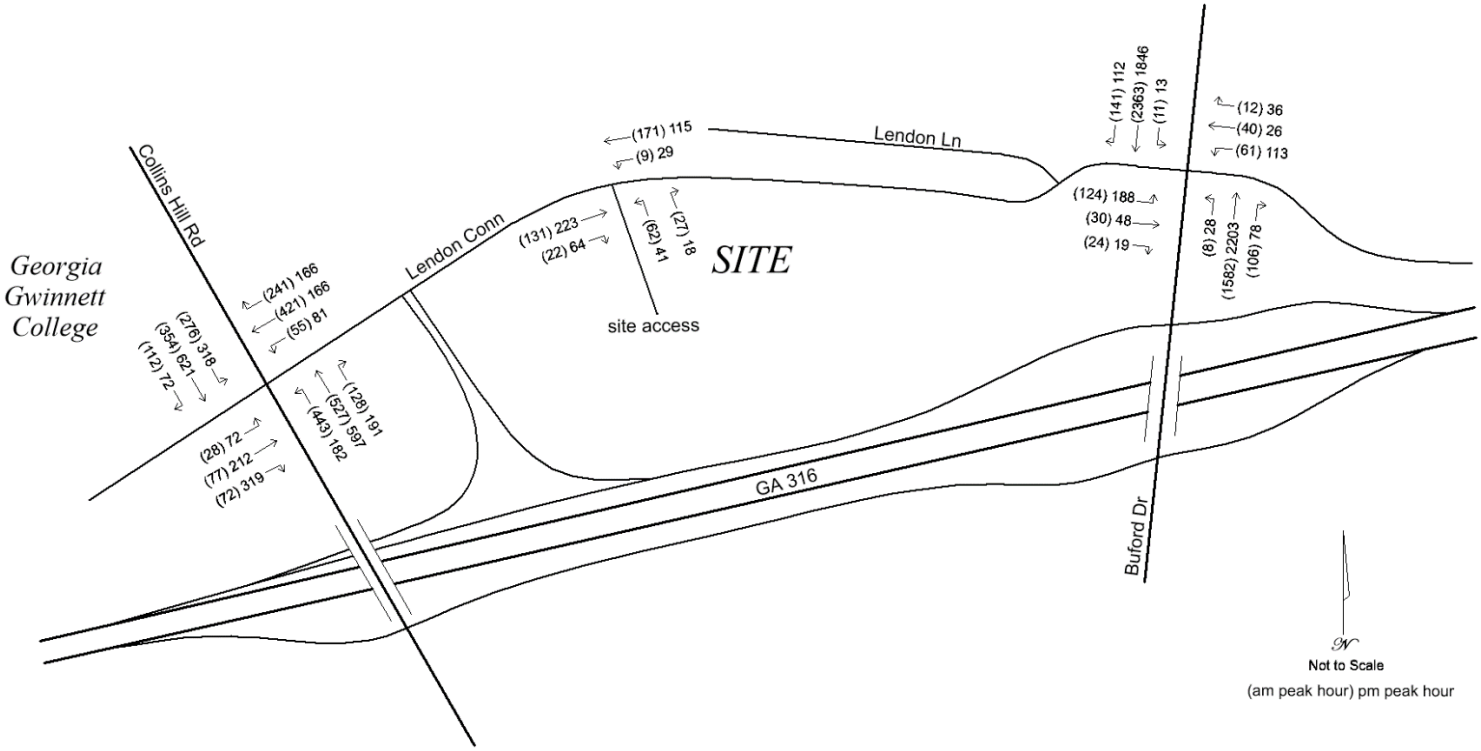

Figure 5 – Future Weekday A.M and P.M. Peak Hour Traffic Volumes

Lane Configuration at Site Access

The analysis of the residential development access on the Lendon Connector includes one through lane per direction with a center two-way left turn lane on the Lendon Connector (or a median with a westbound left turn lane at the project access, modeled the same way in the capacity analysis). The site access on the Lendon Connector was reviewed for Gwinnett County lane requirements. The Gwinnett County Unified Development Ordinance (UDO) Section 900-30 Project Access Improvements, Subsection 900-30.2 applies to Multi-Family and Non-Residential Developments. For this traffic study, when applying the UDO, it will be assumed that Lendon Connector will be a collector.

The code states that a deceleration lane will be required at each project driveway that is provided access to a minor collector or major thoroughfare. Based on the road classification assumed above, a deceleration lane is required at the site access on the Lendon Connector. The UDO states that the deceleration lane shall have 200 feet of full-width storage (12 feet) and an additional 50 foot taper.

The UDO states that left turn lanes shall be provided in accordance with Gwinnett County DOT's *Criteria and Guidelines for Left Turn Lanes*. That document's Table 2 applies to multi-family developments and is presented below as Table 5.

Table 5 – Gwinnett County Left Turn Lane Criteria for Multi-Family Developments

Posted Speed Limit (mph)	2 Lane Routes ----------ADT---------- <6000	>=6000	More Than 2 Lanes on Main Road ----------ADT---------- <10,000	>=10,000
30 to 35	175 units	110 units	245 units	175 units
40 to 50	145 units	95 units	195 units	145 units
>= 55	110 units	75 units	145 units	110 units

For two-lane roads with an ADT greater than 6,000 vpd (assumed, to be conservative, though it is likely that the Lendon Connector may carry a lower ADT) and an anticipated posted speed limit of 40 mph, the multi-family threshold for requiring a left turn lane at the site access on the Lendon Connector is 95 units. The proposed 361 units exceed this threshold. Therefore, a westbound left turn lane will be required at the site access. The conceptual design of the Lendon Connector and the existing cross-section east of the GA 316 ramps includes a center two-way left turn lane from which the project left turns can be accommodated. This would serve as the project's westbound left turn lane.

Future Intersection Operations

An operational analysis was performed for the anticipated 2025 project build-out conditions. The analysis was performed for the two study intersections and the proposed project access. The analysis assumes the site access will allow full turning movements with one inbound and two outbound lanes, stripes as a left and a right turn lane, and side street stop sign control. The analysis assumes that left and right turn lanes will be provided on the Lendon Connector at the site access as identified above. Table 6 presents the results the future analysis. The results of the no-build analysis are also reproduced in Table 6 to provide a side-by-side comparison of traffic operations without and with the proposed residential development. Computer printouts containing detailed results of the analysis are located in Appendix E. Levels of service and delays are provided for the overall intersection and for each approach or controlled movement. Intersections or approaches that "fail" (operate at LOS E or LOS F) are shown in bold type.

Table 6 – No-Build and Future Intersection Operations

Intersection / Approach	A.M. Peak Hour				P.M. Peak Hour			
	No-Build		Build		No-Build		Build	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. Collins Hill Rd at Collins Industrial Way / Lendon Connector	C	33.6	C	34.7	D	45.0	D	46.9
northbound approach	C	30.9	C	30.6	D	36.8	D	40.5
southbound approach	C	32.9	C	32.5	D	37.5	D	42.3
eastbound approach	C	26.2	C	27.0	***F***	***88.2***	***F***	***86.6***
westbound approach	D	39.9	D	44.4	C	20.1	B	16.5
2. Buford Drive at Reynolds Road / Lendon Lane	B	14.3	B	15.6	B	19.0	B	19.9
northbound approach	A	8.3	A	8.9	B	15.3	B	15.5
southbound approach	B	11.9	B	13.2	B	14.1	B	15.1
eastbound approach	***E***	***66.2***	***E***	***66.1***	***E***	***60.8***	***E***	***63.3***
westbound approach	***E***	***61.8***	***E***	***61.9***	***E***	***59.7***	***E***	***59.6***
3. Lendon Connector at Site Access			A	2.5			A	2.0
northbound left turn (exit site)			B	11.8			B	12.5
northbound right turn (exit site)			A	9.2			A	9.8
westbound left turn (enter site)			A	7.6			A	8.0

The future build analysis shows comparable operations to the no-build condition, with slight increases in delays due to the addition of the project's trips. For example, at the Collins Hill Road intersection, the overall delay increases by 1.1 seconds per vehicle in the a.m. and 1.9 seconds per vehicle in the p.m. due to the addition of the residential development's trips. This is an imperceptible change for motorists. Some approaches may actually experience slight decreases in average delays per vehicle during some time periods due to increased signal efficiency in processing slightly more vehicles on certain movements.

The same issues from the existing and no-build conditions will carry through to the future. The site access will operate well, with low delays. All of those low delays at the site access will be incurred by site trips, with effectively zero impedance to other vehicles on the Lendon Connector. The traffic impact of the proposed residential development will be small and will generally be imperceptible to the motoring public.

Conclusions and Recommendations

This traffic impact study evaluates the impact of a proposed residential development in the City of Lawrenceville. Vehicular access will be provided one full-movement driveway on the future Lendon Connector. The following is a summary of the findings and recommendations of this study:

1. Existing traffic operations at the two study intersections are generally acceptable. Traffic volumes are very heavy on Buford Drive and heavy on Collins Hill Road. The signal timing at both intersections appropriately favors the north/south through movements on the major streets, resulting in high side street delays. The volumes incurring these delays are lower at Lendon Lane / Reynolds Road but more notable at Collins Industrial Way / Lendon Connector. Changing the signal timing to increase the proportion of green time for the side streets would reduce those delays, but would increase delays for many more vehicles on the major streets. Therefore, no changes are recommended in the operations of the traffic signals.

2. Mitigation was identified to reduce existing delays. Adding an eastbound right turn lane on Collins Industrial Way at Collins Hill Road would reduce the side street delays substantially, especially in the p.m. peak. A southbound right turn lane on Collins Hill Road at Collins Industrial Way would also be beneficial. However, retaining walls reduce the feasibility of constructing these lanes. These lanes would mitigate existing delays, whether or not the proposed residential development is built.

3. A new roadway, the Lendon Connector, is proposed to extend from its current terminus, just east of the ramps from GA 316, to Buford Drive. This roadway will pass the subject residential development and intersect with Buford Drive at the existing signalized intersection with Lendon Lane and Reynolds Road. Lendon Lane, a local residential street, will tie into the new connector roadway just west of Buford Drive.

4. The no-build analysis assumes the Lendon Connector will be completed, connecting Collins Hill Road to Buford Drive, by the time the proposed residential development is built. Traffic operations in the no-build condition at the two study intersections will be comparable to the existing with some increases in delays.

5. The proposed residential development will generate 120 new trips in the a.m. peak hour, 152 new trips in the p.m. peak hour, and 1,966 daily new trips.

6. A trip generation comparison if the site was alternatively developed with an office park reveals substantially higher trips from the office park with 778 new trips in the a.m. peak hour, 578 new trips in the p.m. peak hour, and 6,000 daily new trips.

7. The future condition with the project trips is expected to be comparable to the no-build condition. The project access will operate well, with low delays. The traffic impact of the proposed residential development will be small and will generally be imperceptible to the motoring public.

8. The Gwinnett UDO and Left Turn Lane Policy require an eastbound right turn lane and a westbound left turn lane on the Lendon Connector at the site access. The westbound left turns are expected to be accommodated in the center two way left turn lane that is part of the conceptual design of the Lendon Connector.

9. The site access should be built with one entering lane and one or two exiting lanes (either will operate acceptably) and the exiting approach should be controlled by stop sign and accompanying stop bar.

10. The project civil/site engineer is advised to refer to applicable driveway design standards to ensure design compliance at the project access.

Appendix A

Traffic Count Data and Volume Worksheets

Lendon Connector Residential Development - Traffic Impact Study
City of Lawrenceville, Gwinnett County, Georgia

May 2020

Intersection: 1. Collins Hill Road and Collins Industrial Way / Lendon Connector

Weekday A.M. Peak Hour	Northbound Collins Hill Road				Southbound Collins Hill Road				Eastbound Collins Industrial Way				Westbound Lendon Connector			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, September 28, 2016, 7:15-8:15)	481	509	50	1040	202	343	116	661	34	36	82	152	15	244	181	440
Adjustment to May 2020	4.1%	4.1%	4.1%		4.1%	4.1%	4.1%		4.1%	4.1%	4.1%		4.1%	4.1%	4.1%	
Calculated May 2020 Volumes	**501**	**530**	**52**	**1082**	**210**	**357**	**121**	**688**	**35**	**37**	**85**	**158**	**16**	**254**	**188**	**458**
Volumes Shifted for Completed Lendon Connector	401	477	105	983	246	321	101	668	25	67	65	157	32	374	207	613
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
No-Build Volumes	**443**	**527**	**116**	**1085**	**272**	**354**	**112**	**738**	**28**	**74**	**72**	**173**	**35**	**413**	**229**	**677**
Lendon Connector Residential Trips	**0**	**0**	**12**	**12**	**4**	**0**	**0**	**4**	**0**	**3**	**0**	**3**	**20**	**8**	**12**	**40**
Build Volumes	**443**	**527**	**128**	**1097**	**276**	**354**	**112**	**742**	**28**	**77**	**72**	**176**	**55**	**421**	**241**	**717**

Weekday P.M. Peak Hour	Northbound Collins Hill Road				Southbound Collins Hill Road				Eastbound Collins Industrial Way				Westbound Lendon Connector			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, September 28, 2016, 4:30-5:30)	207	578	78	863	206	600	82	888	82	101	335	518	30	83	125	238
Adjustment to May 2020	4.1%	4.1%	4.1%		4.1%	4.1%	4.1%		4.1%	4.1%	4.1%		4.1%	4.1%	4.1%	
Calculated May 2020 Volumes	**215**	**601**	**81**	**898**	**214**	**624**	**85**	**924**	**85**	**105**	**349**	**539**	**31**	**86**	**130**	**248**
Volumes Shifted for Completed Lendon Connector	165	541	141	847	276	562	65	903	65	185	289	539	62	146	143	351
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
No-Build Volumes	**182**	**597**	**156**	**935**	**305**	**621**	**72**	**997**	**72**	**204**	**319**	**595**	**68**	**161**	**158**	**388**
Lendon Connector Residential Trips	**0**	**0**	**35**	**35**	**13**	**0**	**0**	**13**	**0**	**8**	**0**	**8**	**13**	**5**	**8**	**26**
Build Volumes	**182**	**597**	**191**	**970**	**318**	**621**	**72**	**1010**	**72**	**212**	**319**	**603**	**81**	**166**	**166**	**414**

MARC R. ACAMPORA, PE, LLC

Lendon Connector Residential Development - Traffic Impact Study

City of Lawrenceville, Gwinnett County, Georgia

May 2020

Intersection: 2. Buford Drive (GA 20 / GA 124) and Reynolds Road / Lendon Connector

Weekday A.M. Peak Hour	Northbound Buford Drive				Southbound Buford Drive				Eastbound Lendon Lane/Connector				Westbound Reynolds Road			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Tuesday, September 10, 2019, 7:30-8:30)	4	1529	119	1652	10	2260	4	2274	6	1	11	18	90	0	11	101
Adjustment to May 2020	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	
Calculated May 2020 Volumes	**4**	**1529**	**119**	**1652**	**10**	**2260**	**4**	**2274**	**6**	**1**	**11**	**18**	**90**	**0**	**11**	**101**
Volumes Shifted for Completed Lendon Connector	4	1433	96	1533	10	2140	124	2274	102	24	11	137	55	35	11	101
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
No-Build Volumes	**4**	**1582**	**106**	**1693**	**11**	**2363**	**137**	**2511**	**113**	**26**	**12**	**151**	**61**	**39**	**12**	**112**
Lendon Connector Residential Trips	**4**	**0**	**0**	**4**	**0**	**0**	**4**	**4**	**11**	**4**	**12**	**27**	**0**	**1**	**0**	**1**
Build Volumes	**8**	**1582**	**106**	**1697**	**11**	**2363**	**141**	**2515**	**124**	**30**	**24**	**178**	**61**	**40**	**12**	**113**

Weekday P.M. Peak Hour	Northbound Buford Drive				Southbound Buford Drive				Eastbound Lendon Lane/Connector				Westbound Reynolds Road			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Tuesday, September 10, 2019, 4:30-5:30)	14	2157	111	2282	12	1756	7	1775	2	2	9	13	122	0	33	155
Adjustment to May 2020	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	
Calculated May 2020 Volumes	**14**	**2157**	**111**	**2282**	**12**	**1756**	**7**	**1775**	**2**	**2**	**9**	**13**	**122**	**0**	**33**	**155**
Volumes Shifted for Completed Lendon Connector	14	1995	71	2080	12	1672	91	1775	164	42	9	215	102	20	33	155
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
No-Build Volumes	**15**	**2203**	**78**	**2297**	**13**	**1846**	**100**	**1960**	**181**	**46**	**10**	**237**	**113**	**22**	**36**	**171**
Lendon Connector Residential Trips	**13**	**0**	**0**	**13**	**0**	**0**	**12**	**12**	**7**	**2**	**9**	**18**	**0**	**4**	**0**	**4**
Build Volumes	**28**	**2203**	**78**	**2310**	**13**	**1846**	**112**	**1972**	**188**	**48**	**19**	**255**	**113**	**26**	**36**	**175**

MARC R. ACAMPORA, PE, LLC

Lendon Connector Residential Development - Traffic Impact Study

City of Lawrenceville, Gwinnett County, Georgia

May 2020

Intersection: 3. Lendon Connector and Site Access

Weekday A.M. Peak Hour	**Northbound Site Access**				**Eastbound Lendon Connector**			**Westbound Lendon Connector**		
	L		**R**	**Tot**	**T**	**R**	**Tot**	**L**	**T**	**Tot**
Counted Volumes (Wednesday, September 28, 2016, 7:15-8:15)										
Adjustment to May 2020										
Calculated May 2020 Volumes										
Volumes Shifted for Completed Lendon Connector					119		119		155	155
Total Annual Background Growth					10.4%				10.4%	
No-Build Volumes					**131**		**131**		**171**	**171**
Lendon Connector Residential Trips	**62**		**27**	**89**	**0**	**22**	**22**	**9**	**0**	**9**
Build Volumes	**62**		**27**	**89**	**131**	**22**	**153**	**9**	**171**	**180**

Weekday P.M. Peak Hour	**Northbound Site Access**				**Eastbound Lendon Connector**			**Westbound Lendon Connector**		
	L		**R**	**Tot**	**T**	**R**	**Tot**	**L**	**T**	**Tot**
Counted Volumes (Wednesday, September 28, 2016, 4:30-5:30)										
Adjustment to May 2020										
Calculated May 2020 Volumes										
Volumes Shifted for Completed Lendon Connector					202		202		104	104
Total Annual Background Growth					10.4%				10.4%	
No-Build Volumes					**223**		**223**		**115**	**115**
Lendon Connector Residential Trips	**41**		**18**	**59**	**0**	**64**	**64**	**29**	**0**	**29**
Build Volumes	**41**		**18**	**59**	**223**	**64**	**287**	**29**	**115**	**144**

MARC R. ACAMPORA, PE, LLC

PEAK HOUR ITM SUMMARY

#001 Collins Hill Road & Collins Industrial Way

LOCATION#:	001	QTD PROJ#:	2016282	AM PEAK:	715 AM
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016	MD PEAK:	100 PM
EAST / WEST:	Collins Industrial Way	VICINITY:	GA	PM PEAK:	430 PM

Collins Hill Road

SOUTHBOUND LANES

LN	0	2	1
AM	116	343	202
MD	74	429	178
PM	82	600	206
TOTAL	272	1372	586

Collins Industrial Way

EASTBOUND LANES

LN	AM	MD	PM	TOTAL
1	34	56	82	172
1	36	98	101	235
0	82	264	335	681

SIGNALIZED

WESTBOUND LANES

TOTAL	PM	MD	AM	LN
387	125	81	181	1
398	83	71	244	1
71	30	26	15	1

Collins Industrial Way

NORTHBOUND LANES

TOTAL	865	1425	200
PM	207	578	78
MD	177	338	72
AM	481	509	50
LN	1	2	1

Collins Hill Road

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9701 W Pico Blvd, Suite 205, Los Angeles, CA 90035
Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

AM COUNT	6:00 AM	TO	12:00 PM
MD COUNT	12:00 PM	TO	2:00 PM
PM COUNT	2:00 PM	TO	7:00 PM

VEHICLE TURNING MOVEMENT COUNT

#001 Collins Hill Road & Collins Industrial Way - AM PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	2	1	1	2	0	1	1	0	1	1	1	
6:00 AM	6	22	10	31	33	4	0	1	9	2	9	13	140
6:15 AM	22	41	8	21	41	10	3	2	7	6	5	24	190
6:30 AM	33	40	10	20	51	8	1	0	16	4	12	20	215
6:45 AM	35	46	18	37	58	5	4	4	17	2	28	25	279
7:00 AM	59	76	10	38	55	8	1	5	19	1	29	26	327
7:15 AM	92	109	11	42	49	18	8	4	16	3	51	43	446
7:30 AM	138	142	14	38	84	29	10	10	23	2	65	62	617
7:45 AM	154	141	10	51	110	47	10	12	22	5	89	56	707
8:00 AM	97	117	15	71	100	22	6	10	21	5	39	20	523
8:15 AM	44	98	14	44	83	15	4	5	18	7	18	30	380
8:30 AM	54	92	15	43	93	21	6	5	14	6	24	34	407
8:45 AM	62	101	10	33	96	17	8	6	35	3	36	30	437
9:00 AM	103	91	10	46	87	23	7	3	27	6	42	37	482
9:15 AM	107	122	10	33	74	28	15	15	49	13	55	37	558
9:30 AM	76	77	21	39	83	24	8	8	36	6	38	24	440
9:45 AM	73	88	10	40	69	11	9	10	33	14	36	14	407
10:00 AM	49	68	19	29	72	13	11	7	23	8	25	17	341
10:15 AM	65	79	18	35	77	19	5	8	32	9	24	24	395
10:30 AM	94	108	14	33	73	26	9	12	45	10	31	38	493
10:45 AM	87	112	22	34	84	22	22	23	62	5	33	30	536

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	1450	1770	269	758	1472	370	147	150	524	117	689	604	8320
P.H.V: [1]	481	509	50	202	343	116	34	36	82	15	244	181	2293
P.H.F: [2]		0.852			0.794			0.864			0.733		0.811

(1) Peak Hour Volume (Peak Hour Begins At 715 AM)
(2) Peak Hour Factor (directional aggregate)

RZC2019-00010
SUP2019-00022
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VEHICLE TURNING MOVEMENT COUNT

#001 Collins Hill Road & Collins Industrial Way - MD PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	2	1	1	2	0	1	1	0	1	1	1	
11:00 AM	52	74	27	27	87	21	14	18	50	5	24	18	417
11:15 AM	62	75	21	28	62	14	11	10	28	6	15	15	347
11:30 AM	47	73	24	21	61	16	7	14	40	10	21	15	349
11:45 AM	65	74	18	22	61	17	11	15	50	8	26	23	390
12:00 PM	69	80	18	36	89	26	14	19	58	5	21	21	456
12:15 PM	67	87	24	44	128	29	18	26	74	9	24	28	558
12:30 PM	46	85	22	43	94	15	18	21	71	10	12	16	453
12:45 PM	43	64	16	19	89	15	11	14	33	8	12	13	337
1:00 PM	43	86	8	35	81	15	9	13	54	4	17	15	380
1:15 PM	36	80	18	30	82	19	19	19	51	9	16	24	403
1:30 PM	44	83	22	41	112	16	16	22	68	5	22	22	473
1:45 PM	54	89	24	72	154	24	12	44	91	8	16	20	608

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	628	950	242	418	1100	227	160	235	668	87	226	230	5171
P.H.V: [1]	177	338	72	178	429	74	56	98	264	26	71	81	1864
P.H.F: [2]		0.879			0.681			0.711			0.908		0.766

(1) Peak Hour Volume (Peak Hour Begins At 100 PM)
(2) Peak Hour Factor (directional aggregate)

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VEHICLE TURNING MOVEMENT COUNT

#001 Collins Hill Road & Collins Industrial Way - PM PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	2	1	1	2	0	1	1	0	1	1	1	
2:00 PM	34	82	18	53	121	23	20	27	84	6	19	13	500
2:15 PM	55	101	15	39	89	22	12	12	45	8	24	21	443
2:30 PM	62	105	24	18	101	19	11	7	41	11	14	19	432
2:45 PM	74	112	15	25	87	31	13	15	53	10	34	25	494
3:00 PM	94	126	15	25	108	37	15	10	44	10	38	34	556
3:15 PM	91	130	13	46	119	19	25	16	63	9	45	44	620
3:30 PM	65	146	14	48	152	36	14	30	73	7	17	21	623
3:45 PM	47	89	26	30	124	24	17	18	68	11	17	29	500
4:00 PM	37	130	17	38	109	21	14	15	70	8	14	23	496
4:15 PM	46	115	28	29	107	17	13	19	45	6	31	27	483
4:30 PM	63	138	17	31	121	24	23	22	67	10	27	39	582
4:45 PM	66	158	20	65	157	19	22	26	105	7	28	36	709
5:00 PM	38	138	21	67	191	26	17	31	95	6	18	30	678
5:15 PM	40	144	20	43	131	13	20	22	68	7	10	20	538
5:30 PM	44	143	30	38	121	19	22	14	66	12	29	35	573
5:45 PM	65	118	17	55	130	9	16	26	80	9	22	28	575
6:00 PM	51	145	13	48	143	26	25	16	81	8	42	34	632
6:15 PM	68	132	15	62	168	18	19	27	83	8	29	41	670
6:30 PM	46	104	13	50	131	15	26	14	99	7	19	20	544
6:45 PM	21	98	17	24	67	9	10	10	96	14	7	13	386

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	1107	2454	368	834	2477	427	354	377	1426	174	484	552	11034
P.H.V: (1)	207	578	78	206	600	82	82	101	335	30	83	125	2507
P.H.F: (2)		0.884			0.782			0.846			0.783		0.884

(1) Peak Hour Volume (Peak Hour Begins At 430 PM)
(2) Peak Hour Factor (directional aggregate)

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PEDESTRIAN CROSSWALK COUNTS

#001 Collins Hill Road & Collins Industrial Way - AM PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NORTHERN CROSSWALK	SOUTHERN CROSSWALK	EASTERN CROSSWALK	WESTERN CROSSWALK	TOTALS
6:00 AM	0	0	0	0	
6:15 AM	0	0	0	0	
6:30 AM	0	0	0	0	
6:45 AM	0	0	0	0	
7:00 AM	0	0	0	0	
7:15 AM	0	0	0	0	
7:30 AM	0	0	0	0	
7:45 AM	1	0	0	0	1
8:00 AM	0	0	0	0	
8:15 AM	0	0	0	0	
8:30 AM	0	0	0	0	
8:45 AM	0	0	0	0	
9:00 AM	0	0	0	0	
9:15 AM	0	0	0	0	
9:30 AM	0	0	0	0	
9:45 AM	0	0	0	0	
10:00 AM	0	0	0	0	
10:15 AM	0	0	0	0	
10:30 AM	0	0	0	0	
10:45 AM	0	0	0	0	

VOLUME STATS:	NORTHERN CROSSWALK	SOUTHERN CROSSWALK	EASTERN CROSSWALK	WESTERN CROSSWALK	
TOTAL:	1	0	0	0	1
P.H.V: (1)	1	0	0	0	1
P.H.F: (2)	0.250	0.000	0.000	0.000	0.250

(1) Peak Hour Volume (Peak hour begins at: 745 AM)
(2) Peak Hour Factor

RZC2019-00010
SUP2019-00022
Received: 06.12.2020
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PEDESTRIAN CROSSWALK COUNTS

#001 Collins Hill Road & Collins Industrial Way - MD PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NORTHERN CROSSWALK	SOUTHERN CROSSWALK	EASTERN CROSSWALK	WESTERN CROSSWALK	TOTALS
11:00 AM	0	0	0	0	
11:15 AM	0	0	0	0	
11:30 AM	0	0	0	0	
11:45 AM	0	0	0	0	
12:00 PM	0	0	0	0	
12:15 PM	0	0	0	0	
12:30 PM	0	0	0	0	
12:45 PM	0	0	0	0	
1:00 PM	0	0	0	0	
1:15 PM	0	0	0	0	
1:30 PM	0	0	0	0	
1:45 PM	0	0	0	0	

VOLUME STATS:	NORTHERN CROSSWALK	SOUTHERN CROSSWALK	EASTERN CROSSWALK	WESTERN CROSSWALK	
TOTAL:	0	0	0	0	0
P.H.V: [1]	0	0	0	0	0
P.H.F: [2]	0.000	0.000	0.000	0.000	0.000

(1) Peak Hour Volume (Peak hour begins at: 0 AM)
(2) Peak Hour Factor

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PEDESTRIAN CROSSWALK COUNTS

#001 Collins Hill Road & Collins Industrial Way - PM PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NORTHERN CROSSWALK	SOUTHERN CROSSWALK	EASTERN CROSSWALK	WESTERN CROSSWALK	TOTALS
2:00 PM	0	0	0	0	
2:15 PM	0	0	0	0	
2:30 PM	0	0	0	0	
2:45 PM	0	0	0	0	
3:00 PM	1	0	0	0	1
3:15 PM	0	0	0	0	
3:30 PM	0	0	0	0	
3:45 PM	0	0	0	0	
4:00 PM	0	0	0	0	
4:15 PM	0	0	0	0	
4:30 PM	0	0	0	0	
4:45 PM	0	0	0	0	
5:00 PM	0	0	0	0	
5:15 PM	0	0	0	0	
5:30 PM	0	0	0	0	
5:45 PM	0	0	0	0	
6:00 PM	0	0	0	0	
6:15 PM	0	0	0	0	
6:30 PM	0	0	0	0	
6:45 PM	0	0	0	0	

VOLUME STATS:	NORTHERN CROSSWALK	SOUTHERN CROSSWALK	EASTERN CROSSWALK	WESTERN CROSSWALK	
TOTAL:	1	0	0	0	1
P.H.V: [1]	1	0	0	0	1
P.H.F: [2]	0.250	0.000	0.000	0.000	0.250

(1) Peak Hour Volume (Peak hour begins at: 300 PM)
(2) Peak Hour Factor

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Planning & Development

QUALITY TRAFFIC DATA, LLC
9701 W Pico Blvd, Suite 205, Los Angeles, CA 90035
Phone: 310-341-0019 Fax: 310-807-9247 Info@QualityTrafficData.com

BICYCLE TURNING MOVEMENT COUNT

#001 Collins Hill Road & Collins Industrial Way - AM PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	2	1	1	2	0	1	1	0	1	1	1	
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	0	0	0	0	0	0	0	0	0	0	0	0	0
P.H.V: [1]	0	0	0	0	0	0	0	0	0	0	0	0	0
P.H.F: [2]		0.000			0.000			0.000			0.000		0.000

(1) Peak Hour Volume (Peak Hour Begins At 0 AM)
(2) Peak Hour Factor (directional aggregate)

RZC2019-00010
SUP2019-00022
Received: 06.12.2020
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BICYCLE TURNING MOVEMENT COUNT

#001 Collins Hill Road & Collins Industrial Way - AM PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	2	1	1	2	0	1	1	0	1	1	1	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	0	0	0	0	0	0	0	0	0	0	0	0	0
P.H.V: (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
P.H.F: (2)		0.000			0.000			0.000			0.000		0.000

(1) Peak Hour Volume (Peak Hour Begins At 0 AM)
(2) Peak Hour Factor (directional aggregate)

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BICYCLE TURNING MOVEMENT COUNT

#001 Collins Hill Road & Collins Industrial Way - PM PEAK

LOCATION#:	001	QTD PROJ#:	2016282
NORTH / SOUTH:	Collins Hill Road	DATE:	Wednesday, September 28, 2016
EAST / WEST:	Collins Industrial Way	VICINITY:	GA

DIRECTION:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	2	1	1	2	0	1	1	0	1	1	1	
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
6:30 PM	0	1	0	0	0	0	0	0	0	2	0	0	3
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	

VOLUME STATS:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	0	3	0	1	0	0	0	0	0	2	0	0	6
P.H.V: [1]	0	2	0	0	0	0	0	0	0	2	0	0	4
P.H.F: [2]		0.500			0.000			0.000			0.250		0.333

(1) Peak Hour Volume (Peak Hour Begins At 545 PM)
(2) Peak Hour Factor (directional aggregate)

RZC2019-00010
SUP2019-00022
Received: 06.12.2020
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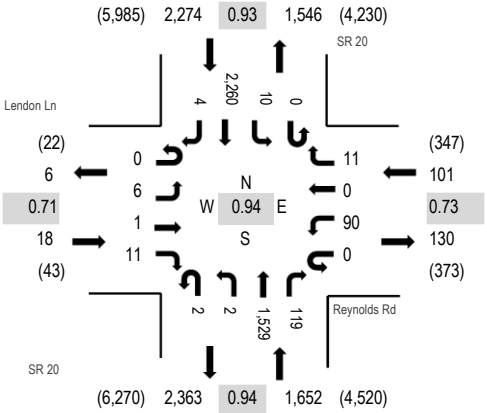
All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

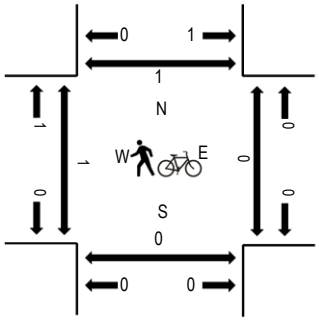
Location: #2 SR 20 & Reynolds Rd AM
Date and Start Time: Tuesday, September 10, 2019
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Lendon Ln Eastbound				Reynolds Rd Westbound				SR 20 Northbound				SR 20 Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
6:00 AM	0	0	0	0	0	14	0	3	1	1	237	26	0	5	278	0	565	3,021	1	0	0	0
6:15 AM	0	1	0	4	0	28	0	8	2	2	295	11	0	1	366	2	720	3,420	0	0	0	1
6:30 AM	0	3	1	1	0	40	0	6	0	2	306	27	0	2	421	0	809	3,624	0	0	0	0
6:45 AM	0	1	1	1	0	23	0	9	3	3	319	38	0	5	524	0	927	3,824	0	0	0	0
7:00 AM	0	2	0	0	0	17	0	3	1	0	359	34	0	0	548	0	964	3,977	1	2	0	0
7:15 AM	0	0	0	3	0	22	0	2	1	0	337	29	0	4	525	1	924	4,040	0	0	0	0
7:30 AM	0	0	1	4	0	17	0	3	0	1	367	22	0	0	594	0	1,009	4,045	0	0	0	0
7:45 AM	0	3	0	1	0	21	0	2	0	0	402	34	0	3	612	2	1,080	4,026	0	0	0	0
8:00 AM	0	1	0	5	0	19	0	3	2	1	402	42	0	5	546	1	1,027	3,897	1	0	0	0
8:15 AM	0	2	0	1	0	33	0	3	0	0	358	21	0	2	508	1	929		0	0	0	0
8:30 AM	0	4	1	2	0	29	0	5	1	2	386	26	0	3	529	2	990		0	1	0	0
8:45 AM	0	0	0	0	0	30	1	6	1	0	392	26	0	3	492	0	951		0	0	0	0

Peak Rolling Hour Flow Rates

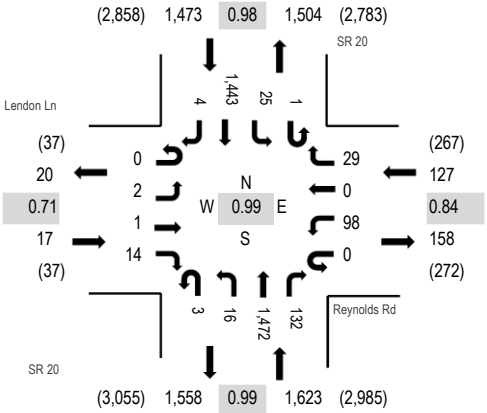
Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	42	0	0	0	37	0	79
Lights	0	5	1	11	0	85	0	9	2	2	1,436	113	0	10	2,176	3	3,853
Mediums	0	1	0	0	0	5	0	2	0	0	51	6	0	0	47	1	113
Total	0	6	1	11	0	90	0	11	2	2	1,529	119	0	10	2,260	4	4,045

All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

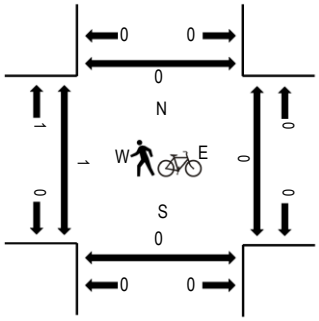
Location: #2 SR 20 & Reynolds Rd Noon
Date and Start Time: Tuesday, September 10, 2019
Peak Hour: 12:00 PM - 01:00 PM
Peak 15-Minutes: 12:30 PM - 12:45 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Lendon Ln Eastbound				Reynolds Rd Westbound				SR 20 Northbound				SR 20 Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
11:00 AM	0	2	0	3	0	26	0	8	1	5	333	26	0	3	284	1	692	2,907	0	0	0	0
11:15 AM	0	2	3	2	0	23	0	2	2	3	317	24	0	4	370	0	752	3,010	0	0	0	0
11:30 AM	0	1	0	5	0	26	0	13	4	3	309	25	0	3	364	1	754	3,070	1	0	0	0
11:45 AM	0	1	1	0	0	36	1	5	1	2	286	21	0	4	350	1	709	3,135	1	0	0	2
12:00 PM	0	1	0	4	0	38	0	7	0	2	356	36	0	2	349	0	795	3,240	0	0	0	0
12:15 PM	0	0	0	3	0	24	0	2	2	5	371	32	1	8	363	1	812		0	0	0	0
12:30 PM	0	1	1	4	0	16	0	15	0	5	370	35	0	8	361	3	819		0	0	0	0
12:45 PM	0	0	0	3	0	20	0	5	1	4	375	29	0	7	370	0	814		0	0	0	0

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	40	1	0	0	39	0	80
Lights	0	2	1	12	0	93	0	29	3	15	1,383	125	1	25	1,350	3	3,042
Mediums	0	0	0	2	0	5	0	0	0	1	49	6	0	0	54	1	118
Total	0	2	1	14	0	98	0	29	3	16	1,472	132	1	25	1,443	4	3,240

All Traffic Data Services Inc.
(303) 216-2439
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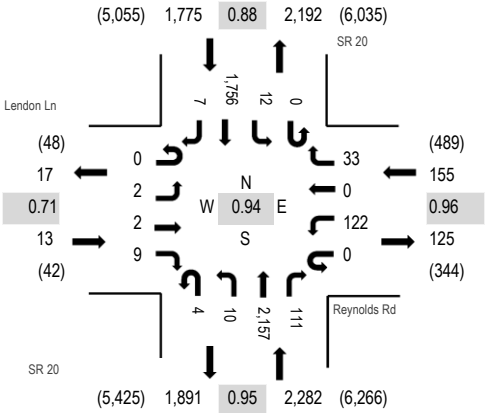
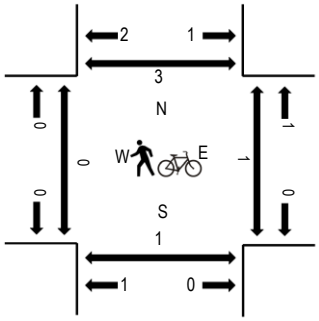
Location: #2 SR 20 & Reynolds Rd PM
Date and Start Time: Tuesday, September 10, 2019
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Lendon Ln Eastbound				Reynolds Rd Westbound				SR 20 Northbound				SR 20 Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	2	1	3	0	55	0	5	1	2	494	21	0	2	399	2	987	4,174	1	0	0	1
4:15 PM	0	1	1	1	0	16	0	3	0	1	582	24	0	3	446	2	1,080	4,185	1	0	0	0
4:30 PM	0	0	0	5	0	38	0	14	0	1	574	23	0	0	437	1	1,093	4,225	0	0	0	0
4:45 PM	0	1	1	1	0	31	0	9	1	3	526	28	0	2	408	3	1,014	4,184	0	0	1	0
5:00 PM	0	1	1	0	0	27	0	4	1	2	514	32	0	4	410	2	998	4,096	0	1	0	1
5:15 PM	0	0	0	3	0	26	0	6	2	4	543	28	0	6	501	1	1,120	4,082	0	0	0	1
5:30 PM	0	0	0	2	0	32	0	9	0	2	537	21	0	3	445	1	1,052	3,909	0	0	0	0
5:45 PM	0	1	1	2	0	35	0	10	2	2	452	26	0	2	392	1	926	3,739	0	0	0	0
6:00 PM	0	2	0	1	0	36	0	12	1	2	473	27	0	3	423	4	984	3,582	2	0	0	2
6:15 PM	0	0	0	3	0	38	0	9	1	3	429	26	0	4	433	1	947		0	1	0	0
6:30 PM	0	1	0	4	0	31	0	14	0	3	423	20	0	1	384	1	882		0	0	0	0
6:45 PM	0	1	2	0	0	24	0	5	1	3	378	27	0	4	323	1	769		1	0	0	0

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	23	0	0	0	24	0	47
Lights	0	2	2	8	0	118	0	31	4	10	2,095	109	0	12	1,691	6	4,088
Mediums	0	0	0	1	0	4	0	2	0	0	39	2	0	0	41	1	90
Total	0	2	2	9	0	122	0	33	4	10	2,157	111	0	12	1,756	7	4,225

Appendix B

Intersection Analysis Methodology

Intersection Analysis Methodology

The methodology used for evaluating traffic operations at intersections is presented in the Transportation Research Board's *Highway Capacity Manual*, 2016 edition (HCM 6). Synchro 10 software, which emulates the HCM 6 methodology, was used for all analyses. The following is an overview of the methodology employed for the analysis of signalized intersections and roundabouts and stop-sign controlled (unsignalized) intersections. Levels of service (LOS) are assigned letters A through F. LOS A indicates operations with very low control delay while LOS F describes operations with high control delay. LOS F is considered to be unacceptable by most drivers, while LOS E is typically considered to be the limit of acceptable delay.

Signalized Intersections and Roundabouts – Level of service for a signalized intersection and a roundabout is defined in terms of control delay per vehicle. For signalized intersections and roundabouts, a composite intersection level of service is determined. The thresholds for each level of service are higher for signalized intersections and roundabouts than for unsignalized intersections. This is attributable to a variety of factors including expectation and acceptance of higher delays at signals/roundabouts, and the fact that drivers can relax when waiting at a signal as opposed to having to remain attentive as they proceed through the unsignalized intersection. The level of service criteria for signalized intersections and roundabouts are shown in Table A.

Table A – Level of Service Criteria for Signalized Intersections and Roundabouts

Control Delay (s/veh)	LOS
≤ 10	A
> 10 and ≤ 20	B
> 20 and ≤ 35	C
> 35 and ≤ 55	D
> 55 and ≤ 80	E
> 80	F

Source: Highway Capacity Manual 6

Unsignalized Intersections – Level of service for an unsignalized intersection is defined in terms of control delay per vehicle. Control delay is that portion of delay attributable to the control device and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The delays at unsignalized intersections are based on gap acceptance theory, factoring in availability of gaps, usefulness of the gaps, and the priority of right-of-way given to each traffic stream. The level of service criteria for unsignalized intersections are presented in Table B.

Table B – Level of Service Criteria for Unsignalized Intersections

Control Delay (s/veh)	LOS
0 – 10	A
> 10 and ≤ 15	B
> 15 and ≤ 25	C
> 25 and ≤ 35	D
> 35 and ≤ 50	E
> 50	F

Source: Highway Capacity Manual 6

Appendix C

Existing Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	37	85	16	254	188	501	530	52	210	357	121
Future Volume (veh/h)	35	37	85	16	254	188	501	530	52	210	357	121
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	43	99	22	348	258	589	624	61	266	452	153
Peak Hour Factor	0.86	0.86	0.86	0.73	0.73	0.73	0.85	0.85	0.85	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	183	113	261	324	397	336	635	1395	622	526	719	241
Arrive On Green	0.04	0.23	0.23	0.02	0.21	0.21	0.25	0.39	0.39	0.13	0.28	0.28
Sat Flow, veh/h	1781	503	1159	1781	1870	1585	1781	3554	1585	1781	2612	877
Grp Volume(v), veh/h	41	0	142	22	348	258	589	624	61	266	306	299
Grp Sat Flow(s),veh/h/ln	1781	0	1662	1781	1870	1585	1781	1777	1585	1781	1777	1712
Q Serve(g_s), s	1.4	0.0	5.8	0.8	14.4	12.3	17.8	10.4	1.9	8.3	12.1	12.3
Cycle Q Clear(g_c), s	1.4	0.0	5.8	0.8	14.4	12.3	17.8	10.4	1.9	8.3	12.1	12.3
Prop In Lane	1.00		0.70	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	183	0	375	324	397	336	635	1395	622	526	489	471
V/C Ratio(X)	0.22	0.00	0.38	0.07	0.88	0.77	0.93	0.45	0.10	0.51	0.63	0.63
Avail Cap(c_a), veh/h	227	0	376	392	423	359	650	1395	622	632	489	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.4	0.0	26.2	23.8	30.5	29.7	14.9	17.9	15.4	16.5	25.4	25.4
Incr Delay (d2), s/veh	0.6	0.0	0.6	0.1	17.7	9.1	19.3	1.0	0.3	0.8	6.0	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.3	0.3	8.2	5.4	9.6	4.2	0.7	3.3	5.7	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	0.0	26.9	23.8	48.2	38.7	34.2	18.9	15.7	17.2	31.3	31.8
LnGrp LOS	C	A	C	C	D	D	C	B	B	B	C	C
Approach Vol, veh/h		183			628			1274			871	
Approach Delay, s/veh		26.5			43.4			25.8			27.2	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.1	35.9	6.4	22.5	24.5	26.5	7.5	21.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.4	23.5	5.0	18.1	20.7	18.2	5.0	18.1
Max Q Clear Time (g_c+I1), s	10.3	12.4	2.8	7.8	19.8	14.3	3.4	16.4
Green Ext Time (p_c), s	0.4	3.4	0.0	0.5	0.2	1.4	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	30.0
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	1	11	90	0	11	4	1529	119	10	2260	4
Future Volume (veh/h)	6	1	11	90	0	11	4	1529	119	10	2260	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1826	1826	1870	1826	1826
Adj Flow Rate, veh/h	8	1	15	123	0	15	4	1627	127	11	2430	4
Peak Hour Factor	0.71	0.71	0.71	0.73	0.73	0.73	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	5	5	2	5	5
Cap, veh/h	113	3	44	212	0	147	139	3521	275	246	3876	6
Arrive On Green	0.01	0.03	0.03	0.07	0.00	0.09	0.01	0.75	0.75	0.01	0.75	0.75
Sat Flow, veh/h	1781	100	1500	1781	0	1585	1781	4715	368	1781	5139	8
Grp Volume(v), veh/h	8	0	16	123	0	15	4	1146	608	11	1571	863
Grp Sat Flow(s),veh/h/ln	1781	0	1600	1781	0	1585	1781	1662	1760	1781	1662	1824
Q Serve(g_s), s	0.6	0.0	1.3	8.5	0.0	1.1	0.1	17.3	17.4	0.2	28.7	28.7
Cycle Q Clear(g_c), s	0.6	0.0	1.3	8.5	0.0	1.1	0.1	17.3	17.4	0.2	28.7	28.7
Prop In Lane	1.00		0.94	1.00		1.00	1.00		0.21	1.00		0.00
Lane Grp Cap(c), veh/h	113	0	46	212	0	147	139	2482	1314	246	2506	1376
V/C Ratio(X)	0.07	0.00	0.34	0.58	0.00	0.10	0.03	0.46	0.46	0.04	0.63	0.63
Avail Cap(c_a), veh/h	165	0	222	212	0	274	199	2482	1314	292	2506	1376
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.3	0.0	61.9	54.4	0.0	54.0	7.0	6.4	6.4	5.0	7.4	7.4
Incr Delay (d2), s/veh	0.3	0.0	4.3	3.9	0.0	0.3	0.1	0.6	1.2	0.1	1.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.6	4.1	0.0	0.5	0.0	5.7	6.3	0.1	9.3	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.6	0.0	66.2	58.3	0.0	54.3	7.1	7.0	7.5	5.1	8.6	9.6
LnGrp LOS	E	A	E	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		24			138			1758			2445	
Approach Delay, s/veh		64.3			57.9			7.2			9.0	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	101.6	14.0	8.3	5.2	102.6	5.8	16.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	79.5	9.5	18.0	5.0	79.5	5.0	22.5
Max Q Clear Time (g_c+I1), s	2.2	19.4	10.5	3.3	2.1	30.7	2.6	3.1
Green Ext Time (p_c), s	0.0	21.9	0.0	0.0	0.0	33.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	105	349	31	86	130	215	601	81	214	624	85
Future Volume (veh/h)	85	105	349	31	86	130	215	601	81	214	624	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	124	411	40	110	167	244	683	92	274	800	109
Peak Hour Factor	0.85	0.85	0.85	0.78	0.78	0.78	0.88	0.88	0.88	0.78	0.78	0.78
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	415	102	339	156	461	391	374	1231	549	442	1123	153
Arrive On Green	0.06	0.27	0.27	0.04	0.25	0.25	0.11	0.35	0.35	0.12	0.36	0.36
Sat Flow, veh/h	1781	381	1262	1781	1870	1585	1781	3554	1585	1781	3142	428
Grp Volume(v), veh/h	100	0	535	40	110	167	244	683	92	274	452	457
Grp Sat Flow(s),veh/h/ln	1781	0	1643	1781	1870	1585	1781	1777	1585	1781	1777	1793
Q Serve(g_s), s	3.3	0.0	21.5	1.3	3.8	7.1	6.9	12.4	3.2	7.7	17.6	17.6
Cycle Q Clear(g_c), s	3.3	0.0	21.5	1.3	3.8	7.1	6.9	12.4	3.2	7.7	17.6	17.6
Prop In Lane	1.00		0.77	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	415	0	442	156	461	391	374	1231	549	442	635	641
V/C Ratio(X)	0.24	0.00	1.21	0.26	0.24	0.43	0.65	0.55	0.17	0.62	0.71	0.71
Avail Cap(c_a), veh/h	434	0	442	201	489	414	408	1231	549	479	635	641
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.5	0.0	29.3	23.5	24.1	25.4	16.5	21.2	18.1	14.9	22.2	22.2
Incr Delay (d2), s/veh	0.3	0.0	114.6	0.9	0.3	0.7	3.3	1.8	0.7	2.2	6.7	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	22.1	0.6	1.7	2.7	2.9	5.2	1.2	3.1	8.1	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	143.8	24.3	24.4	26.1	19.7	23.0	18.8	17.1	28.8	28.8
LnGrp LOS	C	A	F	C	C	C	B	C	B	B	C	C
Approach Vol, veh/h		635			317			1019			1183	
Approach Delay, s/veh		124.5			25.3			21.8			26.1	
Approach LOS		F			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.3	32.2	7.4	26.0	13.5	33.1	9.2	24.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.5	24.0	5.0	21.5	10.5	25.0	5.6	20.9
Max Q Clear Time (g_c+I1), s	9.7	14.4	3.3	23.5	8.9	19.6	5.3	9.1
Green Ext Time (p_c), s	0.2	3.4	0.0	0.0	0.1	2.7	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	44.4
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	105	349	31	86	130	215	601	81	214	624	85
Future Volume (veh/h)	85	105	349	31	86	130	215	601	81	214	624	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	124	411	40	110	167	244	683	92	274	800	109
Peak Hour Factor	0.85	0.85	0.85	0.78	0.78	0.78	0.88	0.88	0.88	0.78	0.78	0.78
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	365	421	527	303	375	318	424	1409	629	474	1442	643
Arrive On Green	0.06	0.23	0.23	0.04	0.20	0.20	0.11	0.40	0.40	0.12	0.41	0.41
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	100	124	411	40	110	167	244	683	92	274	800	109
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.5	4.4	18.0	1.4	4.0	7.5	6.3	11.5	3.0	7.1	13.8	3.5
Cycle Q Clear(g_c), s	3.5	4.4	18.0	1.4	4.0	7.5	6.3	11.5	3.0	7.1	13.8	3.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	365	421	527	303	375	318	424	1409	629	474	1442	643
V/C Ratio(X)	0.27	0.29	0.78	0.13	0.29	0.53	0.58	0.48	0.15	0.58	0.55	0.17
Avail Cap(c_a), veh/h	367	421	527	349	421	357	534	1409	629	544	1442	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.2	25.7	24.1	23.8	27.2	28.6	13.2	18.0	15.5	12.6	18.2	15.2
Incr Delay (d2), s/veh	0.4	0.4	7.4	0.2	0.4	1.3	1.2	1.2	0.5	1.1	1.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.9	7.7	0.6	1.8	2.9	2.4	4.7	1.1	2.7	5.6	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	26.1	31.5	24.0	27.6	29.9	14.4	19.2	16.0	13.7	19.8	15.7
LnGrp LOS	C	C	C	C	C	C	B	B	B	B	B	B
Approach Vol, veh/h		635			317			1019			1183	
Approach Delay, s/veh		29.2			28.4			17.8			18.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.8	36.2	7.4	22.5	13.1	37.0	9.4	20.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	26.5	5.0	18.0	13.5	25.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	9.1	13.5	3.4	20.0	8.3	15.8	5.5	9.5
Green Ext Time (p_c), s	0.3	4.1	0.0	0.0	0.3	4.1	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	9	122	0	33	14	2157	111	12	1756	7
Future Volume (veh/h)	2	2	9	122	0	33	14	2157	111	12	1756	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1826	1826	1870	1826	1826
Adj Flow Rate, veh/h	3	3	13	127	0	34	15	2271	117	14	1995	8
Peak Hour Factor	0.71	0.71	0.71	0.96	0.96	0.96	0.95	0.95	0.95	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	5	5	2	5	5
Cap, veh/h	107	10	43	232	0	174	204	3558	182	155	3751	15
Arrive On Green	0.00	0.03	0.03	0.08	0.00	0.11	0.02	0.73	0.73	0.02	0.73	0.73
Sat Flow, veh/h	1781	306	1326	1781	0	1585	1781	4856	248	1781	5125	21
Grp Volume(v), veh/h	3	0	16	127	0	34	15	1549	839	14	1294	709
Grp Sat Flow(s),veh/h/ln	1781	0	1632	1781	0	1585	1781	1662	1781	1781	1662	1822
Q Serve(g_s), s	0.2	0.0	1.2	8.7	0.0	2.5	0.3	30.3	30.9	0.3	22.2	22.2
Cycle Q Clear(g_c), s	0.2	0.0	1.2	8.7	0.0	2.5	0.3	30.3	30.9	0.3	22.2	22.2
Prop In Lane	1.00		0.81	1.00		1.00	1.00		0.14	1.00		0.01
Lane Grp Cap(c), veh/h	107	0	54	232	0	174	204	2435	1305	155	2432	1334
V/C Ratio(X)	0.03	0.00	0.30	0.55	0.00	0.20	0.07	0.64	0.64	0.09	0.53	0.53
Avail Cap(c_a), veh/h	173	0	227	232	0	284	248	2435	1305	201	2432	1334
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.4	0.0	61.4	53.1	0.0	52.7	6.2	8.7	8.8	8.2	7.6	7.7
Incr Delay (d2), s/veh	0.1	0.0	3.1	2.7	0.0	0.5	0.2	1.3	2.4	0.2	0.8	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.6	4.1	0.0	1.0	0.1	10.3	11.6	0.1	7.5	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.5	0.0	64.5	55.9	0.0	53.2	6.4	10.0	11.2	8.5	8.5	9.2
LnGrp LOS	E	A	E	E	A	D	A	A	B	A	A	A
Approach Vol, veh/h		19			161			2403			2017	
Approach Delay, s/veh		63.9			55.3			10.4			8.7	
Approach LOS		E			E			B			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.5	99.8	15.0	8.8	6.6	99.6	5.0	18.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.3	78.1	10.5	18.1	5.3	78.1	5.3	23.3
Max Q Clear Time (g_c+I1), s	2.3	32.9	10.7	3.2	2.3	24.2	2.2	4.5
Green Ext Time (p_c), s	0.0	31.3	0.0	0.0	0.0	26.4	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	11.5
HCM 6th LOS	B

Appendix D

No-Build Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	74	72	35	413	229	443	527	116	272	354	112
Future Volume (veh/h)	28	74	72	35	413	229	443	527	116	272	354	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	86	84	45	529	294	521	620	136	344	448	142
Peak Hour Factor	0.86	0.86	0.86	0.78	0.78	0.78	0.85	0.85	0.85	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	143	245	239	393	538	456	571	1126	502	495	666	209
Arrive On Green	0.03	0.28	0.28	0.08	0.58	0.58	0.23	0.32	0.32	0.16	0.25	0.25
Sat Flow, veh/h	1781	869	849	1781	1870	1585	1781	3554	1585	1781	2660	836
Grp Volume(v), veh/h	33	0	170	45	529	294	521	620	136	344	298	292
Grp Sat Flow(s),veh/h/ln	1781	0	1718	1781	1870	1585	1781	1777	1585	1781	1777	1720
Q Serve(g_s), s	1.2	0.0	7.1	1.6	24.9	11.3	18.5	13.0	5.8	12.6	13.6	13.8
Cycle Q Clear(g_c), s	1.2	0.0	7.1	1.6	24.9	11.3	18.5	13.0	5.8	12.6	13.6	13.8
Prop In Lane	1.00		0.49	1.00		1.00	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	143	0	483	393	538	456	571	1126	502	495	445	431
V/C Ratio(X)	0.23	0.00	0.35	0.11	0.98	0.64	0.91	0.55	0.27	0.70	0.67	0.68
Avail Cap(c_a), veh/h	187	0	492	427	538	456	590	1126	502	519	445	431
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.1	0.0	25.8	20.8	18.9	16.0	18.4	25.4	23.0	19.6	30.4	30.5
Incr Delay (d2), s/veh	0.8	0.0	0.4	0.1	34.3	3.1	18.3	1.9	1.3	3.8	7.8	8.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	2.9	0.6	11.0	3.3	9.9	5.6	2.3	5.5	6.6	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.9	0.0	26.2	21.0	53.1	19.1	36.7	27.4	24.3	23.5	38.2	38.8
LnGrp LOS	C	A	C	C	D	B	D	C	C	C	D	D
Approach Vol, veh/h		203			868			1277			934	
Approach Delay, s/veh		26.2			39.9			30.9			32.9	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.3	33.0	7.9	29.8	25.3	27.0	7.3	30.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.0	25.1	5.1	25.8	21.7	19.4	5.0	25.9
Max Q Clear Time (g_c+I1), s	14.6	15.0	3.6	9.1	20.5	15.8	3.2	26.9
Green Ext Time (p_c), s	0.2	3.4	0.0	0.8	0.3	1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	33.6
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	26	12	61	39	12	4	1582	106	11	2363	137
Future Volume (veh/h)	113	26	12	61	39	12	4	1582	106	11	2363	137
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1826	1826	1870	1826	1826
Adj Flow Rate, veh/h	141	32	15	84	53	16	4	1683	113	12	2541	147
Peak Hour Factor	0.80	0.80	0.80	0.73	0.73	0.73	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	5	5	2	5	5
Cap, veh/h	194	80	38	206	75	23	112	3474	233	232	3553	203
Arrive On Green	0.07	0.07	0.07	0.05	0.05	0.05	0.01	0.73	0.73	0.01	0.74	0.74
Sat Flow, veh/h	1781	1204	564	1781	1379	416	1781	4771	320	1781	4824	275
Grp Volume(v), veh/h	141	0	47	84	0	69	4	1172	624	12	1740	948
Grp Sat Flow(s),veh/h/ln	1781	0	1769	1781	0	1795	1781	1662	1768	1781	1662	1776
Q Serve(g_s), s	8.5	0.0	3.3	5.7	0.0	4.9	0.1	19.2	19.3	0.2	37.6	39.2
Cycle Q Clear(g_c), s	8.5	0.0	3.3	5.7	0.0	4.9	0.1	19.2	19.3	0.2	37.6	39.2
Prop In Lane	1.00		0.32	1.00		0.23	1.00		0.18	1.00		0.16
Lane Grp Cap(c), veh/h	194	0	118	206	0	98	112	2420	1288	232	2447	1308
V/C Ratio(X)	0.73	0.00	0.40	0.41	0.00	0.71	0.04	0.48	0.48	0.05	0.71	0.72
Avail Cap(c_a), veh/h	194	0	268	206	0	250	173	2420	1288	278	2447	1308
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.5	0.0	58.2	54.3	0.0	60.4	10.4	7.4	7.4	5.9	9.5	9.7
Incr Delay (d2), s/veh	12.7	0.0	2.2	1.3	0.0	8.9	0.1	0.7	1.3	0.1	1.8	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.6	2.7	0.0	2.5	0.0	6.5	7.2	0.1	12.7	14.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.2	0.0	60.3	55.6	0.0	69.3	10.6	8.1	8.7	6.0	11.3	13.2
LnGrp LOS	E	A	E	E	A	E	B	A	A	A	B	B
Approach Vol, veh/h		188			153			1800			2700	
Approach Delay, s/veh		66.2			61.8			8.3			11.9	
Approach LOS		E			E			A			B	

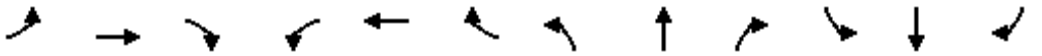
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.3	99.2	11.4	13.2	5.2	100.2	13.0	11.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	80.3	6.9	19.7	5.1	80.3	8.5	18.1
Max Q Clear Time (g_c+I1), s	2.2	21.3	7.7	5.3	2.1	41.2	10.5	6.9
Green Ext Time (p_c), s	0.0	22.7	0.0	0.1	0.0	31.9	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	204	319	68	161	158	182	597	156	305	621	72
Future Volume (veh/h)	72	204	319	68	161	158	182	597	156	305	621	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	85	240	375	83	196	193	207	678	177	391	796	92
Peak Hour Factor	0.85	0.85	0.85	0.82	0.82	0.82	0.88	0.88	0.88	0.78	0.78	0.78
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	430	219	341	167	621	526	312	848	378	440	1042	120
Arrive On Green	0.05	0.33	0.33	0.06	0.44	0.44	0.09	0.24	0.24	0.18	0.32	0.32
Sat Flow, veh/h	1781	658	1028	1781	1870	1585	1781	3554	1585	1781	3210	371
Grp Volume(v), veh/h	85	0	615	83	196	193	207	678	177	391	441	447
Grp Sat Flow(s),veh/h/ln	1781	0	1685	1781	1870	1585	1781	1777	1585	1781	1777	1804
Q Serve(g_s), s	2.8	0.0	29.9	2.7	6.1	7.3	7.9	16.2	8.6	14.1	20.0	20.0
Cycle Q Clear(g_c), s	2.8	0.0	29.9	2.7	6.1	7.3	7.9	16.2	8.6	14.1	20.0	20.0
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	430	0	560	167	621	526	312	848	378	440	577	586
V/C Ratio(X)	0.20	0.00	1.10	0.50	0.32	0.37	0.66	0.80	0.47	0.89	0.76	0.76
Avail Cap(c_a), veh/h	449	0	560	181	621	526	312	848	378	451	577	586
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	30.1	22.7	18.5	18.8	23.9	32.2	29.4	20.8	27.3	27.3
Incr Delay (d2), s/veh	0.2	0.0	67.7	2.3	0.3	0.4	5.2	7.8	4.1	18.9	9.3	9.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	22.1	1.2	2.5	2.5	3.7	7.7	3.6	7.8	9.7	9.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	0.0	97.8	25.0	18.8	19.3	29.1	40.0	33.5	39.7	36.6	36.4
LnGrp LOS	B	A	F	C	B	B	C	D	C	D	D	D
Approach Vol, veh/h		700			472			1062			1279	
Approach Delay, s/veh		88.2			20.1			36.8			37.5	
Approach LOS		F			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.7	26.0	8.9	34.4	13.0	33.7	8.9	34.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.8	20.2	5.1	29.9	8.5	28.5	5.4	29.6
Max Q Clear Time (g_c+I1), s	16.1	18.2	4.7	31.9	9.9	22.0	4.8	9.3
Green Ext Time (p_c), s	0.1	1.1	0.0	0.0	0.0	3.0	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	45.0
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	46	10	113	22	36	15	2203	78	13	1846	100
Future Volume (veh/h)	181	46	10	113	22	36	15	2203	78	13	1846	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1826	1826	1870	1826	1826
Adj Flow Rate, veh/h	226	58	12	118	23	38	16	2319	82	15	2098	114
Peak Hour Factor	0.80	0.80	0.80	0.96	0.96	0.96	0.95	0.95	0.95	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	5	5	2	5	5
Cap, veh/h	290	146	30	258	33	55	159	3332	117	140	3258	176
Arrive On Green	0.12	0.10	0.10	0.07	0.05	0.05	0.02	0.67	0.67	0.02	0.67	0.67
Sat Flow, veh/h	1781	1503	311	1781	634	1048	1781	4944	174	1781	4840	262
Grp Volume(v), veh/h	226	0	70	118	0	61	16	1555	846	15	1437	775
Grp Sat Flow(s),veh/h/ln	1781	0	1814	1781	0	1682	1781	1662	1795	1781	1662	1779
Q Serve(g_s), s	15.4	0.0	4.7	8.1	0.0	4.6	0.4	37.3	37.8	0.3	32.4	32.8
Cycle Q Clear(g_c), s	15.4	0.0	4.7	8.1	0.0	4.6	0.4	37.3	37.8	0.3	32.4	32.8
Prop In Lane	1.00		0.17	1.00		0.62	1.00		0.10	1.00		0.15
Lane Grp Cap(c), veh/h	290	0	176	258	0	88	159	2240	1209	140	2237	1197
V/C Ratio(X)	0.78	0.00	0.40	0.46	0.00	0.69	0.10	0.69	0.70	0.11	0.64	0.65
Avail Cap(c_a), veh/h	290	0	334	258	0	234	199	2240	1209	181	2237	1197
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.4	0.0	55.1	53.1	0.0	60.6	10.9	13.0	13.1	12.4	12.2	12.3
Incr Delay (d2), s/veh	12.7	0.0	1.5	1.3	0.0	9.4	0.3	1.8	3.4	0.3	1.4	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.0	2.2	3.7	0.0	2.2	0.1	13.5	15.3	0.1	11.7	13.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.1	0.0	56.6	54.3	0.0	70.0	11.1	14.8	16.4	12.8	13.7	15.0
LnGrp LOS	E	A	E	D	A	E	B	B	B	B	B	B
Approach Vol, veh/h		296			179			2417			2227	
Approach Delay, s/veh		60.8			59.7			15.3			14.1	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	92.1	14.2	17.1	6.7	92.0	20.0	11.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	73.3	9.7	23.9	5.1	73.3	15.5	18.1
Max Q Clear Time (g_c+I1), s	2.3	39.8	10.1	6.7	2.4	34.8	17.4	6.6
Green Ext Time (p_c), s	0.0	25.3	0.0	0.2	0.0	25.5	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	19.0
HCM 6th LOS	B

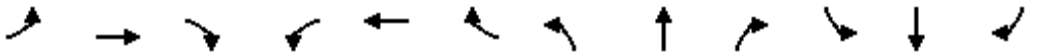
Appendix E

Build Intersection Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	77	72	55	421	241	443	527	128	276	354	112
Future Volume (veh/h)	28	77	72	55	421	241	443	527	128	276	354	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	90	84	71	540	309	521	620	151	349	448	142
Peak Hour Factor	0.86	0.86	0.86	0.78	0.78	0.78	0.85	0.85	0.85	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	241	225	391	534	453	573	1128	503	496	674	212
Arrive On Green	0.03	0.27	0.27	0.09	0.57	0.57	0.23	0.32	0.32	0.17	0.25	0.25
Sat Flow, veh/h	1781	890	831	1781	1870	1585	1781	3554	1585	1781	2660	836
Grp Volume(v), veh/h	33	0	174	71	540	309	521	620	151	349	298	292
Grp Sat Flow(s),veh/h/ln	1781	0	1721	1781	1870	1585	1781	1777	1585	1781	1777	1720
Q Serve(g_s), s	1.2	0.0	7.4	2.5	25.7	12.3	18.4	13.0	6.5	12.7	13.5	13.7
Cycle Q Clear(g_c), s	1.2	0.0	7.4	2.5	25.7	12.3	18.4	13.0	6.5	12.7	13.5	13.7
Prop In Lane	1.00		0.48	1.00		1.00	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	136	0	466	391	534	453	573	1128	503	496	450	436
V/C Ratio(X)	0.24	0.00	0.37	0.18	1.01	0.68	0.91	0.55	0.30	0.70	0.66	0.67
Avail Cap(c_a), veh/h	189	0	491	417	534	453	593	1128	503	523	450	436
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	0.0	26.6	21.1	19.3	16.4	18.3	25.4	23.2	19.5	30.1	30.2
Incr Delay (d2), s/veh	0.9	0.0	0.5	0.2	41.7	4.2	17.9	1.9	1.5	4.0	7.5	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	3.0	1.0	12.3	3.7	9.8	5.6	2.6	5.6	6.6	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.6	0.0	27.1	21.3	61.0	20.6	36.1	27.3	24.7	23.4	37.6	38.2
LnGrp LOS	C	A	C	C	F	C	D	C	C	C	D	D
Approach Vol, veh/h		207			920			1292			939	
Approach Delay, s/veh		27.0			44.4			30.6			32.5	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.4	33.1	8.7	28.9	25.2	27.3	7.3	30.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.3	24.5	5.5	25.7	21.7	19.1	5.5	25.7
Max Q Clear Time (g_c+I1), s	14.7	15.0	4.5	9.4	20.4	15.7	3.2	27.7
Green Ext Time (p_c), s	0.2	3.3	0.0	0.8	0.3	1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	34.7
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	30	24	61	40	12	8	1582	106	11	2363	141
Future Volume (veh/h)	124	30	24	61	40	12	8	1582	106	11	2363	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1826	1826	1870	1826	1826
Adj Flow Rate, veh/h	155	38	30	84	55	16	9	1683	113	12	2541	152
Peak Hour Factor	0.80	0.80	0.80	0.73	0.73	0.73	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	5	5	2	5	5
Cap, veh/h	208	73	58	200	77	23	118	3432	230	228	3477	205
Arrive On Green	0.07	0.08	0.08	0.05	0.06	0.06	0.01	0.72	0.72	0.01	0.72	0.72
Sat Flow, veh/h	1781	968	764	1781	1392	405	1781	4771	320	1781	4814	284
Grp Volume(v), veh/h	155	0	68	84	0	71	9	1172	624	12	1743	950
Grp Sat Flow(s),veh/h/ln	1781	0	1733	1781	0	1797	1781	1662	1768	1781	1662	1775
Q Serve(g_s), s	9.5	0.0	4.9	5.7	0.0	5.0	0.2	19.9	19.9	0.2	39.8	41.6
Cycle Q Clear(g_c), s	9.5	0.0	4.9	5.7	0.0	5.0	0.2	19.9	19.9	0.2	39.8	41.6
Prop In Lane	1.00		0.44	1.00		0.23	1.00		0.18	1.00		0.16
Lane Grp Cap(c), veh/h	208	0	131	200	0	100	118	2390	1272	228	2400	1282
V/C Ratio(X)	0.75	0.00	0.52	0.42	0.00	0.71	0.08	0.49	0.49	0.05	0.73	0.74
Avail Cap(c_a), veh/h	208	0	276	200	0	250	169	2390	1272	274	2400	1282
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.7	0.0	57.8	54.2	0.0	60.4	11.9	7.9	7.9	6.3	10.6	10.8
Incr Delay (d2), s/veh	13.6	0.0	3.2	1.4	0.0	8.9	0.3	0.7	1.4	0.1	2.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	2.3	2.7	0.0	2.6	0.1	6.8	7.5	0.1	13.8	16.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.3	0.0	61.0	55.6	0.0	69.3	12.2	8.6	9.3	6.4	12.5	14.7
LnGrp LOS	E	A	E	E	A	E	B	A	A	A	B	B
Approach Vol, veh/h		223			155			1805			2705	
Approach Delay, s/veh		66.1			61.9			8.9			13.2	
Approach LOS		E			E			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.3	98.0	11.4	14.3	5.9	98.4	14.0	11.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	79.3	6.9	20.7	5.1	79.3	9.5	18.1
Max Q Clear Time (g_c+I1), s	2.2	21.9	7.7	6.9	2.2	43.6	11.5	7.0
Green Ext Time (p_c), s	0.0	22.5	0.0	0.2	0.0	29.6	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	131	22	9	171	62	27
Future Vol, veh/h	131	22	9	171	62	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	78	78	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	26	12	219	78	34

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	178	0	395	152
Stage 1	-	-	-	-	152	-
Stage 2	-	-	-	-	243	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1398	-	610	894
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1398	-	605	894
Mov Cap-2 Maneuver	-	-	-	-	605	-
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	797	-

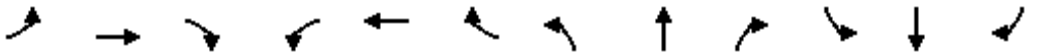
Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	605	894	-	-	1398	-
HCM Lane V/C Ratio	0.128	0.038	-	-	0.008	-
HCM Control Delay (s)	11.8	9.2	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	212	319	81	166	166	182	597	191	318	621	72
Future Volume (veh/h)	72	212	319	81	166	166	182	597	191	318	621	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	85	249	375	99	202	202	207	678	217	408	796	92
Peak Hour Factor	0.85	0.85	0.85	0.82	0.82	0.82	0.88	0.88	0.88	0.78	0.78	0.78
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	447	227	343	175	640	542	303	802	358	433	1013	117
Arrive On Green	0.05	0.34	0.34	0.09	0.57	0.57	0.09	0.23	0.23	0.18	0.32	0.32
Sat Flow, veh/h	1781	673	1014	1781	1870	1585	1781	3554	1585	1781	3210	371
Grp Volume(v), veh/h	85	0	624	99	202	202	207	678	217	408	441	447
Grp Sat Flow(s),veh/h/ln	1781	0	1688	1781	1870	1585	1781	1777	1585	1781	1777	1804
Q Serve(g_s), s	2.8	0.0	30.4	3.2	5.1	6.2	8.1	16.4	11.1	15.2	20.3	20.3
Cycle Q Clear(g_c), s	2.8	0.0	30.4	3.2	5.1	6.2	8.1	16.4	11.1	15.2	20.3	20.3
Prop In Lane	1.00		0.60	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	447	0	570	175	640	542	303	802	358	433	561	569
V/C Ratio(X)	0.19	0.00	1.09	0.57	0.32	0.37	0.68	0.85	0.61	0.94	0.79	0.79
Avail Cap(c_a), veh/h	467	0	570	181	640	542	303	802	358	433	561	569
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.9	0.0	29.8	21.9	13.8	14.0	24.9	33.3	31.3	21.5	28.0	28.0
Incr Delay (d2), s/veh	0.2	0.0	66.1	3.8	0.3	0.4	6.2	10.7	7.4	28.9	10.6	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	22.2	1.4	2.0	2.0	3.8	8.1	4.9	9.4	10.0	10.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.0	95.9	25.8	14.1	14.5	31.1	44.0	38.7	50.4	38.6	38.5
LnGrp LOS	B	A	F	C	B	B	C	D	D	D	D	D
Approach Vol, veh/h		709			503			1102			1296	
Approach Delay, s/veh		86.6			16.5			40.5			42.3	
Approach LOS		F			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	24.8	9.3	34.9	12.9	32.9	8.9	35.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	20.0	5.1	30.4	8.4	28.1	5.4	30.1
Max Q Clear Time (g_c+I1), s	17.2	18.4	5.2	32.4	10.1	22.3	4.8	8.2
Green Ext Time (p_c), s	0.0	0.9	0.0	0.0	0.0	2.7	0.0	1.8

Intersection Summary	
HCM 6th Ctrl Delay	46.9
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	48	19	113	26	36	28	2203	78	13	1846	112
Future Volume (veh/h)	188	48	19	113	26	36	28	2203	78	13	1846	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1826	1826	1870	1826	1826
Adj Flow Rate, veh/h	235	60	24	118	27	38	29	2319	82	15	2098	127
Peak Hour Factor	0.80	0.80	0.80	0.96	0.96	0.96	0.95	0.95	0.95	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	5	5	2	5	5
Cap, veh/h	290	125	50	260	38	54	169	3321	117	139	3187	192
Arrive On Green	0.12	0.10	0.10	0.08	0.05	0.05	0.02	0.67	0.67	0.02	0.66	0.66
Sat Flow, veh/h	1781	1271	508	1781	703	989	1781	4944	174	1781	4808	289
Grp Volume(v), veh/h	235	0	84	118	0	65	29	1555	846	15	1447	778
Grp Sat Flow(s),veh/h/ln	1781	0	1779	1781	0	1692	1781	1662	1795	1781	1662	1774
Q Serve(g_s), s	15.5	0.0	5.8	8.0	0.0	4.9	0.7	37.5	38.0	0.4	33.8	34.3
Cycle Q Clear(g_c), s	15.5	0.0	5.8	8.0	0.0	4.9	0.7	37.5	38.0	0.4	33.8	34.3
Prop In Lane	1.00		0.29	1.00		0.58	1.00		0.10	1.00		0.16
Lane Grp Cap(c), veh/h	290	0	175	260	0	92	169	2232	1206	139	2203	1176
V/C Ratio(X)	0.81	0.00	0.48	0.45	0.00	0.71	0.17	0.70	0.70	0.11	0.66	0.66
Avail Cap(c_a), veh/h	290	0	326	260	0	236	201	2232	1206	180	2203	1176
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.7	0.0	55.5	52.7	0.0	60.4	11.9	13.2	13.2	12.6	13.1	13.2
Incr Delay (d2), s/veh	15.7	0.0	2.0	1.2	0.0	9.4	0.5	1.8	3.4	0.3	1.5	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.0	2.7	3.7	0.0	2.4	0.3	13.7	15.5	0.1	12.4	13.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.4	0.0	57.5	53.9	0.0	69.9	12.3	15.0	16.7	12.9	14.6	16.1
LnGrp LOS	E	A	E	D	A	E	B	B	B	B	B	B
Approach Vol, veh/h		319			183			2430			2240	
Approach Delay, s/veh		63.3			59.6			15.5			15.1	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	91.8	14.3	17.3	7.7	90.7	20.0	11.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	73.3	9.8	23.8	5.6	72.8	15.5	18.1
Max Q Clear Time (g_c+I1), s	2.4	40.0	10.0	7.8	2.7	36.3	17.5	6.9
Green Ext Time (p_c), s	0.0	25.1	0.0	0.3	0.0	24.8	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	223	64	29	115	41	18
Future Vol, veh/h	223	64	29	115	41	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	200	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	82	82	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	262	75	35	140	55	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	337	0	472	262
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	210	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1222	-	551	777
Stage 1	-	-	-	-	782	-
Stage 2	-	-	-	-	825	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1222	-	535	777
Mov Cap-2 Maneuver	-	-	-	-	535	-
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	825	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	535	777	-	-	1222	-
HCM Lane V/C Ratio	0.102	0.031	-	-	0.029	-
HCM Control Delay (s)	12.5	9.8	-	-	8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-

Appendix F

Programmed Infrastructure Project Information Sheets

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Planning & Development