

SHERRILL BLVD MEDICAL OFFICE TRAFFIC STUDY



Submitted to: Realty Trust Group



Submitted by: CDM Smith Inc.



SHERRILL BLVD MEDICAL OFFICE

KNOXVILLE, TENNESSEE

TRAFFIC IMPACT STUDY

Submitted to:

Realty Trust Group
2220 Sutherland Avenue
Knoxville, TN 37919



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Revised November 2017

Submitted by:

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Project No. 221989

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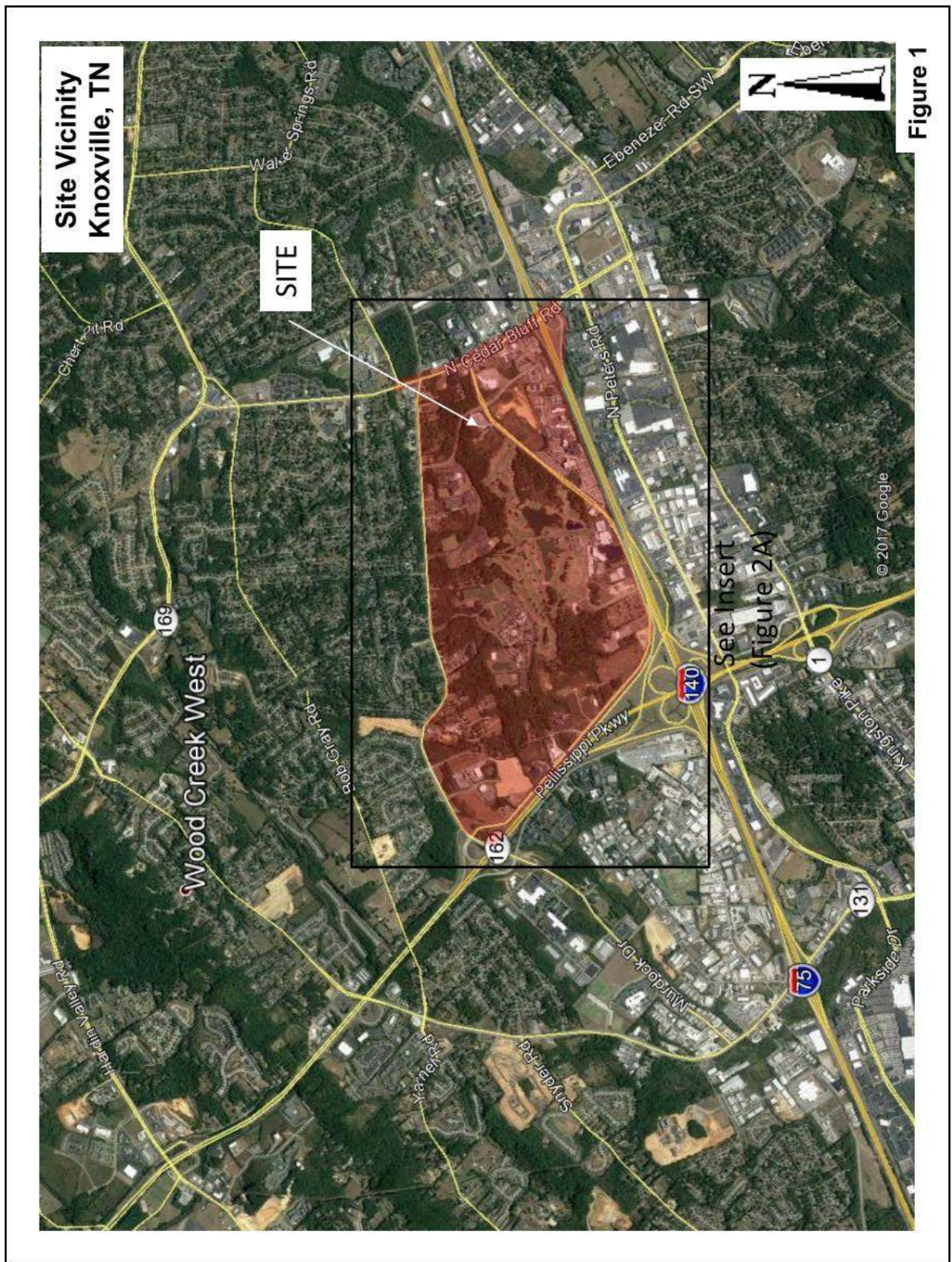
Introduction

CDM Smith is pleased to submit this report to address the traffic impact and access requirements of the proposed medical office development in the west Knoxville, TN. The basis of this study required the collection of traffic data, generation of anticipated traffic volumes for the proposed site and development of projected traffic volumes for normal growth planned adjacent development, and from the proposed site. Analyses of the resulting traffic projections were conducted to determine the capacity and levels of service for the site accesses and the intersections within the study area of the Sherril Boulevard and Cedar Bluff Road.

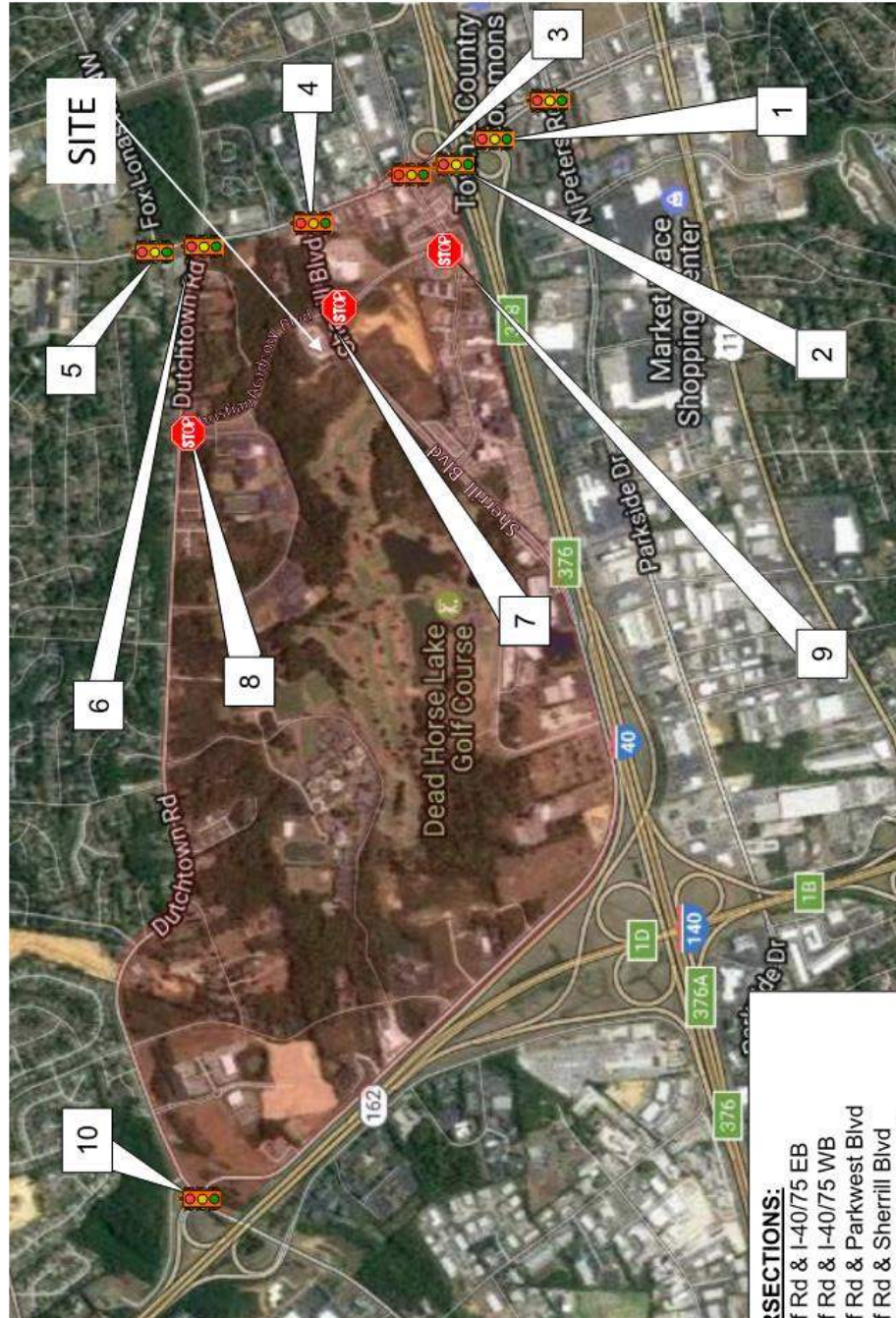
Site Description and Location

The proposed development is located in the northwest corner of Sherrill Boulevard and Christian Academy Boulevard/Park 40 North Boulevard. The site is proposed for the development of approximately 100,000 square feet of medical office. The medical office site proposes three accesses with two from Sherrill Boulevard and one from Christian Academy Boulevard. One access to Sherrill Boulevard will be restricted to right turns and the other provided unrestricted movements requiring a median opening on Sherrill Boulevard. **Figure 1** illustrates the site vicinity, and **Figure 2A** identifies the study area and intersections. The study area is bounded to the north and south by Dutchtown Road and Interstate 40/75, Cedar Bluff Road to the east, and Sherrill Boulevard to the west. The study includes the Interstate 40/75 interchange to the south on Cedar Bluff Road.

Figure 2B illustrates the Medical Office site plan and proposed access. This project will be phased over the next few years, but the study commissioned will address the buildout of 100,000 square feet of medical office.



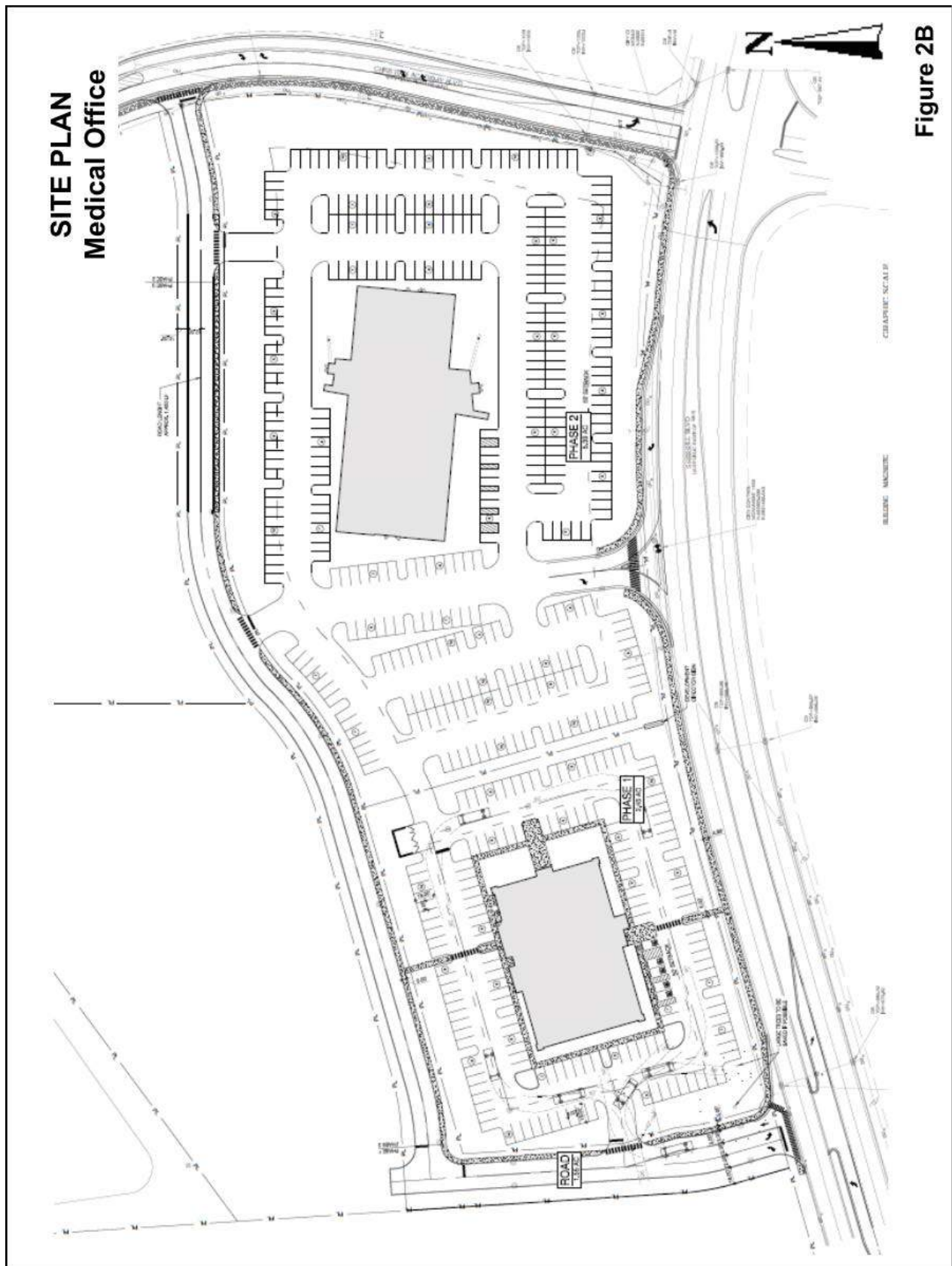
Study Area and Intersections



STUDY INTERSECTIONS:

1. Cedar Bluff Rd & I-40/75 EB
2. Cedar Bluff Rd & I-40/75 WB
3. Cedar Bluff Rd & Parkwest Blvd
4. Cedar Bluff Rd & Sherrill Blvd
5. Cedar Bluff Rd & Fox Lomas Rd
6. Cedar Bluff Rd & Dutchtown Rd
7. Sherrill Blvd & Park 40 Blvd
8. Dutchtown Rd & Christian Academy Blvd
9. Parkwest Blvd & Park 40 Blvd
10. Dutchtown Rd & Sherrill Blvd

Figure 2A



Data Collection Activities

One of the most critical components of a traffic study is data collection within the study area. Data collection began in early May 2017 and continued throughout the month. Data that were collected for this study includes:

- Turning movement counts (details included in the Appendix)
- Mechanical traffic counts (details included in the Appendix)

The turning movement counts began on May 5th and were completed on May 21st prior to the school summer recess. The turning movement counts were made during morning, midday and afternoon peak periods, 7:00 AM to 9:00 AM, 11:00 AM to 1:00 PM and 2:00 PM to 6:00 PM, respectively. These counts are used to evaluate the Level of Service (LOS) at which an intersection performs. The study intersections included:

1. Cedar Bluff Rd & I-40/75 EB
2. Cedar Bluff Rd & I-40/75 WB
3. Cedar Bluff Rd & Parkwest Blvd
4. Cedar Bluff Rd & Sherrill Blvd
5. Cedar Bluff Rd & Fox Lonas Rd
6. Cedar Bluff Rd & Dutchtown Rd
7. Sherrill Blvd & Park 40 Blvd
8. Dutchtown Rd & Christian Academy Blvd
9. Parkwest Blvd & Park 40 Blvd
10. Dutchtown Rd & Sherrill Blvd

The existing daily traffic counts were conducted for CDM Smith Inc. within the study area. The mechanical traffic count began on May 10th and were continuous until May 13th. The mechanical counts helped to establish daily traffic volumes within the study area. Mechanical traffic counts were conducted for 72-hours for Sherrill Boulevard northeast of the Parkwest Medical Center. The average weekday traffic (AWT) volume for Sherrill Boulevard is approximately 5,780 vpd.

Historical traffic count data were obtained from Tennessee Department of Transportation (TDOT) and is provided in the Appendix.

Existing Traffic Characteristics

Data from the field studies were utilized to analyze existing traffic conditions within the Cedar Bluff Road and Sherrill Boulevard environs. The following sections provide a description of the analysis. **Figure 3** illustrates the 72-hour mechanical traffic count data.

Existing Traffic Control Devices and Intersection Geometry

An inventory of existing traffic control devices and intersection geometry is shown in **Figure 4**. Three of the intersections surveyed are stop controlled and seven are signalized. Signalized intersections are along Cedar Bluff Road and the intersection of Dutchtown Road and Sherrill Boulevard at Pellissippi Parkway. Stop control intersections exist on Park 40 North Boulevard for its approaches to Sherrill Boulevard and Parkwest Boulevard. Posted speeds limits adjacent to the site are 40mph for Sherrill Boulevard and 30mph for Christian Academy Boulevard.

Existing Peak Hour Volumes

Figure 5A illustrates the current intersection turning movement counts for the AM and PM peak hours and **Figure 5B** illustrates the midday and school peak hours. When all the intersections are considered, the morning peak hour varies between the hour beginning 7:45 and 8:45 AM, and the afternoon peak is from 5:00 to 6:00 PM. For the Cedar Bluff Road interchange with I-40/75 and the Cedar Bluff Road intersection with Parkwest Boulevard, the traffic illustrated in Figures 6A and 6B represent balanced traffic from the turning movement counts found in the Appendix of the report.

During the PM peak hour, volumes on Cedar Bluff Road, north of Parkwest Boulevard and Executive Park Drive, are heavier in the northbound direction. However, south of this intersection the volumes are greater in the southbound direction. It could be that drivers destined for the medical center use Pellissippi Parkway and Sherrill Boulevard in the morning and then Parkwest Boulevard to Interstate 40/75 in the afternoon.

**72-HR Average Weekday
Traffic (AWT)**

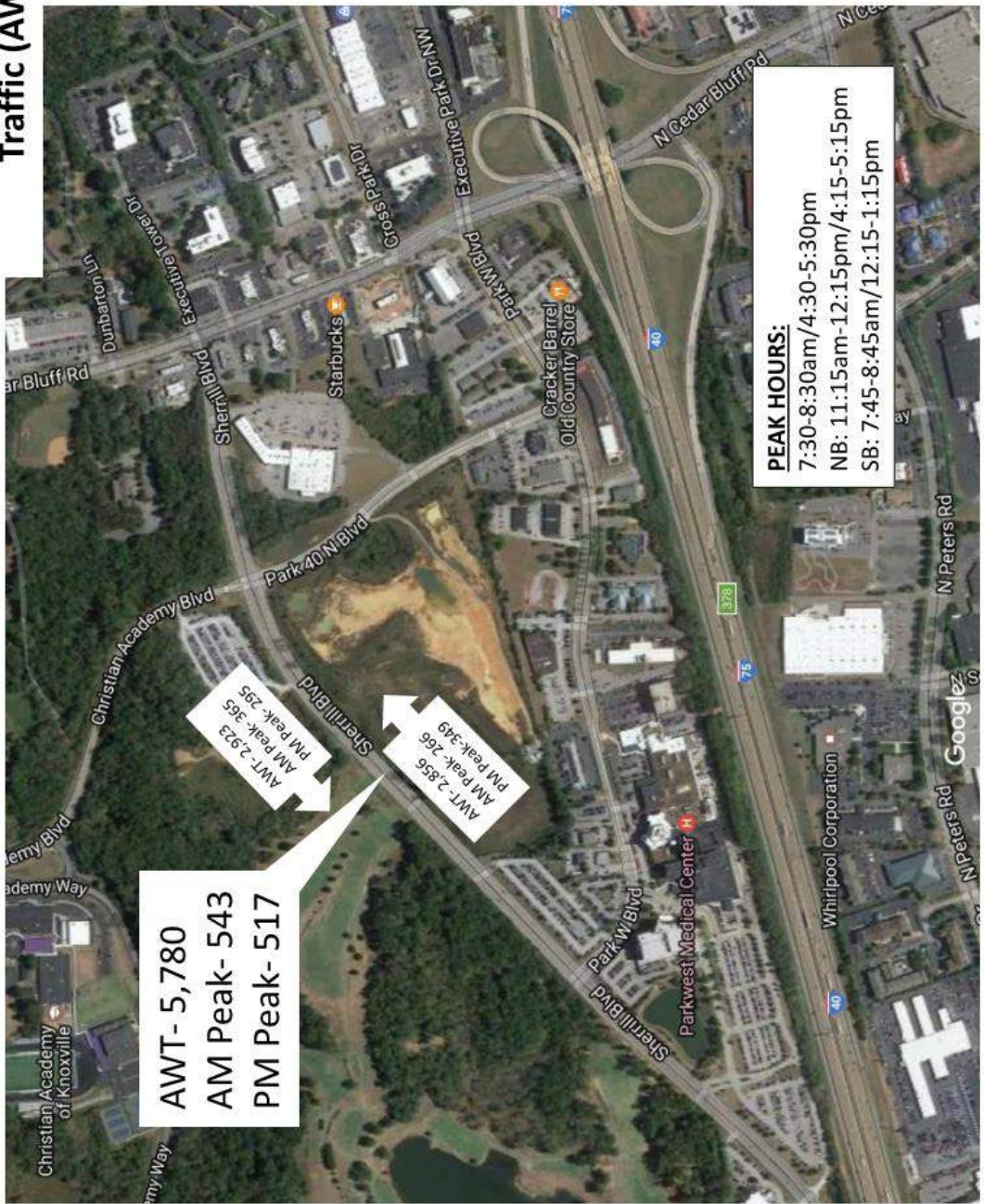
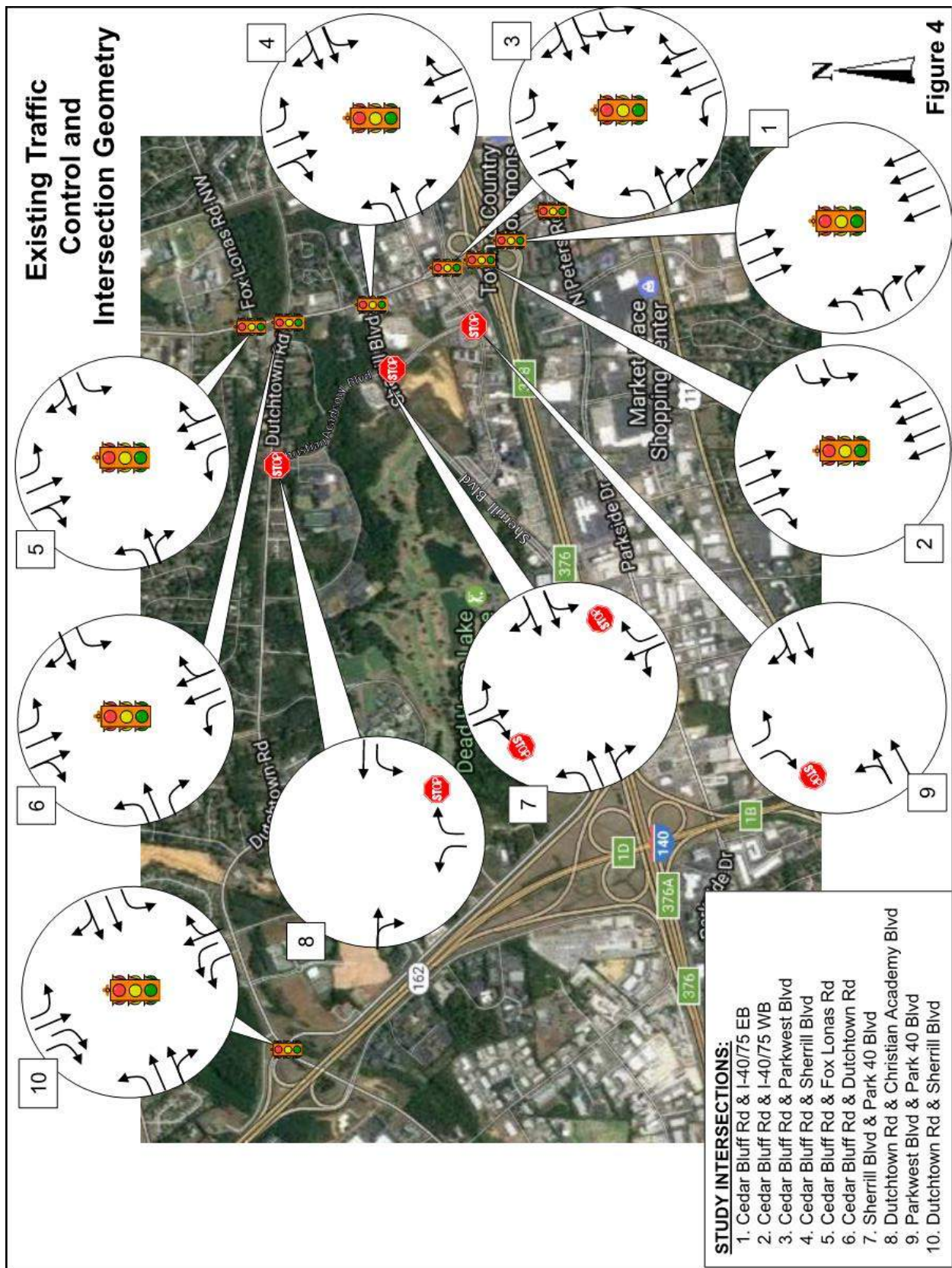
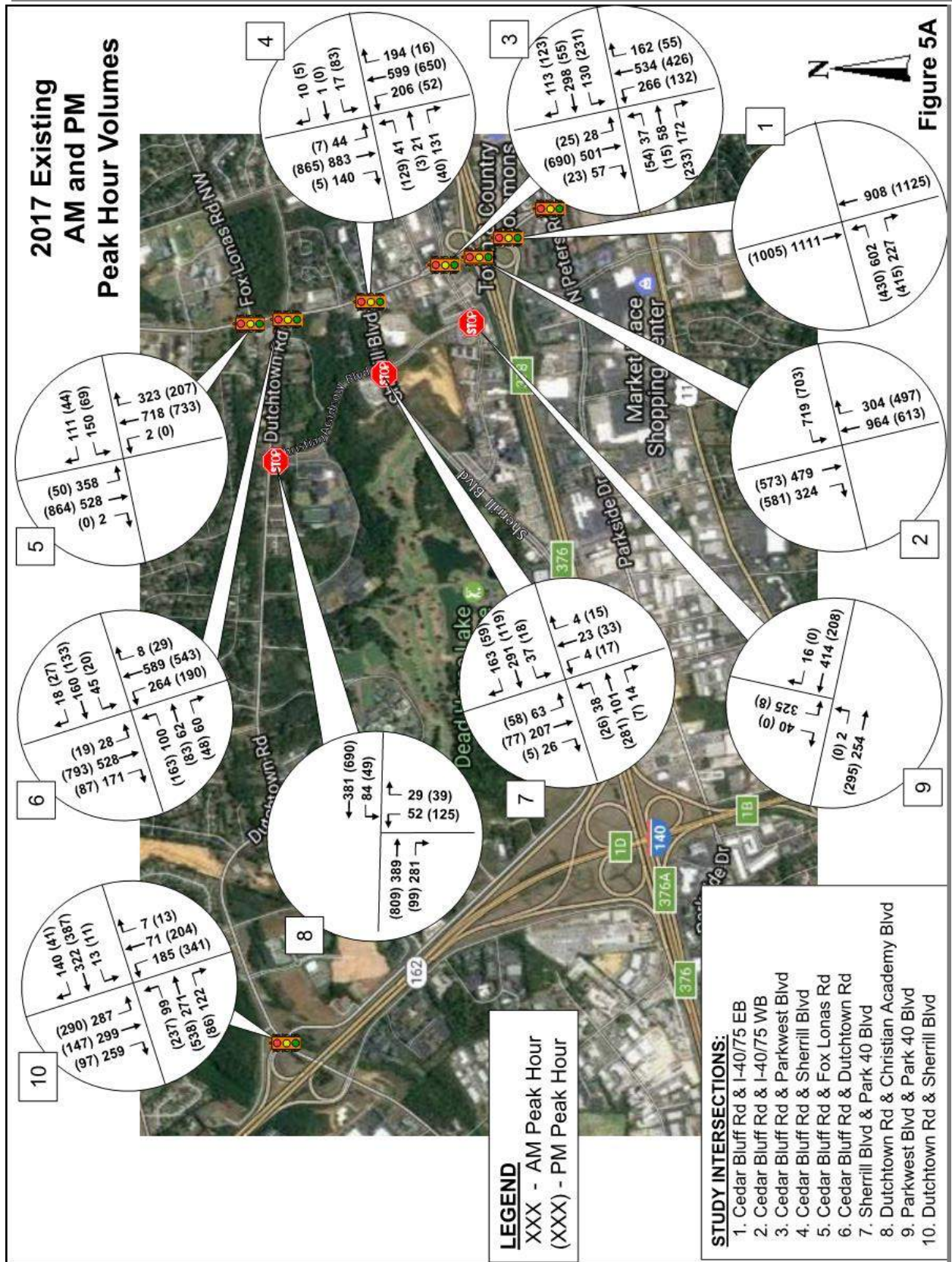
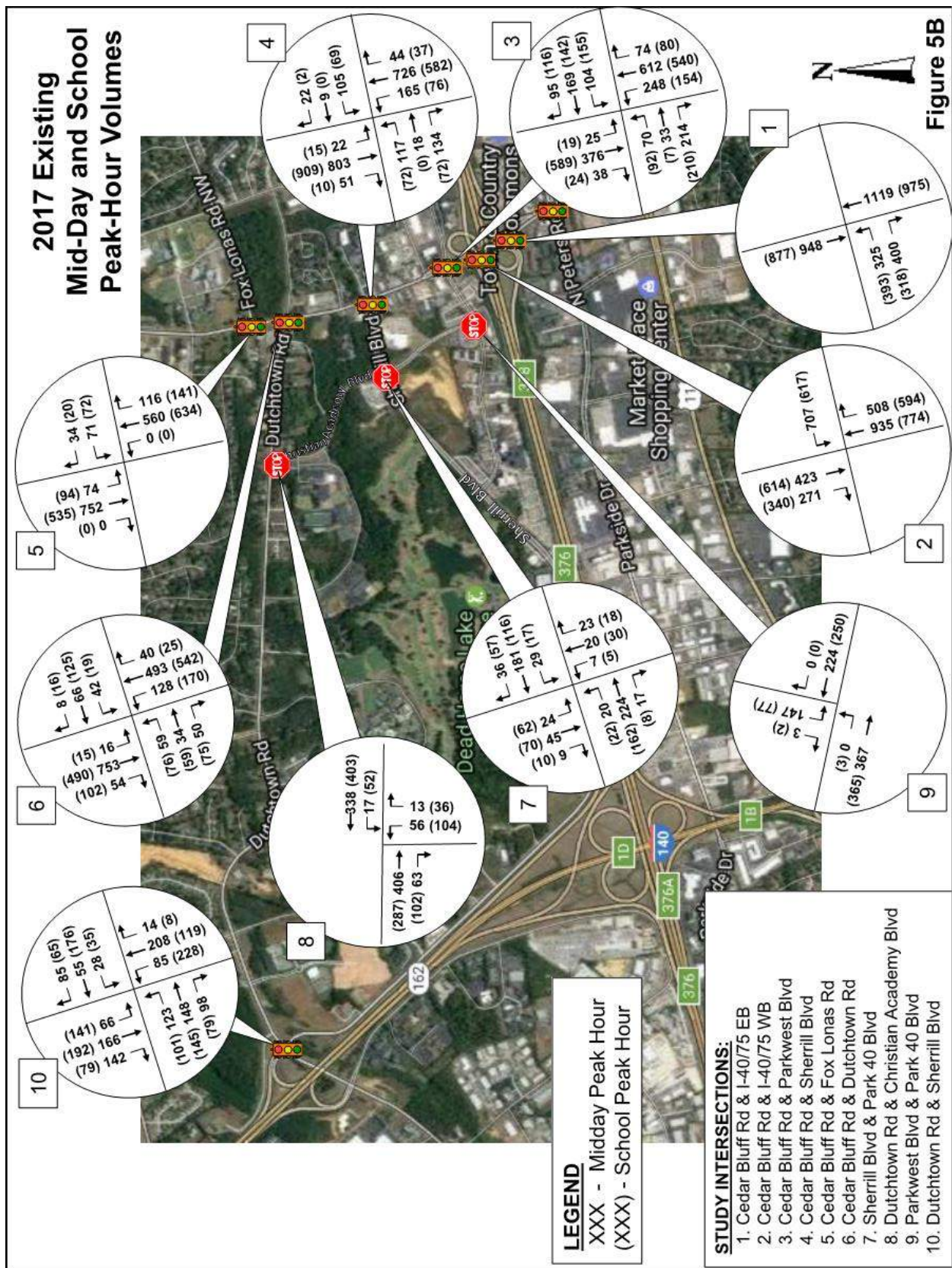


Figure 3







As shown in **Figure 5B**, the midday and school peak traffic volumes were also evaluated for this site. With the site located near the Christian Academy, traffic from the medical office will impact the current school traffic operation thereby its peak hours are addressed in the study. The midday is included in the study, as Cedar Bluff Road traffic exhibits a significant peak due to the restaurant establishments and the I-40/75 interchange. The north and southbound volumes, north of Parkwest Boulevard and Executive Park Drive, were fairly balanced, which would be expected on this section of Cedar Bluff Road with the availability of eating establishments. South of the intersection, volumes in the southbound direction are much greater than the northbound. These could be drivers oriented to the interstate or Kingston Pike and northbound traffic from the interstate having to access Executive Park Drive.

Knoxville Area Transit

The study area is currently served by the Knoxville Area Transit. Route 16 provides service for Parkwest Boulevard and the hospital. The existing Route 16 Map is shown in **Figure 6**.



Level of Service Definitions

In order to express traffic conditions as perceived by drivers, traffic engineering professionals utilize the concept of “level of service” (LOS). Level of service is a qualitative statement of the acceptability of traffic conditions. It reflects the additional travel time, or delay, incurred by drivers at intersections. The LOS index ranges from LOS A, indicating excellent traffic conditions with minimal delay, to LOS F indicating very congested conditions and excessive delay. LOS D generally is considered the minimum acceptable condition in urban areas. The criteria for signalized and unsignalized intersections are presented in **Table 1**.

Table 1: Level of Service Criteria

	Delay in seconds per vehicle	
	Signalized Intersections	Stop-controlled Intersections
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

For stop-controlled intersections, LOS is measured only for those drivers that must yield to other traffic, such as drivers entering or crossing a major road from a side-street, or major-street drivers turning left onto a side-street. For signalized intersections, the most meaningful measure is the intersection-wide LOS reflecting the average of conditions for all drivers entering the signalized intersection.

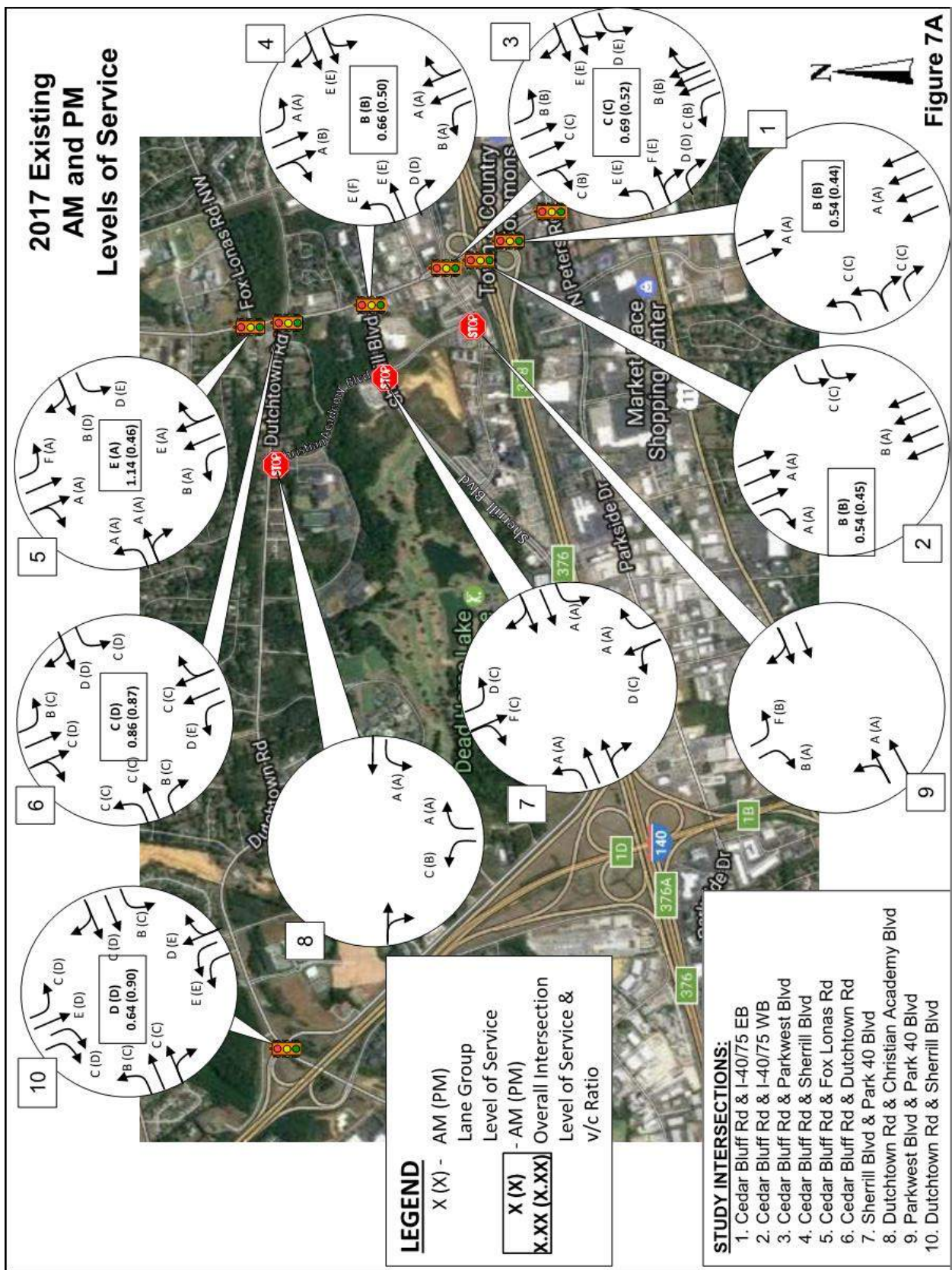
Existing Level of Service

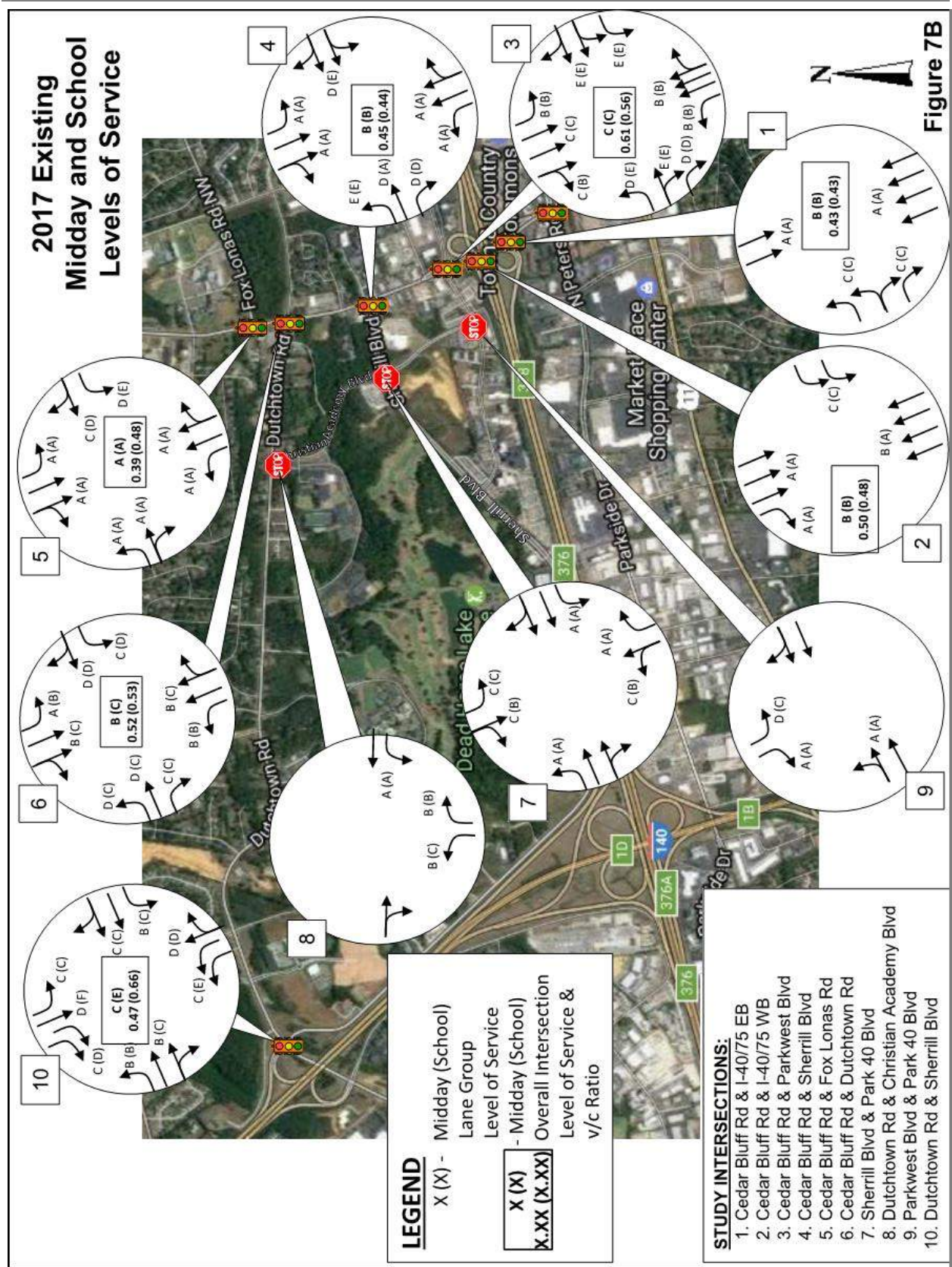
Figures 7A and 7B shows the LOS for the 2017 peak-hour traffic volumes. There are ten study area intersections, and most of these intersections currently operate at an acceptable LOS during the study peak hours.

The intersection of Dutchtown Road and Sherrill Boulevard operates with a LOS E during the afternoon school peak hour. The PM peak hour is approaching capacity with a capacity ratio (V/C, Volume/Capacity) exceeding 0.90, approaching 1.00. Capacity ratios exceeding 0.90 can be unstable and very sensitive to traffic volume variations. The left-turn movements from Sherrill Boulevard and the through movements between the Pellissippi ramps and Sherrill Boulevard operate at a LOS E during the peak hours. The northbound through movement fails during the afternoon school peak hour. During the AM peak hour, adverse queues are experienced for the Pellissippi northbound off-ramp. The current lane storage is insufficient for the current traffic volumes and turning movements. The current right-turn volume from the northbound off ramp does not require a double right-turn lane; Some modification of the lane assignments from the off-ramp could increase the capacity of the intersection and improve the LOS from this approach.

Parkwest Boulevard and Executive Park Drive approaches to Cedar Bluff Road experience a LOS E during the peak hours. Likewise, the Sherrill Boulevard left turn and through movements to Cedar Bluff Road operate at LOS E during some peak hours.

For the Parkwest Boulevard approach to Cedar Bluff Road, during the AM peak hour, the thru-right lane fails. This lane assignment is inefficient for the Parkwest Boulevard approach as any right-turn traffic can be impeded during the right-turn overlap with any thru traffic present. With the current split phase of the intersection, the reassignment of the thru movement to the left-turn lane would permit the greater efficiency of the overlap phase. In addition, the assignment of the right-turn lane to the northbound left-turn phase would permit the left-turn movement to operate with the heavier right turn movement.





The Sherrill Boulevard approach geometry to Cedar Bluff Road is currently operating at levels of service E for its turning movements. The intersection capacity ratios are less than 0.70; therefore, these lower levels of service are timing related. The current timing is maximizing the Cedar Bluff Road movement.

The intersection of Cedar Bluff Road and Fox Lonas Road operates over capacity at a E LOS during the AM peak hour with the southbound left-turn movement failing. Fox Lonas Road intersection operates with this poor LOS due to the morning school traffic.

The Park 40 North Boulevard and Christian Academy Boulevard stop controlled approaches to Sherrill Boulevard operate with a LOS F during the AM peak hour, which is currently mitigated with the Sheriff's Department providing traffic control for the intersection. At the Park 40 North Boulevard and Sherrill Boulevard intersection, an existing traffic signal warrant analysis was performed and it found that traffic is not sufficient to meet the criteria for signalization. Included in the appendix is details of the warrant study.

The current LOS for the southbound left-turn movement from Park 40 North Boulevard to Parkwest Boulevard is F (delay of 137 seconds) during the AM peak hour, but operates at an acceptable LOS for the other peak hours with a STOP control. Motorists (primarily school trips) are willing to tolerate over 2-minutes of delay rather than use Cedar Bluff Road, which is a viable alternative but may result in more delay. The intersection of Park 40 North at Parkwest Boulevard currently operates with an F LOS during the AM peak hour. The intersection does meet the Peak Hour signal warrant (Warrant 3B) but does not meet any other volume warrants. The LOS F is limited to the AM peak hour.

The intersection of Dutchtown Road with Christian Academy Boulevard currently operates at an acceptable level of service. The intersection does currently meet the Peak Hour signal warrant. Existing eastbound traffic has a significant right-turn volume and does warrant a right turn lane for the AM and PM peak hours.

Background Traffic

Future traffic conditions or background conditions are the anticipated conditions regardless of whether the proposed development occurs or not. A worst-case scenario was considered, so traffic in the study area was assumed to grow as the region develops. The count history available through the TDOT and MPC count stations located in the Parkwest Medical Center environs indicated a 5% annual growth rate over the past five years and 2.5-percent over the past 10 years.

The buildout of the medical office will depend largely on the economic conditions; the initial phasing of the development is planned for the next couple years. Therefore, the study assumes buildout for two horizon years consistent with the planned expansion of the Parkwest Medical Center. Using a horizon year of 2019 and the growth rate for the project vicinity, background traffic was estimated for the transportation system. Background traffic for 2019 assumes a 10.4-percent growth factor applied to the existing 2017 traffic volumes, reflecting an annual compounded growth rate of 5-percent. For the horizon year 2030, the existing traffic was grown from the 2017 traffic with a 32.5 percent rate, reflecting an annual compounded rate of 2.5-percent. This growth was applied to public rights of way or the public street system. Growth factors were not applied to private streets or driveways as they do not exhibit a continuous growth through the study area. **Figures 8A and 8B** illustrate the 2019 background traffic growth for the study intersections. **Figures 9A and 9B** illustrate the background traffic growth for 2030.

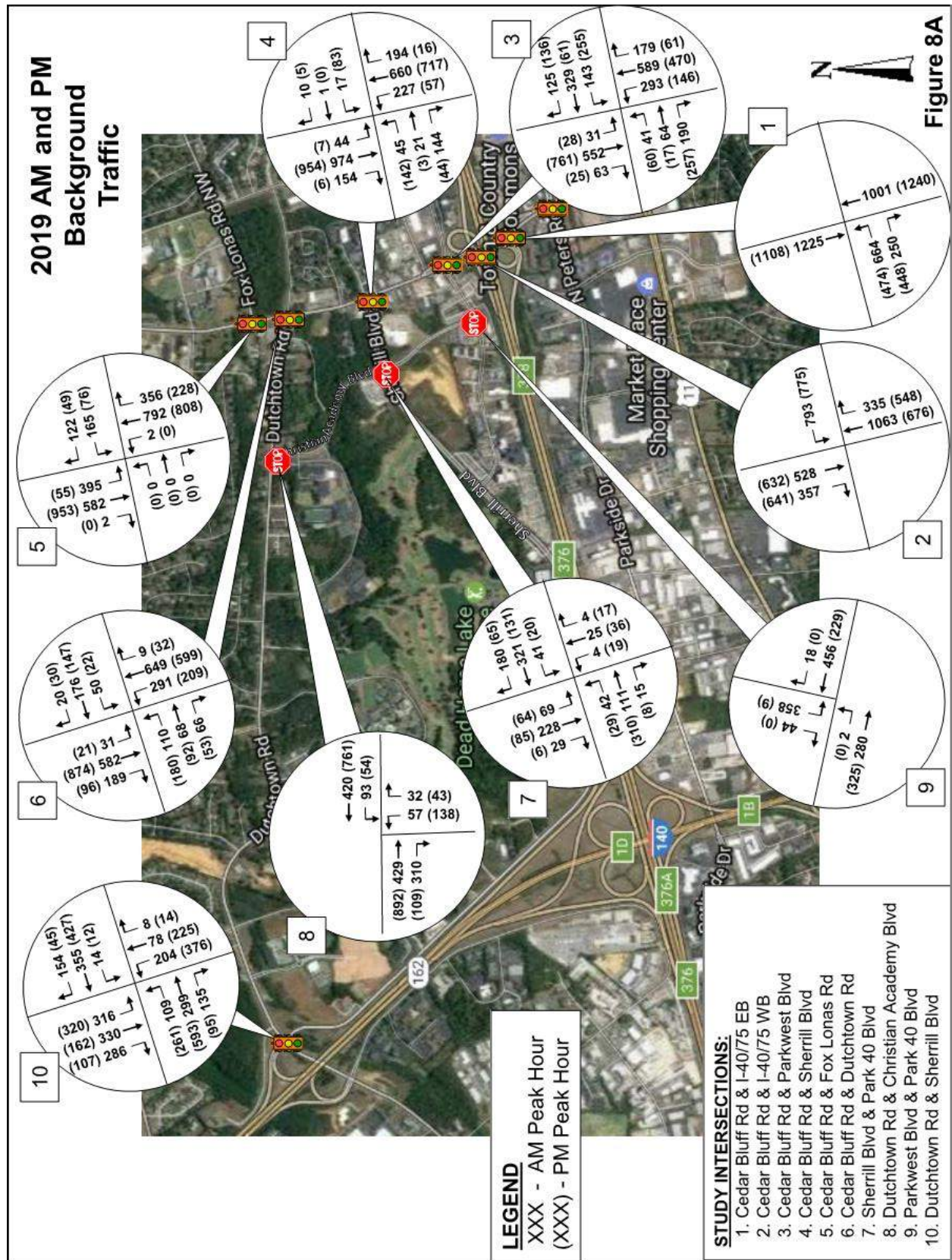
In addition to the normal rate of growth in the traffic through the study area, traffic will increase with proposed development. Parkwest Medical Center is planning an expansion of the hospital with an initial phase of 42 beds for 2019 and a buildout of 182 beds by 2030. The trip generation for this expansion is presented in **Table 2**. The assignment of these trips is illustrated in **Figures 10A and 10B** for 2019 and **Figures 10C and 10D** for 2030.

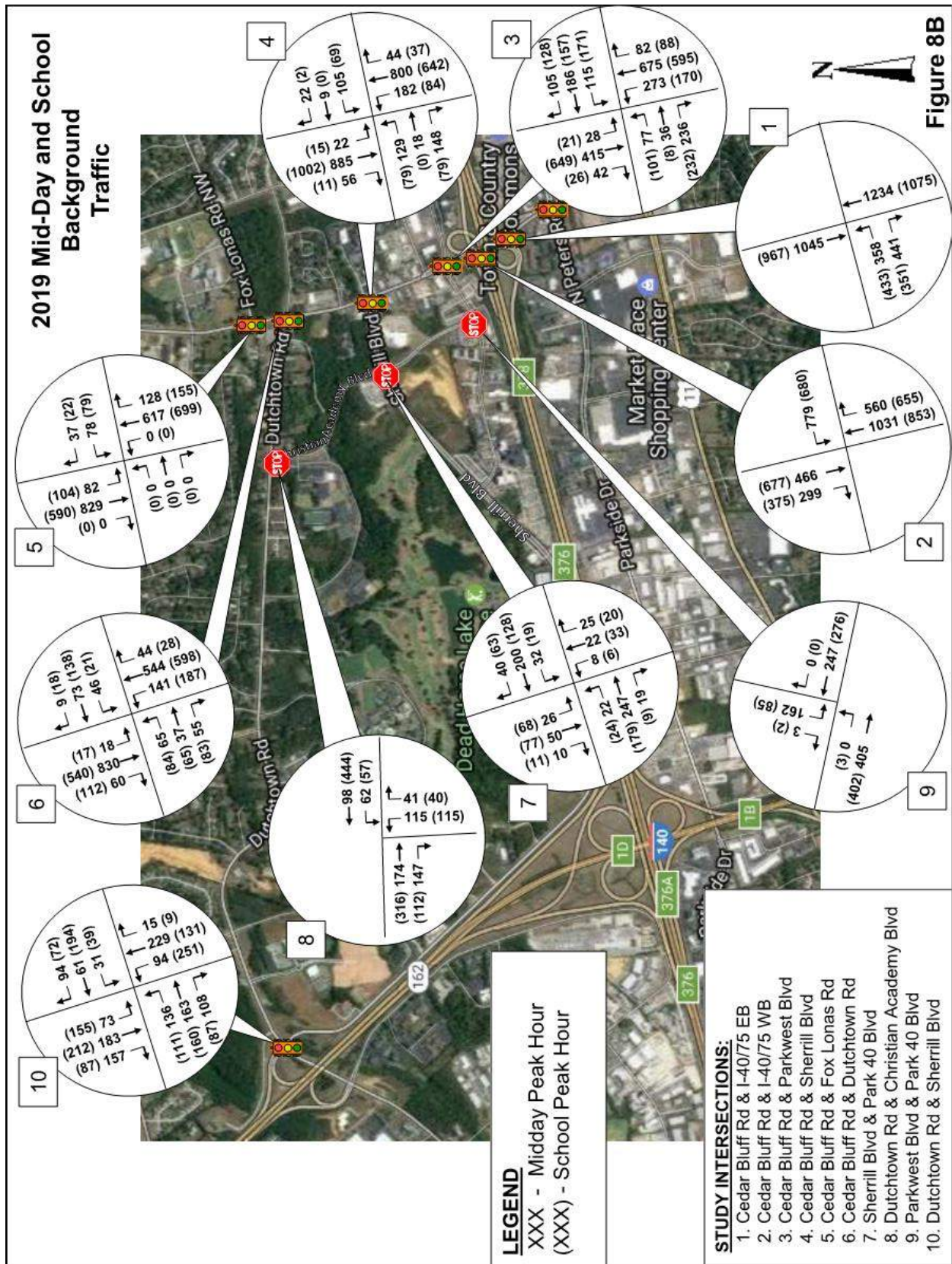
Adding these trips to the background growth turning movements result in the total background traffic, illustrated in **Figures 11A and 11B** for 2019 and **Figures 12A and 12B** for 2030.

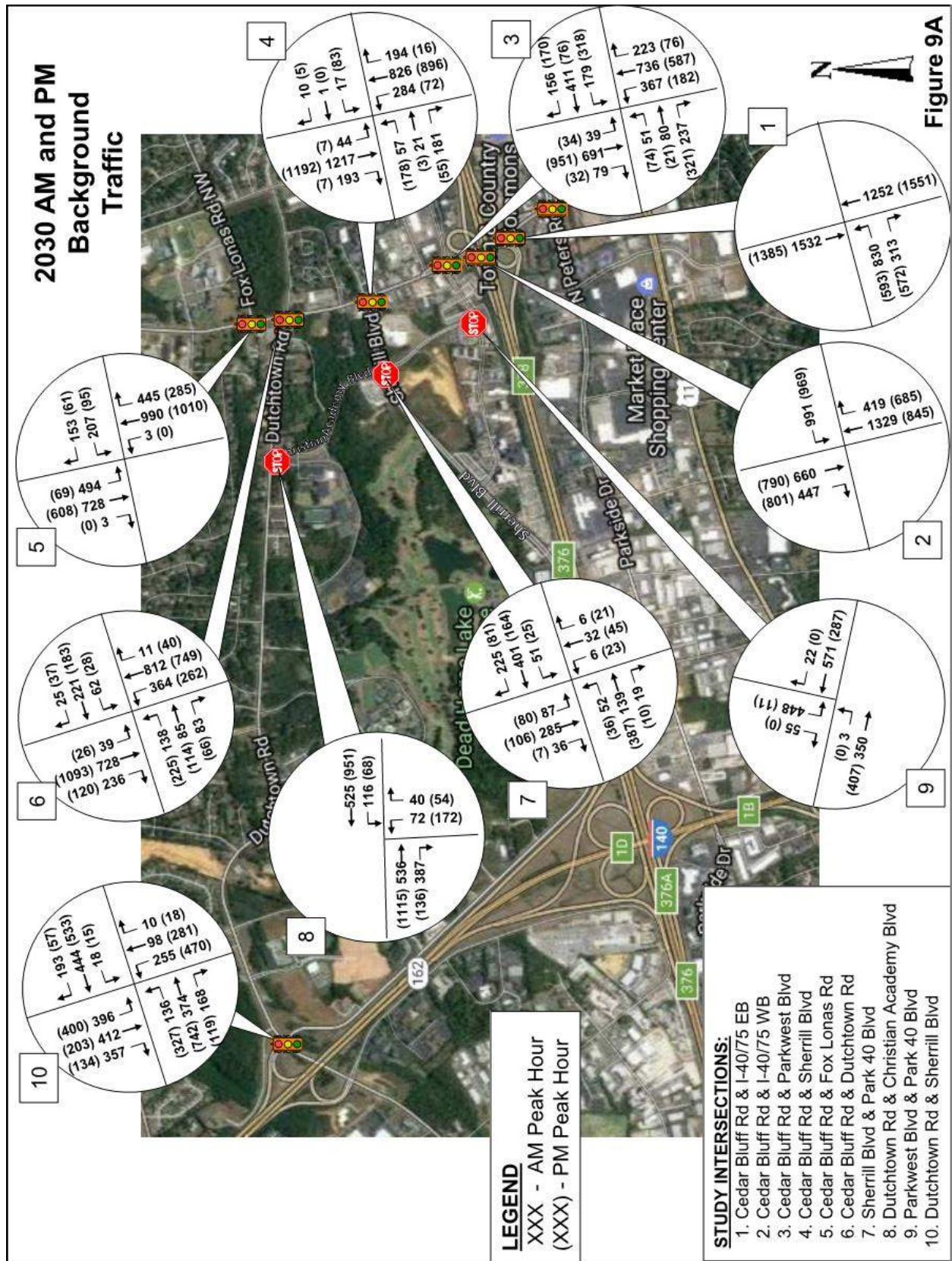
Table 2: Parkwest Hospital Expansion Trip Generation

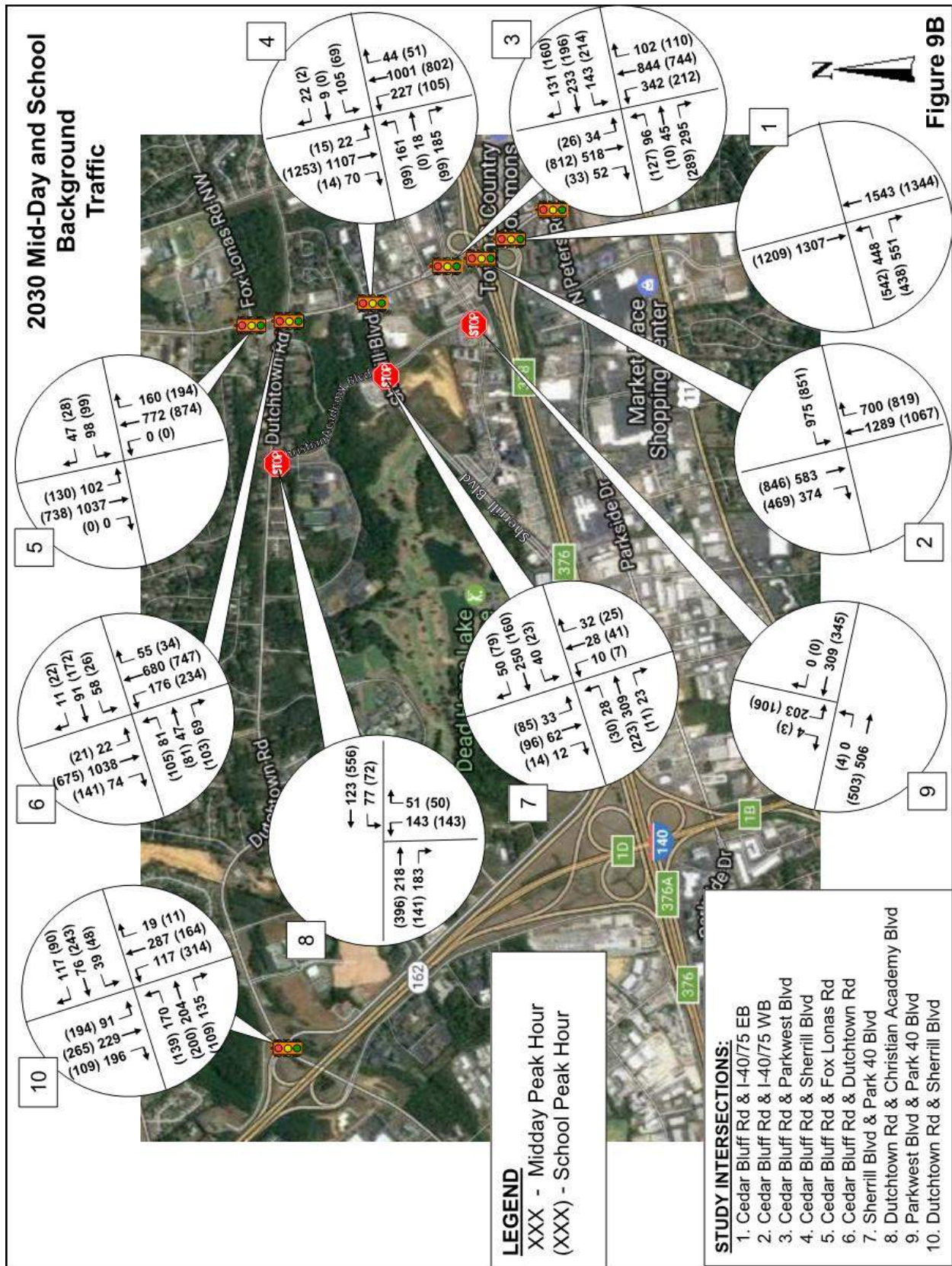
ITE LAND USE CODE (LUC) 610						
PEAK HOUR DESCRIPTION	42 Bed Expansion (2019)			182 Bed Expansion (2030)		
	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
DAILY	154	154	308	667	667	1,334
AM PEAK HOUR OF ADJACENT STREET (AM Peak)	40	16	56	173	67	240
AM PEAK HOUR OF GENERATOR (Midday Peak)	42	19	61	182	82	264
PM PEAK HOUR OF ADJACENT STREET (PM Peak)	20	40	60	85	173	258
PM PEAK HOUR OF GENERATOR (School Peak)	17	34	51	73	141	214

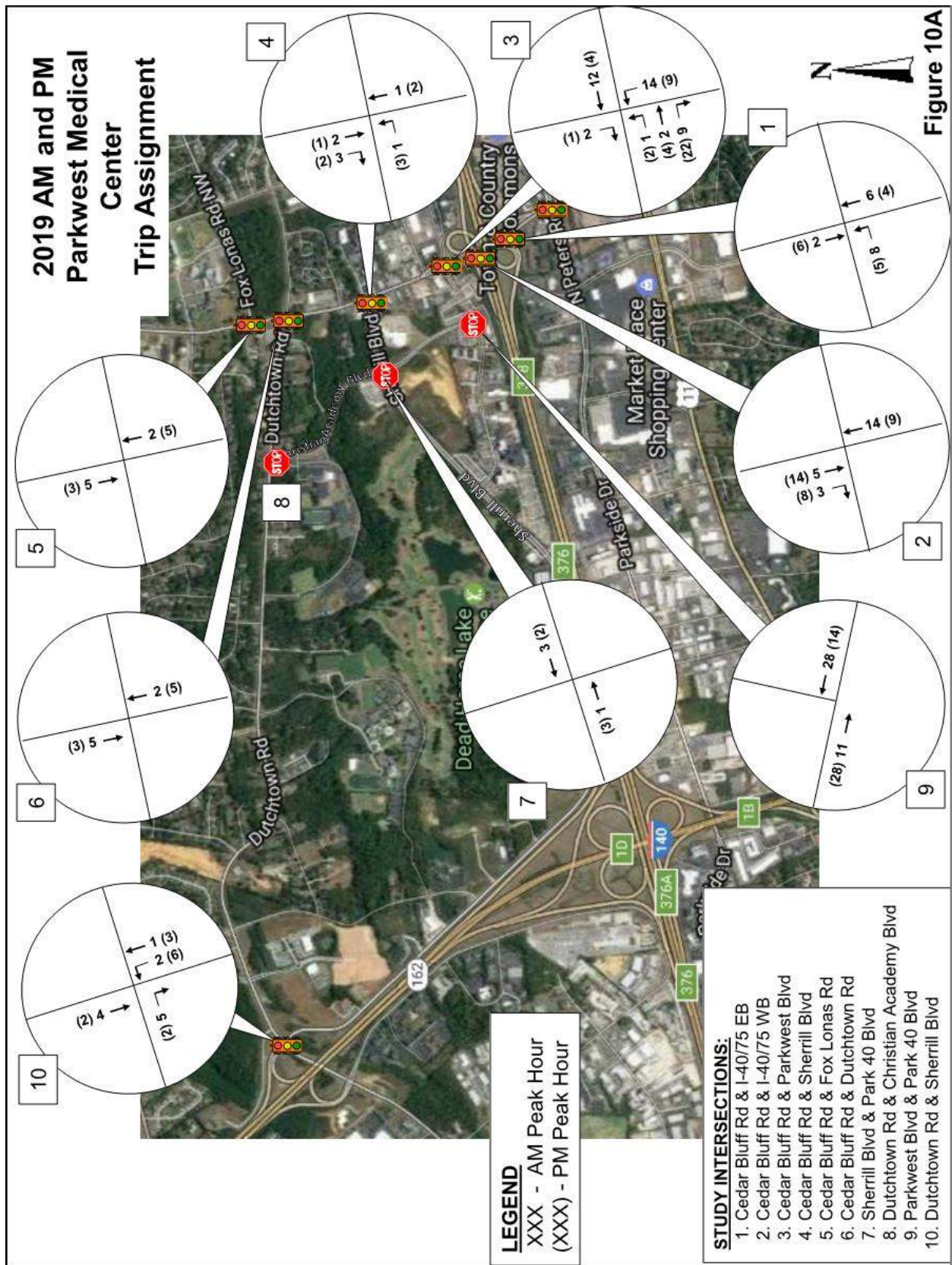
REFERENCE: Trip Generation, 9th Edition, Institute of Transportation Engineers (ITE)

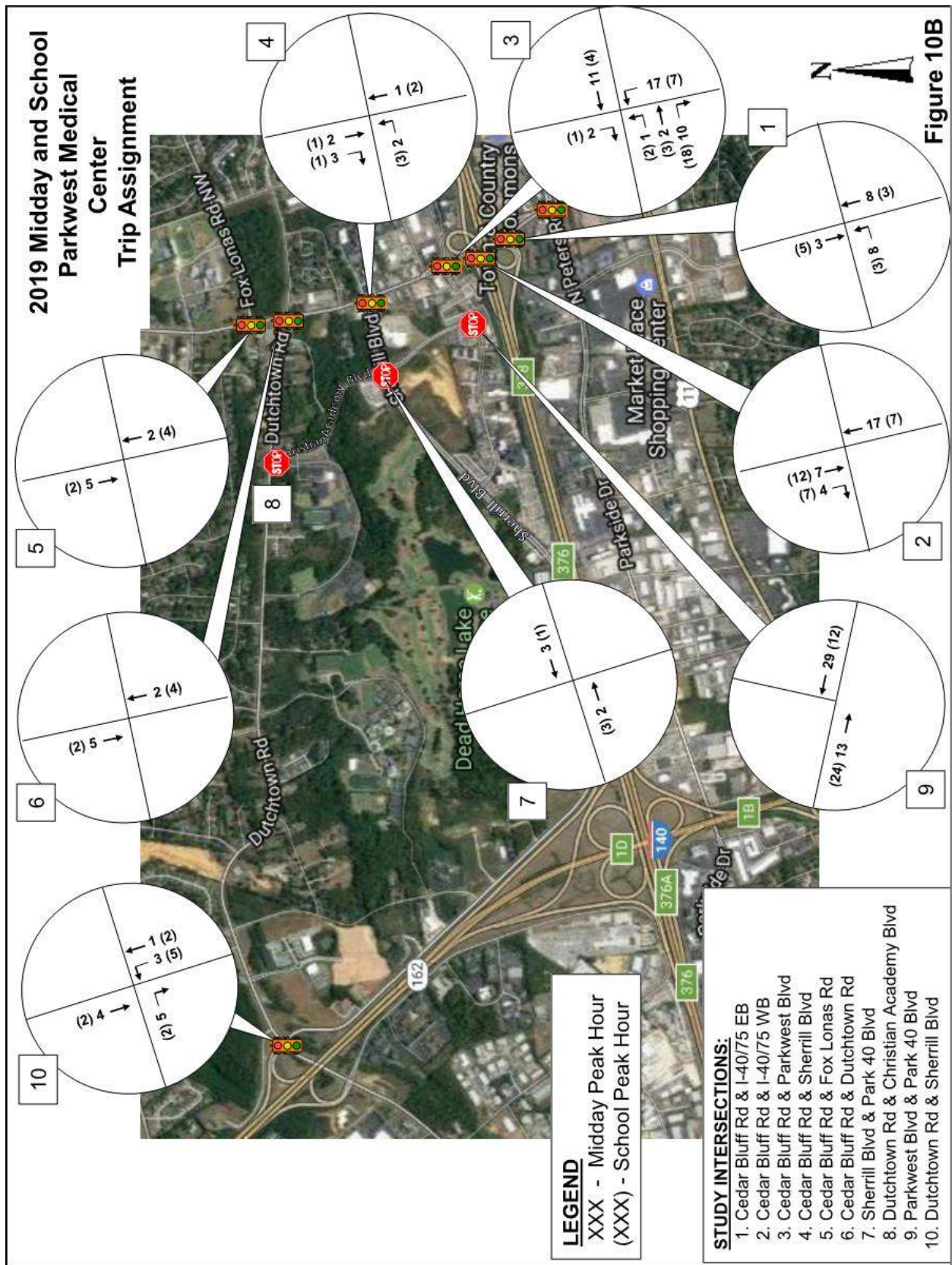


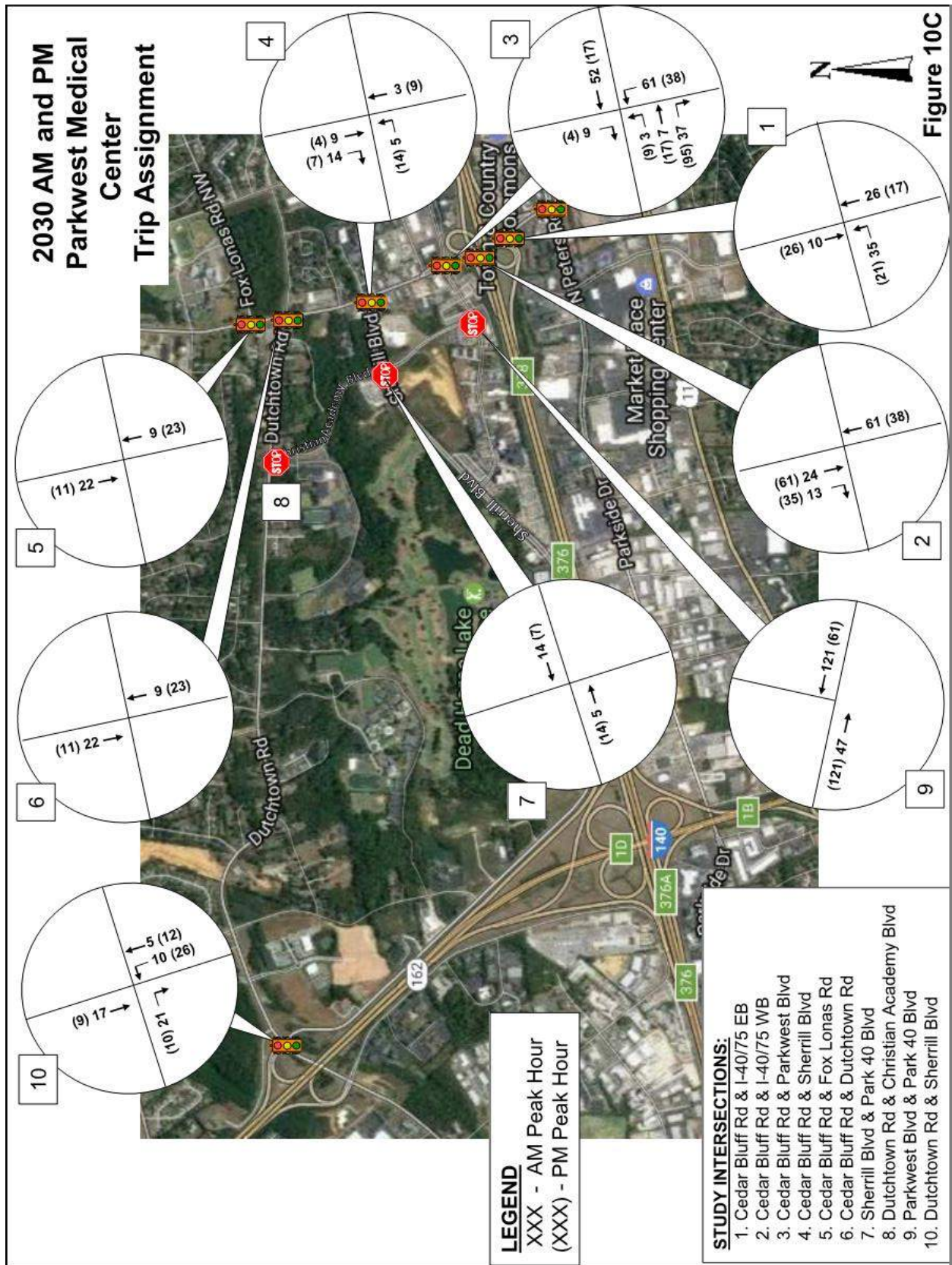


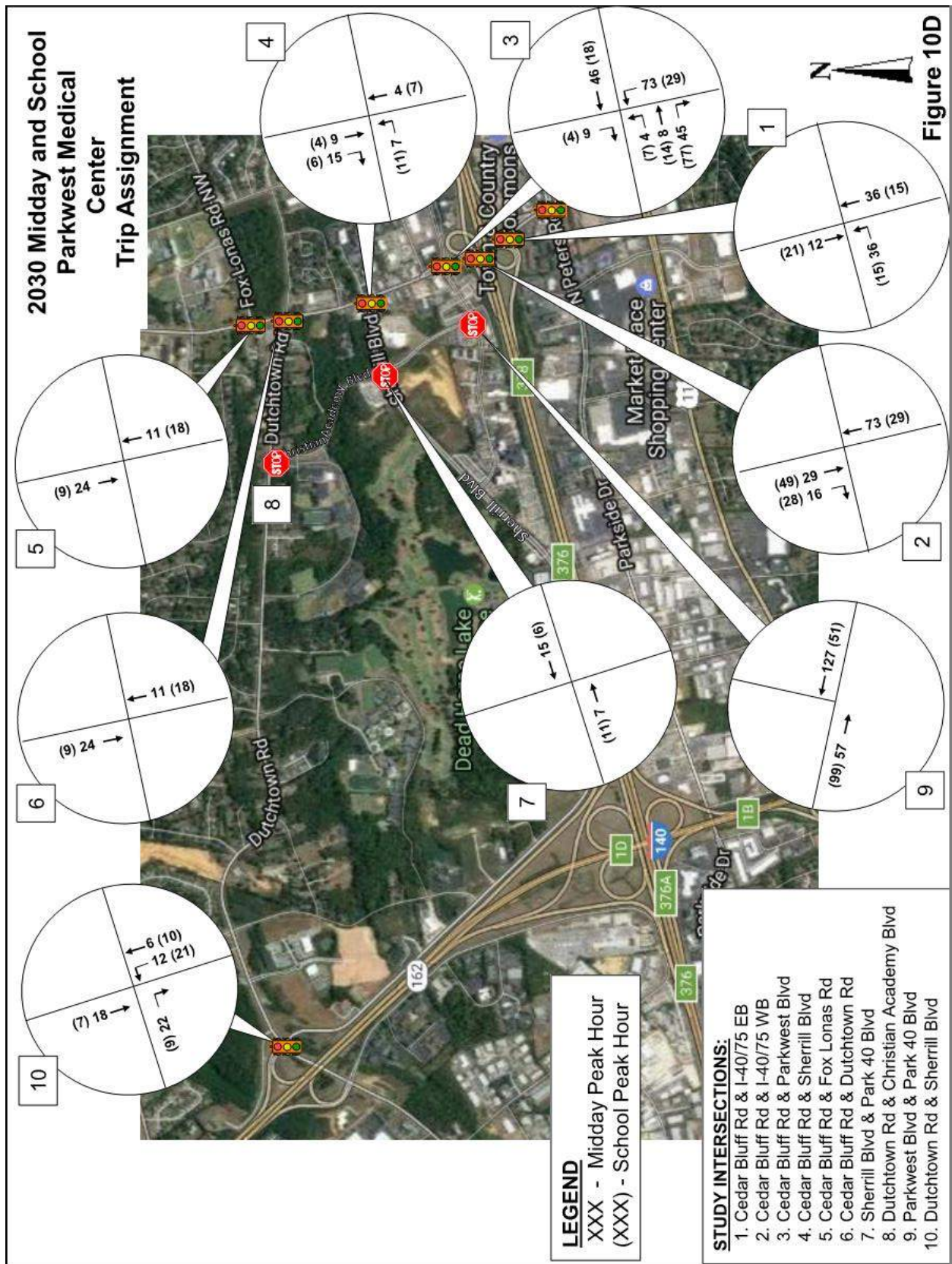


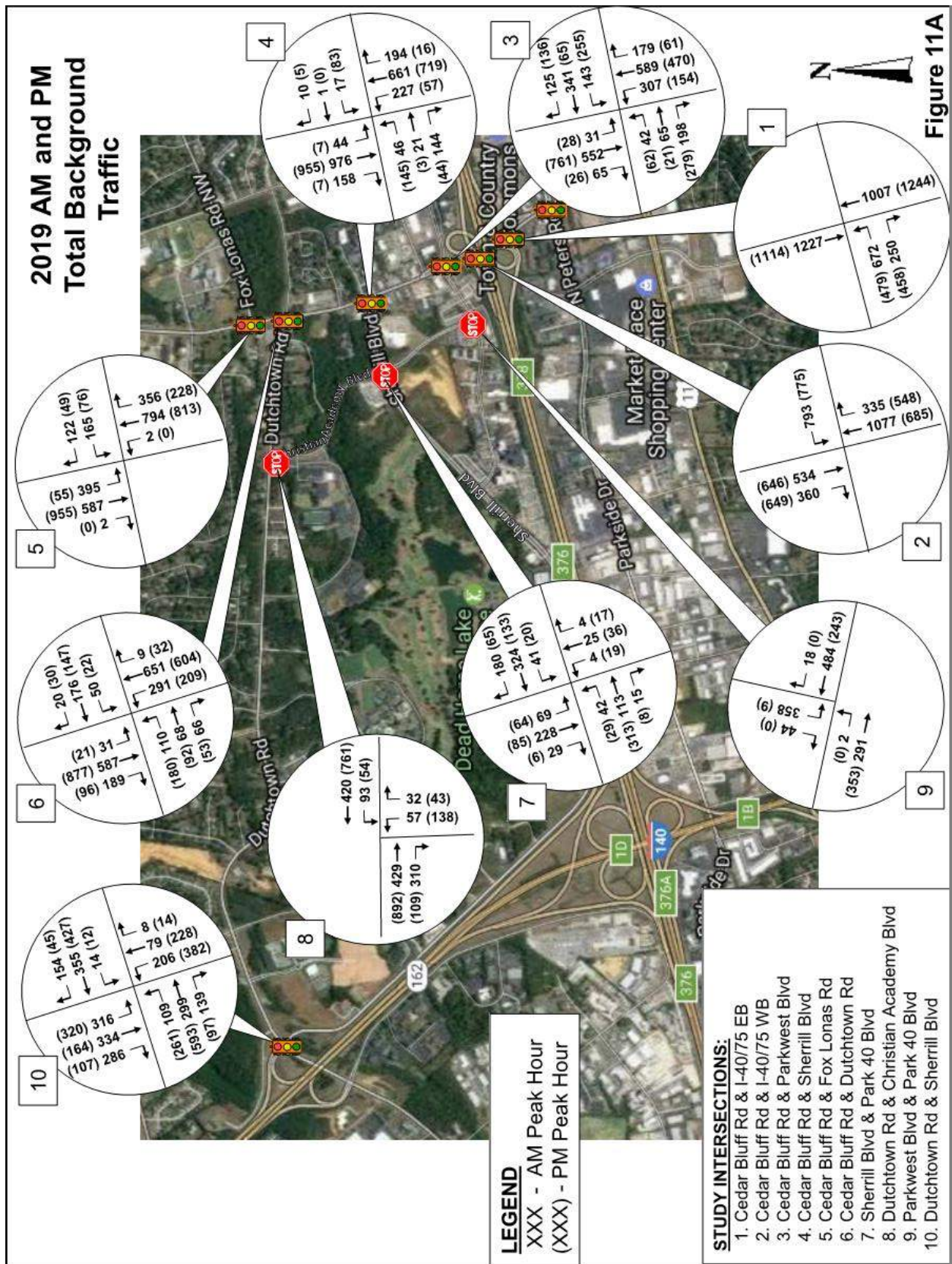


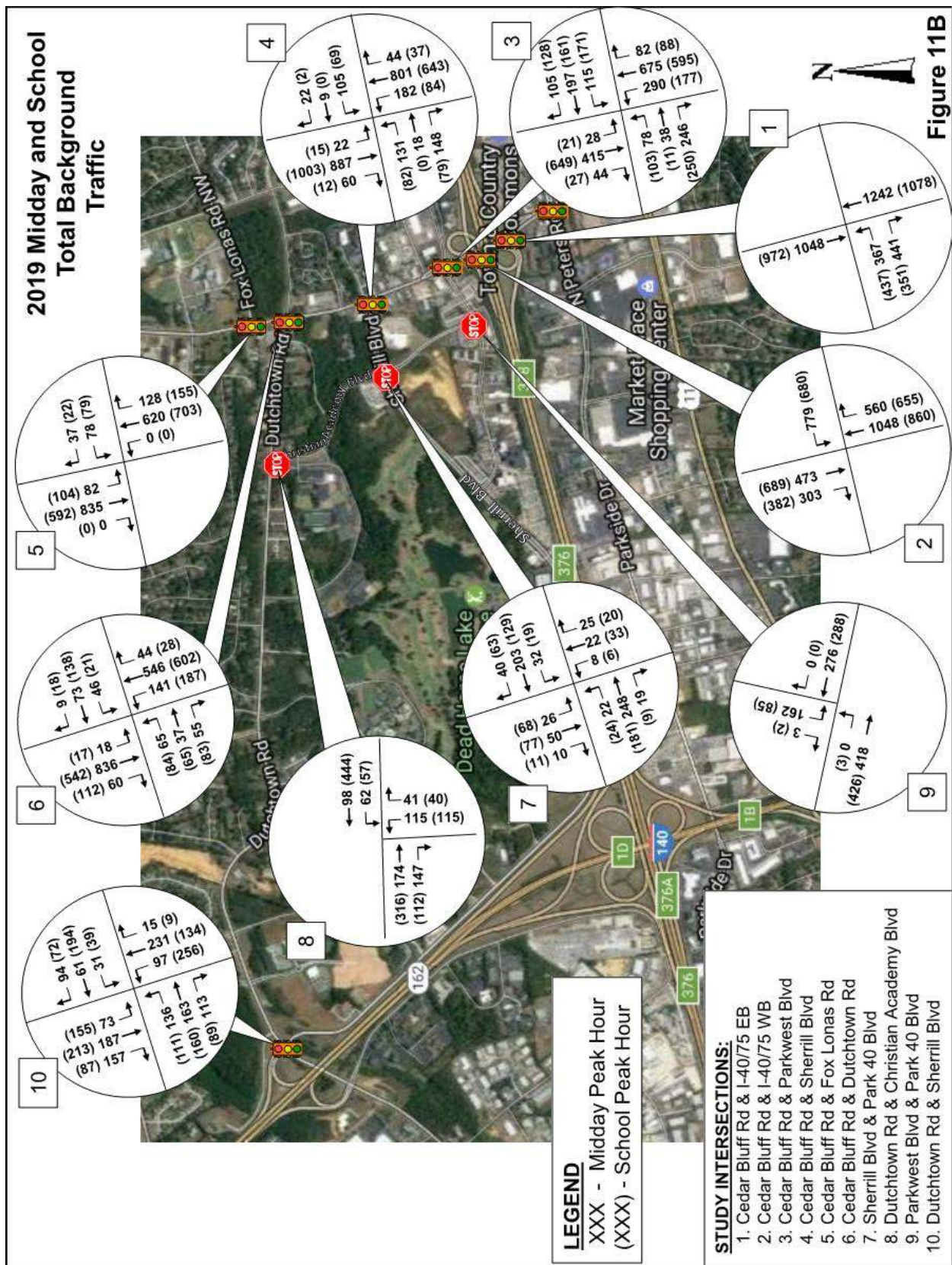


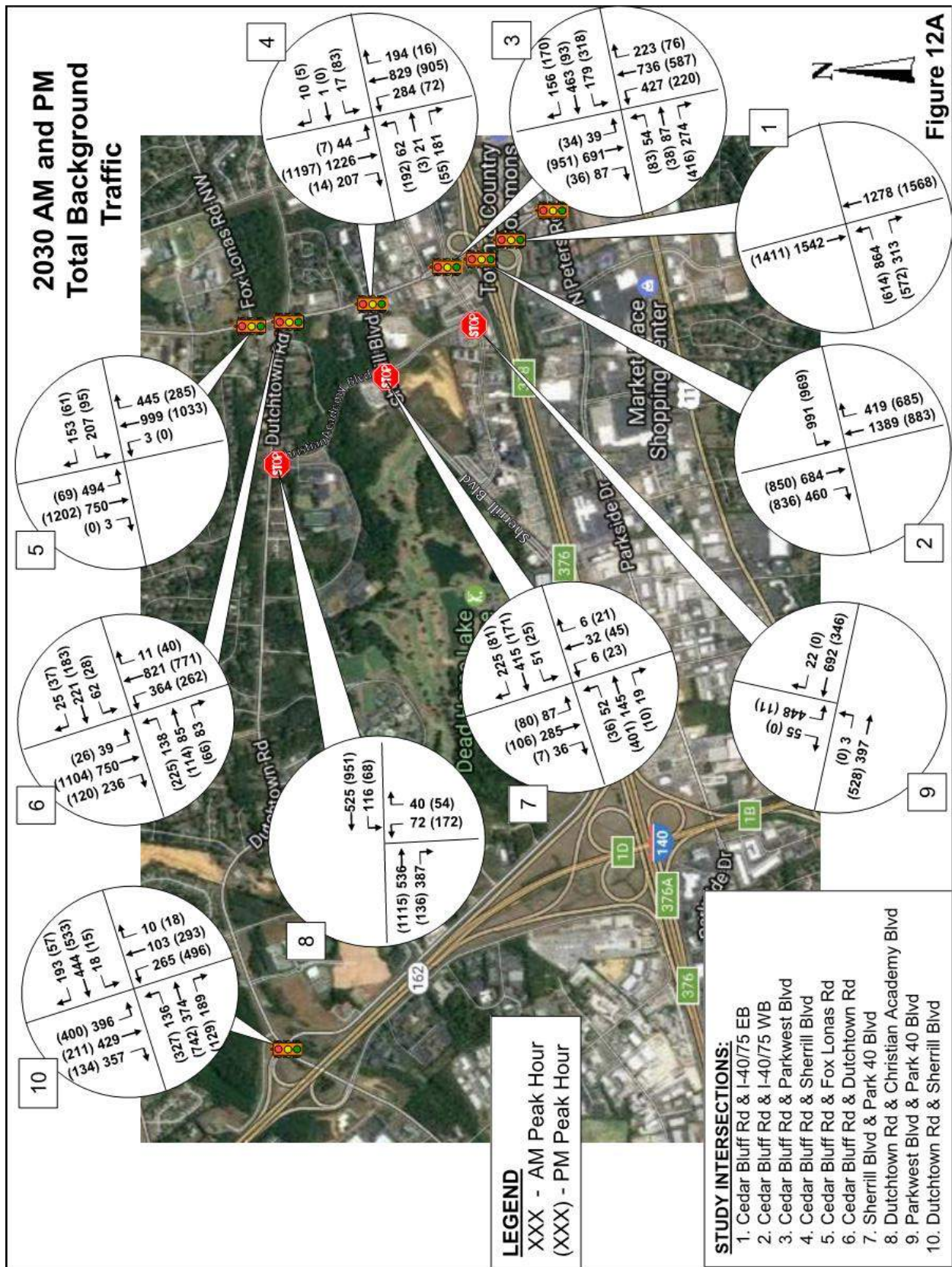


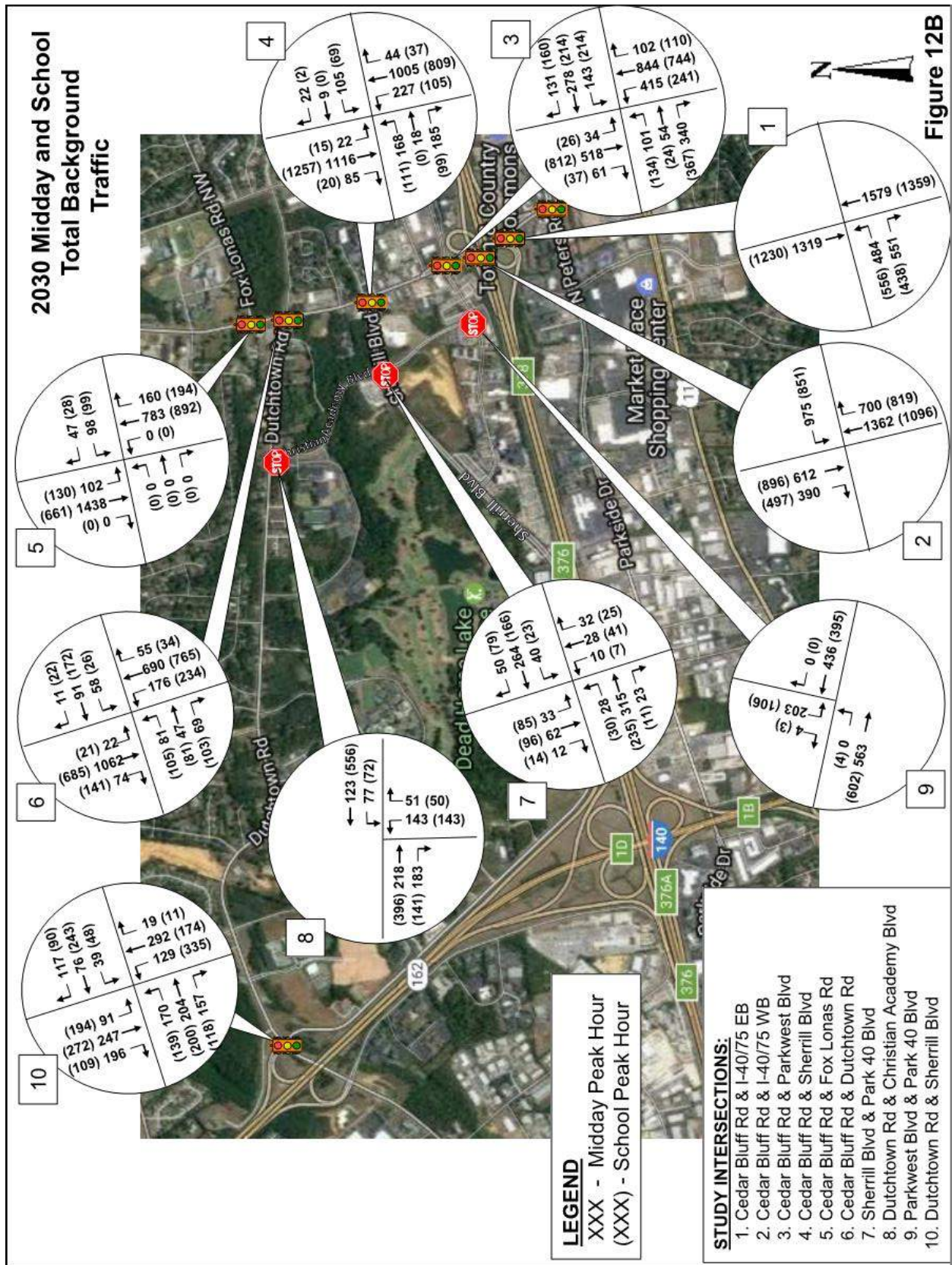










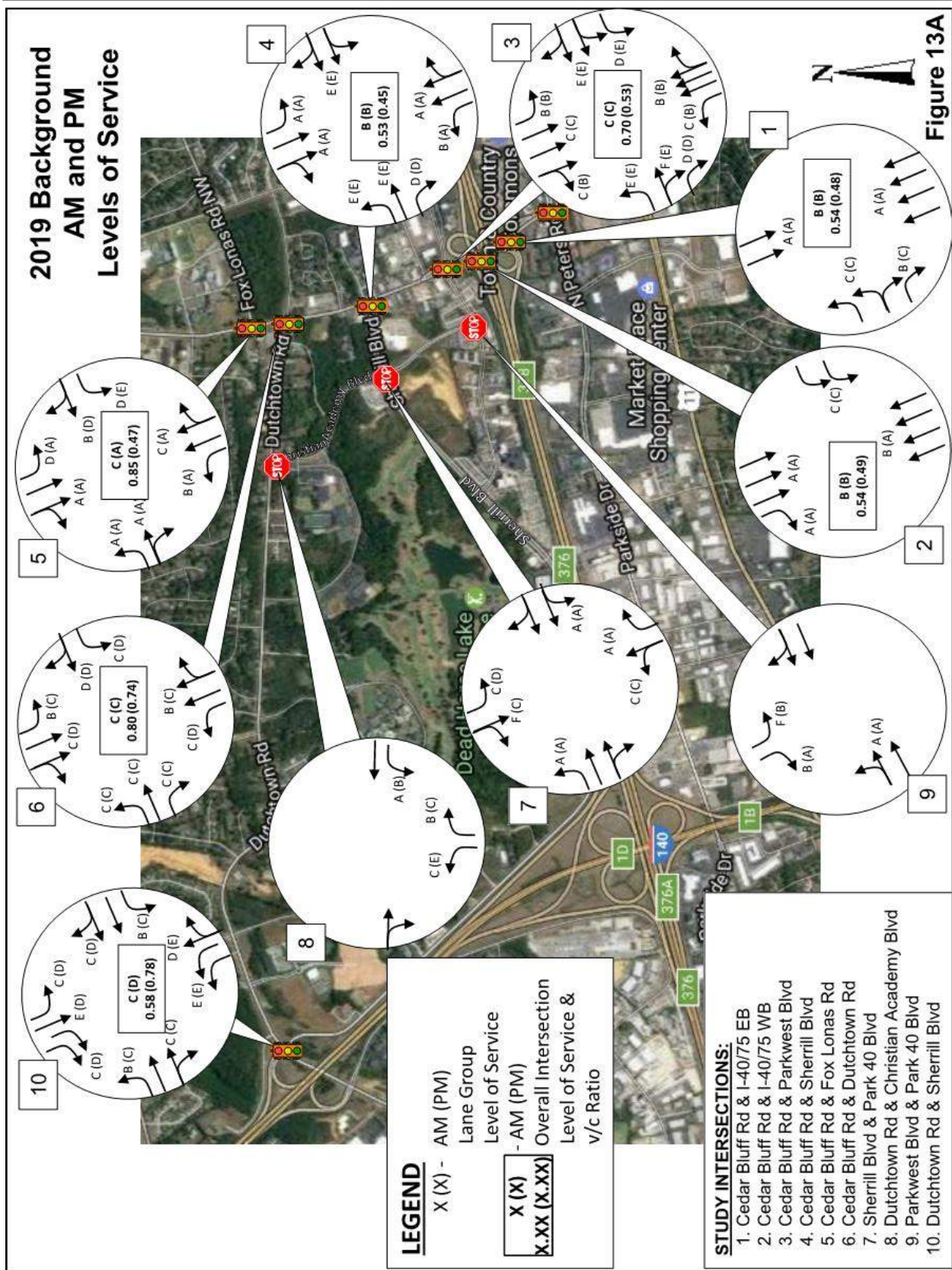


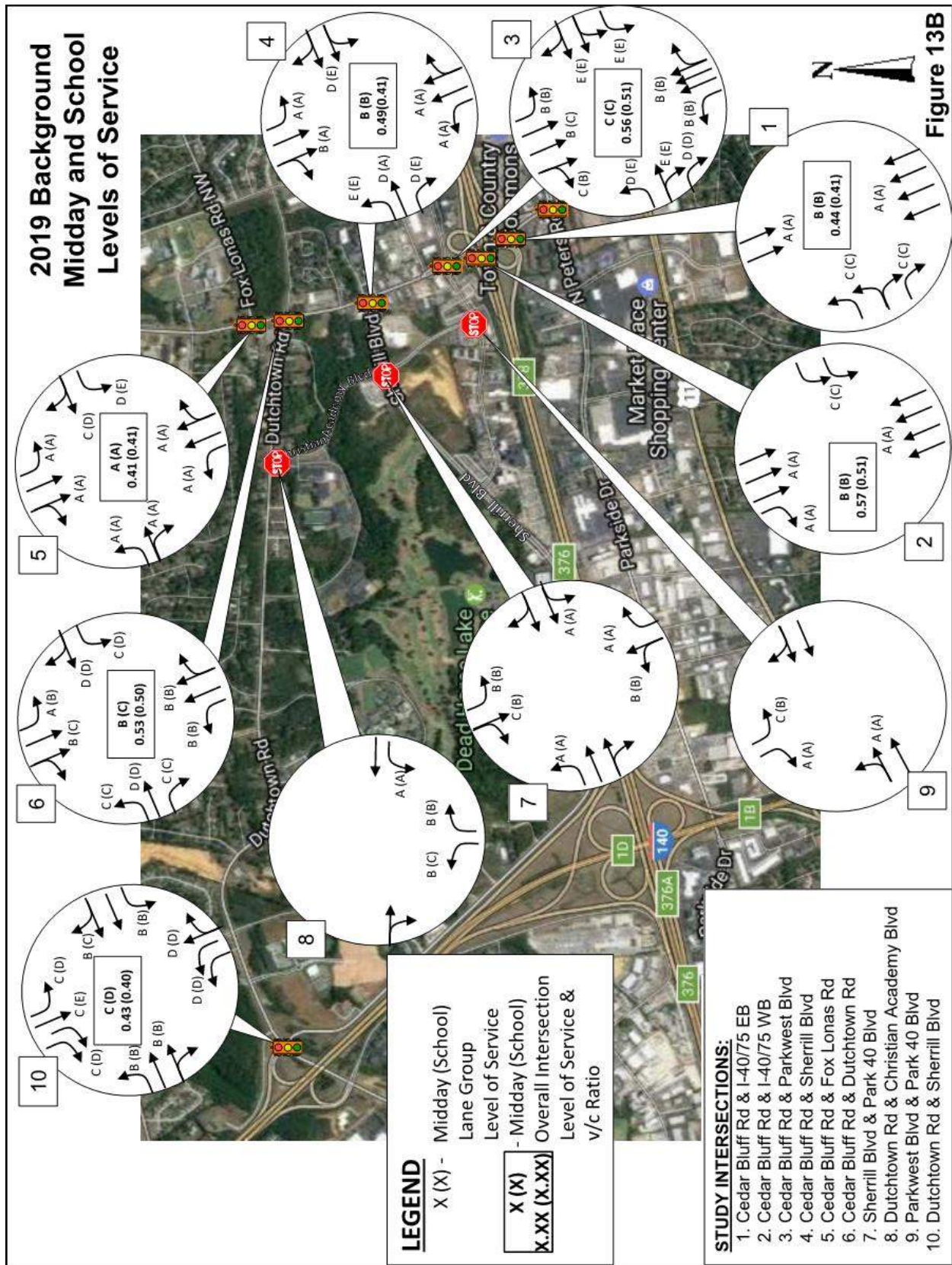
Background Traffic Capacity and LOS

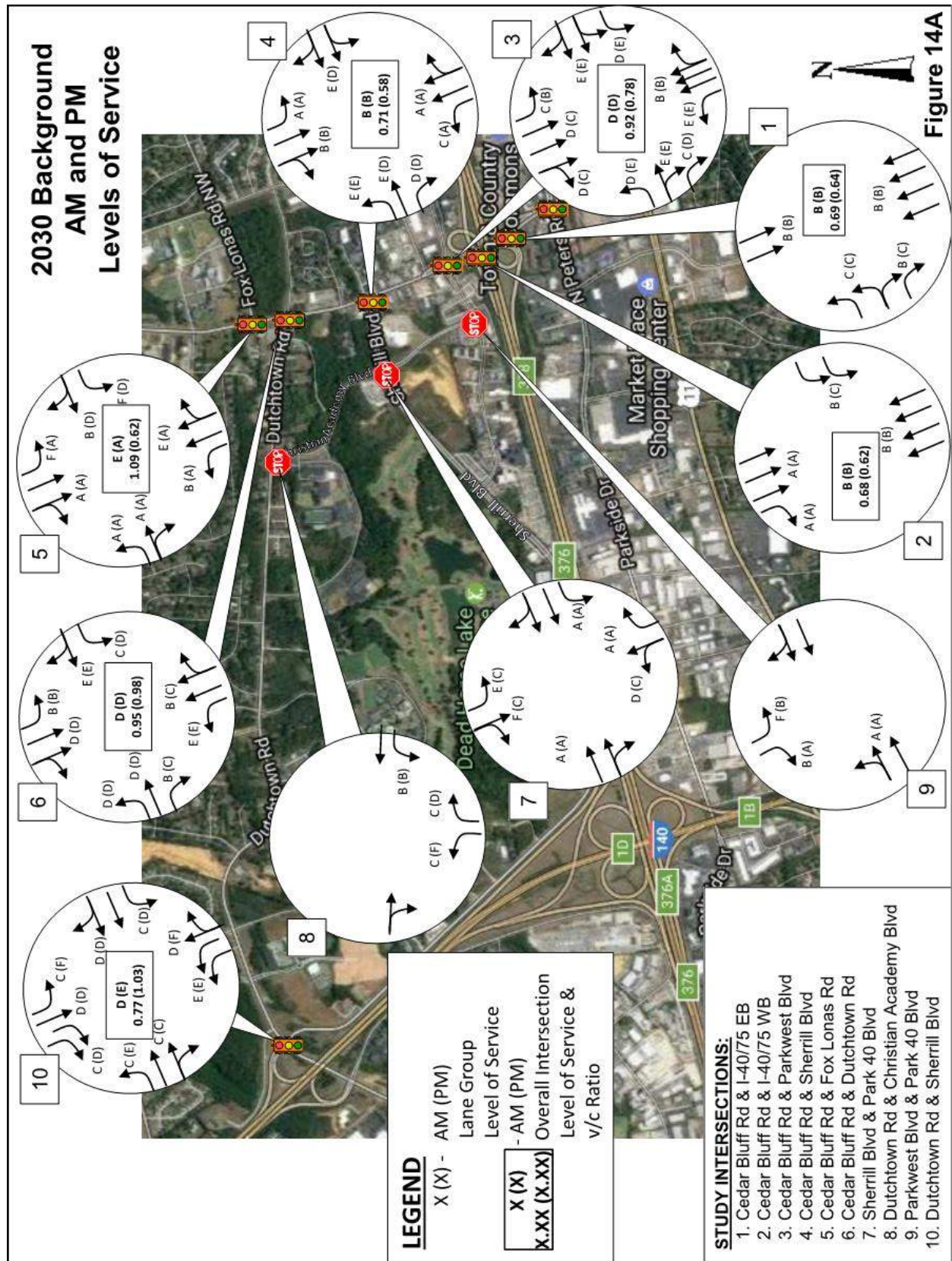
Figures 13A and 13B illustrate the lane group LOS for the 2019 background horizon year, and the 2030 background horizon year is illustrated in **Figures 14A and 14B**. From the analyses, levels of service remain acceptable for 2019. The intersection of Dutchtown Road and Sherrill Boulevard/Pellissippi Northbound off-ramp can be improved to a minimum intersection LOS D for the study peaks, but the through movements from the off-ramp and Sherrill Boulevard may continue to operate at a LOS E. The intersection of Sherrill Boulevard and Dutchtown Road may reach the intersection capacity during the 2030 PM peak hour, and the ramp left-turn and Sherrill Boulevard northbound through movements may fail. The Sherrill Boulevard approach to Cedar Bluff Road can be improved to a LOS E during the midday peak hour. The intersection of Sherrill Boulevard and Christian Academy Boulevard will not meet signal warrants with the Parkwest Medical center expansion, and the failing Stop controlled approaches will continue for the AM peak hour. Signal warrant analysis for the intersection is found in the Appendix of the report.

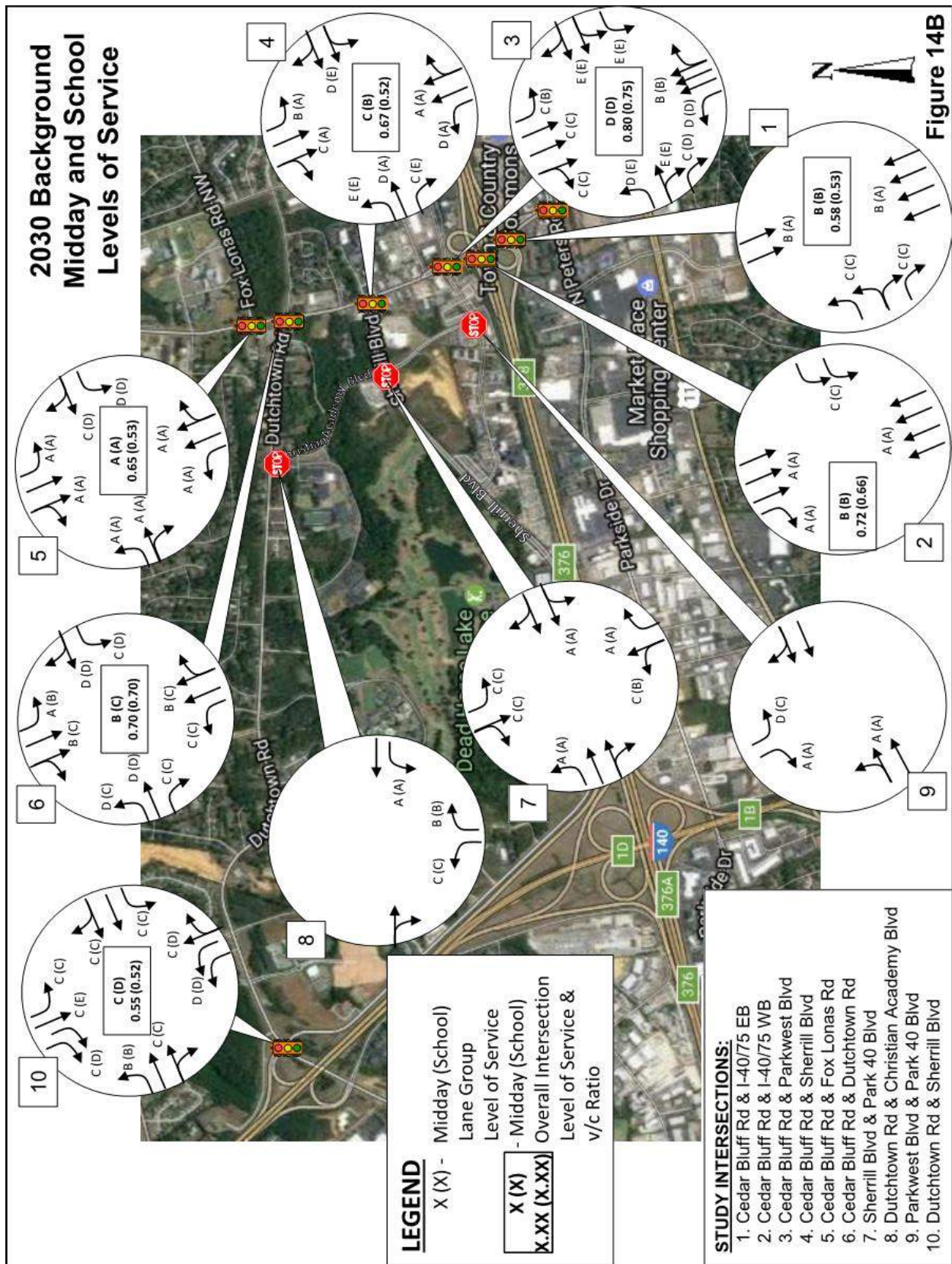
The analyses of the 2030 traffic condition revealed some potential mitigation that would minimize delays and improve LOS. The intersection of Dutchtown Road and Sherrill Boulevard/Pellissippi Parkway northbound off-ramp can be improved by reassigning a northbound right-turn lane for through traffic and the current through lane for a shared left/through movement, thereby providing for two through lanes and/or a double left turn movement from the off-ramp, providing for a more efficient ramp approach throughout the day. This reassignment of the off-ramp lanes would require a signal split phasing and an additional departure lane on Sherrill Boulevard, which would match the current 4-lane section on Sherrill Boulevard, south of the Dutchtown Road intersection. With another receiving lane for the northbound on-ramp and the split phasing, lanes for the Sherrill Boulevard approach could also be reassigned providing for a shared left/through lane and a more efficient approach.

In the 2030 AM peak hour, the northbound left-turn movement on Cedar Bluff Road at Parkwest Boulevard will operate with a LOS E, but it can be improved with the proposed TDOT plan to provide northbound double left-turn lanes.









Medical Office Trip Generation

Project traffic was determined using the publication, **Trip Generation, 9th Edition**. This reference is published by the Institute of Transportation Engineers (ITE) and represents national data collected for many different land uses including industrial, residential, and commercial uses. **Trip Generation** is an essential tool in calculating the traffic, which is generated by a proposed development.

As previously stated, the study addresses the proposed site buildout; however, an initial phase for this medical office development is examined later in this report. Trips for the proposed medical office were estimated from the Medical Office Land Use Code (LUC 720) of **Trip Generation**. The study addresses 100,000 square feet of office space but may vary less as plans are prepared for the site. As shown in **Table 3**, the medical office should generate approximately 3,870 daily trips. The peak-hour trip generation should be 363 and 357 for the midday and typical PM peak hours, respectively. The midday and school peak hours were developed from the daily trips and factored using a medical office hourly distribution.

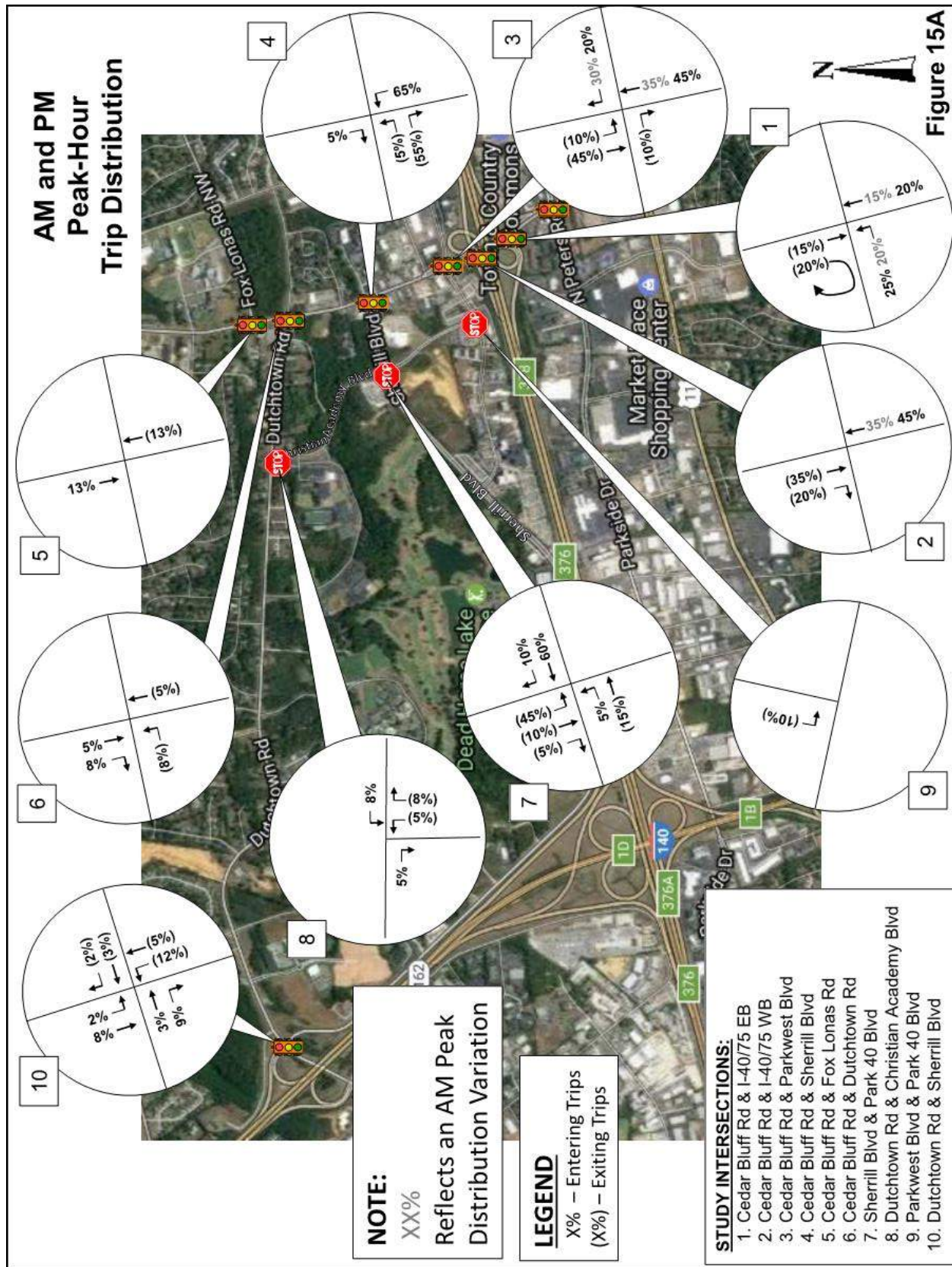
Table 3: Trip Generation

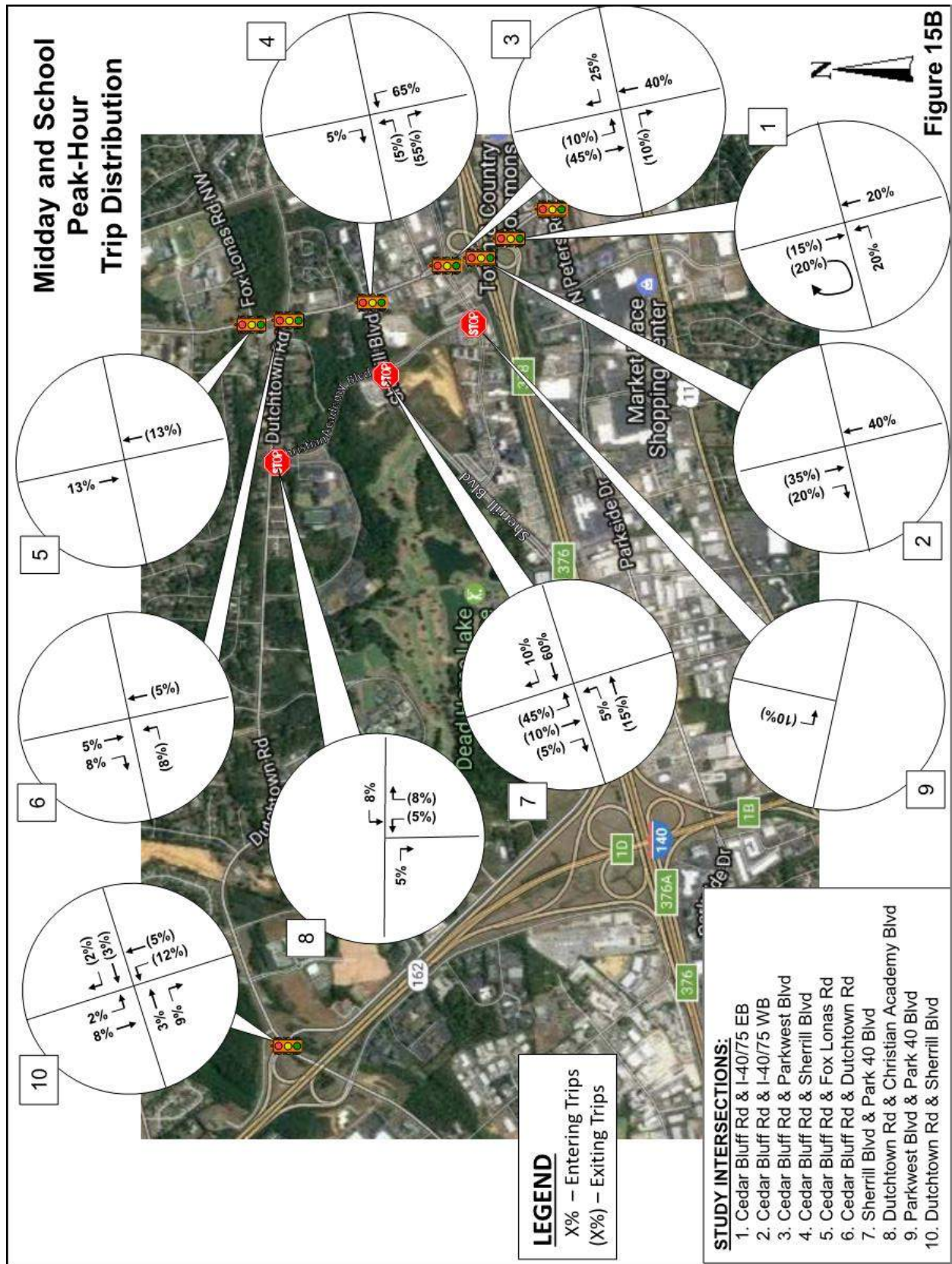
Land Use	LUC	Density (sqft)	Weekday			
			Daily	AM PEAK Enter Exit	PM PEAK Enter Exit	
Medical Office	720	100,000	3,874	189 50	100 257	
				MIDDAY PEAK Enter Exit	SCHOOL PEAK Enter Exit	
				145 218	181 168	

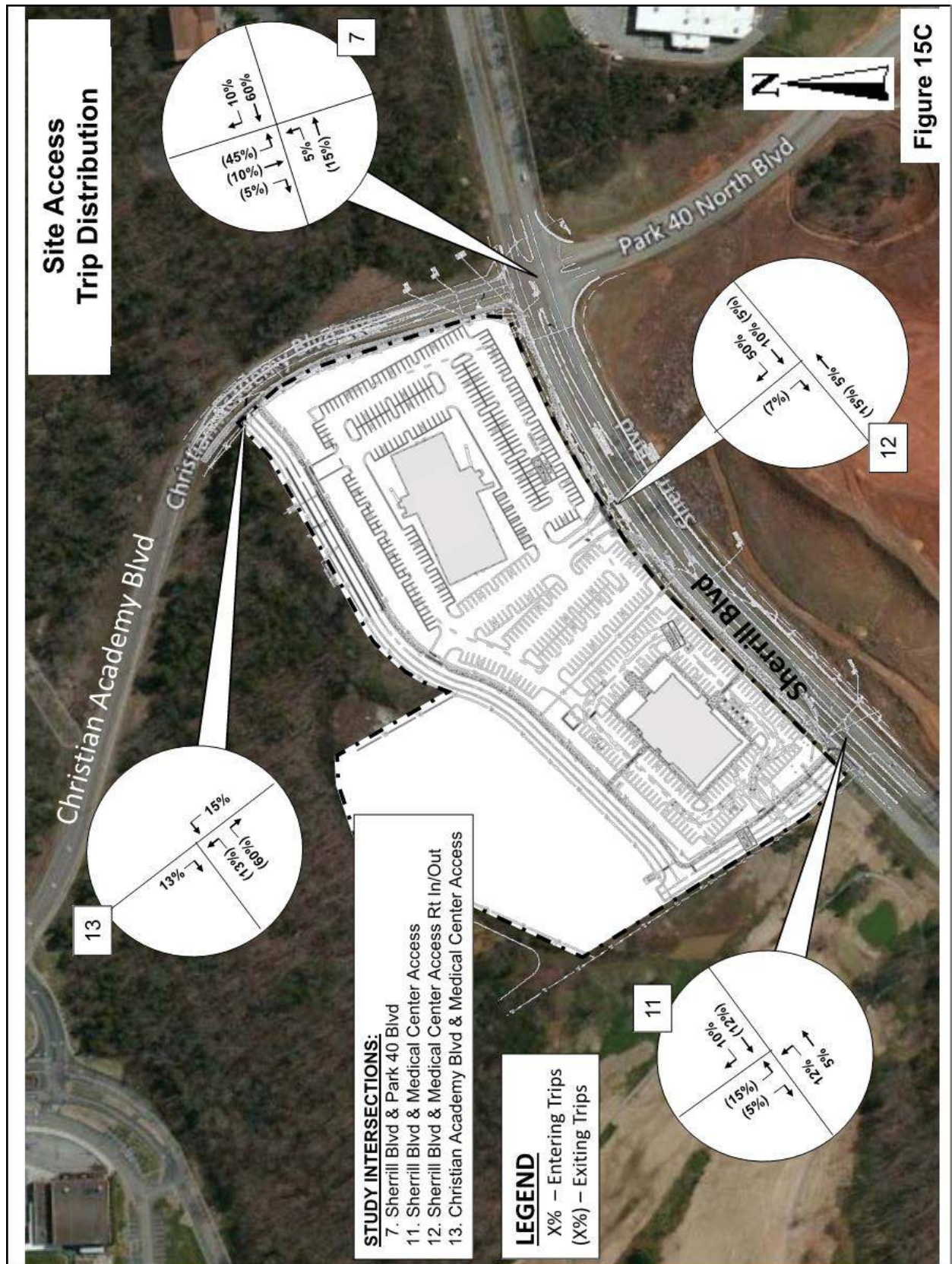
Note: Trips generated using **Trip Generation, 9th Edition**, published by ITE. Midday and school peaks estimated from an observed medical office building hourly distribution.

Trip Distribution

Using the current distribution and knowledge of the hospital vicinity and its available access, trips were distributed to the transportation network with 13-percent to the north on Cedar Bluff Road and 15-or 20-percent distributed south on Cedar Bluff Road, south of the interstate. From I-40/75, 40-or 45-percent was the distribution from I-40/75. Using Sherrill Boulevard, 22-percent was distributed from Dutchtown Road and Pellissippi Parkway. The distribution did vary somewhat depending the time of day from the south on Cedar Bluff Road and from I-40/75. Of the trips generated with the medical office, Sherrill Boulevard would facilitate 87-percent, and Dutchtown Road would facilitate 13-percent. **Figures 15A-C** illustrate the distribution for the medical office development.







Trip Assignment

Multiplying the trip distribution and the trip generation, trips were assigned to the study intersections. **Figures 16A-D** illustrate the assigned trips for the medical office development.

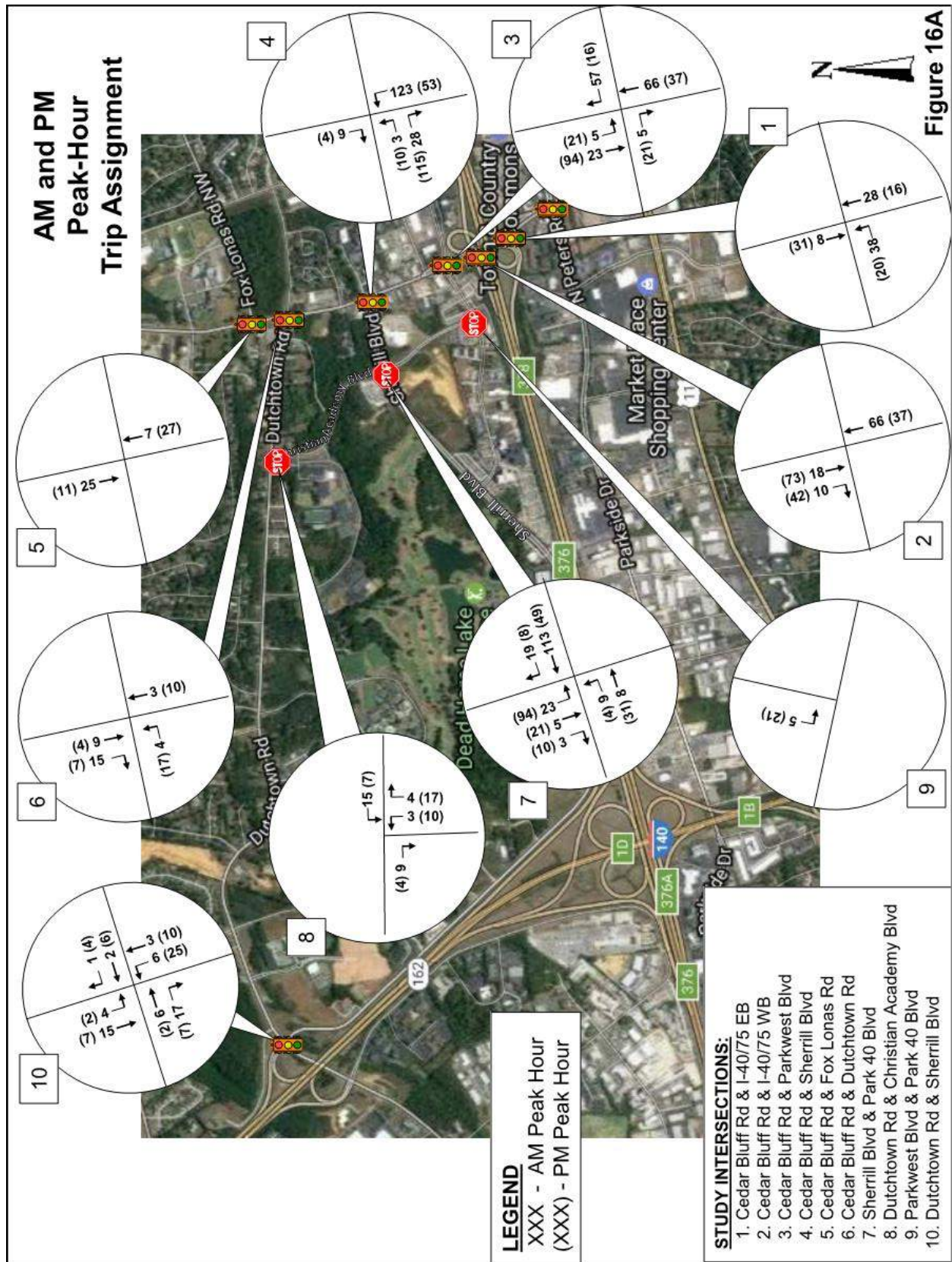
Projected 2019 and 2030 Traffic

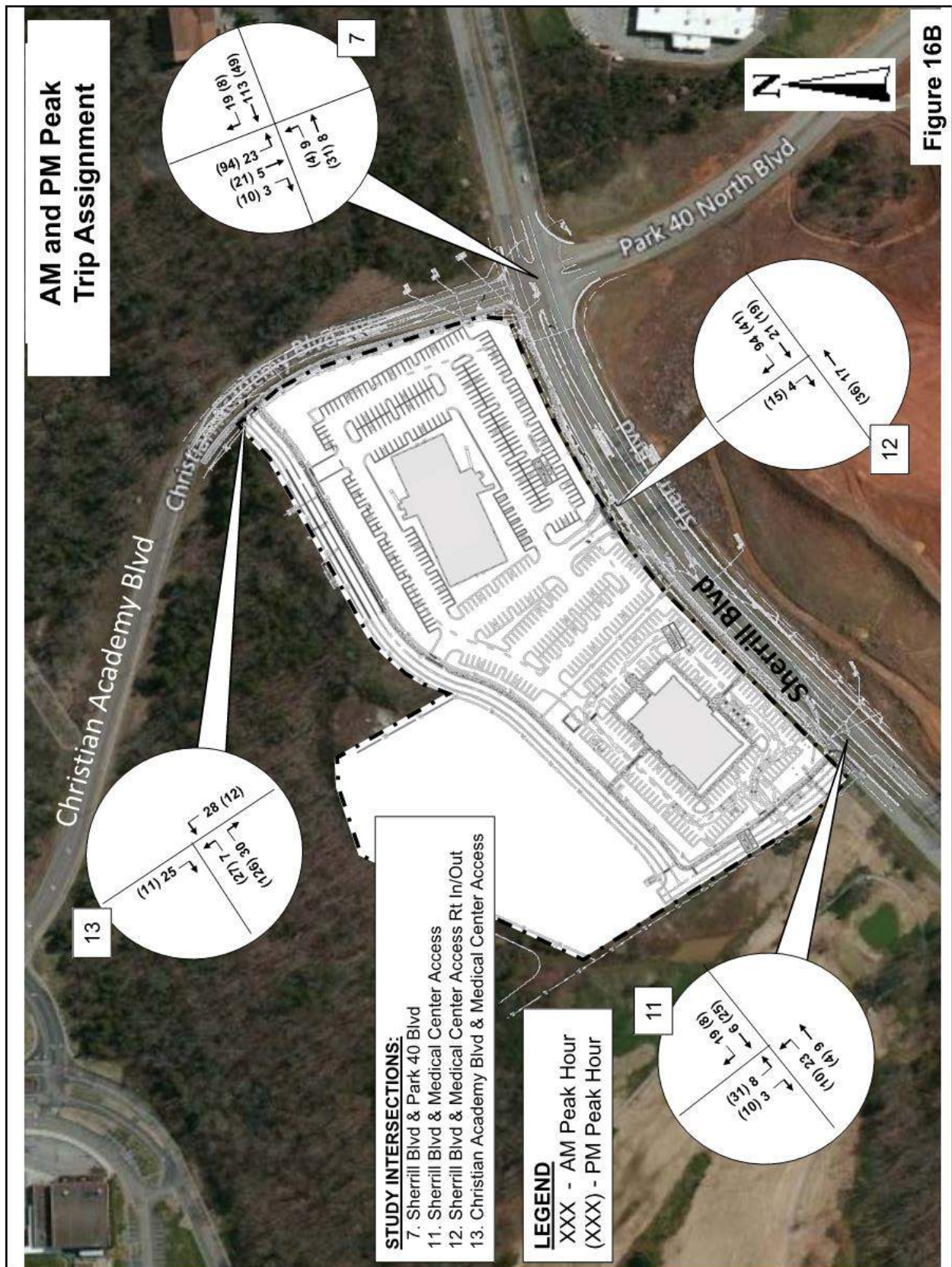
The addition of the trip assignment with the background traffic results in the projected traffic for the horizon years 2019 and 2030 with the planned expansion of the Parkwest Hospital. **Figures 17A-D** illustrate the projected traffic for the peak hours studied. For the projected 2030 traffic conditions, **Figures 18A-D** illustrate the projected peak-hour traffic. These figures include the percent medical office traffic for the study intersections. Daily trip assignments and projected daily weekday traffic for 2019 and 2030 are illustrated in **Figures 19A and 19B**, respectively, for Sherrill Boulevard.

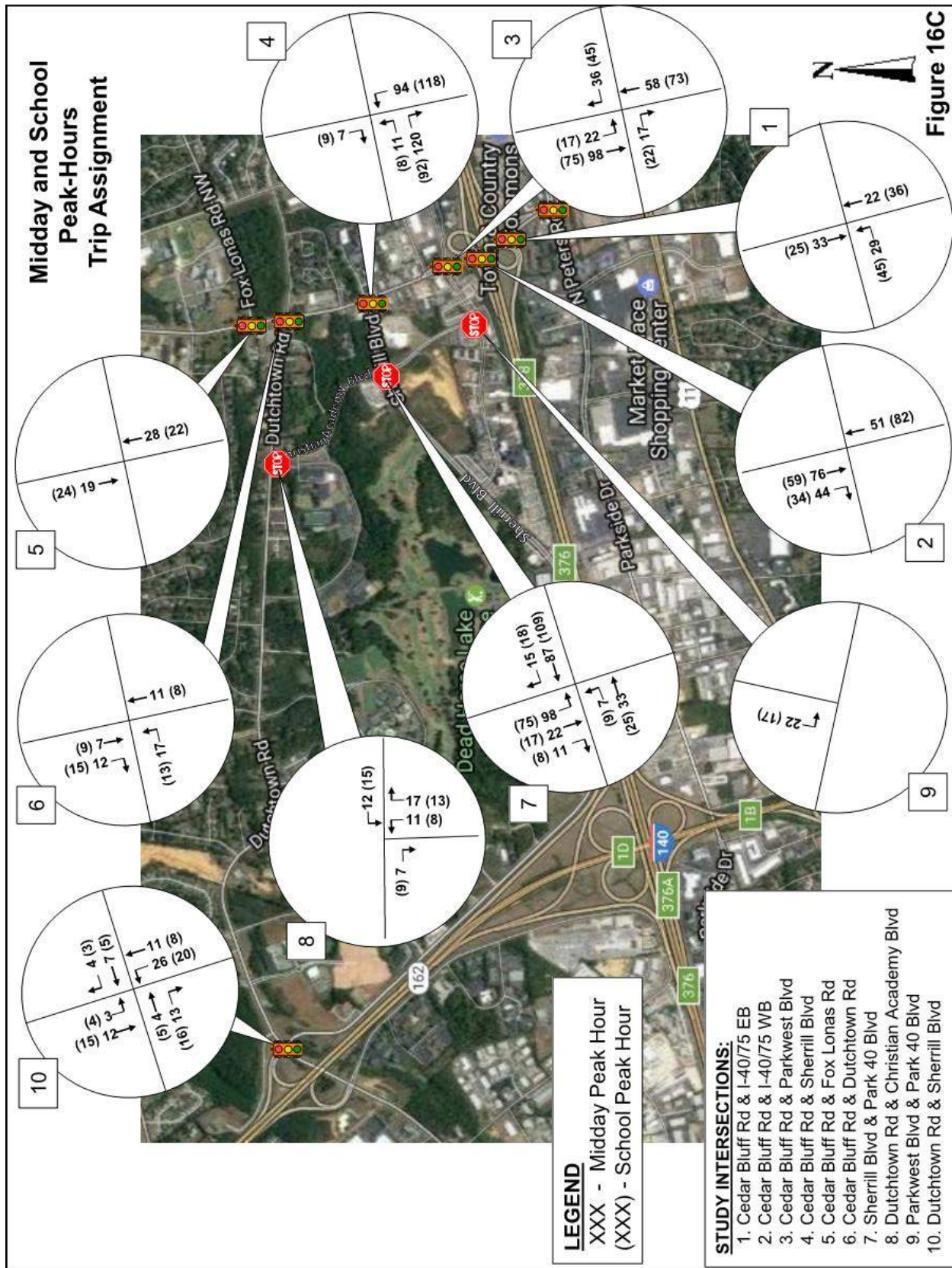
With the projected traffic conditions, the proposed medical office trips having impacts more than 5-percent for the study intersections is limited to a few intersections including the following:

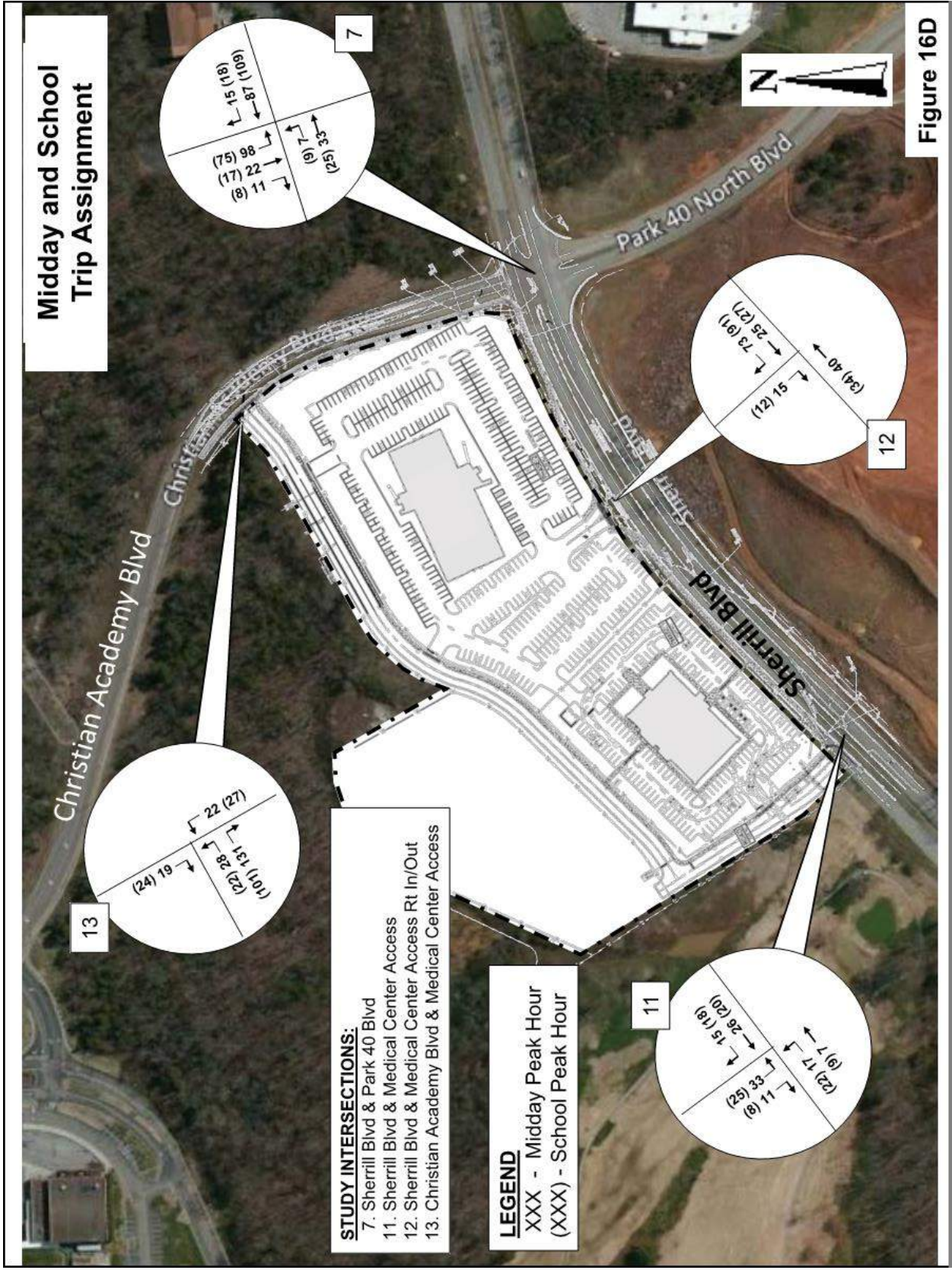
1. Sherrill Boulevard and Christian Academy Boulevard
2. Cedar Bluff Road and Parkwest Boulevard
3. Cedar Bluff Road and Sherrill Boulevard
4. Sherrill Boulevard and Dutchtown Road

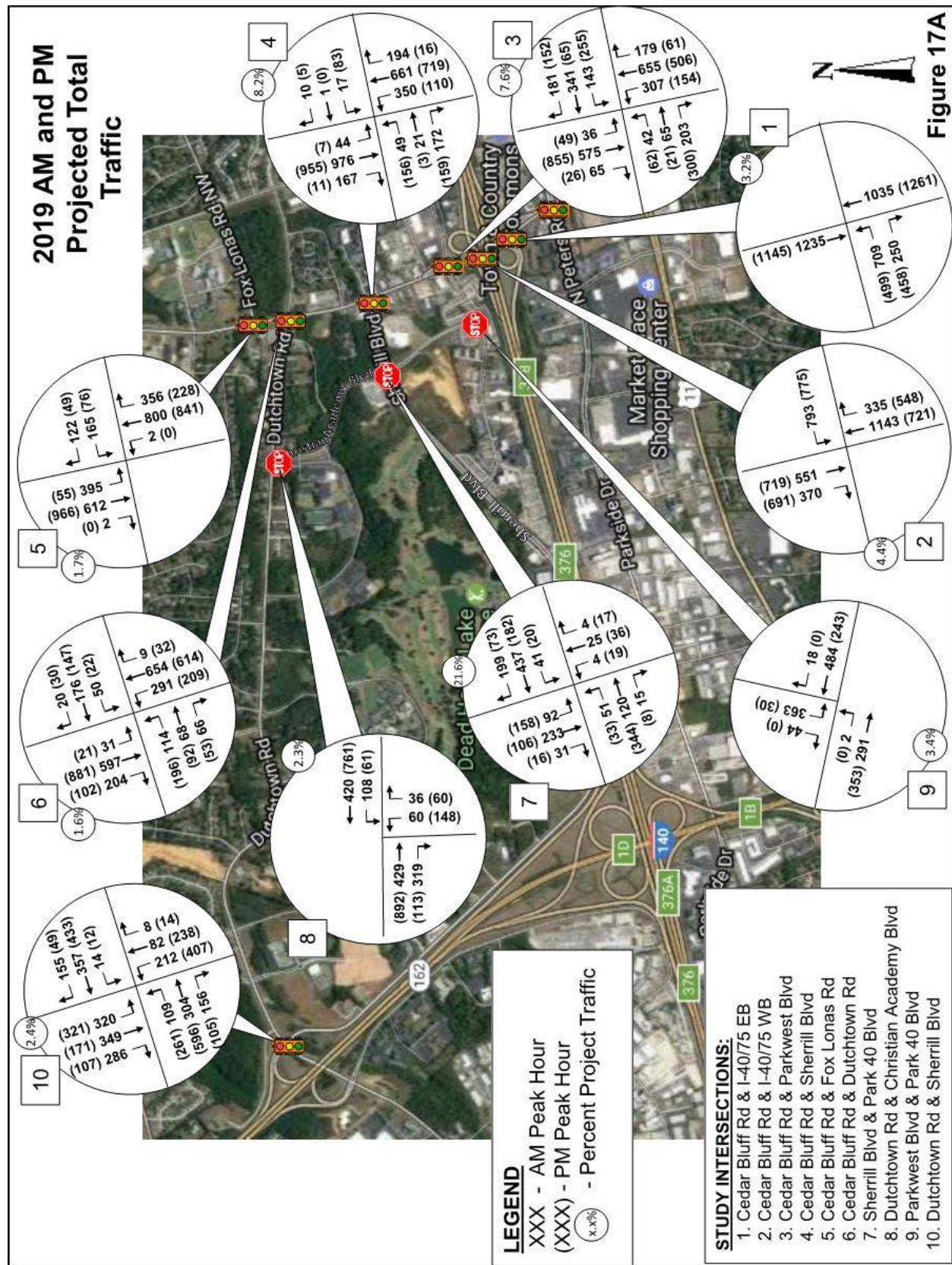
The intersection of Sherrill Boulevard and Dutchtown Road impact of 5.6-percent is limited to the midday peak hour which is not a critical peak. The other study intersections were found to have less than 5-percent of the site distributed traffic for 2019 and 2030. Site distributed trips account for less than 5-percent for the I-40/75.

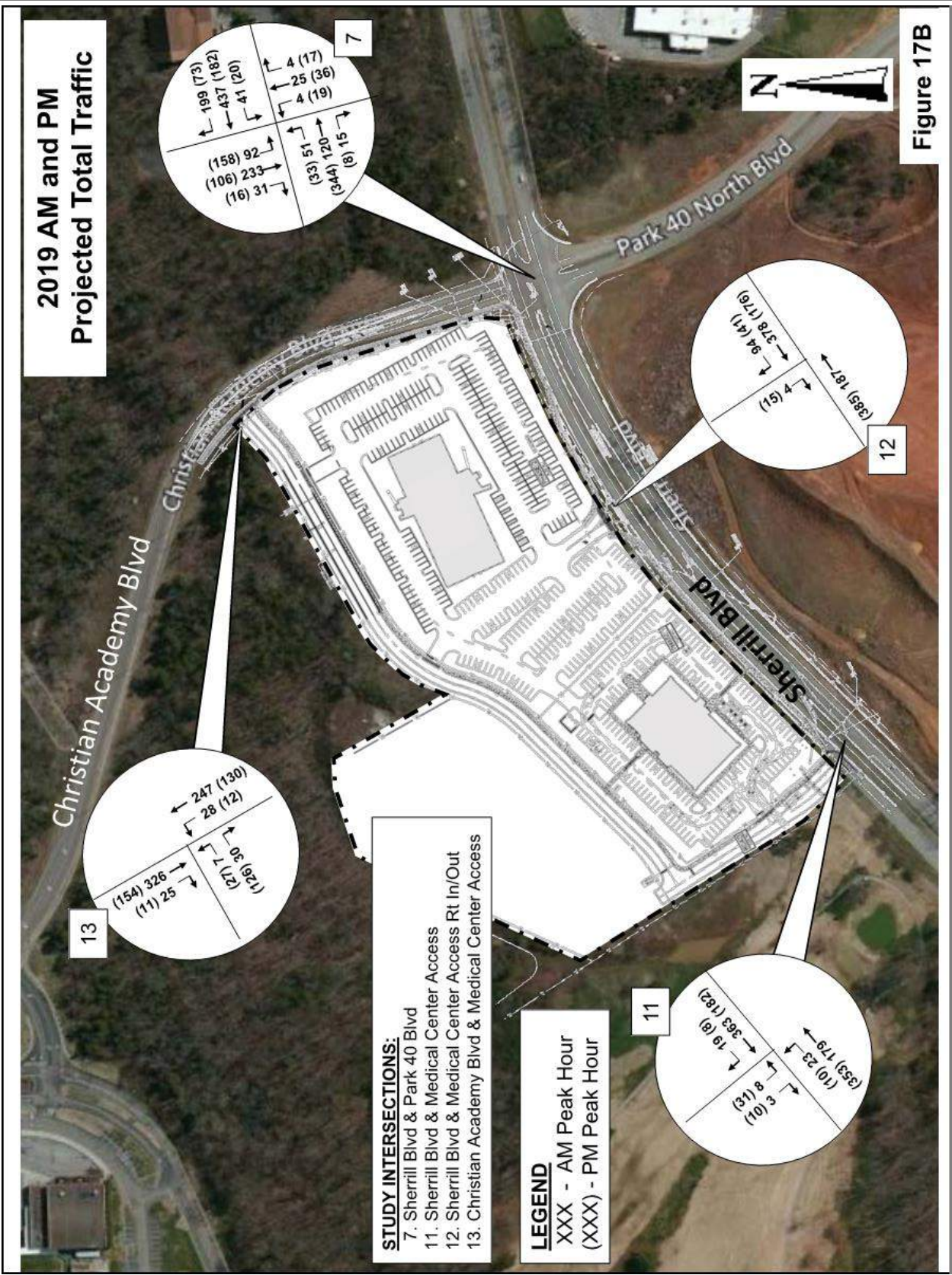


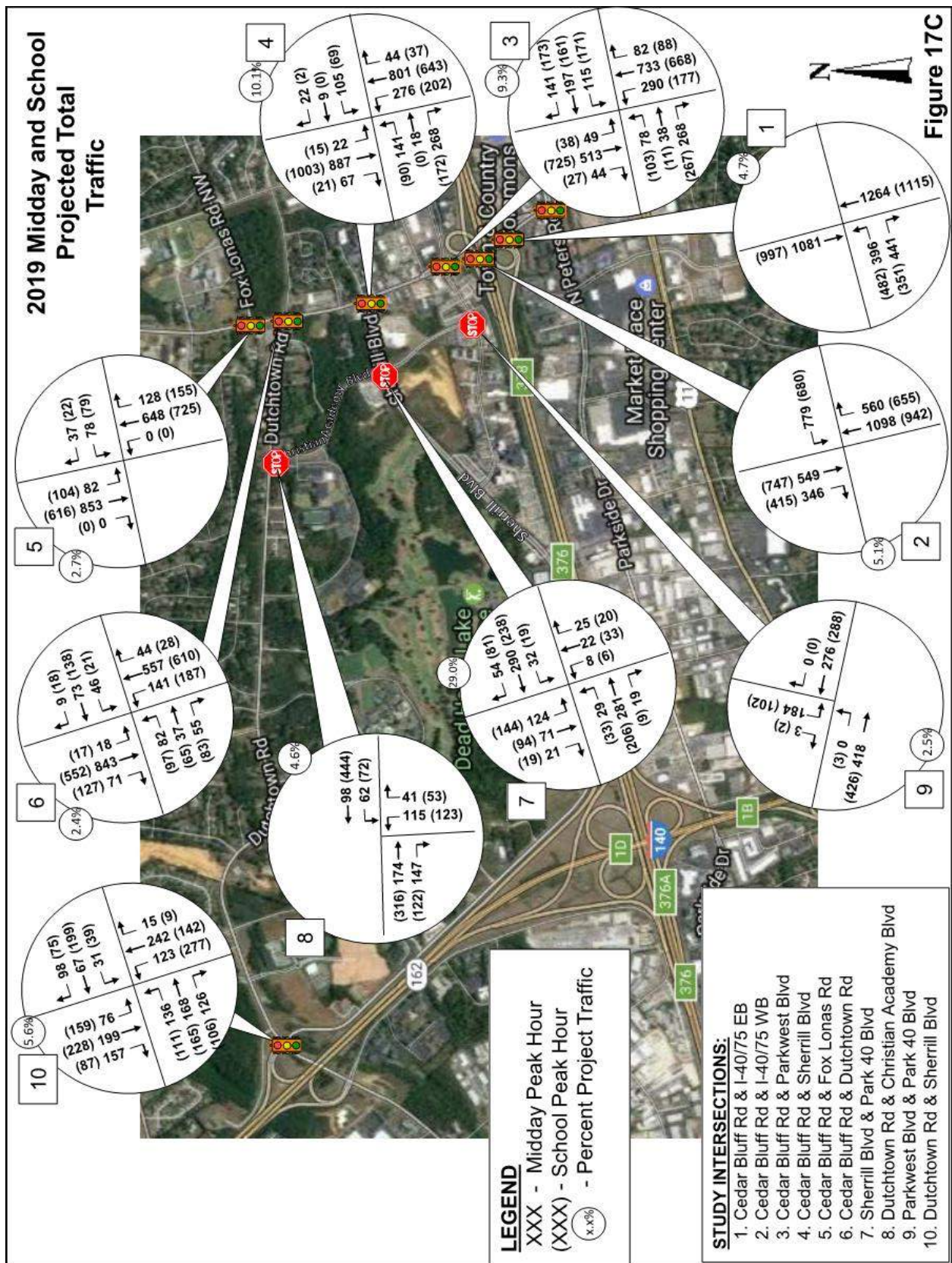


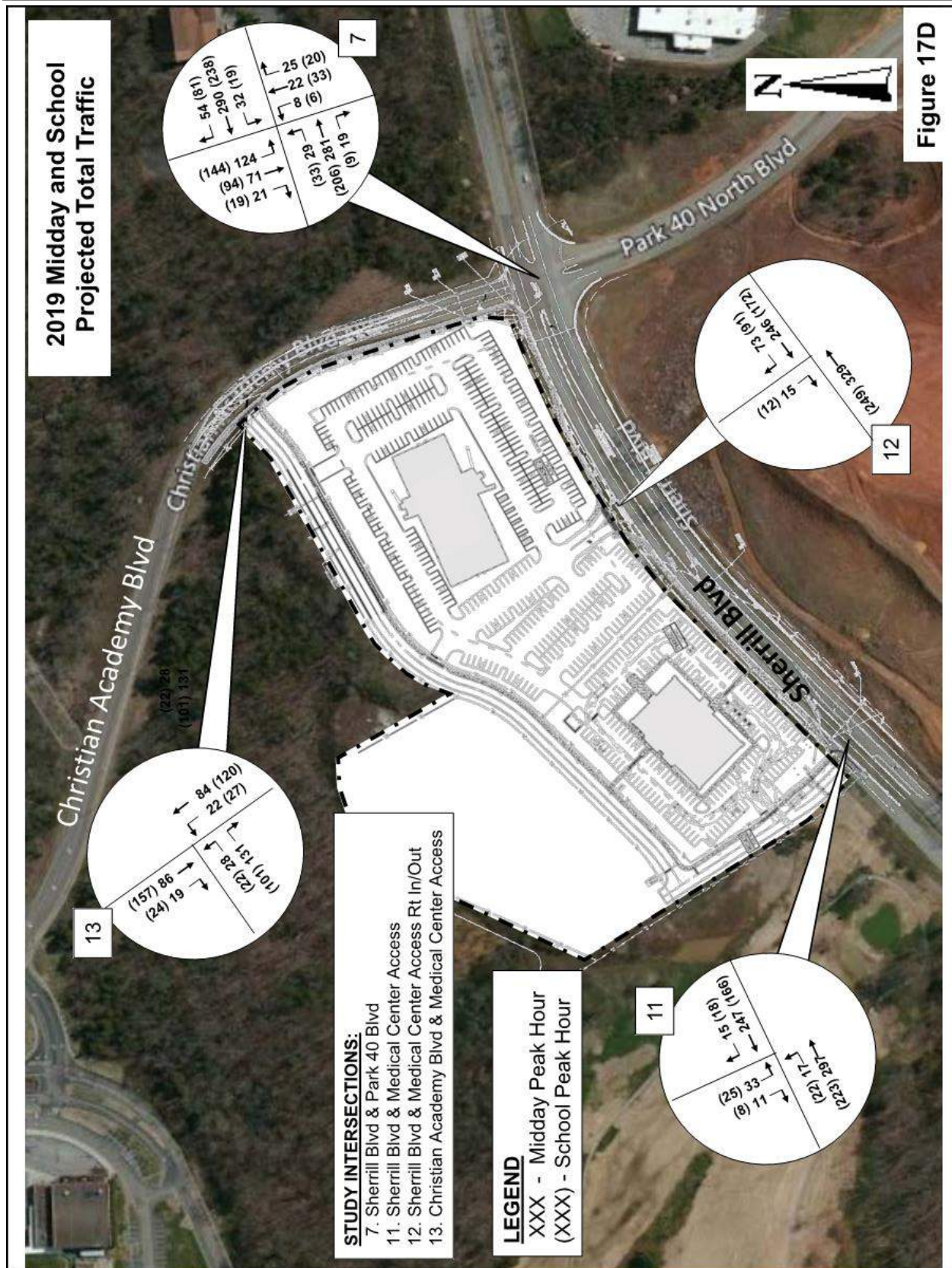


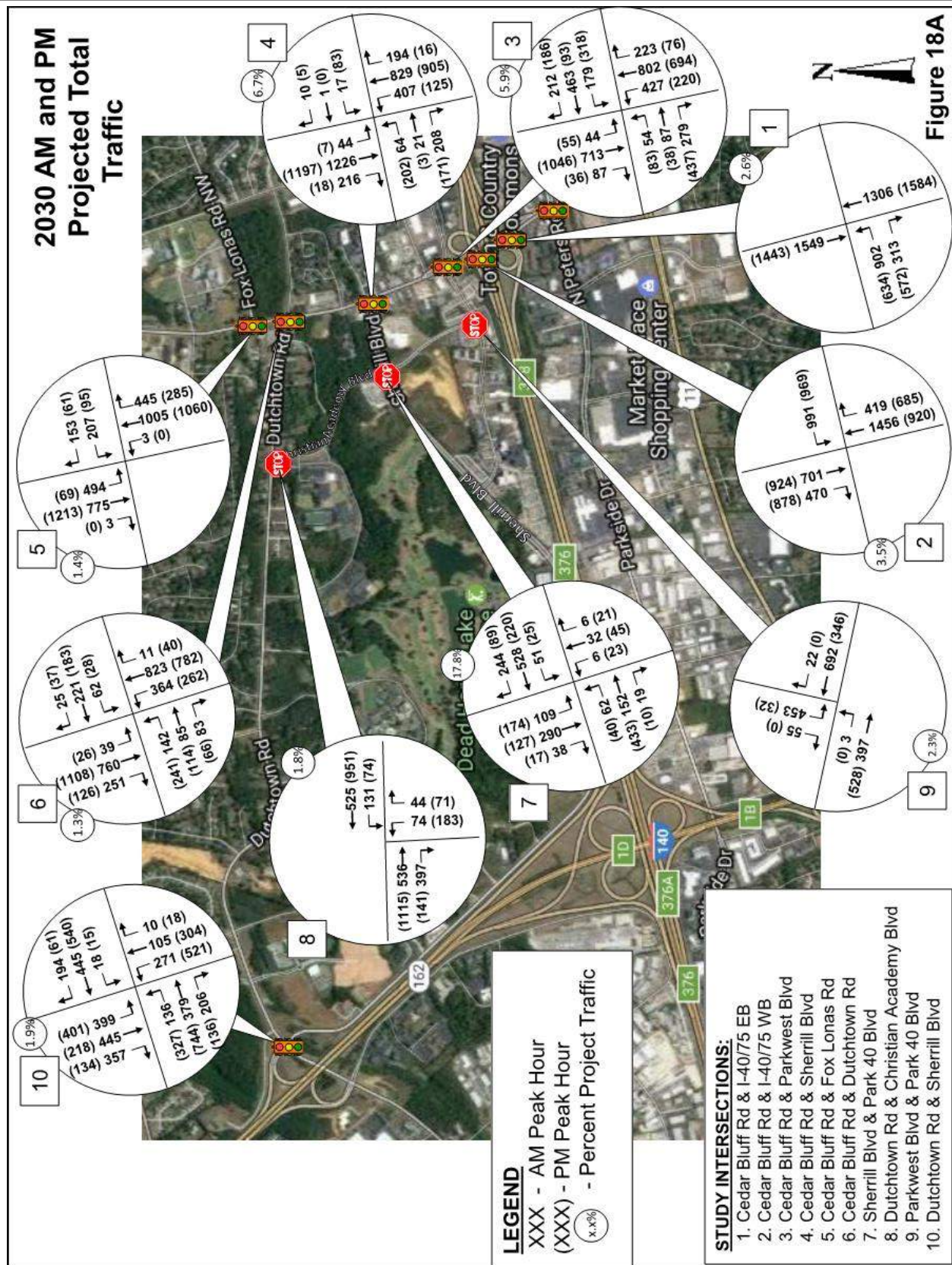


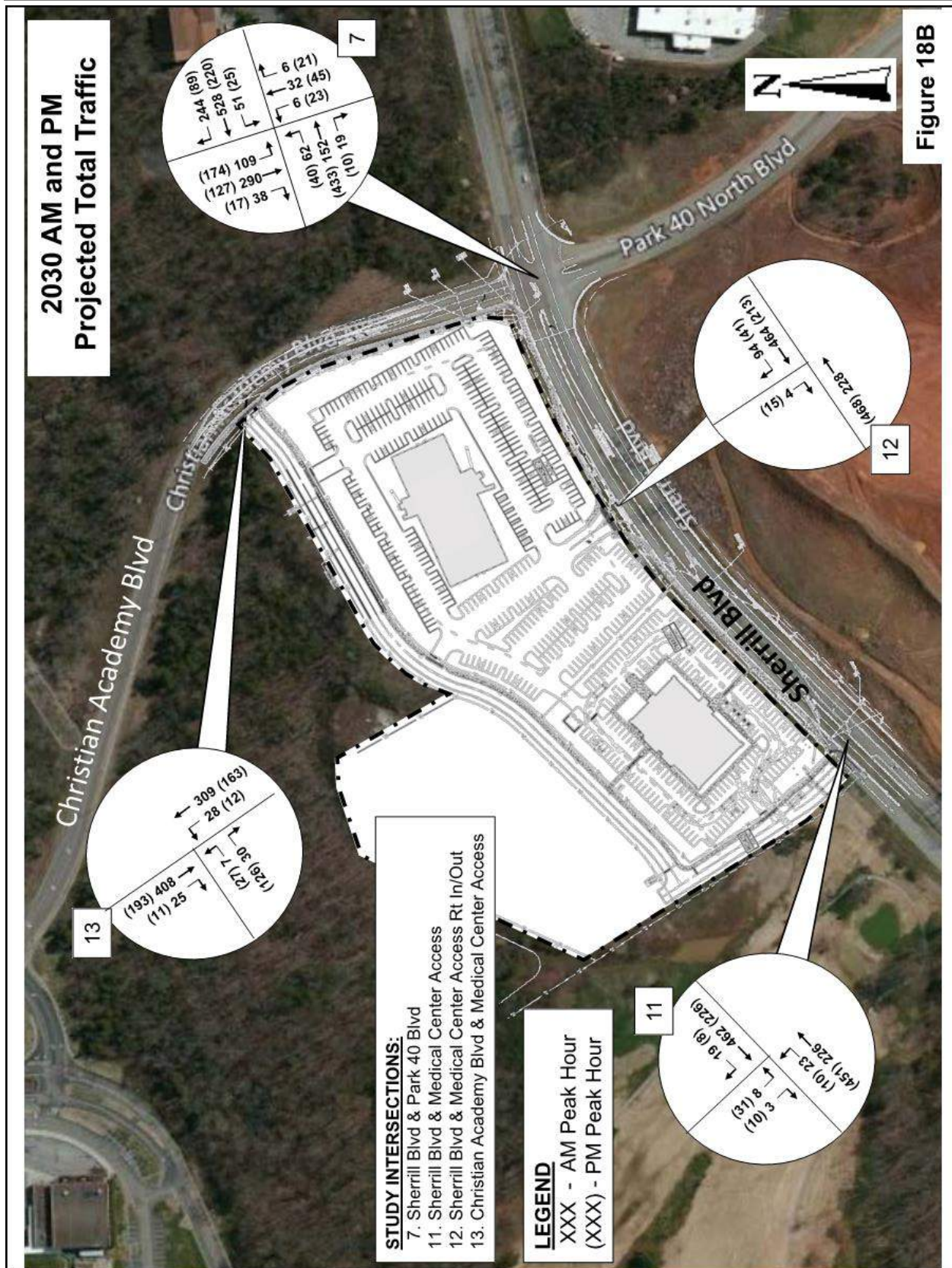


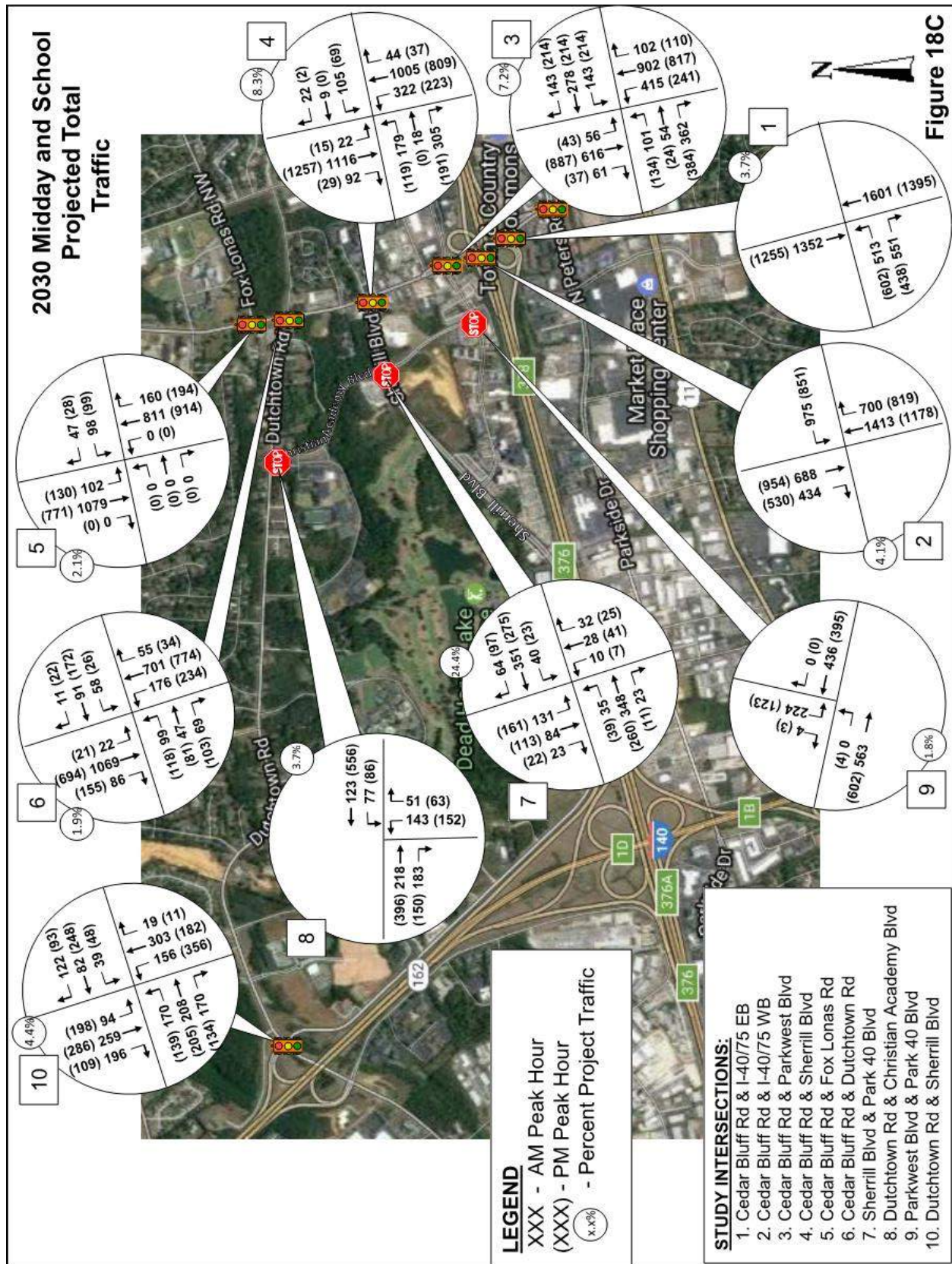


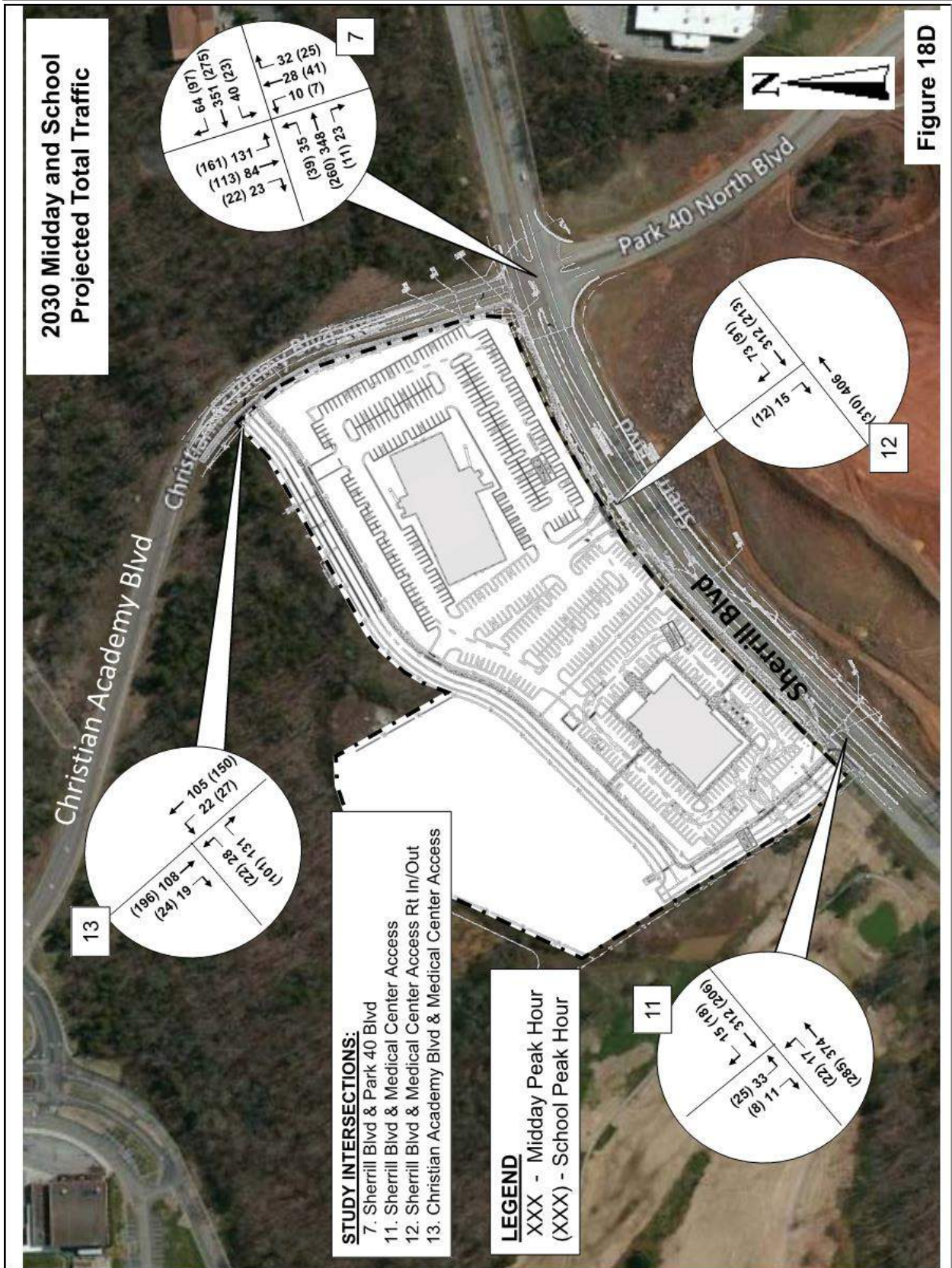












**2019 Projected
Average Weekday Traffic**

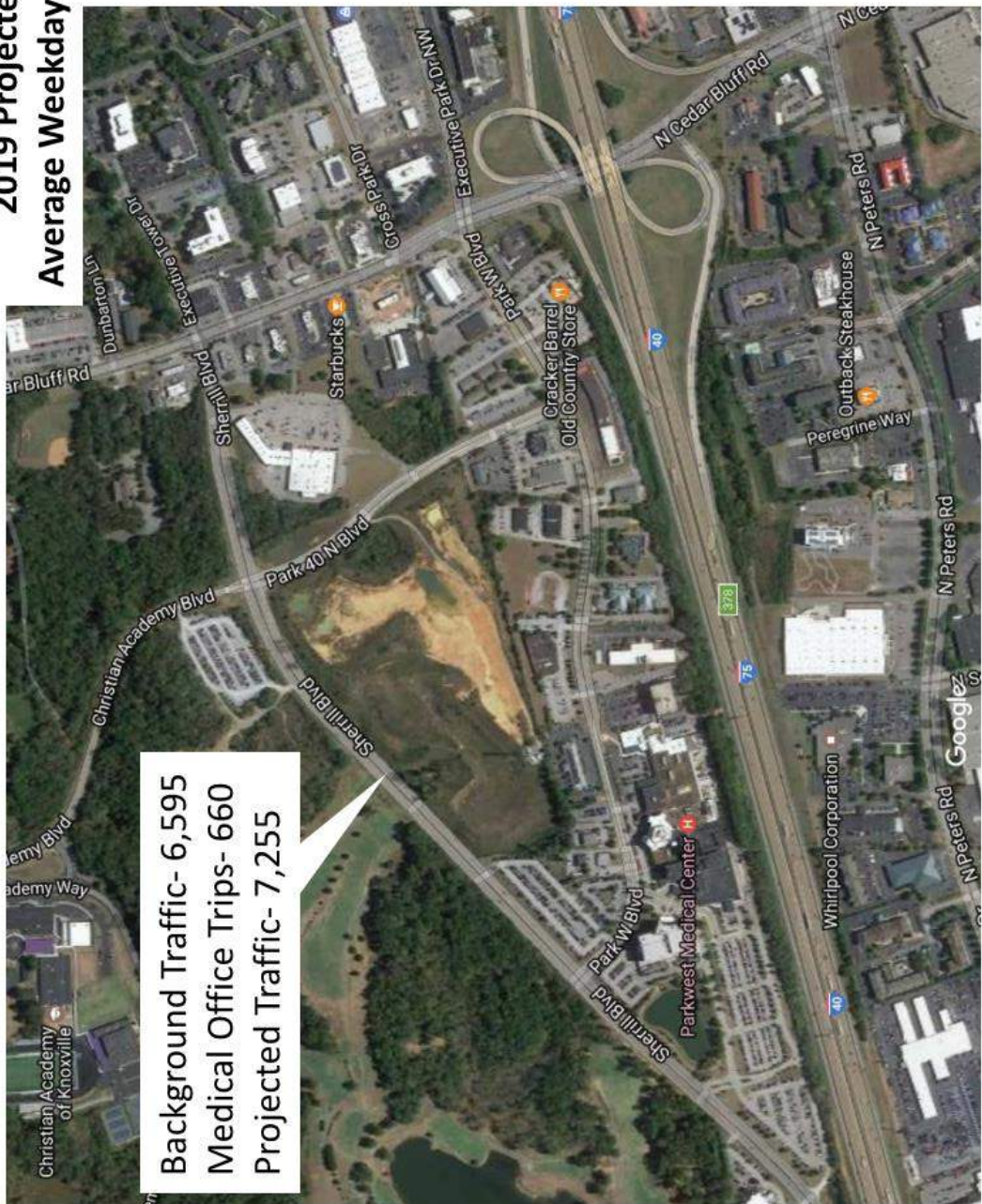


Figure 19A

**2030 Projected
Average Weekday Traffic**

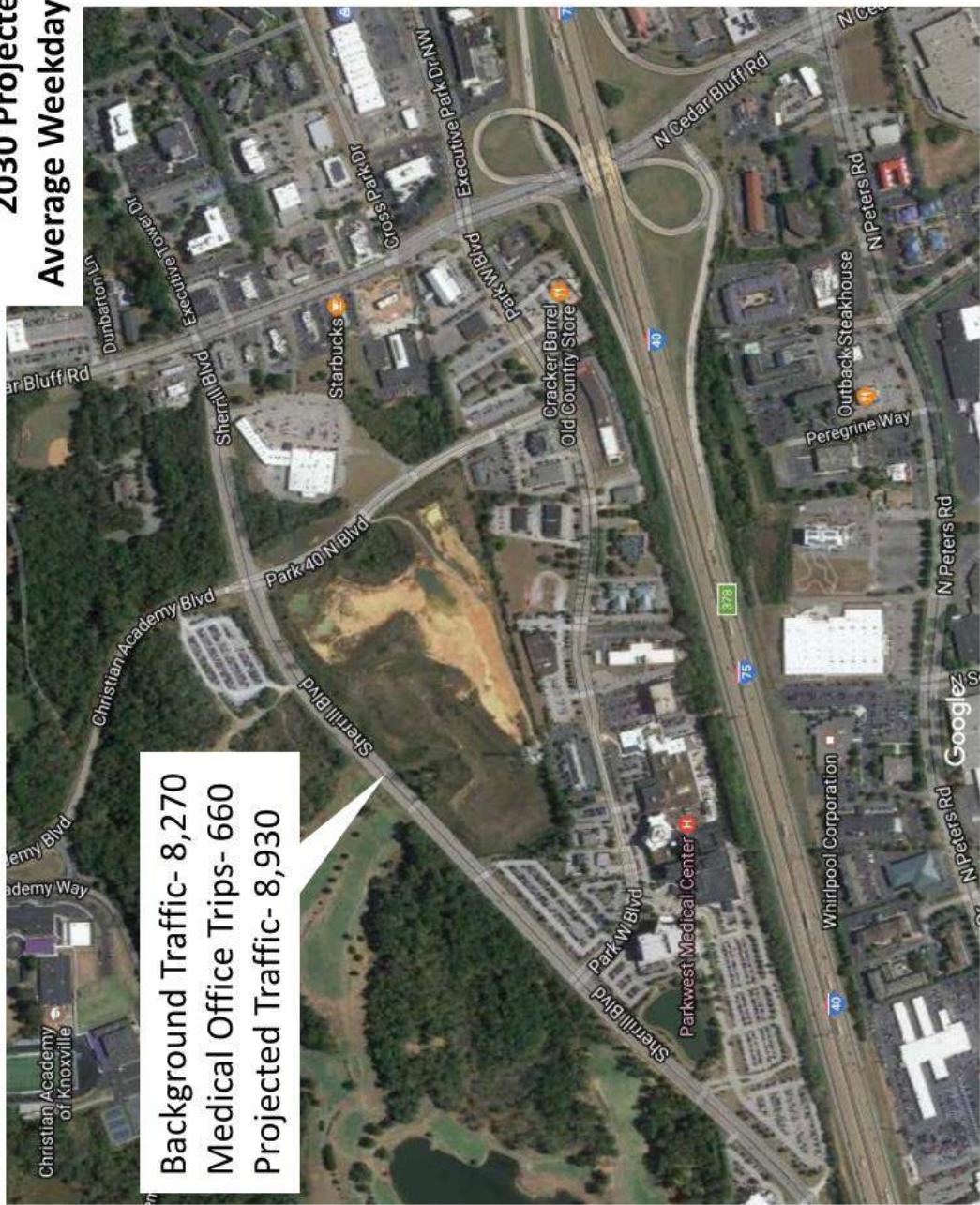


Figure 19B

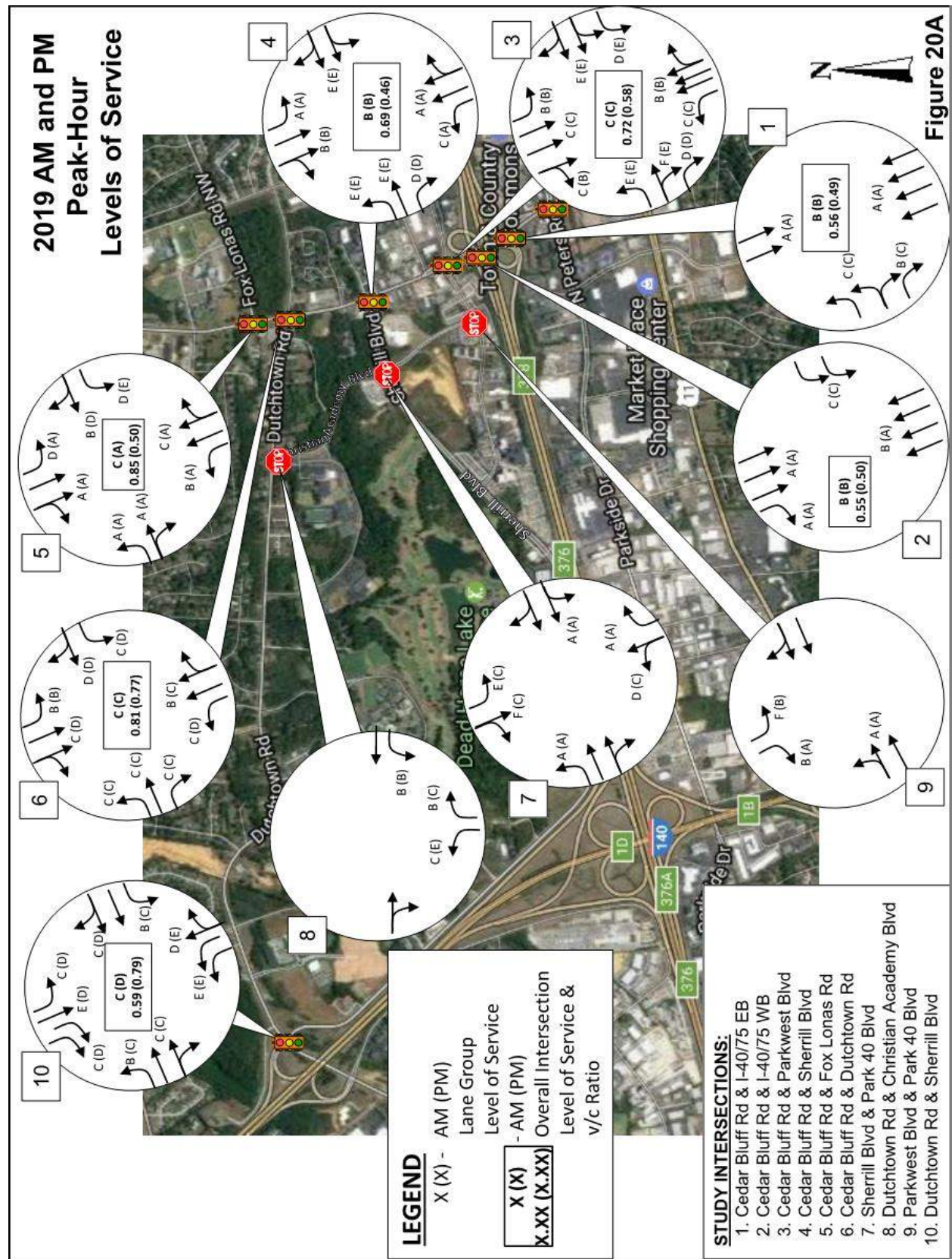
Capacity and Level of Service with Medical Office Development

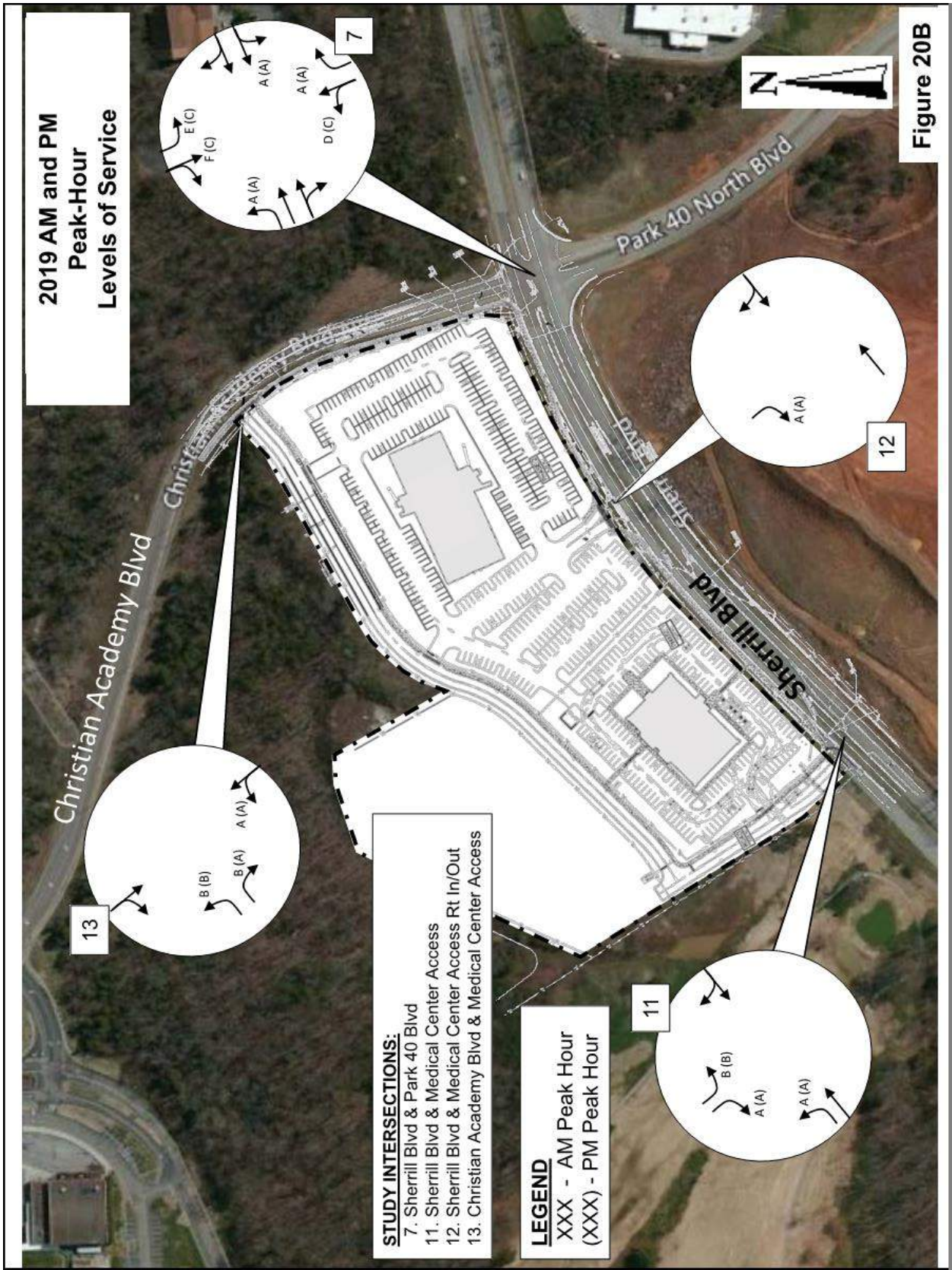
Figures 20A-D illustrates the LOS for the 2019 peak-hour traffic volumes with the Medical office development. **Figures 21A-D** illustrate the peak hour LOS for the projected 2030 traffic conditions.

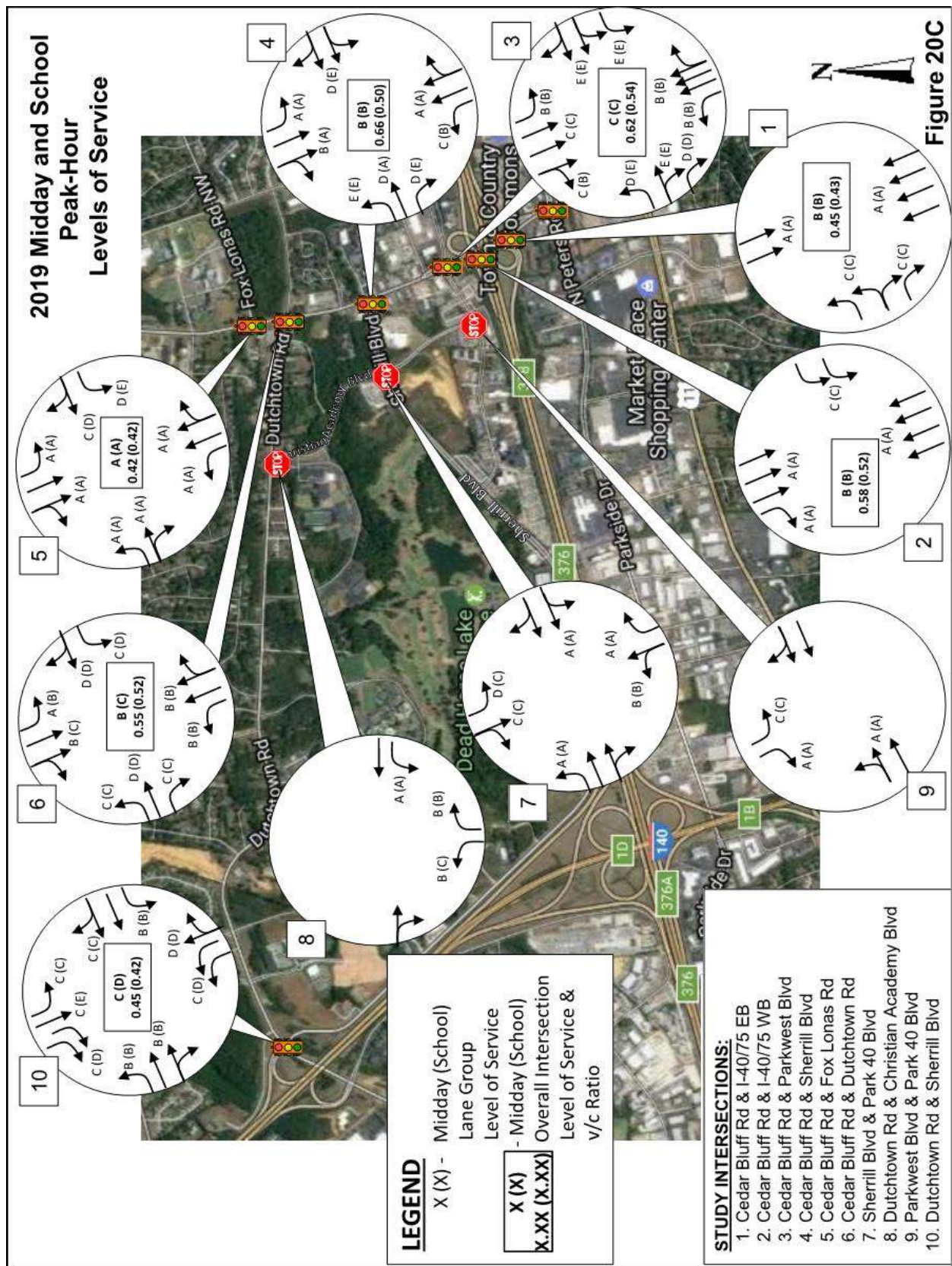
The intersection of Sherrill Boulevard and Christian Academy Boulevard/Park 40 North Boulevard will fail for the study peak hours as the proposed site will impact the intersection. The intersection will warrant signalization with the medical office development. Signal warrant analysis can be found in the Appendix of the report. With the increased traffic for the southbound left turn and its associated queues, the left-turn storage should be increased from 100 feet to a minimum of 250 feet.

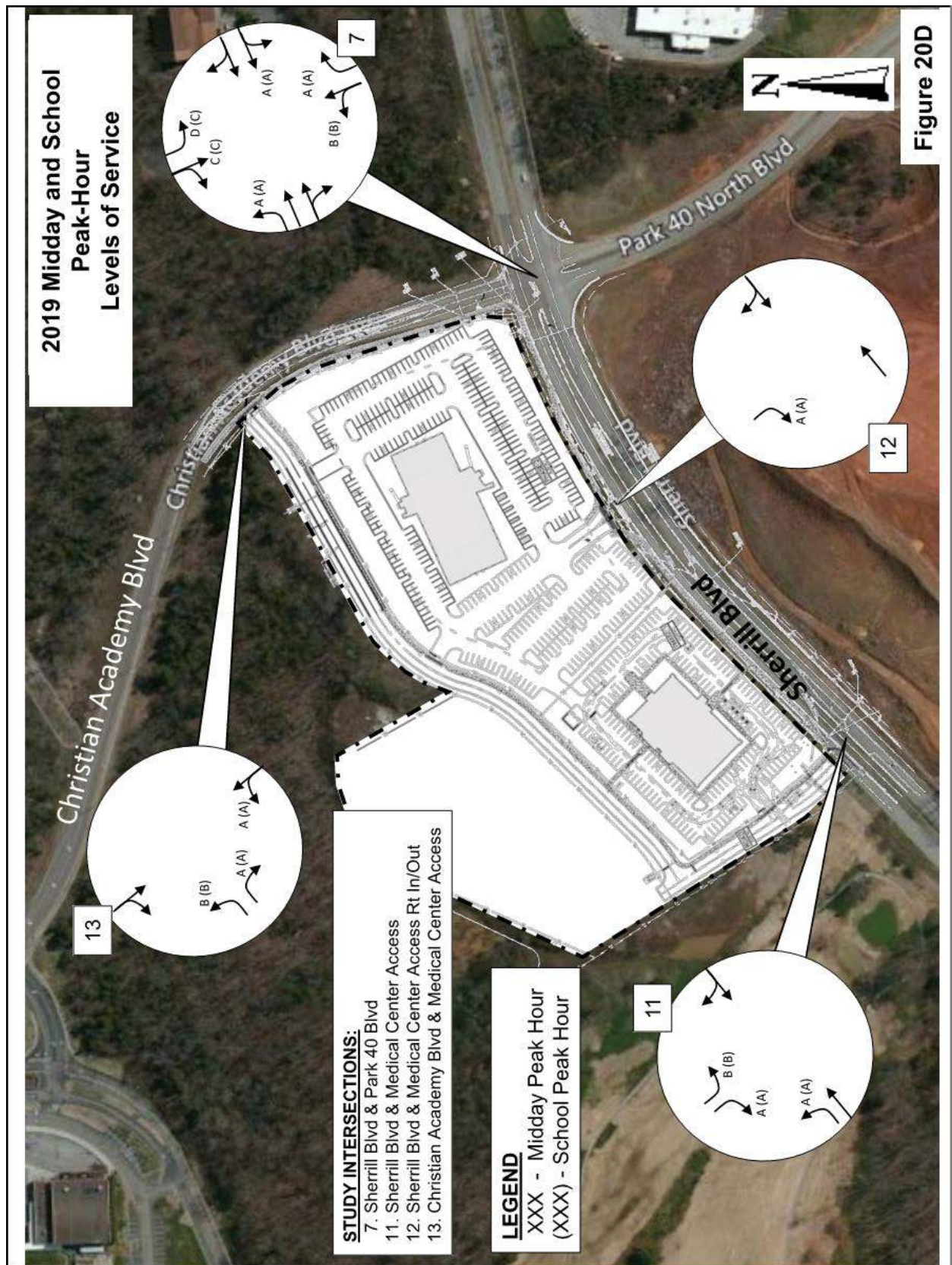
Except for the Sherrill Boulevard intersection with Dutchtown Road and Park 40 North Boulevard/Christian Academy Boulevard, the study intersections operate at acceptable levels of service for the peak hours. For the intersection of Cedar Bluff Road and Parkwest Boulevard/Executive Park Drive, the approach lane groups to Cedar Bluff Road operate at a LOS E during 2019 peak hours and the Parkwest Boulevard shared thru-right lane may fail during the AM peak hour. These approaches and the northbound left-turn movement from Cedar Bluff Road to Parkwest Boulevard may begin to fail for the AM and PM peak hours in 2030. The large volume of turning vehicles are above geometric capacity for this intersection. The most deficient traffic movements at this intersection are the northbound left turns and eastbound right turns. As identified for the existing conditions, the reassignment of the Parkwest Boulevard through traffic from the shared thru-right turn lane to the left-turn lane would increase the efficiency of the right turn movement with the overlap signal phase.

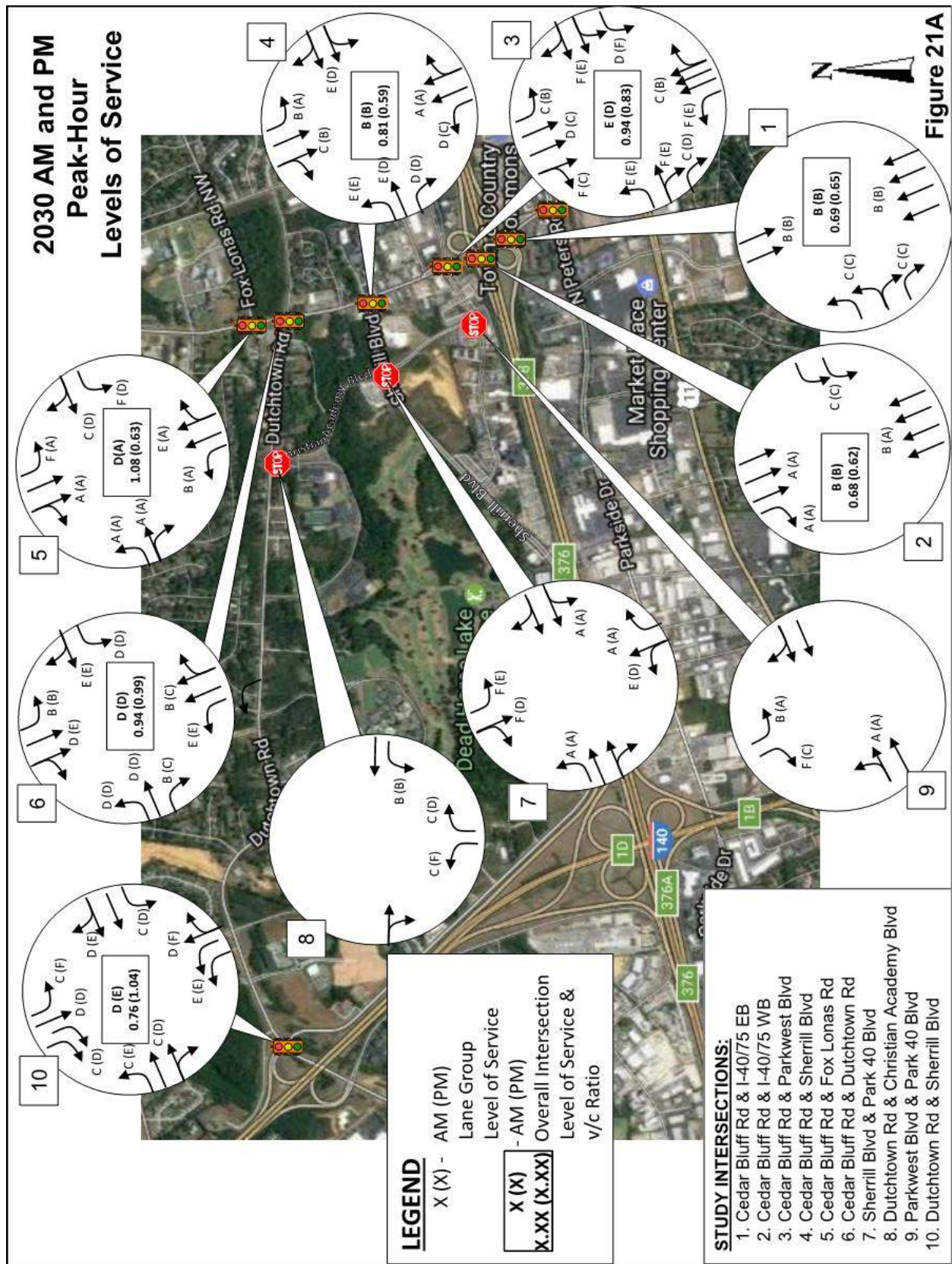
The intersection of Christian Academy Boulevard with Dutchtown Road does become a LOS E during the PM peak hour in 2019 and may fail in 2030. A signal warrant analysis of the projected traffic condition found that the intersection would meet signal warrants including the Interruption (Warrant 1B), Four Hour (Warrant 2) and Peak Hour (Warrant 3B). Signal warrant analysis of the 2017 traffic condition with the medical office development is found in the Appendix. Signalization of the intersection would mitigate poor levels of service during

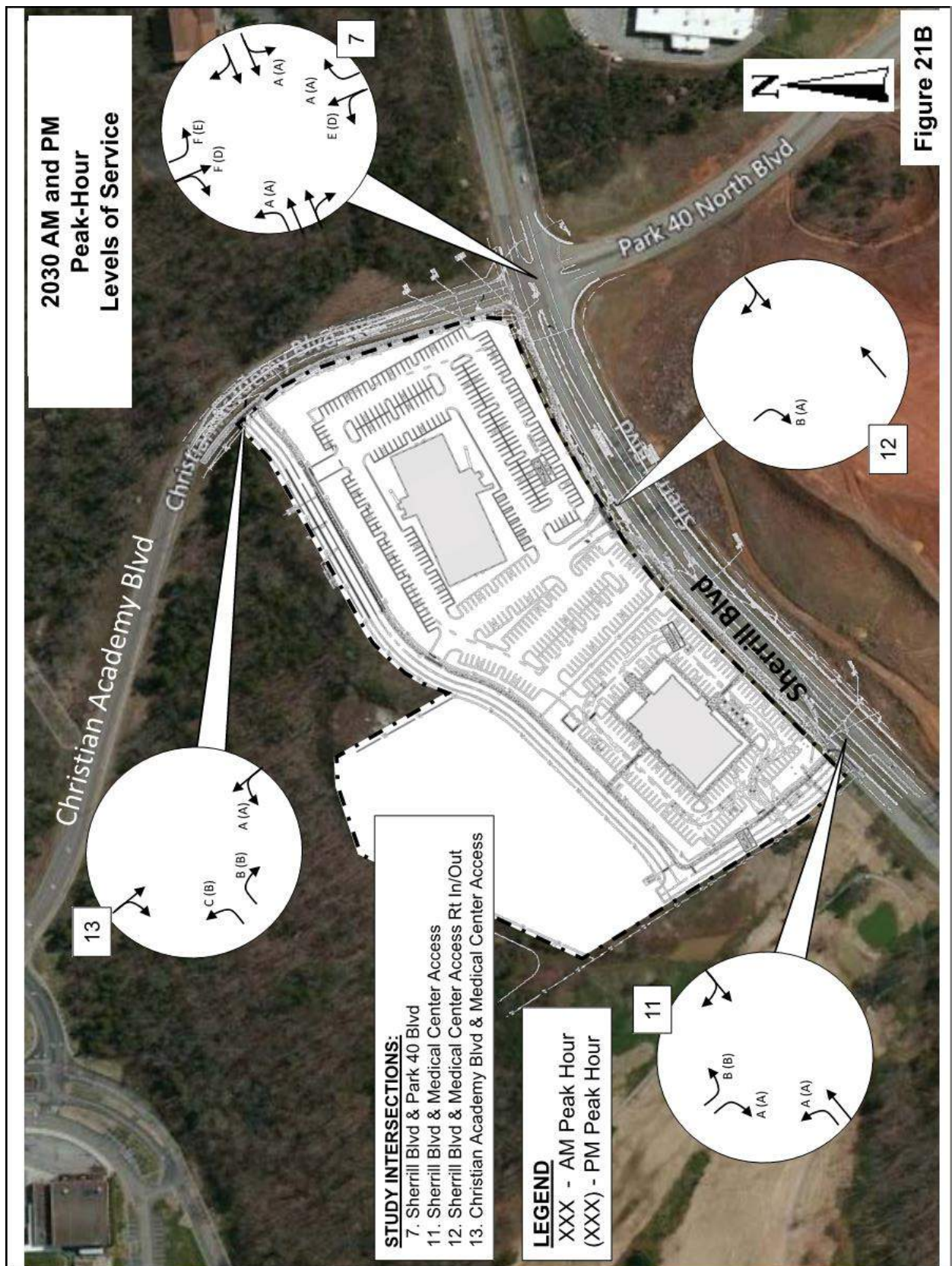


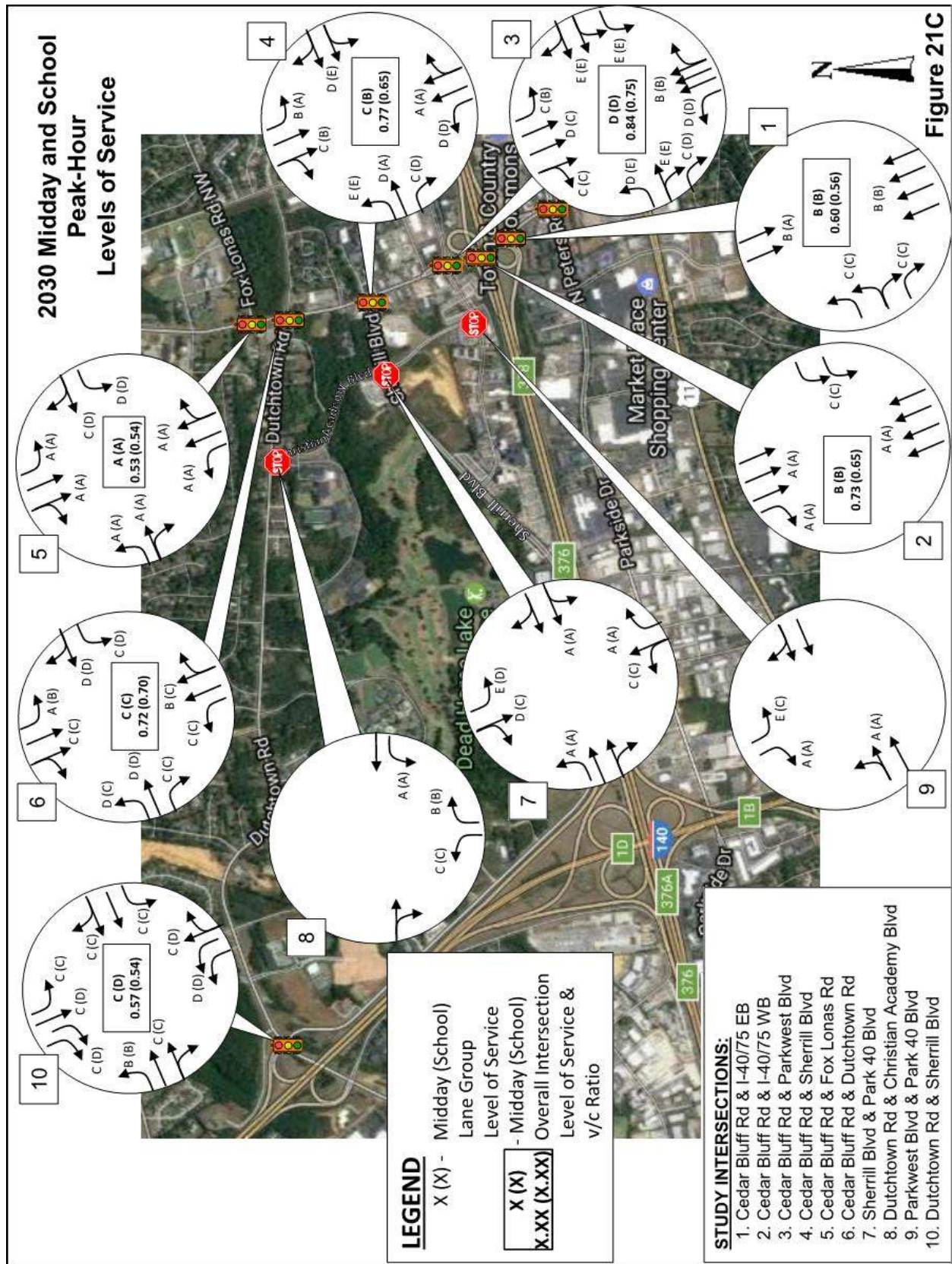


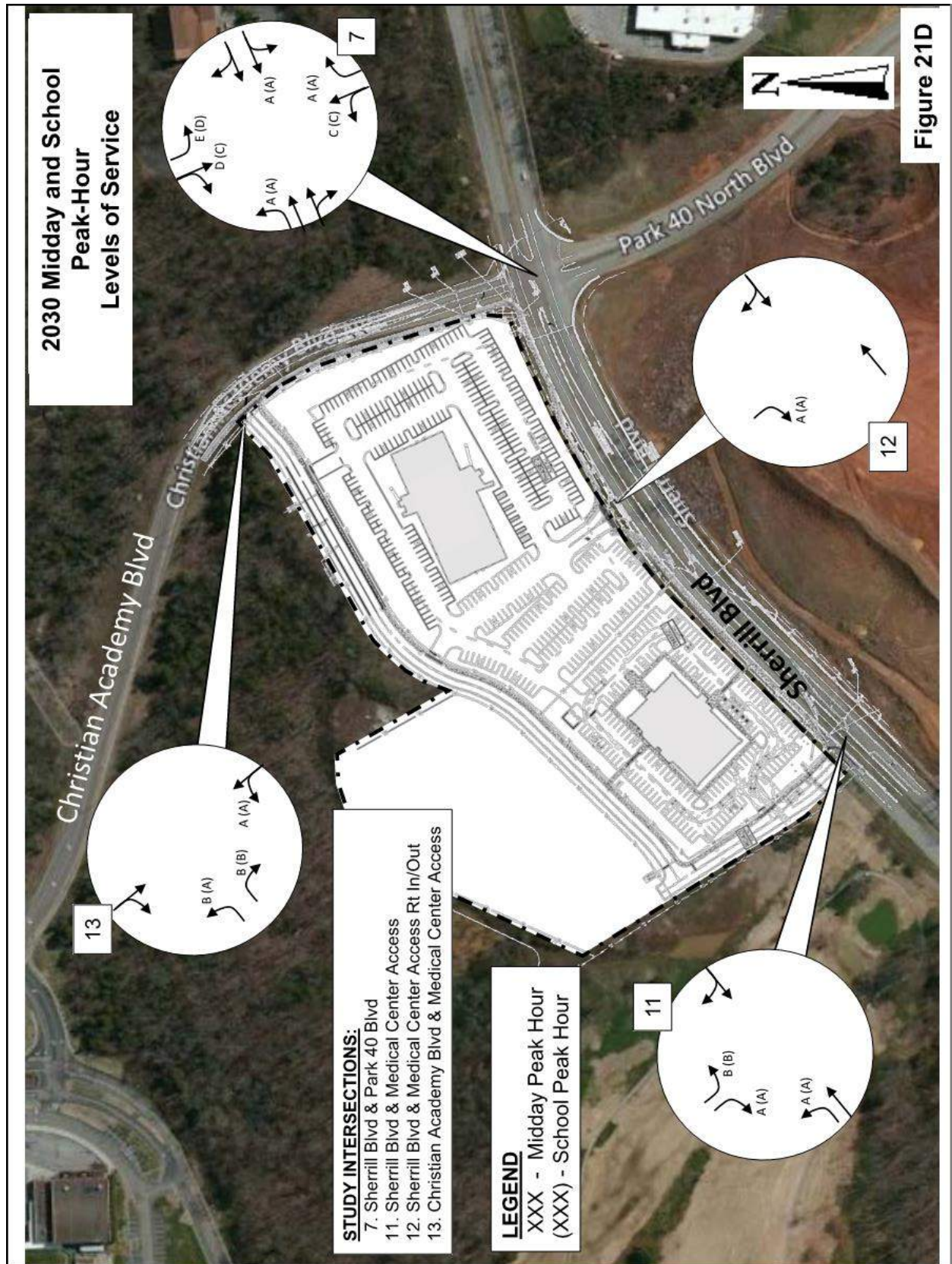












the peak hours for 2019, but the Christian Academy Boulevard signalized approach may fail in 2030 during the PM peak and a LOS E during the AM peak, and the intersection may operate at capacity. This low LOS and capacity is a result of the current 2-lane section for Dutchtown Road. The provision of a right-turn lane may improve the intersection capacity.

The Sherrill Boulevard approach to Cedar Bluff Road may operate with levels of service E for its lane groups for 2019 and 2030 during the study periods, but the intersection should operate with a high LOS and with much capacity. Therefore, the minor approach levels of service can be improved with signal timing.

Proposed Site Access

The proposed access to Sherrill Boulevard will distribute the generated trips from the site thereby minimizing any concentration of trips from the site. The unrestricted access will require a median opening on Sherrill Boulevard. The proposed median opening should be spaced a minimum of 300 feet from the median break to the southwest where the Parkwest Boulevard proposed relocation will intersect Sherrill Boulevard. This spacing would permit construction of 100-foot left-turn lanes for the proposed Parkwest Boulevard relocation and the proposed medical office access. It should, however, be recognized that the TDOT recommended median break separation is 440 feet. Therefore, the proposed driveway location would require an exception noting that the proposed distance would accommodate the recommended left-turn storage. The proposed location would serve a possible future development phase and separate eastbound exiting traffic and any associated queues from within the office site. This access would also permit the development of a greenway along a public right of way and outside of the medical office development.

The sight distance for this proposed access is a minimum of 400 feet required for the recommended corner sight-distance for a 40mph speed zone. Sight distances reviewed from the driveway location found the available lines of sight for the full movement access in excess of 1,000 to the west and approximately 500 feet to the east.

The restricted access would serve right-turning traffic only. Right-turn access do not typically have significant impacts to the adjacent street. Its spacing from either the proposed access and the intersection of Sherrill Boulevard with Christian Academy Boulevard/Park 40 North Boulevard is approximately 500 feet, providing for good spacing and a minimum stopping sight distance of 305 feet. The right-turn access has a line of sight approximately 450 feet to the east.

The access to and from Christian Boulevard is sufficiently spaced from the Sherrill Boulevard and Christian Academy Boulevard/Park 40 North Boulevard intersection as not to interfere with its southbound operation. A left-turn lane warrant is very nearly met during the AM peak hour and should be considered as northbound school traffic may be impeded with the absence of the turn lane. With an increased left-turn storage for the southbound approach of Christian

Academy Boulevard to Sherrill Boulevard and consideration of a left-turn lane from Christian Academy Boulevard to the site, a two-way left-turn lane might be developed for Christian Academy Boulevard between Sherrill Boulevard and the proposed site entrance thereby providing the necessary increase. The sight distance from the driveway location is currently restricted by the road curvature to the north and the existing grass overgrowth in the right-of-way. The clearing of the site should improve this line of sight. A 300-foot minimum MPC recommended corner sight distance is 300 feet for the posted speed limit of 30mph.

Geometric Improvements

Geometric improvements for the study intersections were evaluated for 2019 and 2030 traffic conditions. Geometric improvements were considered for intersections experiencing unacceptable levels of service or intersections with poor levels of service for critical movements. Intersections identified for mitigation included the following:

1. Northbound Pellissippi Parkway and Sherrill Boulevard at Dutchtown Road
2. Park 40 North Boulevard at Sherrill Boulevard
3. Cedar Bluff Road at Parkwest Boulevard/Executive Park Drive

At the intersection of Cedar Bluff Road and Parkwest Boulevard/Executive Park Drive, TDOT has plans to add a second northbound left turn lane. The appendix includes a drawing of this proposed improvement. Note that this proposed improvement has not been funded. With the new geometric changes at this intersection and signal optimization, a better LOS can be achieved for the northbound left turn movement. The reassignment of the through traffic from Parkwest Boulevard from the shared thru-right-turn lane would improve the right-turn overlap efficiency. Analyses found that the Cedar Bluff Road intersection with Parkwest Boulevard increased the intersection capacity and provided an improved right-turn LOS from Parkwest Boulevard.

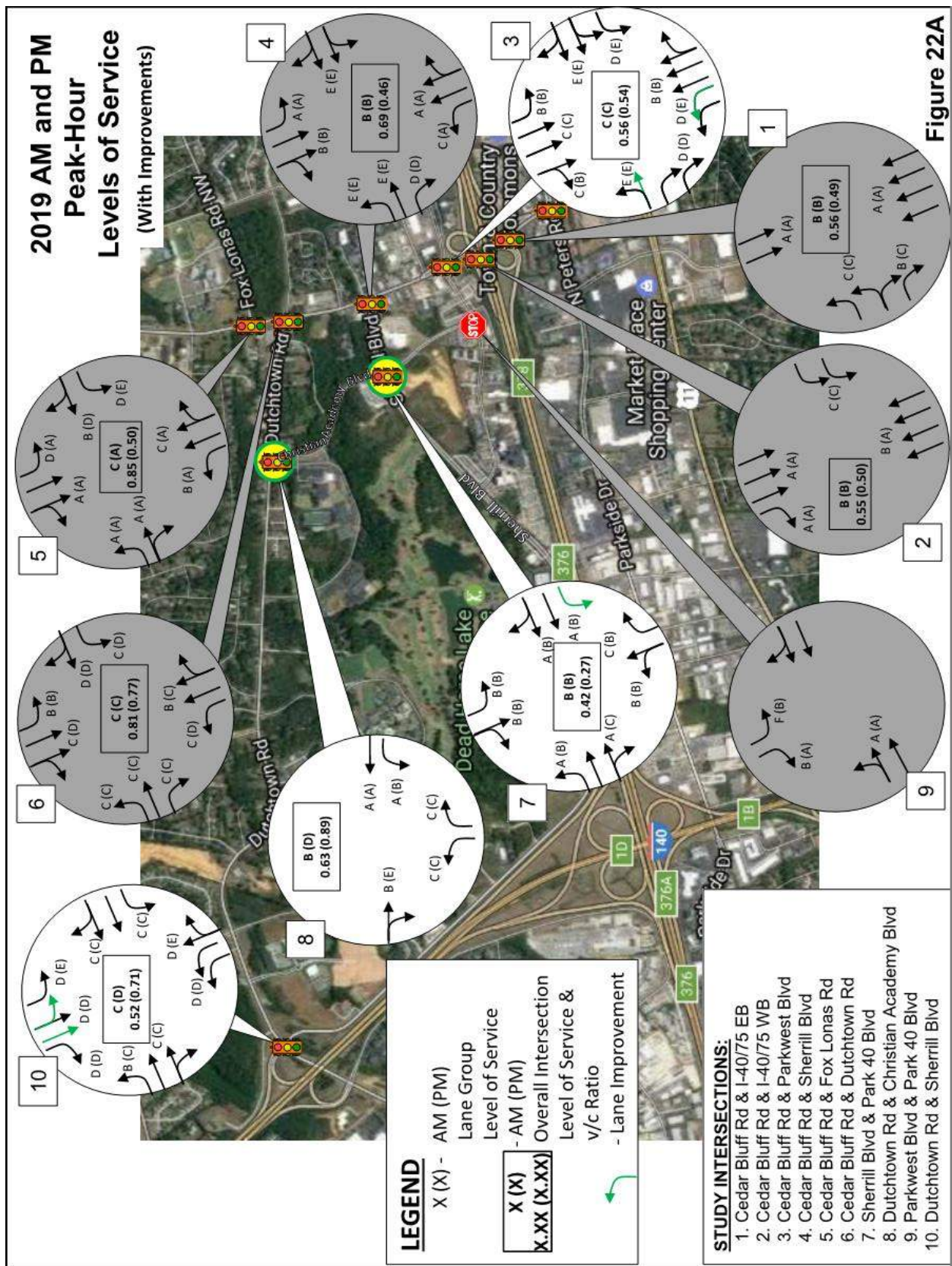
Analysis of the off-ramp Improvements previously discussed for the intersection of Sherrill Boulevard at Dutchtown Road and the Pellissippi northbound off loop ramp (reallocating the lanes to one right turn lane, one through lane, a through-left, and an exclusive left turn lane) suggest that the intersection capacity and levels of service can be improved. A minimum LOS D can be achieved for both the 2019 and 2030 horizon years. The northbound off-ramp improvements increased the available storage on the off-ramp, thereby reducing the adverse queues. The northbound left-turn movement, however, may fail during the PM peak hour in 2030. Thus, by 2030 the northbound Sherrill Boulevard approach may need to be widened to provide addition capacity and efficiency for the intersection. It is important to note that the reallocation of existing lanes on the Pellissippi Parkway off ramp, creating two through lanes,

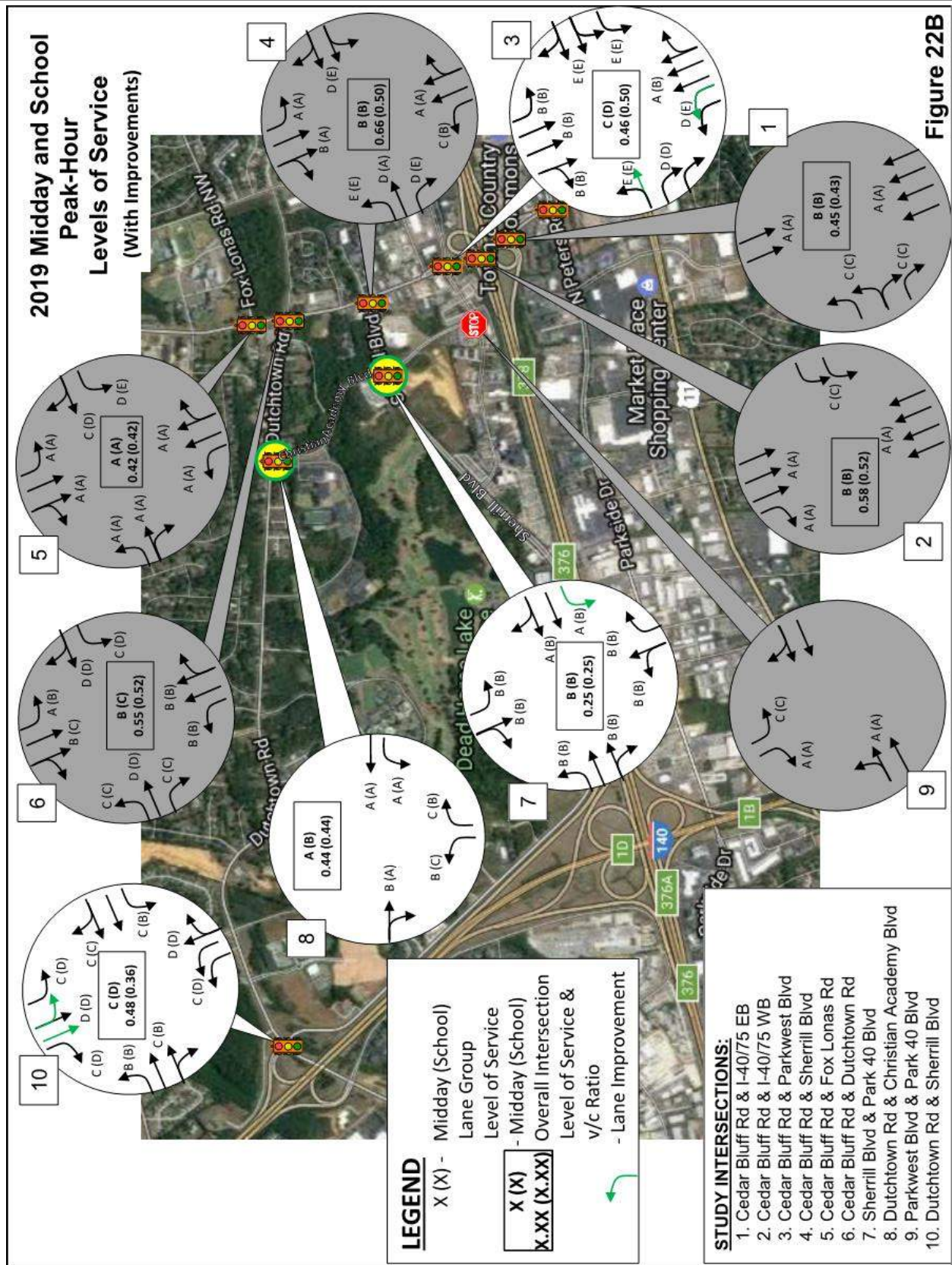
will necessitate adding a second departure lane on southbound Sherrill Boulevard to accommodate the two through lanes.

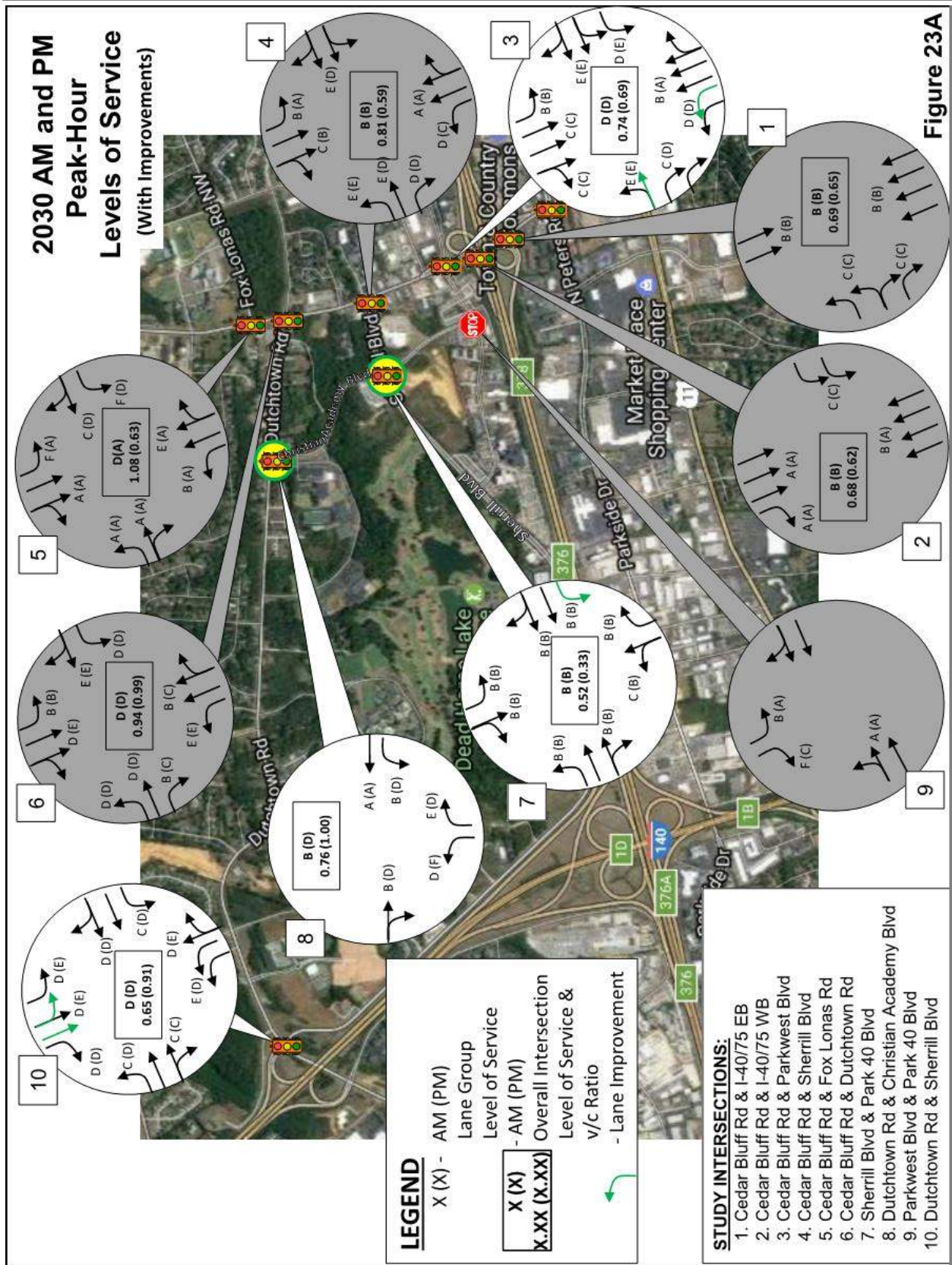
The Tennessee Department of Transportation has identified the Pellissippi Parkway northbound ramp for improvements, providing for a double left-turn lane, mitigating the current adverse queuing. The TDOT planned improvements also included right-turn lanes from Dutchtown Road to the Pellissippi Parkway on-ramp and Sherrill Boulevard. These improvements are not currently funded and may not be constructed in the near future. The improvements identified in this study would require only the improved departure lane on Sherrill Boulevard, stripping modifications for the off-ramp, and signal modification for a split phase operation which does reduce the queue on the ramp and provides for an acceptable intersection LOS.

Signalization of the Sherrill Boulevard and Christian Academy Boulevard/Park 40 North Boulevard should include a minimal westbound left-turn lane.

Figures 22A and 22B illustrate the 2019 conditions with improvements identified. For 2030 traffic conditions, **Figures 23A and 23B** illustrate the resulting levels of service with the identified improvements. **Table 4** is a summary of the capacity and LOS for the analyses conducted for this study. A review of this Table 4 finds that the proposed medical office has minimal impact on the capacity ratios of many of the study intersections with only a few exceptions.







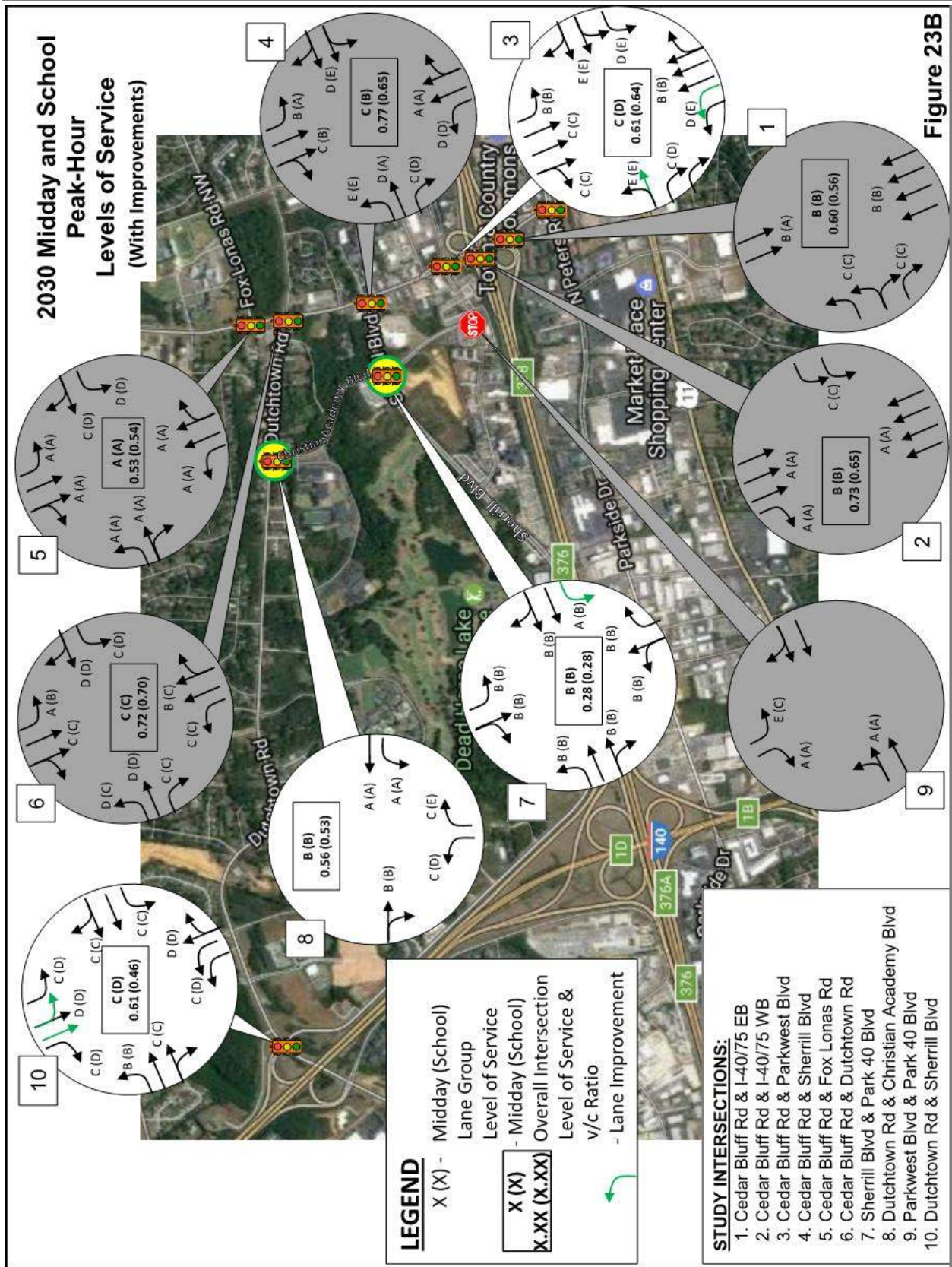


**TABLE 4
CAPACITY AND LEVEL OF SERVICE SUMMARY**

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2017 EXISTING TRAFFIC			2019 BACKGROUND TRAFFIC			2019 PROJECTED TRAFFIC			2030 BACKGROUND TRAFFIC			2030 PROJECTED TRAFFIC		
			V/C	DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS
Cedar Bluff Rd at I-4075 EB Ramps	SIGNAL	AM PM	0.54 0.44	12.4 13.5	B B	0.54 0.48	12.1 13.8	B B	0.56 0.49	12.4 13.9	B B	0.69 0.64	15.8 15.0	B B	0.69 0.65	16.1 15.4	B B
Cedar Bluff Rd at I-4075 WB Ramps	SIGNAL	AM PM	0.54 0.45	12.9 13.0	B B	0.54 0.49	13.1 12.9	B B	0.55 0.50	12.9 12.6	B B	0.68 0.62	12.2 13.4	B B	0.68 0.62	14.8 13.0	B B
Cedar Bluff Rd at Parkwest Blvd	SIGNAL	AM PM	0.69 0.52	33.3 34.2	C C	0.70 0.53	32.8 33.8	C C	0.72 0.58	33.7 34.7	C C	0.92 0.78	45.6 41.5	D D	0.94 0.83	59.4 43.4	E D
Mitigation Add Northbound Left Turn Lane	SIGNAL	AM PM							0.56 0.54	33.7 34.9	C C				0.74 0.69	38.6 35.4	D D
Cedar Bluff Rd at Sherrill Blvd	SIGNAL	AM PM	0.66 0.50	12.6 15.6	B B	0.53 0.45	10.8 14.7	B B	0.69 0.46	13.7 17.0	B B	0.71 0.58	13.3 17.5	B B	0.81 0.59	21.4 20.0	C B
Cedar Bluff Rd at Fox Lonas Rd	SIGNAL	AM PM	1.14 0.46	58.2 7.7	E A	0.85 0.47	27.9 8.6	C A	0.85 0.50	27.8 7.7	C A	1.09 0.62	57.6 9.8	E A	1.08 0.63	52.7 9.8	D A
Cedar Bluff Rd at Dutchtown Rd	SIGNAL	AM PM	0.86 0.87	32.0 40.1	C D	0.80 0.74	27.0 33.5	C C	0.81 0.77	27.4 33.4	C C	0.95 0.98	40.9 45.8	D D	0.94 0.99	42.6 48.4	D D
Sherrill Blvd at Park 40 Blvd	STOP NBL/NSB	AM PM	0.25 / 1.11 0.26 / 0.31	25.3 / 18.0 101.8 / 19.5	D / F C / C	0.12 / 0.17 0.12 / 0.17	20.1 / 15.7 49.6 / 16.5	C / E C / C	0.17 / 0.23 0.21 / 0.49	26.2 / 18.2 103.1 / 23.0	D / F C / C	0.26 / 0.29 0.29 / 0.40	31.4 / 21.2 144 / 40.9	D / F C / C	0.34 / 0.35 0.35 / 0.73	42.5 / 26.3 196 / 41.4	E / F D / E
Mitigation Signalization	SIGNAL	AM PM							0.42 0.27	11.8 18.3	B B				0.52 0.33	17.1 16.2	B B
Dutchtown Rd at Christian Academy Blvd	STOP NBL/NSB	AM PM	0.21 / 0.09 0.55 / 0.24	17.8 / 35.7 14.1 / 19.8	C / B E / C	0.17 / 0.07 0.61 / 0.17	16.8 / 40.8 13.1 / 20.2	C / B E / C	0.19 / 0.23 0.67 / 0.23	17.6 / 46.1 13.2 / 21.5	C / B E / C	0.27 / 0.11 1.07 / 0.29	22.4 / 143.1 15.4 / 30.2	C / C F / D	0.30 / 1.16 0.30 / 0.38	23.8 / 173.1 15.7 / 33.8	C / C F / D
Mitigation Signalization	SIGNAL	AM PM							0.63 0.89	13.0 36.6	B D				0.76 1.00	12.5 39.1	B D
Parkwest Blvd at Park 40 Blvd	STOP SBL	AM PM	1.18 0.07	137.2 13.4	F B	1.04 0.02	91.5 11.9	F B	1.06 0.06	96.2 12.2	F B	2.00 0.03	496.0 14.4	F B	2.02 0.09	505.0 15.0	F B
Dutchtown Rd at Sherrill Blvd	SIGNAL	AM PM	0.64 0.90	35.8 44.0	D D	0.58 0.78	34.1 40.2	C D	0.59 0.79	34.8 41.5	C D	0.77 1.03	36.4 55.9	D E	0.76 1.04	38.7 57.6	D E
Mitigation Southbound Shared Dual Left Turn with Split Phase	SIGNAL	AM PM							0.52 0.71	33.7 39.1	C D				0.65 0.91	39.1 49.6	D D
Sherrill Blvd at Medical Center Access	STOP SBL/EBL	AM PM							0.02 / 0.02 0.06 / 0.01	12.2 / 8.2 11.1 / 7.7	B / A B / A				0.02 / 0.02 0.07 / 0.01	13.7 / 12.0 8.5 / 7.8	B / A B / A
Sherrill Blvd at Medical Center Access RT In/Out	STOP SBR	AM PM							0.01 0.02	9.9 9.0	A A				0.01 0.02	10.2 9.1	B A
Christian Academy Blvd at Medical Center Access	STOP EBL/EBR	AM PM							0.02 / 0.05 0.04 / 0.16	14.2 / 10.8 10.8 / 9.9	B / B B / A				0.02 / 0.05 0.02 / 0.21	16.5 / 11.3 11.3 / 10.6	C / B B / B

Note: Average vehicle delay estimated in seconds. STOP control analyses presented by minor approach.

TABLE 4
CAPACITY AND LEVEL OF SERVICE SUMMARY
(continued)

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2017 EXISTING TRAFFIC			2019 BACKGROUND TRAFFIC			2019 PROJECTED TRAFFIC			2030 BACKGROUND TRAFFIC			2030 PROJECTED TRAFFIC		
			V/C	DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS
Cedar Bluff Rd at I-4075 EB Ramps	SIGNAL	MID SCHOOL	0.43	11.0	B	0.44	11.0	B	0.45	11.2	B	0.58	13.2	B	0.60	13.4	B
Cedar Bluff Rd at I-4075 WB Ramps	SIGNAL	MID SCHOOL	0.50	13.0	B	0.57	11.4	B	0.58	11.2	B	0.72	12.1	B	0.73	11.8	B
Cedar Bluff Rd at Parkwest Blvd	SIGNAL	MID SCHOOL	0.61	29.6	C	0.56	28.0	C	0.62	29.8	C	0.80	36.0	D	0.84	38.3	D
Mitigation Add Northbound Left Turn Lane	SIGNAL	MID SCHOOL	0.56	34.0	C	0.51	32.7	C	0.54	33.1	C	0.75	38.9	D	0.75	40.3	D
Cedar Bluff Rd at Sherrill Blvd	SIGNAL	MID SCHOOL	0.45	15.9	B	0.49	15.2	B	0.66	19.2	B	0.67	20.2	C	0.77	24.3	C
Cedar Bluff Rd at Fox Lomas Rd	SIGNAL	MID SCHOOL	0.39	7.3	A	0.41	7.0	A	0.42	7.0	A	0.65	8.1	A	0.53	7.8	A
Cedar Bluff Rd at Dutchtown Rd	SIGNAL	MID SCHOOL	0.52	19.1	B	0.53	18.1	B	0.55	18.6	B	0.70	20.0	B	0.72	21.4	C
Sherrill Blvd at Park 40 Blvd	STOP NB/SBL	SCHOOL	0.09 / 0.21	12.6 / 16.4	B / C	0.09 / 0.16	12.9 / 15.2	B / C	0.12 / 0.43	14.9 / 22.7	B / C	0.15 / 0.25	15.4 / 19.5	C / C	0.20 / 0.62	18.7 / 42.7	C / E
Mitigation Signalization	SIGNAL	MID SCHOOL	0.13 / 0.23	12.3 / 14.3	B / B	0.10 / 0.19	12.2 / 13.8	B / B	0.12 / 0.43	14.3 / 20.1	B / B	0.14 / 0.28	14.0 / 16.9	B / C	0.19 / 0.60	17.0 / 34.7	C / D
Dutchtown Rd at Christian Academy Blvd	STOP NB/LNB	SCHOOL	0.15 / 0.03	14.1 / 11.8	B / B	0.14 / 0.03	13.6 / 11.7	B / B	0.17 / 0.06	14.1 / 12.0	B / B	0.20 / 0.04	16.0 / 13.1	C / B	0.24 / 0.08	16.8 / 13.5	C / B
Mitigation Signalization	SIGNAL	AM PM	0.41 / 0.08	18.6 / 11.6	C / B	0.28 / 0.07	16.0 / 11.0	C / B	0.31 / 0.09	17.0 / 11.2	C / B	0.42 / 0.10	21.5 / 12.0	C / B	0.46 / 0.12	23.6 / 12.3	C / B
Parkwest Blvd at Park 40 Blvd	STOP SBL	SCHOOL	0.64	25.0	C	0.37	16.7	C	0.42	17.7	C	0.67	35.0	D	0.73	40.4	E
Dutchtown Rd at Sherrill Blvd	SIGNAL	MID SCHOOL	0.47	27.0	C	0.43	27.1	C	0.45	26.2	C	0.55	25.0	C	0.57	25.5	C
Mitigation Southbound Shared Dual Left Turn with Split Phase	SIGNAL	MID SCHOOL	0.66	62.6	E	0.40	36.0	D	0.42	36.6	D	0.52	38.6	D	0.56	37.5	D
Sherrill Blvd at Medical Center Access	STOP SBUEBL	AM PM							0.48	28.3	C				0.61	30.0	C
Sherrill Blvd at Medical Center Access RT In/Out	STOP SBR	AM PM							0.36	37.0	D				0.46	38.5	D
Christian Academy Blvd at Medical Center Access	STOP EBLUEBR	AM PM							0.07 / 0.01	11.7 / 7.9	B / A				0.19 / 0.08	17.6 / 13.2	C / B
									0.04 / 0.02	10.7 / 7.7	B / A				0.13 / 0.45	17.0 / 23.2	C / C
									0.02	9.4	A				0.09	13.7	B
									0.01	9.2	A				0.07	13.7	B
									0.04 / 0.15	10.1 / 9.4	B / A				0.04 / 0.15	10.5 / 9.6	B / A
									0.04 / 0.13	11.1 / 9.8	B / A				0.04 / 0.14	11.8 / 10.1	B / B

Note: Average vehicle delay estimated in seconds. STOP control analyses presented by minor approach.

Medical Office Phase 1

The medical office development may be phased with a possible 30,000 square feet with access limited to the proposed access to Sherrill Boulevard. This study, therefore, conducted additional analyses to determine the necessary mitigation of the Phase 1 impact. Traffic was generated and assigned for this initial medical office space and the access to Sherrill Boulevard. Level of service analyses were conducted for the AM and PM peaks as these peak hours are the peaks for entering and exiting trips (57 entering during the AM and 71 exiting during the PM) for auxiliary lane evaluations and egress level of service. A signal warrant evaluation was again conducted for the intersection of Sherrill Boulevard and Christian Academy Boulevard/Park 40 North Boulevard to determine if warrants would be met with this initial phase. **Table 5** presents the trip generation for the 30,000 square feet of medical office; distribution is reflected in **Figure 24**; and **Figure 25** illustrates the traffic projections for a possible Phase 1.

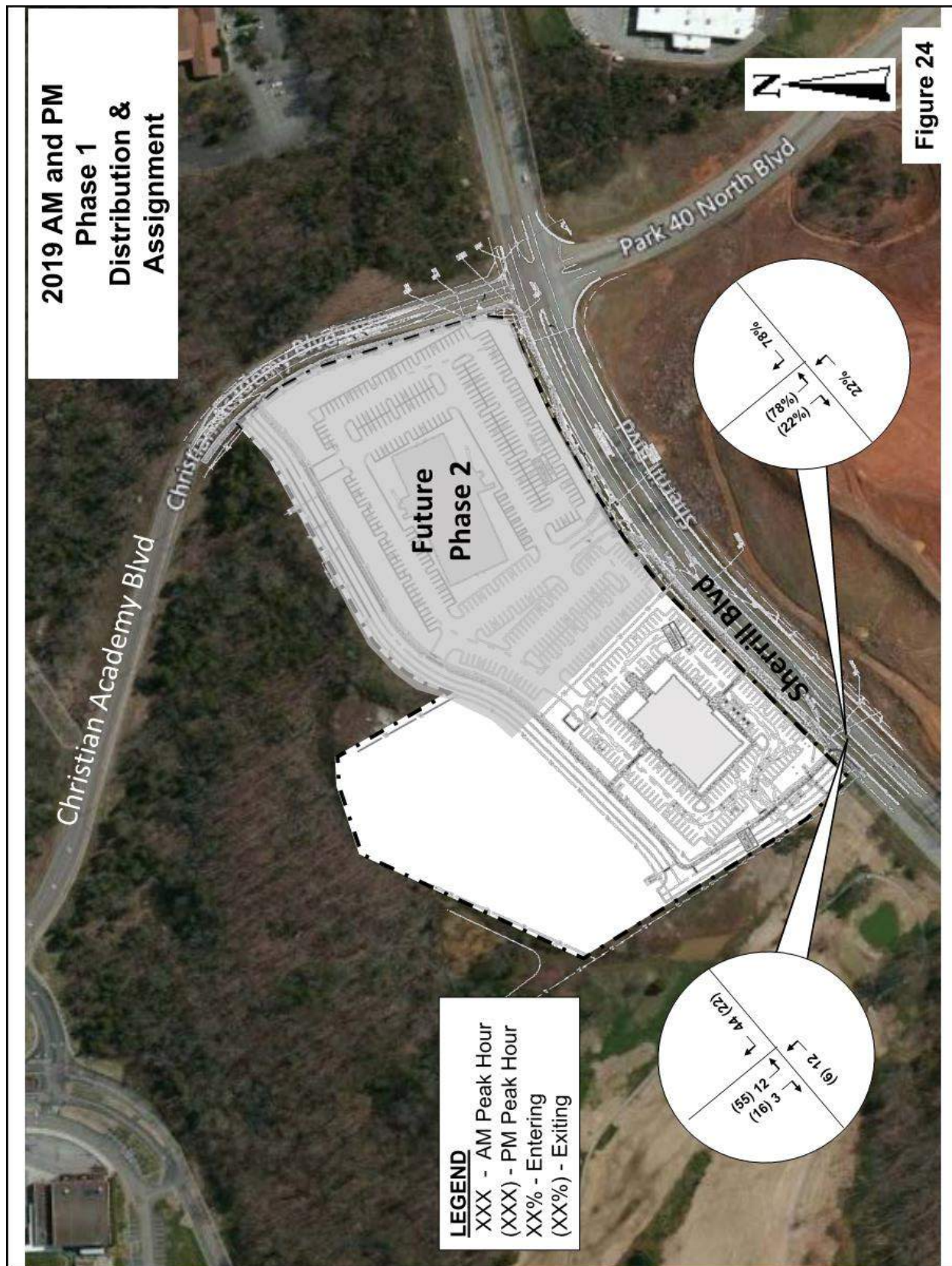
Table 5: Phase 1 Trip Generation

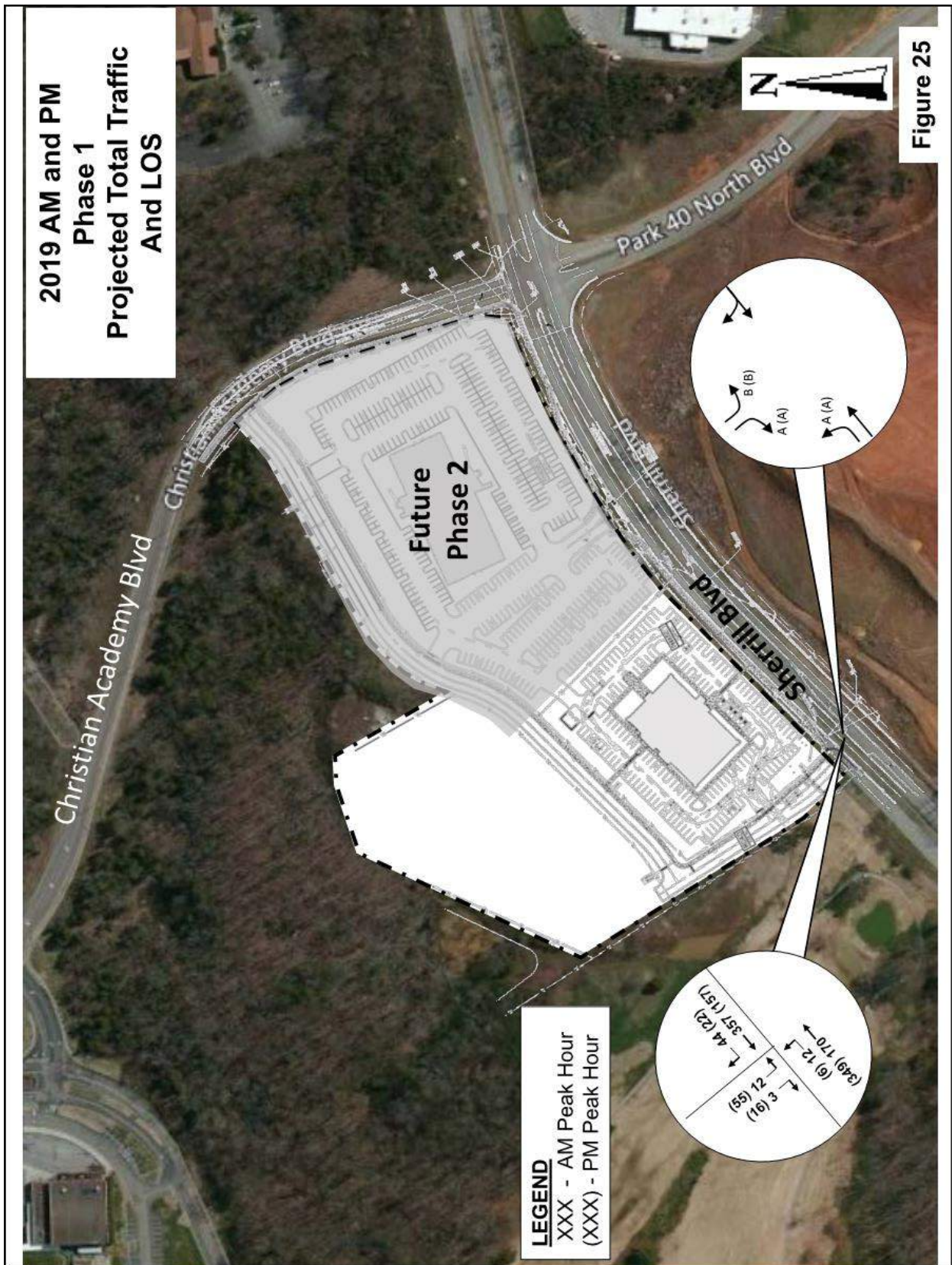
Land Use	LUC	Density (sqft)	Weekday			
			Daily	AM PEAK		PM PEAK
Medical Office	720	30,000	1,012	57	15	28 71

Note: Trips generated using **Trip Generation, 9th Edition**, published by ITE.

The redistribution of trips for the initial phase with access restricted to Sherrill Boulevard assumed trips entering and exiting would use Sherrill Boulevard east and west of the site, thereby the distribution has 22-percent to and from the west and 78-percent to and from the east. This distribution is reflected in the projected traffic for this initial phase.

Access is found to operate with an acceptable level of service for the peak hours. Signalization for the intersection of Sherrill Boulevard and Christian Academy Boulevard/Park 40 North Boulevard is found not warranted. The entering right-turn movement from Sherrill Boulevard to the site should be provided a minimum of a right-turn taper. The initial phase is found to have a minimal impact and can operate with the site access improvements identified in this study including a left-turn lane and a minimum of right-turn taper from Sherrill Boulevard to the proposed site access.





Summary and Conclusion

This report studied the proposed development of 100,000 square feet of medical office space. This development will be phased over the next few years, but the study commissioned will address the buildout of 100,000 square feet of medical office. Traffic was generated and distributed to the adjacent road network for projected 2019 and 2030 horizon years, consistent with the planned Parkwest Medical Center expansion included in the background traffic conditions.

Traffic projections indicated that the additional trips would be less than 5-percent to study intersections except for the intersections of Cedar Bluff Road at Parkwest Boulevard and Sherrill Boulevard and the intersections of Sherrill Boulevard at Christian Academy Boulevard/Park 40 North Boulevard. The most significant impact will be to the intersection of Sherrill Boulevard and Christian Academy Boulevard, which currently fails during the AM peak hour and will serve the site development to access Sherrill Boulevard and Cedar Bluff Road. For the Parkwest Boulevard intersection with Cedar Bluff Road, current plans by TDOT and the possible geometric improvement for the Parkwest Boulevard approach would increase capacity and reduce the projected delays. For the Parkwest Boulevard approach to Cedar Bluff Road, during the AM peak hour, the thru-right lane currently fails. The current lane assignment is inefficient for the Parkwest Boulevard approach as any right-turn traffic can be impeded during the right-turn overlap with any thru traffic present. With the current split phasing of the intersection, the reassignment of the thru movement to the left-turn lane would permit the greater efficiency of the overlap phase. In addition, the assignment of the right-turn lane to the northbound left-turn phase would permit the left-turn movement to operate with the heavier right turn movement.

The site should have less than a 5-percent impact on the critical peaks for the Sherrill Boulevard intersection with Dutchtown Road. This intersection currently experiences long queues on the Pellissippi Parkway northbound off-ramp during the AM peak hour and poor levels of service for the Sherrill Boulevard through movements. The reassignment of the approach lanes from the off-ramp can mitigate the lower LOS and achieve greater approach efficiency.

In general, the proposed medical office trips, plus anticipated growth of background traffic can be absorbed into the road network without creating unacceptable delays. An annual growth rate of 5-percent over the next few years and 2.5-percent over the next 10-15 years was assumed based on historical trends. The medical office should have minimal impact on study intersections thereby having a limited impact. The proposed medical office has minimal impact on the capacity ratios of many of the study intersections with only a few exceptions. Existing and background conditions did create the need for several possible improvements that would mitigate failing intersections or critical movements.

The medical office development may develop with an initial possible phase of 30,000 square feet with access to Sherrill Boulevard. This study conducted analyses to determine the necessary mitigation of the possible Phase 1 impact. Traffic was generated and assigned for this initial medical office space and the access to Sherrill Boulevard. Access is found to operate at an acceptable level of service for the peak hours. Signalization for the intersection of Sherrill Boulevard and Christian Academy Boulevard/Park 40 North Boulevard is found not warranted with this initial phase. The entering right-turn movement from Sherrill Boulevard to the site should be provided a minimum of a right-turn taper. The initial phase is found to have a minimal impact and can operate with the site access improvements identified in this study.

Recommendations for the site access and improving the traffic conditions in the study area include the following:

Phase 1 (30,000sf) Site Access

1. Provide a 100-foot left-turn lane on Sherrill Boulevard for the proposed unrestricted western access.
2. Provide a minimum of a right-turn taper from Sherril Boulevard to the proposed site access.

Site Buildout (100,000sf) and Study Area

1. Provide a 100-foot right-turn lane from Sherrill Boulevard to the right-turn access driveway.

2. Signalize the intersection of Christian Academy Boulevard with Sherrill Boulevard. Signalization should include a 100-foot westbound left-turn lane.
3. Increase the southbound left-turn storage from Christian Academy Boulevard to eastbound Sherrill Boulevard. The provision of a two-way left-turn on Christian Academy Boulevard between Sherrill Boulevard and the Christian Academy Boulevard site access would provide for this increased storage and accommodate left-turn traffic to the site.
4. Minimize landscaping, using low growing vegetation, and signing at the proposed street accesses to ensure that safe sight distance is provided. The access to Sherrill Boulevard should maintain a minimum 450-foot line of sight. The Christian Academy Boulevard driveway location and right of way clearance should provide a minimum 300-foot line of sight.
5. Signalize the intersection of Christian Academy Boulevard with Dutchtown Road, an existing mitigation recommendation. Reassign the through traffic from Parkwest Boulevard from the shared thru-right-turn lane to the left-turn lane thereby improving the right-turn overlap efficiency.
6. Reassign a southbound right-turn lane from the northbound Pellissippi Parkway off-ramp at Dutchtown Road for a through lane and the existing through lane to a shared left/through lane. This would require an added departure lane on Sherrill Boulevard for approximately 500 feet to match the current 4-lane section of Sherrill Boulevard. Further improvements to address 2030 buildout traffic might include adding a departure lane for the northbound Pellissippi Parkway on-ramp and the reassignment of a left-turn lane to a shared left/through lane on the northbound Sherrill Boulevard approach. (NOTE: Improvements for this interchange ramp intersection is currently planned by TDOT)
7. Intersection design should conform to the recommended standards and practices of the Tennessee Department of Transportation, American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, and the Knoxville, Engineering Department and Public Works, Knox County Public Works and Engineering, and the Tennessee Department of Transportation.

The recommended improvements are provided in concept plans prepared for the development and are provided in the Appendix of this report.

Appendix

Count Data



Traffic History

Traffic History reflects the Annual Average Daily Traffic (AADT) count along specific locations on Tennessee's road network

View stations on map: Non-Map Record Search: Station Number:

Station Information	
Station	000510
Route	05655
Location	SHERRILL BLVD. CEDAR BLUF
County	Knox
2015	5080
2014	4494
2013	4326
2012	4538
2011	4884
2010	4815
2009	NA
2008	NA
2007	NA
2006	NA
2005	NA
2004	NA
2003	NA
2002	NA
2001	NA
2000	NA
1999	NA
1998	NA

Download	KML	ESRI Geodatabase	ESRI Shapefile	Database
File:	(/Applications/Files/TrfcHist.kmz)	(/Applications/Files/TrfcHistFGDB.zip)	(/Applications/Files/TrfcHistSHP.zip)	(/Applications/Files/T
Open	Google Earth	ArcGIS Explorer		MS Access o
With:	(https://earth.google.com/)	(http://www.esri.com/software/arcgis/explorer/index.html)		

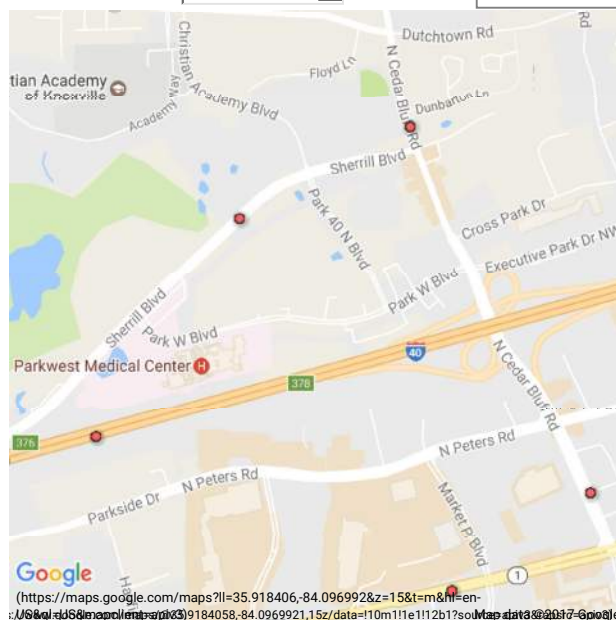
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Traffic History

Traffic History reflects the Annual Average Daily Traffic (AADT) count along specific locations on Tennessee's road network

View stations on map: Non-Map Record Search: Station Number:



Station Information	
Station	000350
Route	01053
Location	CEDAR BLUFF KNOXVILLE
County	Knox
2015	19139
2014	18508
2013	19243
2012	17047
2011	16169
2010	15360
2009	15451
2008	16092
2007	17328
2006	16443
2005	15655
2004	17321
2003	16187
2002	16559
2001	16697
2000	17066
1999	16155
1998	13419

Download	KML	ESRI Geodatabase	ESRI Shapefile	Database 1
File:	(/Applications/Files/TrfcHist.kmz)	(/Applications/Files/TrfcHistFGDB.zip)	(/Applications/Files/TrfcHistSHP.zip)	(/Applications/Files/T
Open	Google Earth	ArcGIS Explorer		
With:	(https://earth.google.com/)	(http://www.esri.com/software/arcgis/explorer/index.html)		MS Access o

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Groups Printed- Unshifted

	CEDAR BLUFF RD Southbound				I-40 EB RAMP Westbound				CEDAR BLUFF RD Northbound				I-40 EB RAMP Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	206	0	206	0	0	0	0	0	140	0	140	109	0	40	149	495
07:15 AM	0	266	0	266	0	0	0	0	0	173	0	173	144	0	49	193	632
07:30 AM	0	283	0	283	0	0	0	0	0	252	0	252	184	0	43	227	762
07:45 AM	0	327	0	327	0	0	0	0	0	291	0	291	119	0	57	176	794
Total	0	1082	0	1082	0	0	0	0	0	856	0	856	556	0	189	745	2683
08:00 AM	0	235	0	235	0	0	0	0	0	192	0	192	155	0	78	233	660
08:15 AM	0	237	0	237	0	0	0	0	0	141	0	141	139	0	96	235	613
08:30 AM	0	247	0	247	0	0	0	0	0	133	0	133	127	0	92	219	599
08:45 AM	0	238	0	238	0	0	0	0	0	129	0	129	149	0	116	265	632
Total	0	957	0	957	0	0	0	0	0	595	0	595	570	0	382	952	2504
*** BREAK ***																	
11:00 AM	0	222	0	222	0	0	0	0	0	229	0	229	75	0	61	136	587
11:15 AM	0	184	0	184	0	0	0	0	0	186	0	186	74	0	80	154	524
11:30 AM	0	226	0	226	0	0	0	0	0	206	0	206	77	0	102	179	611
11:45 AM	0	237	0	237	0	0	0	0	0	270	0	270	66	0	110	176	683
Total	0	869	0	869	0	0	0	0	0	891	0	891	292	0	353	645	2405
12:00 PM	0	282	0	282	0	0	0	0	0	288	0	288	78	0	112	190	760
12:15 PM	0	204	0	204	0	0	0	0	0	307	0	307	80	0	103	183	694
12:30 PM	0	225	0	225	0	0	0	0	0	254	0	254	101	0	75	176	655
12:45 PM	0	189	0	189	0	0	0	0	0	233	0	233	98	0	78	176	598
Total	0	900	0	900	0	0	0	0	0	1082	0	1082	357	0	368	725	2707
*** BREAK ***																	
02:00 PM	0	219	0	219	0	0	0	0	0	224	0	224	92	0	64	156	599
02:15 PM	0	205	0	205	0	0	0	0	0	240	0	240	79	0	52	131	576
02:30 PM	0	210	0	210	0	0	0	0	0	203	0	203	87	0	55	142	555
02:45 PM	0	173	0	173	0	0	0	0	0	195	0	195	90	0	59	149	517
Total	0	807	0	807	0	0	0	0	0	862	0	862	348	0	230	578	2247
03:00 PM	0	202	0	202	0	0	0	0	0	268	0	268	70	0	67	137	607
03:15 PM	0	193	0	193	0	0	0	0	0	202	0	202	77	0	72	149	544
03:30 PM	0	207	0	207	0	0	0	0	0	217	0	217	85	0	60	145	569
03:45 PM	0	275	0	275	0	0	0	0	0	223	0	223	96	0	119	215	713
Total	0	877	0	877	0	0	0	0	0	910	0	910	328	0	318	646	2433
04:00 PM	0	283	0	283	0	0	0	0	0	241	0	241	88	0	109	197	721
04:15 PM	0	249	0	249	0	0	0	0	0	269	0	269	107	0	92	199	717
04:30 PM	0	234	0	234	0	0	0	0	0	291	0	291	126	0	118	244	769
04:45 PM	0	258	0	258	0	0	0	0	0	258	0	258	112	0	118	230	746
Total	0	1024	0	1024	0	0	0	0	0	1059	0	1059	433	0	437	870	2953
05:00 PM	0	264	0	264	0	0	0	0	0	307	0	307	85	0	87	172	743
05:15 PM	0	202	0	202	0	0	0	0	0	302	0	302	86	0	85	171	675
05:30 PM	0	260	0	260	0	0	0	0	0	259	0	259	114	0	83	197	716
05:45 PM	0	236	0	236	0	0	0	0	0	227	0	227	80	0	148	228	691
Total	0	962	0	962	0	0	0	0	0	1095	0	1095	365	0	403	768	2825
Grand Total	0	7478	0	7478	0	0	0	0	0	7350	0	7350	3249	0	2680	5929	20757
Apprch %	0	100	0		0	0	0		0	100	0		54.8	0	45.2		
Total %	0	36	0	36	0	0	0	0	0	35.4	0	35.4	15.7	0	12.9	28.6	

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	CEDAR BLUFF RD Southbound				I-40 EB RAMPS Westbound				CEDAR BLUFF RD Northbound				I-40 EB RAMPS Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	266	0	266	0	0	0	0	0	173	0	173	144	0	49	193	632
07:30 AM	0	283	0	283	0	0	0	0	0	252	0	252	184	0	43	227	762
07:45 AM	0	327	0	327	0	0	0	0	0	291	0	291	119	0	57	176	794
08:00 AM	0	235	0	235	0	0	0	0	0	192	0	192	155	0	78	233	660
Total Volume	0	1111	0	1111	0	0	0	0	0	908	0	908	602	0	227	829	2848
% App. Total	0	100	0		0	0	0		0	100	0		72.6	0	27.4		
PHF	.000	.849	.000	.849	.000	.000	.000	.000	.000	.780	.000	.780	.818	.000	.728	.889	.897

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	0	237	0	237	0	0	0	0	0	270	0	270	66	0	110	176	683
12:00 PM	0	282	0	282	0	0	0	0	0	288	0	288	78	0	112	190	760
12:15 PM	0	204	0	204	0	0	0	0	0	307	0	307	80	0	103	183	694
12:30 PM	0	225	0	225	0	0	0	0	0	254	0	254	101	0	75	176	655
Total Volume	0	948	0	948	0	0	0	0	0	1119	0	1119	325	0	400	725	2792
% App. Total	0	100	0		0	0	0		0	100	0		44.8	0	55.2		
PHF	.000	.840	.000	.840	.000	.000	.000	.000	.000	.911	.000	.911	.804	.000	.893	.954	.918

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	0	202	0	202	0	0	0	0	0	268	0	268	70	0	67	137	607
03:15 PM	0	193	0	193	0	0	0	0	0	202	0	202	77	0	72	149	544
03:30 PM	0	207	0	207	0	0	0	0	0	217	0	217	85	0	60	145	569
03:45 PM	0	275	0	275	0	0	0	0	0	223	0	223	96	0	119	215	713
Total Volume	0	877	0	877	0	0	0	0	0	910	0	910	328	0	318	646	2433
% App. Total	0	100	0		0	0	0		0	100	0		50.8	0	49.2		
PHF	.000	.797	.000	.797	.000	.000	.000	.000	.000	.849	.000	.849	.854	.000	.668	.751	.853

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	249	0	249	0	0	0	0	0	269	0	269	107	0	92	199	717
04:30 PM	0	234	0	234	0	0	0	0	0	291	0	291	126	0	118	244	769
04:45 PM	0	258	0	258	0	0	0	0	0	258	0	258	112	0	118	230	746
05:00 PM	0	264	0	264	0	0	0	0	0	307	0	307	85	0	87	172	743
Total Volume	0	1005	0	1005	0	0	0	0	0	1125	0	1125	430	0	415	845	2975
% App. Total	0	100	0		0	0	0		0	100	0		50.9	0	49.1		
PHF	.000	.952	.000	.952	.000	.000	.000	.000	.000	.916	.000	.916	.853	.000	.879	.866	.967

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Groups Printed- Unshifted

	CEDAR BLUFF RD Southbound				I-40 WB RAMPS Westbound				CEDAR BLUFF RD Northbound				I-40 WB RAMPS Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	87	81	168	130	0	0	130	0	176	48	224	0	0	0	0	522
07:15 AM	0	109	54	163	175	0	0	175	0	207	66	273	0	0	0	0	611
07:30 AM	0	150	87	237	175	0	0	175	0	302	88	390	0	0	0	0	802
07:45 AM	0	80	102	182	214	0	0	214	0	222	83	305	0	0	0	0	701
Total	0	426	324	750	694	0	0	694	0	907	285	1192	0	0	0	0	2636
08:00 AM	0	107	81	188	155	0	0	155	0	233	67	300	0	0	0	0	643
08:15 AM	0	95	68	163	167	0	0	167	0	196	62	258	0	0	0	0	588
08:30 AM	0	77	88	165	201	0	0	201	0	189	109	298	0	0	0	0	664
08:45 AM	0	100	78	178	190	0	0	190	0	189	124	313	0	0	0	0	681
Total	0	379	315	694	713	0	0	713	0	807	362	1169	0	0	0	0	2576
*** BREAK ***																	
11:00 AM	0	178	76	254	170	0	0	170	0	203	74	277	0	0	0	0	701
11:15 AM	0	58	72	130	127	0	0	127	0	130	49	179	0	0	0	0	436
11:30 AM	0	97	94	191	153	0	0	153	0	146	75	221	0	0	0	0	565
11:45 AM	0	140	60	200	182	0	0	182	0	200	60	260	0	0	0	0	642
Total	0	473	302	775	632	0	0	632	0	679	258	937	0	0	0	0	2344
12:00 PM	0	66	69	135	193	0	0	193	0	164	94	258	0	0	0	0	586
12:15 PM	0	85	77	162	156	0	0	156	0	191	74	265	0	0	0	0	583
12:30 PM	0	132	65	197	176	0	0	176	0	187	87	274	0	0	0	0	647
12:45 PM	0	82	69	151	118	0	0	118	0	201	80	281	0	0	0	0	550
Total	0	365	280	645	643	0	0	643	0	743	335	1078	0	0	0	0	2366
*** BREAK ***																	
02:00 PM	0	163	91	254	151	0	0	151	0	239	93	332	0	0	0	0	737
02:15 PM	0	97	60	157	162	0	0	162	0	153	123	276	0	0	0	0	595
02:30 PM	0	120	71	191	155	0	0	155	0	180	118	298	0	0	0	0	644
02:45 PM	0	123	63	186	124	0	0	124	0	202	79	281	0	0	0	0	591
Total	0	503	285	788	592	0	0	592	0	774	413	1187	0	0	0	0	2567
03:00 PM	0	181	79	260	159	0	0	159	0	190	76	266	0	0	0	0	685
03:15 PM	0	148	83	231	144	0	0	144	0	143	147	290	0	0	0	0	665
03:30 PM	0	176	89	265	150	0	0	150	0	184	190	374	0	0	0	0	789
03:45 PM	0	109	89	198	164	0	0	164	0	150	181	331	0	0	0	0	693
Total	0	614	340	954	617	0	0	617	0	667	594	1261	0	0	0	0	2832
04:00 PM	0	121	97	218	165	0	0	165	0	178	145	323	0	0	0	0	706
04:15 PM	0	78	95	173	188	0	0	188	0	122	140	262	0	0	0	0	623
04:30 PM	0	121	129	250	168	0	0	168	0	127	134	261	0	0	0	0	679
04:45 PM	0	152	160	312	196	0	0	196	0	181	117	298	0	0	0	0	806
Total	0	472	481	953	717	0	0	717	0	608	536	1144	0	0	0	0	2814
05:00 PM	0	173	147	320	201	0	0	201	0	146	134	280	0	0	0	0	801
05:15 PM	0	123	132	255	150	0	0	150	0	132	133	265	0	0	0	0	670
05:30 PM	0	125	142	267	156	0	0	156	0	154	113	267	0	0	0	0	690
05:45 PM	0	57	122	179	165	0	0	165	0	105	106	211	0	0	0	0	555
Total	0	478	543	1021	672	0	0	672	0	537	486	1023	0	0	0	0	2716
Grand Total	0	3710	2870	6580	5280	0	0	5280	0	5722	3269	8991	0	0	0	0	20851
Apprch %	0	56.4	43.6		100	0	0		0	63.6	36.4		0	0	0		
Total %	0	17.8	13.8	31.6	25.3	0	0	25.3	0	27.4	15.7	43.1	0	0	0	0	

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Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	109	54	163	175	0	0	175	0	207	66	273	0	0	0	0	611
07:30 AM	0	150	87	237	175	0	0	175	0	302	88	390	0	0	0	0	802
07:45 AM	0	80	102	182	214	0	0	214	0	222	83	305	0	0	0	0	701
08:00 AM	0	107	81	188	155	0	0	155	0	233	67	300	0	0	0	0	643
Total Volume	0	446	324	770	719	0	0	719	0	964	304	1268	0	0	0	0	2757
% App. Total	0	57.9	42.1		100	0	0		0	76	24		0	0	0		
PHF	.000	.743	.794	.812	.840	.000	.000	.840	.000	.798	.864	.813	.000	.000	.000	.000	.859

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	0	140	60	200	182	0	0	182	0	200	60	260	0	0	0	0	642
12:00 PM	0	66	69	135	193	0	0	193	0	164	94	258	0	0	0	0	586
12:15 PM	0	85	77	162	156	0	0	156	0	191	74	265	0	0	0	0	583
12:30 PM	0	132	65	197	176	0	0	176	0	187	87	274	0	0	0	0	647
Total Volume	0	423	271	694	707	0	0	707	0	742	315	1057	0	0	0	0	2458
% App. Total	0	61	39		100	0	0		0	70.2	29.8		0	0	0		
PHF	.000	.755	.880	.868	.916	.000	.000	.916	.000	.928	.838	.964	.000	.000	.000	.000	.950

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	0	181	79	260	159	0	0	159	0	190	76	266	0	0	0	0	685
03:15 PM	0	148	83	231	144	0	0	144	0	143	147	290	0	0	0	0	665
03:30 PM	0	176	89	265	150	0	0	150	0	184	190	374	0	0	0	0	789
03:45 PM	0	109	89	198	164	0	0	164	0	150	181	331	0	0	0	0	693
Total Volume	0	614	340	954	617	0	0	617	0	667	594	1261	0	0	0	0	2832
% App. Total	0	64.4	35.6		100	0	0		0	52.9	47.1		0	0	0		
PHF	.000	.848	.955	.900	.941	.000	.000	.941	.000	.878	.782	.843	.000	.000	.000	.000	.897

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	152	160	312	196	0	0	196	0	181	117	298	0	0	0	0	806
05:00 PM	0	173	147	320	201	0	0	201	0	146	134	280	0	0	0	0	801
05:15 PM	0	123	132	255	150	0	0	150	0	132	133	265	0	0	0	0	670
05:30 PM	0	125	142	267	156	0	0	156	0	154	113	267	0	0	0	0	690
Total Volume	0	573	581	1154	703	0	0	703	0	613	497	1110	0	0	0	0	2967
% App. Total	0	49.7	50.3		100	0	0		0	55.2	44.8		0	0	0		
PHF	.000	.828	.908	.902	.874	.000	.000	.874	.000	.847	.927	.931	.000	.000	.000	.000	.920

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	CEDAR BLUFF RD Southbound				EXECUTIVE PARK DR Westbound				CEDAR BLUFF RD Northbound				EXECUTIVE PARK DR Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	97	4	102	31	42	23	96	47	101	28	176	5	3	35	43	417
07:15 AM	2	121	8	131	52	61	21	134	48	124	35	207	6	6	27	39	511
07:30 AM	11	151	6	168	45	93	35	173	78	196	28	302	20	18	62	100	743
07:45 AM	2	108	14	124	40	54	24	118	55	126	41	222	5	9	45	59	523
Total	16	477	32	525	168	250	103	521	228	547	132	907	36	36	169	241	2194
08:00 AM	6	119	14	139	29	78	31	138	68	111	54	233	4	16	39	59	569
08:15 AM	9	123	23	155	16	73	23	112	65	92	39	196	8	15	26	49	512
08:30 AM	9	75	9	93	25	60	38	123	48	114	27	189	3	10	23	36	441
08:45 AM	4	98	22	124	19	61	23	103	43	113	33	189	7	12	31	50	466
Total	28	415	68	511	89	272	115	476	224	430	153	807	22	53	119	194	1988
*** BREAK ***																	
11:00 AM	3	123	16	142	34	46	38	118	59	130	14	203	20	23	73	116	579
11:15 AM	3	74	4	81	13	34	15	62	21	97	12	130	1	8	28	37	310
11:30 AM	5	87	8	100	38	39	21	98	37	93	16	146	19	10	45	74	418
11:45 AM	2	115	13	130	23	40	29	92	67	115	18	200	15	7	57	79	501
Total	13	399	41	453	108	159	103	370	184	435	60	679	55	48	203	306	1808
12:00 PM	5	76	8	89	22	57	20	99	34	108	22	164	14	14	57	85	437
12:15 PM	6	62	6	74	26	50	17	93	47	139	5	191	22	9	45	76	434
12:30 PM	12	93	11	116	33	22	29	84	49	124	14	187	19	3	55	77	464
12:45 PM	2	96	7	105	29	52	20	101	55	133	13	201	21	7	28	56	463
Total	25	327	32	384	110	181	86	377	185	504	54	743	76	33	185	294	1798
*** BREAK ***																	
02:00 PM	7	129	10	146	38	65	27	130	35	175	29	239	31	1	64	96	611
02:15 PM	3	61	5	69	46	30	28	104	39	100	14	153	21	1	33	55	381
02:30 PM	2	100	4	106	32	21	31	84	33	134	13	180	14	3	43	60	430
02:45 PM	7	63	5	75	39	26	30	95	47	131	24	202	26	2	70	98	470
Total	19	353	24	396	155	142	116	413	154	540	80	774	92	7	210	309	1892
03:00 PM	4	96	6	106	45	7	34	86	42	133	15	190	17	0	83	100	482
03:15 PM	2	85	5	92	42	8	19	69	28	95	20	143	18	5	70	93	397
03:30 PM	0	88	8	96	52	13	30	95	50	118	16	184	13	2	93	108	483
03:45 PM	2	110	11	123	56	23	30	109	33	109	8	150	15	5	54	74	456
Total	8	379	30	417	195	51	113	359	153	455	59	667	63	12	300	375	1818
04:00 PM	8	116	9	133	69	18	38	125	24	141	13	178	17	1	54	72	508
04:15 PM	1	54	6	61	45	3	31	79	22	95	5	122	21	0	40	61	323
04:30 PM	7	90	8	105	49	3	26	78	29	83	15	127	14	0	48	62	372
04:45 PM	2	87	8	97	60	23	29	112	38	128	15	181	14	7	67	88	478
Total	18	347	31	396	223	47	124	394	113	447	48	608	66	8	209	283	1681
05:00 PM	12	96	3	111	72	13	26	111	27	103	16	146	14	3	68	85	453
05:15 PM	1	92	7	100	38	12	28	78	34	91	7	132	8	3	45	56	366
05:30 PM	10	115	5	130	61	7	40	108	33	104	17	154	18	2	53	73	465
05:45 PM	4	70	4	78	36	8	26	70	22	78	5	105	8	0	22	30	283
Total	27	373	19	419	207	40	120	367	116	376	45	537	48	8	188	244	1567
Grand Total	154	3070	277	3501	1255	1142	880	3277	1357	3734	631	5722	458	205	1583	2246	14746
Apprch %	4.4	87.7	7.9		38.3	34.8	26.9		23.7	65.3	11		20.4	9.1	70.5		
Total %	1	20.8	1.9	23.7	8.5	7.7	6	22.2	9.2	25.3	4.3	38.8	3.1	1.4	10.7	15.2	

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	CEDAR BLUFF RD Southbound				EXECUTIVE PARK DR Westbound				CEDAR BLUFF RD Northbound				EXECUTIVE PARK DR Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	11	151	6	168	45	93	35	173	78	196	28	302	20	18	62	100	743
07:45 AM	2	108	14	124	40	54	24	118	55	126	41	222	5	9	45	59	523
08:00 AM	6	119	14	139	29	78	31	138	68	111	54	233	4	16	39	59	569
08:15 AM	9	123	23	155	16	73	23	112	65	92	39	196	8	15	26	49	512
Total Volume	28	501	57	586	130	298	113	541	266	525	162	953	37	58	172	267	2347
% App. Total	4.8	85.5	9.7		24	55.1	20.9		27.9	55.1	17		13.9	21.7	64.4		
PHF	.636	.829	.620	.872	.722	.801	.807	.782	.853	.670	.750	.789	.463	.806	.694	.668	.790

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	2	115	13	130	23	40	29	92	67	115	18	200	15	7	57	79	501
12:00 PM	5	76	8	89	22	57	20	99	34	108	22	164	14	14	57	85	437
12:15 PM	6	62	6	74	26	50	17	93	47	139	5	191	22	9	45	76	434
12:30 PM	12	93	11	116	33	22	29	84	49	124	14	187	19	3	55	77	464
Total Volume	25	346	38	409	104	169	95	368	197	486	59	742	70	33	214	317	1836
% App. Total	6.1	84.6	9.3		28.3	45.9	25.8		26.5	65.5	8		22.1	10.4	67.5		
PHF	.521	.752	.731	.787	.788	.741	.819	.929	.735	.874	.670	.928	.795	.589	.939	.932	.916

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	7	129	10	146	38	65	27	130	35	175	29	239	31	1	64	96	611
02:15 PM	3	61	5	69	46	30	28	104	39	100	14	153	21	1	33	55	381
02:30 PM	2	100	4	106	32	21	31	84	33	134	13	180	14	3	43	60	430
02:45 PM	7	63	5	75	39	26	30	95	47	131	24	202	26	2	70	98	470
Total Volume	19	353	24	396	155	142	116	413	154	540	80	774	92	7	210	309	1892
% App. Total	4.8	89.1	6.1		37.5	34.4	28.1		19.9	69.8	10.3		29.8	2.3	68		
PHF	.679	.684	.600	.678	.842	.546	.935	.794	.819	.771	.690	.810	.742	.583	.750	.788	.774

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	2	87	8	97	60	23	29	112	38	128	15	181	14	7	67	88	478
05:00 PM	12	96	3	111	72	13	26	111	27	103	16	146	14	3	68	85	453
05:15 PM	1	92	7	100	38	12	28	78	34	91	7	132	8	3	45	56	366
05:30 PM	10	115	5	130	61	7	40	108	33	104	17	154	18	2	53	73	465
Total Volume	25	390	23	438	231	55	123	409	132	426	55	613	54	15	233	302	1762
% App. Total	5.7	89	5.3		56.5	13.4	30.1		21.5	69.5	9		17.9	5	77.2		
PHF	.521	.848	.719	.842	.802	.598	.769	.913	.868	.832	.809	.847	.750	.536	.857	.858	.922

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File Name : CedarBluff_Sherrill
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	CEDAR BLUFF RD Southbound				SHERRILL BLVD Westbound				CEDAR BLUFF RD Northbound				SHERRILL BLVD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	7	176	9	192	0	0	1	1	19	107	34	160	12	0	20	32	385
07:15 AM	6	226	14	246	2	1	1	4	77	147	29	253	13	7	23	43	546
07:30 AM	19	227	47	293	2	1	1	4	33	213	23	269	6	5	30	41	607
07:45 AM	22	237	33	292	1	0	1	2	22	106	33	161	5	1	24	30	485
Total	54	866	103	1023	5	2	4	11	151	573	119	843	36	13	97	146	2023
08:00 AM	19	240	40	299	6	0	1	7	35	140	72	247	6	5	30	41	594
08:15 AM	16	206	28	250	0	0	2	2	92	170	31	293	7	8	31	46	591
08:30 AM	5	216	40	261	7	0	4	11	55	137	30	222	14	4	28	46	540
08:45 AM	4	221	32	257	4	1	3	8	24	152	61	237	14	4	42	60	562
Total	44	883	140	1067	17	1	10	28	206	599	194	999	41	21	131	193	2287
*** BREAK ***																	
11:00 AM	6	155	5	166	14	0	1	15	26	130	8	164	16	0	14	30	375
11:15 AM	6	161	14	181	13	0	0	13	33	123	13	169	22	0	18	40	403
11:30 AM	7	202	14	223	23	3	3	29	35	162	13	210	25	3	22	50	512
11:45 AM	4	199	11	214	29	4	6	39	47	183	6	236	33	4	27	64	553
Total	23	717	44	784	79	7	10	96	141	598	40	779	96	7	81	184	1843
12:00 PM	6	224	7	237	31	1	9	41	43	212	9	264	28	5	48	81	623
12:15 PM	5	178	19	202	22	1	4	27	40	169	16	225	31	6	37	74	528
12:30 PM	5	168	14	187	17	1	9	27	39	145	22	206	19	5	19	43	463
12:45 PM	8	202	14	224	20	3	3	26	53	155	37	245	25	4	27	56	551
Total	24	772	54	850	90	6	25	121	175	681	84	940	103	20	131	254	2165
*** BREAK ***																	
02:00 PM	5	219	4	228	17	0	10	27	22	193	15	230	12	4	13	29	514
02:15 PM	2	240	10	252	17	0	2	19	27	169	3	199	9	0	5	14	484
02:30 PM	2	157	2	161	12	0	4	16	25	137	25	187	5	0	10	15	379
02:45 PM	11	124	4	139	2	0	4	6	18	78	7	103	17	0	4	21	269
Total	20	740	20	780	48	0	20	68	92	577	50	719	43	4	32	79	1646
03:00 PM	2	276	0	278	25	0	2	27	25	184	14	223	16	0	24	40	568
03:15 PM	5	192	0	197	10	0	0	10	20	131	3	154	12	0	10	22	383
03:30 PM	2	232	4	238	18	0	0	18	8	145	11	164	17	0	25	42	462
03:45 PM	6	209	6	221	16	0	0	16	23	122	9	154	27	0	13	40	431
Total	15	909	10	934	69	0	2	71	76	582	37	695	72	0	72	144	1844
04:00 PM	8	215	4	227	11	0	0	11	35	143	12	190	17	0	24	41	469
04:15 PM	7	179	8	194	15	0	1	16	27	140	4	171	12	0	3	15	396
04:30 PM	3	241	4	248	17	0	2	19	16	145	0	161	33	0	21	54	482
04:45 PM	3	178	2	183	17	0	2	19	18	130	5	153	31	0	4	35	390
Total	21	813	18	852	60	0	5	65	96	558	21	675	93	0	52	145	1737
05:00 PM	0	214	3	217	36	0	0	36	12	136	0	148	32	0	12	44	445
05:15 PM	4	192	0	196	0	0	0	0	15	138	5	158	28	3	13	44	398
05:30 PM	0	281	0	281	30	0	3	33	7	246	6	259	38	0	11	49	622
05:45 PM	2	176	0	178	17	0	2	19	4	138	9	151	12	0	3	15	363
Total	6	863	3	872	83	0	5	88	38	658	20	716	110	3	39	152	1828
Grand Total	207	6563	392	7162	451	16	81	548	975	4826	565	6366	594	68	635	1297	15373
Apprch %	2.9	91.6	5.5		82.3	2.9	14.8		15.3	75.8	8.9		45.8	5.2	49		
Total %	1.3	42.7	2.5	46.6	2.9	0.1	0.5	3.6	6.3	31.4	3.7	41.4	3.9	0.4	4.1	8.4	

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	CEDAR BLUFF RD Southbound				SHERRILL BLVD Westbound				CEDAR BLUFF RD Northbound				SHERRILL BLVD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	19	240	40	299	6	0	1	7	35	140	72	247	6	5	30	41	594
08:15 AM	16	206	28	250	0	0	2	2	92	170	31	293	7	8	31	46	591
08:30 AM	5	216	40	261	7	0	4	11	55	137	30	222	14	4	28	46	540
08:45 AM	4	221	32	257	4	1	3	8	24	152	61	237	14	4	42	60	562
Total Volume	44	883	140	1067	17	1	10	28	206	599	194	999	41	21	131	193	2287
% App. Total	4.1	82.8	13.1		60.7	3.6	35.7		20.6	60	19.4		21.2	10.9	67.9		
PHF	.579	.920	.875	.892	.607	.250	.625	.636	.560	.881	.674	.852	.732	.656	.780	.804	.963

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	7	202	14	223	23	3	3	29	35	162	13	210	25	3	22	50	512
11:45 AM	4	199	11	214	29	4	6	39	47	183	6	236	33	4	27	64	553
12:00 PM	6	224	7	237	31	1	9	41	43	212	9	264	28	5	48	81	623
12:15 PM	5	178	19	202	22	1	4	27	40	169	16	225	31	6	37	74	528
Total Volume	22	803	51	876	105	9	22	136	165	726	44	935	117	18	134	269	2216
% App. Total	2.5	91.7	5.8		77.2	6.6	16.2		17.6	77.6	4.7		43.5	6.7	49.8		
PHF	.786	.896	.671	.924	.847	.563	.611	.829	.878	.856	.688	.885	.886	.750	.698	.830	.889

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	2	276	0	278	25	0	2	27	25	184	14	223	16	0	24	40	568
03:15 PM	5	192	0	197	10	0	0	10	20	131	3	154	12	0	10	22	383
03:30 PM	2	232	4	238	18	0	0	18	8	145	11	164	17	0	25	42	462
03:45 PM	6	209	6	221	16	0	0	16	23	122	9	154	27	0	13	40	431
Total Volume	15	909	10	934	69	0	2	71	76	582	37	695	72	0	72	144	1844
% App. Total	1.6	97.3	1.1		97.2	0	2.8		10.9	83.7	5.3		50	0	50		
PHF	.625	.823	.417	.840	.690	.000	.250	.657	.760	.791	.661	.779	.667	.000	.720	.857	.812

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	3	178	2	183	17	0	2	19	18	130	5	153	31	0	4	35	390
05:00 PM	0	214	3	217	36	0	0	36	12	136	0	148	32	0	12	44	445
05:15 PM	4	192	0	196	0	0	0	0	15	138	5	158	28	3	13	44	398
05:30 PM	0	281	0	281	30	0	3	33	7	246	6	259	38	0	11	49	622
Total Volume	7	865	5	877	83	0	5	88	52	650	16	718	129	3	40	172	1855
% App. Total	0.8	98.6	0.6		94.3	0	5.7		7.2	90.5	2.2		75	1.7	23.3		
PHF	.438	.770	.417	.780	.576	.000	.417	.611	.722	.661	.667	.693	.849	.250	.769	.878	.746

CDM SMITH Inc.
1100 Marion Street, Suite 300
Knoxville, TN 37921
(865) 963-4300

File Name : cedarbluff_foxlonas_balanced

Site Code : 00000001

Start Date : 5/4/2017

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Groups Printed- Unshifted

	CEDAR BLUFF RD Southbound				FOX LONAS DR Westbound				CEDAR BLUFF RD Northbound				FOX LONAS DR Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	19	156	0	175	40	0	30	70	0	102	11	113	0	0	0	0	358
07:15 AM	59	111	1	171	29	0	27	56	1	149	39	189	0	0	0	0	416
07:30 AM	107	186	0	293	34	0	32	66	1	241	136	378	0	0	0	0	737
07:45 AM	131	95	1	227	55	0	37	92	0	176	109	285	0	0	0	0	604
Total	316	548	2	866	158	0	126	284	2	668	295	965	0	0	0	0	2115
08:00 AM	61	136	0	197	32	0	15	47	0	152	39	191	0	0	0	0	435
08:15 AM	24	166	1	191	23	0	20	43	0	138	25	163	0	0	0	0	397
08:30 AM	25	211	0	236	13	0	13	26	0	115	22	137	0	0	0	0	399
08:45 AM	21	199	0	220	24	0	3	27	0	120	40	160	0	0	0	0	407
Total	131	712	1	844	92	0	51	143	0	525	126	651	0	0	0	0	1638
*** BREAK ***																	
11:00 AM	26	120	0	146	20	0	11	31	0	145	31	176	0	0	0	0	353
11:15 AM	6	158	0	164	11	0	14	25	0	148	26	174	0	0	0	0	363
11:30 AM	0	150	0	150	15	0	8	23	0	137	0	137	0	0	0	0	310
11:45 AM	24	171	1	196	17	0	5	22	0	133	30	163	0	0	0	0	381
Total	56	599	1	656	63	0	38	101	0	563	87	650	0	0	0	0	1407
12:00 PM	31	184	0	215	20	0	5	25	0	157	36	193	0	0	0	0	433
12:15 PM	12	199	0	211	19	0	16	35	0	129	23	152	0	0	0	0	398
12:30 PM	7	198	0	205	15	0	8	23	0	141	27	168	0	0	0	0	396
12:45 PM	15	141	0	156	17	0	3	20	0	135	37	172	0	0	0	0	348
Total	65	722	0	787	71	0	32	103	0	562	123	685	0	0	0	0	1575
*** BREAK ***																	
02:00 PM	14	116	0	130	23	0	12	35	0	147	31	178	0	0	0	0	343
02:15 PM	10	112	0	122	10	0	16	26	0	143	26	169	0	0	0	0	317
02:30 PM	21	121	0	142	17	0	10	27	0	156	46	202	0	0	0	0	371
02:45 PM	13	92	0	105	35	0	2	37	0	161	32	193	0	0	0	0	335
Total	58	441	0	499	85	0	40	125	0	607	135	742	0	0	0	0	1366
03:00 PM	39	114	0	153	32	0	2	34	0	150	36	186	0	0	0	0	373
03:15 PM	30	104	0	134	14	0	6	20	0	132	47	179	0	0	0	0	333
03:30 PM	14	156	0	170	20	0	2	22	0	196	35	231	0	0	0	0	423
03:45 PM	11	161	0	172	6	0	10	16	0	156	23	179	0	0	0	0	367
Total	94	535	0	629	72	0	20	92	0	634	141	775	0	0	0	0	1496
04:00 PM	14	195	0	209	19	0	7	26	0	151	60	211	0	0	0	0	446
04:15 PM	25	187	0	212	11	0	10	21	0	140	42	182	0	0	0	0	415
04:30 PM	16	171	0	187	19	0	17	36	0	183	58	241	0	0	0	0	464
04:45 PM	5	201	0	206	4	0	10	14	0	162	52	214	0	0	0	0	434
Total	60	754	0	814	53	0	44	97	0	636	212	848	0	0	0	0	1759
05:00 PM	10	223	0	233	14	0	13	27	0	186	66	252	0	0	0	0	512
05:15 PM	16	220	0	236	21	0	11	32	0	202	55	257	0	0	0	0	525
05:30 PM	13	209	0	222	18	0	10	28	0	164	44	208	0	0	0	0	458
05:45 PM	11	212	0	223	16	0	10	26	0	181	42	223	0	0	0	0	472
Total	50	864	0	914	69	0	44	113	0	733	207	940	0	0	0	0	1967
Grand Total	830	5175	4	6009	663	0	395	1058	2	4928	1326	6256	0	0	0	0	13323
Apprch %	13.8	86.1	0.1		62.7	0	37.3		0	78.8	21.2		0	0	0		
Total %	6.2	38.8	0	45.1	5	0	3	7.9	0	37	10	47	0	0	0	0	

CDM SMITH Inc.
1100 Marion Street, Suite 300
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File Name : cedarbluff_foxlonas_balanced
Site Code : 00000001
Start Date : 5/4/2017
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	CEDAR BLUFF RD Southbound				FOX LONAS DR Westbound				CEDAR BLUFF RD Northbound				FOX LONAS DR Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	59	111	1	171	29	0	27	56	1	149	39	189	0	0	0	0	416
07:30 AM	107	186	0	293	34	0	32	66	1	241	136	378	0	0	0	0	737
07:45 AM	131	95	1	227	55	0	37	92	0	176	109	285	0	0	0	0	604
08:00 AM	61	136	0	197	32	0	15	47	0	152	39	191	0	0	0	0	435
Total Volume	358	528	2	888	150	0	111	261	2	718	323	1043	0	0	0	0	2192
% App. Total	40.3	59.5	0.2		57.5	0	42.5		0.2	68.8	31		0	0	0		
PHF	.683	.710	.500	.758	.682	.000	.750	.709	.500	.745	.594	.690	.000	.000	.000	.000	.744

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	24	171	1	196	17	0	5	22	0	133	30	163	0	0	0	0	381
12:00 PM	31	184	0	215	20	0	5	25	0	157	36	193	0	0	0	0	433
12:15 PM	12	199	0	211	19	0	16	35	0	129	23	152	0	0	0	0	398
12:30 PM	7	198	0	205	15	0	8	23	0	141	27	168	0	0	0	0	396
Total Volume	74	752	1	827	71	0	34	105	0	560	116	676	0	0	0	0	1608
% App. Total	8.9	90.9	0.1		67.6	0	32.4		0	82.8	17.2		0	0	0		
PHF	.597	.945	.250	.962	.888	.000	.531	.750	.000	.892	.806	.876	.000	.000	.000	.000	.928

Peak Hour Analysis From 01:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	39	114	0	153	32	0	2	34	0	150	36	186	0	0	0	0	373
03:15 PM	30	104	0	134	14	0	6	20	0	132	47	179	0	0	0	0	333
03:30 PM	14	156	0	170	20	0	2	22	0	196	35	231	0	0	0	0	423
03:45 PM	11	161	0	172	6	0	10	16	0	156	23	179	0	0	0	0	367
Total Volume	94	535	0	629	72	0	20	92	0	634	141	775	0	0	0	0	1496
% App. Total	14.9	85.1	0		78.3	0	21.7		0	81.8	18.2		0	0	0		
PHF	.603	.831	.000	.914	.563	.000	.500	.676	.000	.809	.750	.839	.000	.000	.000	.000	.884

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	10	223	0	233	14	0	13	27	0	186	66	252	0	0	0	0	512
05:15 PM	16	220	0	236	21	0	11	32	0	202	55	257	0	0	0	0	525
05:30 PM	13	209	0	222	18	0	10	28	0	164	44	208	0	0	0	0	458
05:45 PM	11	212	0	223	16	0	10	26	0	181	42	223	0	0	0	0	472
Total Volume	50	864	0	914	69	0	44	113	0	733	207	940	0	0	0	0	1967
% App. Total	5.5	94.5	0		61.1	0	38.9		0	78	22		0	0	0		
PHF	.781	.969	.000	.968	.821	.000	.846	.883	.000	.907	.784	.914	.000	.000	.000	.000	.937

CDM SMITH Inc.
1100 Marion Street, Suite 300
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(865) 963-4300

File Name : cedarbluff_dutchtown
Site Code : 00000000
Start Date : 5/4/2017
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Groups Printed- Unshifted

	CEDAR BLUFF RD Southbound				DUTCHTOWN RD Westbound				CEDAR BLUFF RD Northbound				DUTCHTOWN RD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	166	26	196	1	16	2	19	13	93	1	107	7	5	19	31	353
07:15 AM	4	120	16	140	14	27	7	48	26	116	3	145	26	7	18	51	384
07:30 AM	7	159	54	220	13	62	10	85	69	191	1	261	40	14	18	72	638
07:45 AM	11	100	39	150	9	38	4	51	74	148	3	225	24	18	14	56	482
Total	26	545	135	706	37	143	23	203	182	548	8	738	97	44	69	210	1857
08:00 AM	7	121	40	168	14	25	3	42	51	125	3	179	24	14	14	52	441
08:15 AM	3	148	38	189	9	35	1	45	70	125	1	196	12	16	14	42	472
08:30 AM	1	204	19	224	9	20	4	33	25	99	4	128	12	8	26	46	431
08:45 AM	4	194	25	223	5	17	1	23	23	107	5	135	12	8	18	38	419
Total	15	667	122	804	37	97	9	143	169	456	13	638	60	46	72	178	1763
*** BREAK ***																	
11:00 AM	4	130	6	140	5	17	5	27	29	127	3	159	13	15	21	49	375
11:15 AM	5	154	10	169	3	17	2	22	21	135	9	165	11	6	20	37	393
11:30 AM	3	149	13	165	5	9	5	19	26	117	10	153	15	13	12	40	377
11:45 AM	1	171	16	188	7	19	1	27	28	123	8	159	9	6	8	23	397
Total	13	604	45	662	20	62	13	95	104	502	30	636	48	40	61	149	1542
12:00 PM	2	188	14	204	23	12	2	37	43	140	7	190	15	8	12	35	466
12:15 PM	8	200	10	218	8	18	4	30	29	110	14	153	15	9	15	39	440
12:30 PM	5	194	14	213	4	17	1	22	28	120	11	159	20	11	15	46	440
12:45 PM	5	138	15	158	0	16	1	17	53	120	9	182	14	13	9	36	393
Total	20	720	53	793	35	63	8	106	153	490	41	684	64	41	51	156	1739
*** BREAK ***																	
02:00 PM	5	115	19	139	6	9	4	19	45	123	8	176	20	7	22	49	383
02:15 PM	1	107	14	122	6	16	5	27	29	123	9	161	15	9	20	44	354
02:30 PM	5	119	14	138	4	25	11	40	28	135	6	169	10	6	12	28	375
02:45 PM	11	96	20	127	3	22	6	31	35	132	13	180	23	6	14	43	381
Total	22	437	67	526	19	72	26	117	137	513	36	686	68	28	68	164	1493
03:00 PM	3	119	24	146	7	32	3	42	33	138	7	178	9	15	22	46	412
03:15 PM	2	92	24	118	10	32	7	49	50	106	4	160	19	11	13	43	370
03:30 PM	4	145	27	176	2	40	4	46	44	178	5	227	14	12	15	41	490
03:45 PM	6	134	27	167	0	21	2	23	43	120	9	172	34	21	25	80	442
Total	15	490	102	607	19	125	16	160	170	542	25	737	76	59	75	210	1714
04:00 PM	5	185	24	214	3	23	5	31	42	120	12	174	26	13	14	53	472
04:15 PM	3	176	19	198	0	23	2	25	34	113	16	163	25	18	19	62	448
04:30 PM	4	172	14	190	6	37	1	44	32	147	8	187	35	22	22	79	500
04:45 PM	1	198	6	205	8	28	2	38	33	113	4	150	47	16	15	78	471
Total	13	731	63	807	17	111	10	138	141	493	40	674	133	69	70	272	1891
05:00 PM	4	224	9	237	4	41	0	45	39	159	10	208	27	21	10	58	548
05:15 PM	4	212	25	241	1	28	15	44	30	150	6	186	37	26	13	76	547
05:30 PM	6	181	22	209	10	25	8	43	46	104	4	154	52	21	10	83	489
05:45 PM	5	176	31	212	5	39	4	48	75	130	9	214	47	15	15	77	551
Total	19	793	87	899	20	133	27	180	190	543	29	762	163	83	48	294	2135
Grand Total	143	4987	674	5804	204	806	132	1142	1246	4087	222	5555	709	410	514	1633	14134
Apprch %	2.5	85.9	11.6		17.9	70.6	11.6		22.4	73.6	4		43.4	25.1	31.5		
Total %	1	35.3	4.8	41.1	1.4	5.7	0.9	8.1	8.8	28.9	1.6	39.3	5	2.9	3.6	11.6	

CDM SMITH Inc.
1100 Marion Street, Suite 300
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File Name : cedarbluff_dutchtown
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	CEDAR BLUFF RD Southbound				DUTCHTOWN RD Westbound				CEDAR BLUFF RD Northbound				DUTCHTOWN RD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	7	159	54	220	13	62	10	85	69	191	1	261	40	14	18	72	638
07:45 AM	11	100	39	150	9	38	4	51	74	148	3	225	24	18	14	56	482
08:00 AM	7	121	40	168	14	25	3	42	51	125	3	179	24	14	14	52	441
08:15 AM	3	148	38	189	9	35	1	45	70	125	1	196	12	16	14	42	472
Total Volume	28	528	171	727	45	160	18	223	264	589	8	861	100	62	60	222	2033
% App. Total	3.9	72.6	23.5		20.2	71.7	8.1		30.7	68.4	0.9		45	27.9	27		
PHF	.636	.830	.792	.826	.804	.645	.450	.656	.892	.771	.667	.825	.625	.861	.833	.771	.797

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	1	171	16	188	7	19	1	27	28	123	8	159	9	6	8	23	397
12:00 PM	2	188	14	204	23	12	2	37	43	140	7	190	15	8	12	35	466
12:15 PM	8	200	10	218	8	18	4	30	29	110	14	153	15	9	15	39	440
12:30 PM	5	194	14	213	4	17	1	22	28	120	11	159	20	11	15	46	440
Total Volume	16	753	54	823	42	66	8	116	128	493	40	661	59	34	50	143	1743
% App. Total	1.9	91.5	6.6		36.2	56.9	6.9		19.4	74.6	6.1		41.3	23.8	35		
PHF	.500	.941	.844	.944	.457	.868	.500	.784	.744	.880	.714	.870	.738	.773	.833	.777	.935

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	3	119	24	146	7	32	3	42	33	138	7	178	9	15	22	46	412
03:15 PM	2	92	24	118	10	32	7	49	50	106	4	160	19	11	13	43	370
03:30 PM	4	145	27	176	2	40	4	46	44	178	5	227	14	12	15	41	490
03:45 PM	6	134	27	167	0	21	2	23	43	120	9	172	34	21	25	80	442
Total Volume	15	490	102	607	19	125	16	160	170	542	25	737	76	59	75	210	1714
% App. Total	2.5	80.7	16.8		11.9	78.1	10		23.1	73.5	3.4		36.2	28.1	35.7		
PHF	.625	.845	.944	.862	.475	.781	.571	.816	.850	.761	.694	.812	.559	.702	.750	.656	.874

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	4	224	9	237	4	41	0	45	39	159	10	208	27	21	10	58	548
05:15 PM	4	212	25	241	1	28	15	44	30	150	6	186	37	26	13	76	547
05:30 PM	6	181	22	209	10	25	8	43	46	104	4	154	52	21	10	83	489
05:45 PM	5	176	31	212	5	39	4	48	75	130	9	214	47	15	15	77	551
Total Volume	19	793	87	899	20	133	27	180	190	543	29	762	163	83	48	294	2135
% App. Total	2.1	88.2	9.7		11.1	73.9	15		24.9	71.3	3.8		55.4	28.2	16.3		
PHF	.792	.885	.702	.933	.500	.811	.450	.938	.633	.854	.725	.890	.784	.798	.800	.886	.969

CDM SMITH Inc.
1100 Marion Street, Suite 300
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File Name : Sherrill_Park40
Site Code : 00000001
Start Date : 5/16/2017
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Groups Printed- Unshifted

	PARK 40 BLVD Southbound				SHERRILL BLVD Westbound				PARK 40 BLVD Northbound				SHERRILL BLVD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	6	11	2	19	2	23	20	45	1	3	1	5	13	24	2	39	108
07:15 AM	3	18	2	23	6	49	38	93	0	8	1	9	10	29	2	41	166
07:30 AM	14	48	4	66	3	70	50	123	1	11	2	14	14	25	2	41	244
07:45 AM	22	73	13	108	9	66	54	129	2	5	0	7	9	26	4	39	283
Total	45	150	21	216	20	208	162	390	4	27	4	35	46	104	10	160	801
08:00 AM	12	58	7	77	16	81	37	134	1	5	2	8	7	31	4	42	261
08:15 AM	15	28	2	45	9	74	22	105	0	2	0	2	8	19	4	31	183
08:30 AM	5	12	2	19	3	78	9	90	1	4	2	7	2	30	3	35	151
08:45 AM	3	11	6	20	5	77	6	88	0	3	1	4	4	24	1	29	141
Total	35	109	17	161	33	310	74	417	2	14	5	21	21	104	12	137	736
*** BREAK ***																	
11:00 AM	4	9	0	13	1	30	5	36	1	5	4	10	3	40	4	47	106
11:15 AM	8	6	1	15	3	36	10	49	0	2	2	4	2	40	2	44	112
11:30 AM	7	6	0	13	3	45	9	57	0	5	2	7	3	42	2	47	124
11:45 AM	8	15	3	26	11	30	11	52	2	5	4	11	5	51	7	63	152
Total	27	36	4	67	18	141	35	194	3	17	12	32	13	173	15	201	494
12:00 PM	6	17	4	27	12	38	12	62	1	5	3	9	5	53	5	63	161
12:15 PM	6	8	1	15	2	62	8	72	2	4	10	16	6	61	2	69	172
12:30 PM	4	5	1	10	4	51	5	60	2	6	6	14	4	59	3	66	150
12:45 PM	2	6	2	10	5	48	1	54	1	6	4	11	3	49	2	54	129
Total	18	36	8	62	23	199	26	248	6	21	23	50	18	222	12	252	612
*** BREAK ***																	
02:00 PM	6	13	1	20	4	35	9	48	3	8	5	16	3	38	0	41	125
02:15 PM	5	7	1	13	6	53	9	68	0	4	1	5	2	40	2	44	130
02:30 PM	4	8	4	16	3	34	9	46	2	5	2	9	6	48	2	56	127
02:45 PM	13	25	3	41	3	38	11	52	3	4	8	15	4	43	2	49	157
Total	28	53	9	90	16	160	38	214	8	21	16	45	15	169	6	190	539
03:00 PM	10	10	0	20	3	22	17	42	1	11	4	16	6	36	2	44	122
03:15 PM	21	20	4	45	5	26	15	46	1	8	3	12	7	43	2	52	155
03:30 PM	18	15	3	36	6	30	14	50	0	7	3	10	5	40	2	47	143
03:45 PM	10	20	2	32	2	27	8	37	2	0	1	3	3	33	1	37	109
Total	59	65	9	133	16	105	54	175	4	26	11	41	21	152	7	180	529
04:00 PM	22	12	1	35	2	28	5	35	2	7	2	11	5	38	2	45	126
04:15 PM	9	25	5	39	3	21	8	32	6	5	0	11	3	45	1	49	131
04:30 PM	17	29	1	47	1	25	4	30	0	1	5	6	3	47	4	54	137
04:45 PM	27	23	1	51	7	30	13	50	5	7	6	18	7	57	3	67	186
Total	75	89	8	172	13	104	30	147	13	20	13	46	18	187	10	215	580
05:00 PM	9	16	0	25	3	22	16	41	6	4	3	13	10	72	1	83	162
05:15 PM	13	22	3	38	5	43	13	61	2	8	4	14	3	88	3	94	207
05:30 PM	9	16	1	26	3	24	17	44	4	14	2	20	6	64	0	70	160
05:45 PM	12	18	2	32	4	34	6	44	4	4	2	10	2	60	7	69	155
Total	43	72	6	121	15	123	52	190	16	30	11	57	21	284	11	316	684
Grand Total	330	610	82	1022	154	1350	471	1975	56	176	95	327	173	1395	83	1651	4975
Apprch %	32.3	59.7	8		7.8	68.4	23.8		17.1	53.8	29.1		10.5	84.5	5		
Total %	6.6	12.3	1.6	20.5	3.1	27.1	9.5	39.7	1.1	3.5	1.9	6.6	3.5	28	1.7	33.2	

CDM SMITH Inc.
1100 Marion Street, Suite 300
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File Name : Sherrill_Park40
Site Code : 00000001
Start Date : 5/16/2017
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	PARK 40 BLVD Southbound				SHERRILL BLVD Westbound				PARK 40 BLVD Northbound				SHERRILL BLVD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	14	48	4	66	3	70	50	123	1	11	2	14	14	25	2	41	244
07:45 AM	22	73	13	108	9	66	54	129	2	5	0	7	9	26	4	39	283
08:00 AM	12	58	7	77	16	81	37	134	1	5	2	8	7	31	4	42	261
08:15 AM	15	28	2	45	9	74	22	105	0	2	0	2	8	19	4	31	183
Total Volume	63	207	26	296	37	291	163	491	4	23	4	31	38	101	14	153	971
% App. Total	21.3	69.9	8.8		7.5	59.3	33.2		12.9	74.2	12.9		24.8	66	9.2		
PHF	.716	.709	.500	.685	.578	.898	.755	.916	.500	.523	.500	.554	.679	.815	.875	.911	.858

Peak Hour Analysis From 11:00 AM to 01:00 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	8	15	3	26	11	30	11	52	2	5	4	11	5	51	7	63	152
12:00 PM	6	17	4	27	12	38	12	62	1	5	3	9	5	53	5	63	161
12:15 PM	6	8	1	15	2	62	8	72	2	4	10	16	6	61	2	69	172
12:30 PM	4	5	1	10	4	51	5	60	2	6	6	14	4	59	3	66	150
Total Volume	24	45	9	78	29	181	36	246	7	20	23	50	20	224	17	261	635
% App. Total	30.8	57.7	11.5		11.8	73.6	14.6		14	40	46		7.7	85.8	6.5		
PHF	.750	.662	.563	.722	.604	.730	.750	.854	.875	.833	.575	.781	.833	.918	.607	.946	.923

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:45 PM																	
02:45 PM	13	25	3	41	3	38	11	52	3	4	8	15	4	43	2	49	157
03:00 PM	10	10	0	20	3	22	17	42	1	11	4	16	6	36	2	44	122
03:15 PM	21	20	4	45	5	26	15	46	1	8	3	12	7	43	2	52	155
03:30 PM	18	15	3	36	6	30	14	50	0	7	3	10	5	40	2	47	143
Total Volume	62	70	10	142	17	116	57	190	5	30	18	53	22	162	8	192	577
% App. Total	43.7	49.3	7		8.9	61.1	30		9.4	56.6	34		11.5	84.4	4.2		
PHF	.738	.700	.625	.789	.708	.763	.838	.913	.417	.682	.563	.828	.786	.942	1.00	.923	.919

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	27	23	1	51	7	30	13	50	5	7	6	18	7	57	3	67	186
05:00 PM	9	16	0	25	3	22	16	41	6	4	3	13	10	72	1	83	162
05:15 PM	13	22	3	38	5	43	13	61	2	8	4	14	3	88	3	94	207
05:30 PM	9	16	1	26	3	24	17	44	4	14	2	20	6	64	0	70	160
Total Volume	58	77	5	140	18	119	59	196	17	33	15	65	26	281	7	314	715
% App. Total	41.4	55	3.6		9.2	60.7	30.1		26.2	50.8	23.1		8.3	89.5	2.2		
PHF	.537	.837	.417	.686	.643	.692	.868	.803	.708	.589	.625	.813	.650	.798	.583	.835	.864

CDM SMITH Inc.
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File Name : Parkwest_Park40
Site Code : 00000003
Start Date : 5/2/2017
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Groups Printed- Unshifted

	PARK 40 BLVD Southbound				PARKWEST BLVD Westbound				PARK 40 BLVD Northbound				PARKWEST BLVD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	18	0	1	19	0	54	4	58	0	0	0	0	0	43	0	43	120
07:15 AM	41	0	2	43	0	51	5	56	0	0	0	0	0	80	0	80	179
07:30 AM	85	0	8	93	0	122	3	125	0	0	0	0	0	87	0	87	305
07:45 AM	98	0	5	103	0	80	10	90	0	0	0	0	0	53	0	53	246
Total	242	0	16	258	0	307	22	329	0	0	0	0	0	263	0	263	850
08:00 AM	110	0	15	125	0	110	2	112	0	0	0	0	0	69	0	69	306
08:15 AM	32	0	12	44	0	102	1	103	0	0	0	0	2	45	0	47	194
08:30 AM	33	0	0	33	0	21	2	23	0	0	0	0	0	91	0	91	147
08:45 AM	27	0	1	28	0	75	0	75	0	0	0	0	0	91	0	91	194
Total	202	0	28	230	0	308	5	313	0	0	0	0	2	296	0	298	841
*** BREAK ***																	
11:00 AM	4	0	2	6	0	72	0	72	0	0	0	0	0	94	0	94	172
11:15 AM	9	0	4	13	0	76	0	76	0	0	0	0	0	71	0	71	160
11:30 AM	18	0	5	23	0	77	0	77	0	0	0	0	0	102	0	102	202
11:45 AM	7	0	0	7	0	49	0	49	0	0	0	0	0	77	0	77	133
Total	38	0	11	49	0	274	0	274	0	0	0	0	0	344	0	344	667
12:00 PM	6	0	0	6	0	61	0	61	0	0	0	0	0	94	0	94	161
12:15 PM	28	0	3	31	0	54	0	54	0	0	0	0	0	88	0	88	173
12:30 PM	76	0	0	76	0	24	0	24	0	0	0	0	0	88	0	88	188
12:45 PM	37	0	0	37	0	85	0	85	0	0	0	0	0	97	0	97	219
Total	147	0	3	150	0	224	0	224	0	0	0	0	0	367	0	367	741
*** BREAK ***																	
02:00 PM	43	0	0	43	0	39	0	39	0	0	0	0	3	120	0	123	205
02:15 PM	18	0	0	18	0	64	0	64	0	0	0	0	0	57	0	57	139
02:30 PM	13	0	0	13	0	81	0	81	0	0	0	0	0	95	0	95	189
02:45 PM	3	0	2	5	0	66	0	66	0	0	0	0	0	93	0	93	164
Total	77	0	2	79	0	250	0	250	0	0	0	0	3	365	0	368	697
03:00 PM	3	0	8	11	0	35	0	35	0	0	0	0	0	65	0	65	111
03:15 PM	4	0	0	4	0	45	0	45	0	0	0	0	0	52	0	52	101
03:30 PM	0	0	10	10	0	45	0	45	0	0	0	0	0	69	0	69	124
03:45 PM	0	0	0	0	0	31	9	40	0	0	0	0	0	43	0	43	83
Total	7	0	18	25	0	156	9	165	0	0	0	0	0	229	0	229	419
04:00 PM	0	0	0	0	0	28	0	28	0	0	0	0	0	64	0	64	92
04:15 PM	0	0	0	0	0	49	0	49	0	0	0	0	0	65	0	65	114
04:30 PM	8	0	0	8	0	7	0	7	0	0	0	0	0	79	0	79	94
04:45 PM	0	0	0	0	0	55	0	55	0	0	0	0	0	66	0	66	121
Total	8	0	0	8	0	139	0	139	0	0	0	0	0	274	0	274	421
05:00 PM	0	0	0	0	0	97	0	97	0	0	0	0	0	85	0	85	182
05:15 PM	0	0	0	0	0	30	0	30	0	0	0	0	0	33	0	33	63
05:30 PM	7	0	0	7	0	41	0	41	0	0	0	0	0	67	0	67	115
05:45 PM	3	0	0	3	0	62	0	62	0	0	0	0	0	67	0	67	132
Total	10	0	0	10	0	230	0	230	0	0	0	0	0	252	0	252	492
Grand Total	731	0	78	809	0	1888	36	1924	0	0	0	0	5	2390	0	2395	5128
Apprch %	90.4	0	9.6		0	98.1	1.9		0	0	0		0.2	99.8	0		
Total %	14.3	0	1.5	15.8	0	36.8	0.7	37.5	0	0	0	0	0.1	46.6	0	46.7	

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File Name : Parkwest_Park40
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	PARK 40 BLVD Southbound				PARKWEST BLVD Westbound				PARK 40 BLVD Northbound				PARKWEST BLVD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	85	0	8	93	0	122	3	125	0	0	0	0	0	87	0	87	305
07:45 AM	98	0	5	103	0	80	10	90	0	0	0	0	0	53	0	53	246
08:00 AM	110	0	15	125	0	110	2	112	0	0	0	0	0	69	0	69	306
08:15 AM	32	0	12	44	0	102	1	103	0	0	0	0	2	45	0	47	194
Total Volume	325	0	40	365	0	414	16	430	0	0	0	0	2	254	0	256	1051
% App. Total	89	0	11		0	96.3	3.7		0	0	0		0.8	99.2	0		
PHF	.739	.000	.667	.730	.000	.848	.400	.860	.000	.000	.000	.000	.250	.730	.000	.736	.859

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	6	0	0	6	0	61	0	61	0	0	0	0	0	94	0	94	161
12:15 PM	28	0	3	31	0	54	0	54	0	0	0	0	0	88	0	88	173
12:30 PM	76	0	0	76	0	24	0	24	0	0	0	0	0	88	0	88	188
12:45 PM	37	0	0	37	0	85	0	85	0	0	0	0	0	97	0	97	219
Total Volume	147	0	3	150	0	224	0	224	0	0	0	0	0	367	0	367	741
% App. Total	98	0	2		0	100	0		0	0	0		0	100	0		
PHF	.484	.000	.250	.493	.000	.659	.000	.659	.000	.000	.000	.000	.000	.946	.000	.946	.846

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	43	0	0	43	0	39	0	39	0	0	0	0	3	120	0	123	205
02:15 PM	18	0	0	18	0	64	0	64	0	0	0	0	0	57	0	57	139
02:30 PM	13	0	0	13	0	81	0	81	0	0	0	0	0	95	0	95	189
02:45 PM	3	0	2	5	0	66	0	66	0	0	0	0	0	93	0	93	164
Total Volume	77	0	2	79	0	250	0	250	0	0	0	0	3	365	0	368	697
% App. Total	97.5	0	2.5		0	100	0		0	0	0		0.8	99.2	0		
PHF	.448	.000	.250	.459	.000	.772	.000	.772	.000	.000	.000	.000	.250	.760	.000	.748	.850

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	0	49	0	49	0	0	0	0	0	65	0	65	114
04:30 PM	8	0	0	8	0	7	0	7	0	0	0	0	0	79	0	79	94
04:45 PM	0	0	0	0	0	55	0	55	0	0	0	0	0	66	0	66	121
05:00 PM	0	0	0	0	0	97	0	97	0	0	0	0	0	85	0	85	182
Total Volume	8	0	0	8	0	208	0	208	0	0	0	0	0	295	0	295	511
% App. Total	100	0	0		0	100	0		0	0	0		0	100	0		
PHF	.250	.000	.000	.250	.000	.536	.000	.536	.000	.000	.000	.000	.000	.868	.000	.868	.702

CDM SMITH Inc.
1100 Marion Street, Suite 300
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File Name : pellissippi_dutchtown
Site Code : 00000005
Start Date : 5/10/2017
Page No : 1

Groups Printed- Unshifted

	PELLISSIPPI PKWY Southbound				DUTCHTOWN RD Westbound				SHERRILL Northbound				DUTCHTOWN RD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	48	44	58	150	4	94	51	149	4	4	0	8	22	42	47	111	418
07:15 AM	47	60	55	162	1	71	17	89	5	10	0	15	13	52	41	106	372
07:30 AM	92	87	92	271	3	106	38	147	45	21	0	66	20	94	44	158	642
07:45 AM	73	67	43	183	5	82	47	134	65	19	4	88	26	59	19	104	509
Total	260	258	248	766	13	353	153	519	119	54	4	177	81	247	151	479	1941
08:00 AM	75	85	69	229	4	63	38	105	70	21	3	94	40	66	18	124	552
08:15 AM	64	77	51	192	5	22	33	60	41	6	0	47	27	13	27	67	366
08:30 AM	75	48	33	156	0	79	19	98	34	16	0	50	22	67	18	107	411
08:45 AM	60	38	51	149	1	58	18	77	21	11	0	32	8	18	37	63	321
Total	274	248	204	726	10	222	108	340	166	54	3	223	97	164	100	361	1650
*** BREAK ***																	
11:00 AM	36	27	60	123	1	40	10	51	19	21	0	40	33	36	16	85	299
11:15 AM	24	44	55	123	15	12	23	50	15	40	5	60	25	25	30	80	313
11:30 AM	19	56	20	95	0	14	31	45	10	67	1	78	34	35	14	83	301
11:45 AM	3	19	23	45	7	19	19	45	19	47	2	68	32	48	35	115	273
Total	82	146	158	386	23	85	83	191	63	175	8	246	124	144	95	363	1186
12:00 PM	20	47	44	111	6	10	12	28	41	54	6	101	32	40	19	91	331
12:15 PM	21	43	5	69	4	29	17	50	14	44	1	59	12	34	18	64	242
12:30 PM	33	66	17	116	7	11	18	36	32	55	0	87	15	33	14	62	301
12:45 PM	25	37	49	111	4	20	1	25	11	40	3	54	9	9	18	36	226
Total	99	193	115	407	21	70	48	139	98	193	10	301	68	116	69	253	1100
*** BREAK ***																	
02:00 PM	27	36	34	97	15	58	9	82	16	40	1	57	18	28	31	77	313
02:15 PM	42	38	13	93	2	46	13	61	12	22	0	34	17	42	27	86	274
02:30 PM	37	46	35	118	6	48	6	60	11	38	9	58	30	33	27	90	326
02:45 PM	19	31	35	85	4	51	8	63	3	39	0	42	12	29	11	52	242
Total	125	151	117	393	27	203	36	266	42	139	10	191	77	132	96	305	1155
03:00 PM	46	26	13	85	8	41	9	58	6	37	2	45	21	28	18	67	255
03:15 PM	55	16	26	97	0	39	0	39	12	34	0	46	19	20	12	51	233
03:30 PM	27	107	21	155	17	41	41	99	68	35	4	107	33	28	17	78	439
03:45 PM	13	43	19	75	10	55	15	80	142	13	2	157	28	69	32	129	441
Total	141	192	79	412	35	176	65	276	228	119	8	355	101	145	79	325	1368
04:00 PM	54	47	14	115	3	94	16	113	86	11	4	101	24	96	21	141	470
04:15 PM	58	45	11	114	2	105	10	117	77	46	3	126	45	61	39	145	502
04:30 PM	51	34	28	113	4	77	12	93	69	55	0	124	67	101	19	187	517
04:45 PM	70	28	18	116	1	95	8	104	66	61	4	131	47	111	27	185	536
Total	233	154	71	458	10	371	46	427	298	173	11	482	183	369	106	658	2025
05:00 PM	68	24	25	117	0	118	9	127	88	66	5	159	91	186	20	297	700
05:15 PM	63	42	38	143	2	92	11	105	114	41	0	155	61	146	18	225	628
05:30 PM	89	53	16	158	8	82	13	103	73	36	4	113	38	95	21	154	528
05:45 PM	59	40	18	117	3	87	10	100	67	44	1	112	40	91	17	148	477
Total	279	159	97	535	13	379	43	435	342	187	10	539	230	518	76	824	2333
Grand Total	1493	1501	1089	4083	152	1859	582	2593	1356	1094	64	2514	961	1835	772	3568	12758
Apprch %	36.6	36.8	26.7		5.9	71.7	22.4		53.9	43.5	2.5		26.9	51.4	21.6		
Total %	11.7	11.8	8.5	32	1.2	14.6	4.6	20.3	10.6	8.6	0.5	19.7	7.5	14.4	6.1	28	

CDM SMITH Inc.
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	PELLISSIPPI PKWY Southbound				DUTCHTOWN RD Westbound				SHERRILL Northbound				DUTCHTOWN RD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	47	60	55	162	1	71	17	89	5	10	0	15	13	52	41	106	372
07:30 AM	92	87	92	271	3	106	38	147	45	21	0	66	20	94	44	158	642
07:45 AM	73	67	43	183	5	82	47	134	65	19	4	88	26	59	19	104	509
08:00 AM	75	85	69	229	4	63	38	105	70	21	3	94	40	66	18	124	552
Total Volume	287	299	259	845	13	322	140	475	185	71	7	263	99	271	122	492	2075
% App. Total	34	35.4	30.7		2.7	67.8	29.5		70.3	27	2.7		20.1	55.1	24.8		
PHF	.780	.859	.704	.780	.650	.759	.745	.808	.661	.845	.438	.699	.619	.721	.693	.778	.808

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	24	44	55	123	15	12	23	50	15	40	5	60	25	25	30	80	313
11:30 AM	19	56	20	95	0	14	31	45	10	67	1	78	34	35	14	83	301
11:45 AM	3	19	23	45	7	19	19	45	19	47	2	68	32	48	35	115	273
12:00 PM	20	47	44	111	6	10	12	28	41	54	6	101	32	40	19	91	331
Total Volume	66	166	142	374	28	55	85	168	85	208	14	307	123	148	98	369	1218
% App. Total	17.6	44.4	38		16.7	32.7	50.6		27.7	67.8	4.6		33.3	40.1	26.6		
PHF	.688	.741	.645	.760	.467	.724	.685	.840	.518	.776	.583	.760	.904	.771	.700	.802	.920

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	46	26	13	85	8	41	9	58	6	37	2	45	21	28	18	67	255
03:15 PM	55	16	26	97	0	39	0	39	12	34	0	46	19	20	12	51	233
03:30 PM	27	107	21	155	17	41	41	99	68	35	4	107	33	28	17	78	439
03:45 PM	13	43	19	75	10	55	15	80	142	13	2	157	28	69	32	129	441
Total Volume	141	192	79	412	35	176	65	276	228	119	8	355	101	145	79	325	1368
% App. Total	34.2	46.6	19.2		12.7	63.8	23.6		64.2	33.5	2.3		31.1	44.6	24.3		
PHF	.641	.449	.760	.665	.515	.800	.396	.697	.401	.804	.500	.565	.765	.525	.617	.630	.776

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	70	28	18	116	1	95	8	104	66	61	4	131	47	111	27	185	536
05:00 PM	68	24	25	117	0	118	9	127	88	66	5	159	91	186	20	297	700
05:15 PM	63	42	38	143	2	92	11	105	114	41	0	155	61	146	18	225	628
05:30 PM	89	53	16	158	8	82	13	103	73	36	4	113	38	95	21	154	528
Total Volume	290	147	97	534	11	387	41	439	341	204	13	558	237	538	86	861	2392
% App. Total	54.3	27.5	18.2		2.5	88.2	9.3		61.1	36.6	2.3		27.5	62.5	10		
PHF	.815	.693	.638	.845	.344	.820	.788	.864	.748	.773	.650	.877	.651	.723	.796	.725	.854

CDM SMITH Inc.
1100 Marion Street, Suite 300
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File Name : dutchtown_cak
Site Code : 00000000
Start Date : 9/7/2017
Page No : 1

Groups Printed- Unshifted

	CAK BLVD Southbound				DUTCHTOWN DR Westbound				CAK BLVD Northbound				DUTCHTOWN DR Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	3	42	0	45	2	0	1	3	0	32	15	47	95
07:15 AM	0	0	0	0	18	87	0	105	3	0	1	4	0	66	37	103	212
07:30 AM	0	0	0	0	24	99	0	123	12	0	7	19	0	97	75	172	314
07:45 AM	0	0	0	0	26	106	0	132	24	0	11	35	0	127	119	246	413
Total	0	0	0	0	71	334	0	405	41	0	20	61	0	322	246	568	1034
08:00 AM	0	0	0	0	16	89	0	105	13	0	10	23	0	99	50	149	277
08:15 AM	0	0	0	0	3	82	0	85	1	0	1	2	0	91	18	109	196
08:30 AM	0	0	0	0	5	72	0	77	9	0	0	9	0	67	9	76	162
08:45 AM	0	0	0	0	7	44	0	51	3	0	2	5	0	82	17	99	155
Total	0	0	0	0	31	287	0	318	26	0	13	39	0	339	94	433	790
*** BREAK ***																	
11:00 AM	0	0	0	0	2	38	0	40	13	0	0	13	0	51	17	68	121
11:15 AM	0	0	0	0	2	49	0	51	5	0	3	8	0	60	4	64	123
11:30 AM	0	0	0	0	4	60	0	64	12	0	9	21	0	72	11	83	168
11:45 AM	0	0	0	0	7	70	0	77	6	0	2	8	0	88	9	97	182
Total	0	0	0	0	15	217	0	232	36	0	14	50	0	271	41	312	594
12:00 PM	0	0	0	0	5	89	0	94	17	0	3	20	0	102	15	117	231
12:15 PM	0	0	0	0	3	71	0	74	13	0	4	17	0	123	6	129	220
12:30 PM	0	0	0	0	9	70	0	79	16	0	3	19	0	62	20	82	180
12:45 PM	0	0	0	0	0	108	0	108	10	0	3	13	0	119	22	141	262
Total	0	0	0	0	17	338	0	355	56	0	13	69	0	406	63	469	893
*** BREAK ***																	
02:00 PM	0	0	0	0	1	51	0	52	15	0	3	18	0	48	8	56	126
02:15 PM	0	0	0	0	4	59	0	63	7	0	1	8	0	48	11	59	130
02:30 PM	0	0	0	0	8	71	0	79	8	0	1	9	0	60	27	87	175
02:45 PM	0	0	0	0	9	91	0	100	24	0	3	27	0	62	21	83	210
Total	0	0	0	0	22	272	0	294	54	0	8	62	0	218	67	285	641
03:00 PM	0	0	0	0	13	90	0	103	20	0	5	25	0	49	28	77	205
03:15 PM	0	0	0	0	14	111	0	125	46	0	10	56	0	48	19	67	248
03:30 PM	0	0	0	0	12	120	0	132	27	0	9	36	0	100	33	133	301
03:45 PM	0	0	0	0	13	82	0	95	11	0	12	23	0	90	22	112	230
Total	0	0	0	0	52	403	0	455	104	0	36	140	0	287	102	389	984
04:00 PM	0	0	0	0	1	82	0	83	23	0	6	29	0	88	14	102	214
04:15 PM	0	0	0	0	4	121	0	125	15	0	5	20	0	101	7	108	253
04:30 PM	0	0	0	0	7	129	0	136	17	0	9	26	0	183	7	190	352
04:45 PM	0	0	0	0	8	137	0	145	23	0	1	24	0	174	17	191	360
Total	0	0	0	0	20	469	0	489	78	0	21	99	0	546	45	591	1179
05:00 PM	0	0	0	0	6	140	0	146	35	0	19	54	0	216	13	229	429
05:15 PM	0	0	0	0	13	186	0	199	35	0	8	43	0	203	19	222	464
05:30 PM	0	0	0	0	10	196	0	206	24	0	7	31	0	188	26	214	451
05:45 PM	0	0	0	0	20	168	0	188	31	0	5	36	0	202	41	243	467
Total	0	0	0	0	49	690	0	739	125	0	39	164	0	809	99	908	1811
Grand Total	0	0	0	0	277	3010	0	3287	520	0	164	684	0	3198	757	3955	7926
Apprch %	0	0	0		8.4	91.6	0		76	0	24		0	80.9	19.1		
Total %	0	0	0	0	3.5	38	0	41.5	6.6	0	2.1	8.6	0	40.3	9.6	49.9	

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	CAK BLVD Southbound				DUTCHTOWN DR Westbound				CAK BLVD Northbound				DUTCHTOWN DR Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	18	87	0	105	3	0	1	4	0	66	37	103	212
07:30 AM	0	0	0	0	24	99	0	123	12	0	7	19	0	97	75	172	314
07:45 AM	0	0	0	0	26	106	0	132	24	0	11	35	0	127	119	246	413
08:00 AM	0	0	0	0	16	89	0	105	13	0	10	23	0	99	50	149	277
Total Volume	0	0	0	0	84	381	0	465	52	0	29	81	0	389	281	670	1216
% App. Total	0	0	0	0	18.1	81.9	0		64.2	0	35.8		0	58.1	41.9		
PHF	.000	.000	.000	.000	.808	.899	.000	.881	.542	.000	.659	.579	.000	.766	.590	.681	.736

Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	0	0	0	5	89	0	94	17	0	3	20	0	102	15	117	231
12:15 PM	0	0	0	0	3	71	0	74	13	0	4	17	0	123	6	129	220
12:30 PM	0	0	0	0	9	70	0	79	16	0	3	19	0	62	20	82	180
12:45 PM	0	0	0	0	0	108	0	108	10	0	3	13	0	119	22	141	262
Total Volume	0	0	0	0	17	338	0	355	56	0	13	69	0	406	63	469	893
% App. Total	0	0	0	0	4.8	95.2	0		81.2	0	18.8		0	86.6	13.4		
PHF	.000	.000	.000	.000	.472	.782	.000	.822	.824	.000	.813	.863	.000	.825	.716	.832	.852

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	0	0	0	0	13	90	0	103	20	0	5	25	0	49	28	77	205
03:15 PM	0	0	0	0	14	111	0	125	46	0	10	56	0	48	19	67	248
03:30 PM	0	0	0	0	12	120	0	132	27	0	9	36	0	100	33	133	301
03:45 PM	0	0	0	0	13	82	0	95	11	0	12	23	0	90	22	112	230
Total Volume	0	0	0	0	52	403	0	455	104	0	36	140	0	287	102	389	984
% App. Total	0	0	0	0	11.4	88.6	0		74.3	0	25.7		0	73.8	26.2		
PHF	.000	.000	.000	.000	.929	.840	.000	.862	.565	.000	.750	.625	.000	.718	.773	.731	.817

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	6	140	0	146	35	0	19	54	0	216	13	229	429
05:15 PM	0	0	0	0	13	186	0	199	35	0	8	43	0	203	19	222	464
05:30 PM	0	0	0	0	10	196	0	206	24	0	7	31	0	188	26	214	451
05:45 PM	0	0	0	0	20	168	0	188	31	0	5	36	0	202	41	243	467
Total Volume	0	0	0	0	49	690	0	739	125	0	39	164	0	809	99	908	1811
% App. Total	0	0	0	0	6.6	93.4	0		76.2	0	23.8		0	89.1	10.9		
PHF	.000	.000	.000	.000	.613	.880	.000	.897	.893	.000	.513	.759	.000	.936	.604	.934	.969

QC JOB #: 14381006 DIRECTION: NB DATE: May 16 2017 - May 18 2017										
LOCATION: Sherrill Blvd Btwn Park 40N & Park W SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W CITY/STATE: Knoxville, TN										
Start Time	Mon 16-May-17	Tue 16-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	7	4	4	5		5			5	
12:15 AM	4	1	1	7		4			4	
12:30 AM	7	2	2	4		4			4	
12:45 AM	2	0	0	2		1			1	
1:00 AM	6	3	3	3		4			4	
1:15 AM	2	2	2	5		3			3	
1:30 AM	1	1	1	2		1			1	
1:45 AM	0	2	2	0		1			1	
2:00 AM	2	1	1	3		2			2	
2:15 AM	0	2	2	1		1			1	
2:30 AM	5	3	3	7		5			5	
2:45 AM	0	3	3	0		1			1	
3:00 AM	5	0	0	3		3			3	
3:15 AM	2	5	5	1		3			3	
3:30 AM	1	1	1	0		1			1	
3:45 AM	1	0	0	2		1			1	
4:00 AM	0	1	1	0		0			0	
4:15 AM	0	0	0	1		0			0	
4:30 AM	3	2	2	0		2			2	
4:45 AM	0	1	1	1		1			1	
5:00 AM	1	0	0	1		1			1	
5:15 AM	2	1	1	2		2			2	
5:30 AM	4	5	5	4		4			4	
5:45 AM	8	6	6	9		8			8	
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Volume										
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W CITY/STATE: Knoxville, TN										QC JOB #: 14381006 DIRECTION: NB DATE: May 16 2017 - May 18 2017
Start Time	Mon 16-May-17	Tue 16-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
6:00 AM	19	27	25	29	25	25			25	
6:15 AM	34	25	36	27	29	29			29	
6:30 AM	32	20	21	22	33	33			33	
6:45 AM	20	27	27	29	21	21			21	
7:00 AM	43	47	47	51	33	33			33	
7:15 AM	43	60	60	52	47	47			47	
7:30 AM	51	54	54	64	54	56			54	
7:45 AM	50	31	31	58	56	43			56	
8:00 AM	40	26	26	31	30	30			43	
8:15 AM	32	32	22	32	33	33			30	
8:30 AM	34	22	25	30	27	27			33	
8:45 AM	29	23	28	22	23	23			27	
9:00 AM	23	25	39	29	27	27			23	
9:15 AM	25	35	29	24	33	31			27	
9:30 AM	35	26	27	38	31	31			33	
9:45 AM	26	27	49	40	31	31			31	
10:00 AM	27	42	32	35	42	42			42	
10:15 AM	42	40	37	40	37	37			37	
10:30 AM	40	28	43	45	37	37			37	
10:45 AM	46	49	38	51	47	47			47	
11:00 AM	49	58	56	50	46	46			46	
11:15 AM	58	59	68	67	60	60			60	
11:30 AM				72	66	66			66	
11:45 AM										
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W CITY/STATE: Knoxville, TN										QC JOB #: 14381006 DIRECTION: NB DATE: May 16 2017 - May 18 2017
Start Time	Mon 16-May-17	Tue 16-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 PM	66	82	83	77	77	77			77	
12:15 PM	64	61	63	63	63	63			63	
12:30 PM	68	53	58	60	60	60			60	
12:45 PM	50	43	49	47	47	47			47	
1:00 PM	42	56	29	42	42	42			42	
1:15 PM	41	43	58	47	47	47			47	
1:30 PM	59	45	40	48	48	48			48	
1:45 PM	39	40	44	41	41	41			41	
2:00 PM	34	35	41	37	37	37			37	
2:15 PM	48	50	30	43	43	43			43	
2:30 PM	62	52	54	56	56	56			56	
2:45 PM	48	42	49	46	46	46			46	
3:00 PM	61	48	62	57	57	57			57	
3:15 PM	57	46	50	51	51	51			51	
3:30 PM	61	60	66	62	62	62			62	
3:45 PM	63	64	57	61	61	61			61	
4:00 PM	49	61	48	53	53	53			53	
4:15 PM	80	61	69	70	70	70			70	
4:30 PM	87	79	78	81	81	81			81	
4:45 PM	71	77	66	71	71	71			71	
5:00 PM	94	114	122	110	110	110			110	
5:15 PM	75	112	73	87	87	87			87	
5:30 PM	70	73	86	76	76	76			76	
5:45 PM	56	60	55	57	57	57			57	
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W										
SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W										
CITY/STATE: Knoxville, TN										
QC JOB #: 14381006										
DIRECTION: NB										
DATE: May 16 2017 - May 18 2017										
Start Time	Mon 16-May-17	Tue 17-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
6:00 PM	48	48	44	53		48			48	
6:15 PM	44	44	29	37		37			37	
6:30 PM	21	21	30	27		26			26	
6:45 PM	26	26	39	27		31			31	
7:00 PM	33	33	27	39		33			33	
7:15 PM	33	33	28	25		29			29	
7:30 PM	35	35	19	22		25			25	
7:45 PM	27	27	24	22		24			24	
8:00 PM	18	18	31	19		23			23	
8:15 PM	16	16	27	17		20			20	
8:30 PM	29	29	21	12		21			21	
8:45 PM	19	19	25	17		20			20	
9:00 PM	11	11	16	14		14			14	
9:15 PM	7	7	8	13		9			9	
9:30 PM	8	8	7	12		9			9	
9:45 PM	14	14	10	9		11			11	
10:00 PM	16	16	14	6		12			12	
10:15 PM	5	5	12	5		7			7	
10:30 PM	3	3	3	6		4			4	
10:45 PM	6	6	14	11		10			10	
11:00 PM	7	7	18	4		10			10	
11:15 PM	3	3	12	13		9			9	
11:30 PM	3	3	6	11		7			7	
11:45 PM	8	8	1	6		5			5	
Day Total	2833	2833	2847	2890		2856			2856	
% Weekday Average	99.2%	99.2%	99.7%	101.2%						
% Week Average	99.2%	99.2%	99.7%	101.2%		100.0%				
AM Peak	11:45 AM	11:45 AM	11:45 AM	11:45 AM		11:45 AM			11:45 AM	
Volume	59	59	68	72		66			66	
PM Peak	5:00 PM	5:00 PM	5:00 PM	5:00 PM		5:00 PM			5:00 PM	
Volume	94	94	114	122		110			110	
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W										
SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W										
CITY/STATE: Knoxville, TN										
QC JOB #: 14381006										
DIRECTION: SB										
DATE: May 16 2017 - May 18 2017										
Start Time	Mon 16-May-17	Tue 17-May-17	Wed 18-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	1	3	3	3		2			2	
12:15 AM	1	2	2	2		2			2	
12:30 AM	5	0	0	0		2			2	
12:45 AM	7	0	0	1		3			3	
1:00 AM	6	0	0	1		2			2	
1:15 AM	3	1	1	2		2			2	
1:30 AM	6	1	1	2		3			3	
1:45 AM	1	2	2	0		1			1	
2:00 AM	6	1	1	1		3			3	
2:15 AM	0	1	1	2		1			1	
2:30 AM	0	1	1	3		1			1	
2:45 AM	2	0	0	1		1			1	
3:00 AM	0	0	0	1		0			0	
3:15 AM	1	0	0	1		1			1	
3:30 AM	1	1	1	0		1			1	
3:45 AM	0	1	1	3		1			1	
4:00 AM	6	4	4	3		4			4	
4:15 AM	2	2	2	4		3			3	
4:30 AM	7	4	4	7		6			6	
4:45 AM	12	10	10	7		10			10	
5:00 AM	3	7	7	8		6			6	
5:15 AM	20	19	19	17		19			19	
5:30 AM	24	25	25	21		23			23	
5:45 AM	28	25	25	35		29			29	
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Volume										
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W										QC JOB #: 14381006
SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W										DIRECTION: SB
CITY/STATE: Knoxville, TN										DATE: May 16 2017 - May 18 2017
Start Time	Mon 16-May-17	Tue 16-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
6:00 AM		19	24	24		22			22	
6:15 AM		25	17	24		22			22	
6:30 AM		30	31	27		29			29	
6:45 AM		36	47	38		40			40	
7:00 AM		35	29	33		32			32	
7:15 AM		61	69	65		65			65	
7:30 AM		91	77	90		86			86	
7:45 AM		90	89	103		94			94	
8:00 AM		97	83	94		91			91	
8:15 AM		92	94	83		90			90	
8:30 AM		86	83	90		86			86	
8:45 AM		92	106	97		98			98	
9:00 AM		75	62	68		68			68	
9:15 AM		76	65	51		64			64	
9:30 AM		56	43	45		48			48	
9:45 AM		48	52	48		49			49	
10:00 AM		33	43	44		40			40	
10:15 AM		37	45	44		42			42	
10:30 AM		31	31	37		33			33	
10:45 AM		46	44	40		43			43	
11:00 AM		24	24	32		27			27	
11:15 AM		35	31	36		34			34	
11:30 AM		40	33	50		41			41	
11:45 AM		49	44	46		46			46	
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W CITY/STATE: Knoxville, TN										QC JOB #: 14381006 DIRECTION: SB DATE: May 16 2017 - May 18 2017
Start Time	Mon 16-May-17	Tue 16-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 PM	37	37	37	60		45			45	
12:15 PM	53	53	70	57		60			60	
12:30 PM	82	82	69	62		71			71	
12:45 PM	101	101	91	82		91			91	
1:00 PM	67	67	51	77		65			65	
1:15 PM	66	66	79	59		68			68	
1:30 PM	66	66	61	71		66			66	
1:45 PM	69	69	60	57		62			62	
2:00 PM	31	31	41	37		36			36	
2:15 PM	61	61	37	46		48			48	
2:30 PM	36	36	28	48		37			37	
2:45 PM	38	38	46	44		43			43	
3:00 PM	37	37	61	43		47			47	
3:15 PM	38	38	59	38		45			45	
3:30 PM	41	41	39	42		41			41	
3:45 PM	46	46	48	53		49			49	
4:00 PM	25	25	40	43		36			36	
4:15 PM	41	41	39	27		36			36	
4:30 PM	48	48	43	37		43			43	
4:45 PM	33	33	41	44		39			39	
5:00 PM	41	41	46	49		45			45	
5:15 PM	42	42	39	41		41			41	
5:30 PM	46	46	35	41		41			41	
5:45 PM	31	31	30	27		29			29	
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W										QC JOB #: 14381006
SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W										DIRECTION: SB
CITY/STATE: Knoxville, TN										DATE: May 16 2017 - May 18 2017
Start Time	Mon 16-May-17	Tue 17-May-17	Wed 18-May-17	Thu 19-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
6:00 PM	22	37	20	36		26			26	
6:15 PM	33	33	36	44		34			34	
6:30 PM	55	45	44	11		48			48	
6:45 PM	15	22	11	23		16			16	
7:00 PM	25	24	23	23		24			24	
7:15 PM	26	20	23	17		23			23	
7:30 PM	18	22	23	15		21			21	
7:45 PM	23	22	17	10		21			21	
8:00 PM	16	16	15	11		16			16	
8:15 PM	9	10	10	11		10			10	
8:30 PM	12	12	9	11		11			11	
8:45 PM	11	13	9	11		11			11	
9:00 PM	10	13	6	10		10			10	
9:15 PM	7	4	3	5		5			5	
9:30 PM	8	13	13	6		11			11	
9:45 PM	9	6	6	4		7			7	
10:00 PM	1	5	5	4		4			4	
10:15 PM	4	3	6	4		4			4	
10:30 PM	3	6	2	4		4			4	
10:45 PM	2	3	6	4		4			4	
11:00 PM	2	6	5	4		4			4	
11:15 PM	2	5	4	2		4			4	
11:30 PM	3	2	1	3		2			2	
11:45 PM	4	1	3	3		3			3	
Day Total	2942	2909	2919	2923		2923			2923	
% Weekday Average	100.7%	99.5%	99.9%	99.9%						
% Week Average	100.7%	99.5%	99.9%	99.9%		100.0%				
AM Peak	8:00 AM	8:45 AM	7:45 AM	8:45 AM		8:45 AM			8:45 AM	
Volume	97	106	103	98		98			98	
PM Peak	12:45 PM	12:45 PM	12:45 PM	12:45 PM		12:45 PM			12:45 PM	
Volume	101	91	82	91		91			91	
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W CITY/STATE: Knoxville, TN										QC JOB #: 14381006 DIRECTION: NB/SB DATE: May 16 2017 - May 18 2017
Start Time	Mon 16-May-17	Tue 16-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	8	8	7	8		8			8	
12:15 AM	5	5	3	9		6			6	
12:30 AM	12	12	2	4		6			6	
12:45 AM	9	9	0	3		4			4	
1:00 AM	12	12	3	4		6			6	
1:15 AM	5	5	3	7		5			5	
1:30 AM	7	7	2	4		4			4	
1:45 AM	1	1	4	0		2			2	
2:00 AM	8	8	2	4		5			5	
2:15 AM	0	0	3	3		2			2	
2:30 AM	5	5	4	10		6			6	
2:45 AM	2	2	3	1		2			2	
3:00 AM	5	5	0	4		3			3	
3:15 AM	3	3	5	2		3			3	
3:30 AM	2	2	2	0		1			1	
3:45 AM	1	1	1	5		2			2	
4:00 AM	6	6	5	3		5			5	
4:15 AM	2	2	2	5		3			3	
4:30 AM	10	10	6	7		8			8	
4:45 AM	12	12	11	8		10			10	
5:00 AM	4	4	7	9		7			7	
5:15 AM	22	22	20	19		20			20	
5:30 AM	28	28	30	25		28			28	
5:45 AM	36	36	31	44		37			37	
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Volume										
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W CITY/STATE: Knoxville, TN										QC JOB #: 14381006 DIRECTION: NB/SB DATE: May 16 2017 - May 18 2017
Start Time	Mon 16-May-17	Tue 17-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
6:00 AM	38	51	53	51	63	47			47	
6:15 AM	59	42	51	59	61	51			51	
6:30 AM	62	67	60	62	65	63			63	
6:45 AM	56	68	62	62	140	61			61	
7:00 AM	78	56	116	116	150	65			65	
7:15 AM	104	116	137	142	134	112			112	
7:30 AM	142	140	143	167	119	140			140	
7:45 AM	140	137	114	152	119	150			150	
8:00 AM	137	124	120	114	125	134			134	
8:15 AM	124	120	115	122	92	119			119	
8:30 AM	120	121	128	127	91	125			125	
8:45 AM	121	98	87	90	80	92			92	
9:00 AM	101	93	82	80	81	91			91	
9:15 AM	91	82	81	69	80	81			81	
9:30 AM	74	81	86	86	71	80			80	
9:45 AM	60	70	84	84	84	71			71	
10:00 AM	79	94	79	79	70	84			84	
10:15 AM	71	63	77	77	80	70			70	
10:30 AM	74	81	85	85	73	80			80	
10:45 AM	70	67	83	83	80	73			73	
11:00 AM	84	69	86	86	80	80			80	
11:15 AM	84	89	117	117	101	80			80	
11:30 AM	98	89	117	117	113	101			101	
11:45 AM	108	112	118	118	113	113			113	
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Volume										
Comments:										

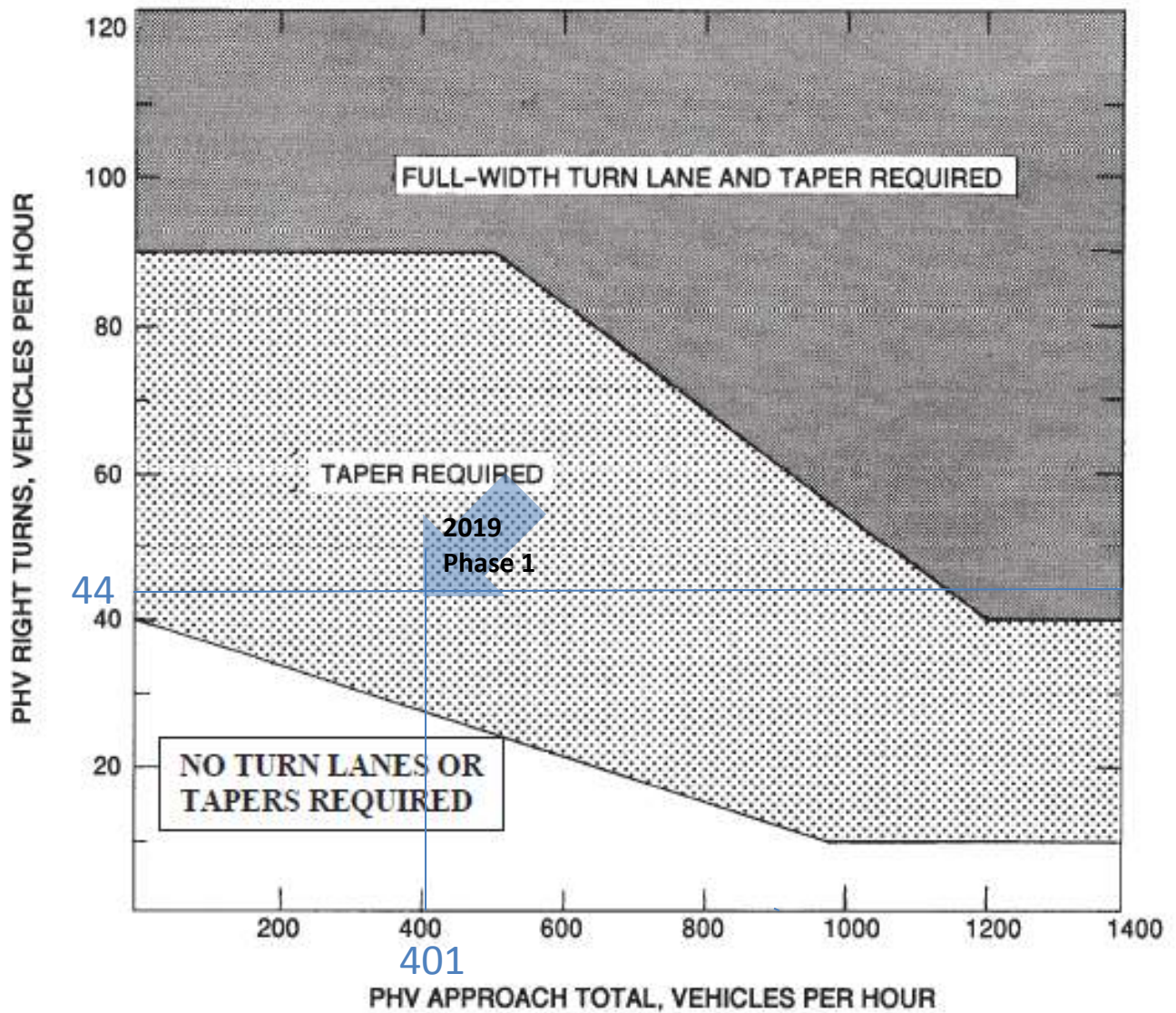
LOCATION: Sherrill Blvd Btwn Park 40N & Park W SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W CITY/STATE: Knoxville, TN										QC JOB #: 14381006 DIRECTION: NB/SB DATE: May 16 2017 - May 18 2017
Start Time	Mon 16-May-17	Tue 16-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 PM	103	119	131	143	122	122			122	
12:15 PM	117	131	122	120	123	123			123	
12:30 PM	150	122	134	120	131	131			131	
12:45 PM	151	109	107	106	139	139			139	
1:00 PM	107	107	122	117	107	107			107	
1:15 PM	125	106	106	111	115	115			115	
1:30 PM	108	100	100	101	114	114			114	
1:45 PM	65	76	76	78	103	103			103	
2:00 PM	109	87	87	76	73	73			73	
2:15 PM	98	80	80	102	91	91			91	
2:30 PM	86	88	88	93	93	93			93	
2:45 PM	98	109	105	105	89	89			89	
3:00 PM	95	105	105	88	104	104			104	
3:15 PM	102	99	108	108	96	96			96	
3:30 PM	109	112	110	110	103	103			103	
3:45 PM	74	101	112	91	110	110			110	
4:00 PM	121	100	100	96	89	89			89	
4:15 PM	135	122	122	115	106	106			106	
4:30 PM	104	118	118	110	124	124			124	
4:45 PM	135	160	118	110	111	111			111	
5:00 PM	117	151	160	171	155	155			155	
5:15 PM	116	151	151	114	127	127			127	
5:30 PM	87	108	108	127	117	117			117	
5:45 PM	87	90	90	82	86	86			86	
Day Total										
% Weekday Average										
% Week Average										
AM Peak Volume										
PM Peak Volume										
Comments:										

LOCATION: Sherrill Blvd Btwn Park 40N & Park W										
SPECIFIC LOCATION: Sherrill Blvd Btwn Park 40N & Park W										
CITY/STATE: Knoxville, TN										
QC JOB #: 14381006										
DIRECTION: NB/SB										
DATE: May 16 2017 - May 18 2017										
Start Time	Mon 16-May-17	Tue 17-May-17	Wed 17-May-17	Thu 18-May-17	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
6:00 PM	70	81	73	73	75	75			75	
6:15 PM	77	62	73	71	71	71			71	
6:30 PM	76	75	71	38	74	74			74	
6:45 PM	41	61	51	62	47	47			47	
7:00 PM	58	59	48	45	57	57			57	
7:15 PM	53	50	46	39	52	52			52	
7:30 PM	34	47	37	27	46	46			46	
7:45 PM	25	33	29	20	45	45			45	
8:00 PM	41	38	26	16	38	38			38	
8:15 PM	30	21	12	25	30	30			30	
8:30 PM	14	16	15	11	32	32			32	
8:45 PM	16	23	19	11	31	31			31	
9:00 PM	17	9	6	8	23	23			23	
9:15 PM	6	8	17	17	14	14			14	
9:30 PM	8	9	24	9	20	20			20	
9:45 PM	5	17	17	12	18	18			18	
10:00 PM	6	12	12	9	16	16			16	
10:15 PM	12	2	9	8	12	12			12	
10:30 PM	5775	5756	5809	5780	8	8			8	
10:45 PM					14	14			14	
11:00 PM					14	14			14	
11:15 PM					13	13			13	
11:30 PM					9	9			9	
11:45 PM					8	8			8	
Day Total	5775	5756	5809	5780	5780	5780			5780	
% Weekday Average	99.9%	99.6%	100.5%							
% Week Average	99.9%	99.6%	100.5%	100.0%						
AM Peak	7:30 AM	7:45 AM	7:45 AM	7:45 AM					7:45 AM	
Volume	142	143	167	150					150	
PM Peak	12:45 PM	5:00 PM	5:00 PM	5:00 PM					5:00 PM	
Volume	151	160	171	155					155	
Comments:										

Auxiliary Lane Warrant Analysis

SHERRILL BLVD & MEDICAL OFFICE PHASE 1 ACCESS

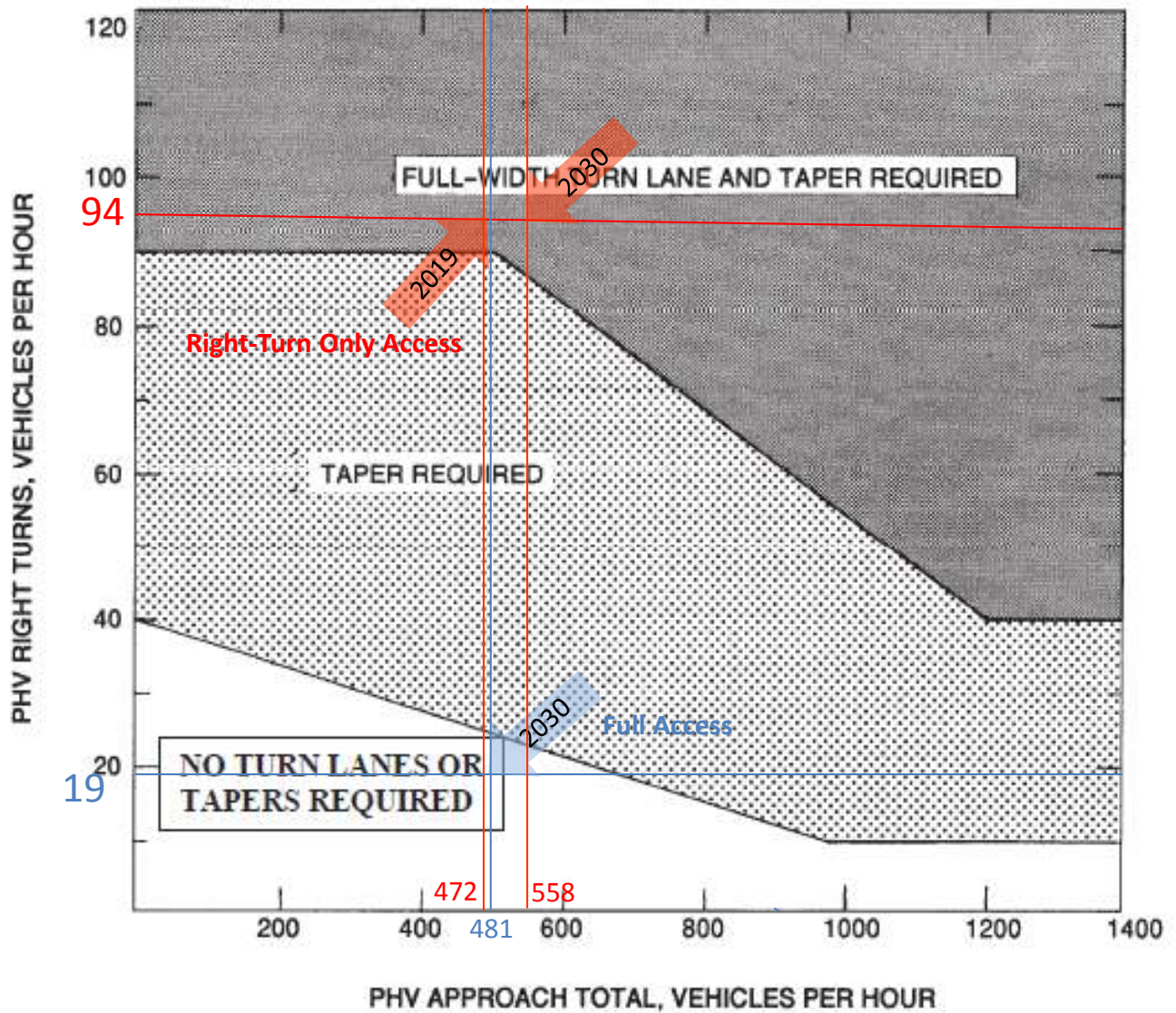
GUIDELINES FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)



References: NCHRP Report 279-Intersection Channelization Design Guide
Virginia Department of Transportation Design Manual

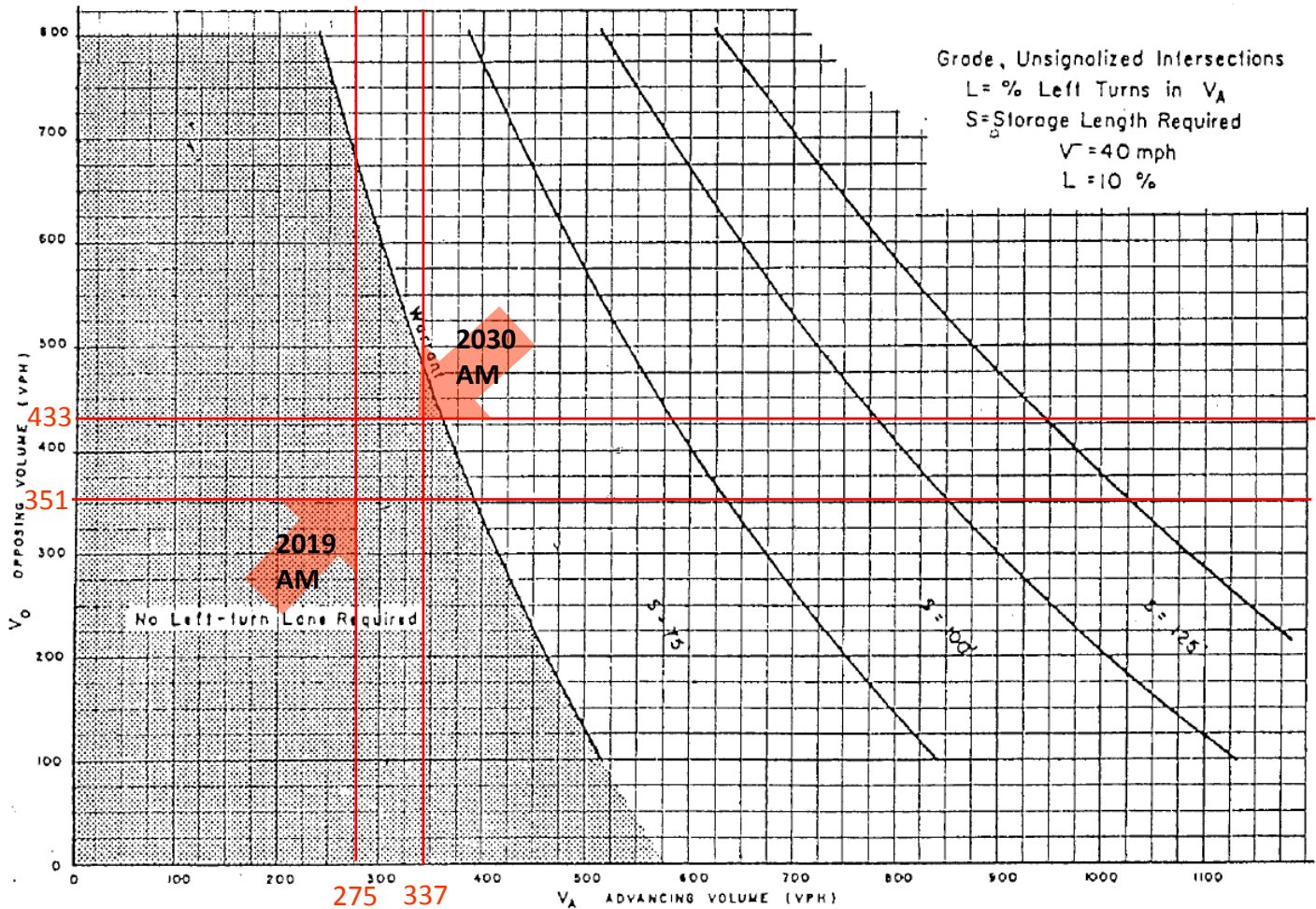
SHERRILL BLVD & MEDICAL OFFICE ACCESS

GUIDELINES FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)



References: NCHRP Report 279-Intersection Channelization Design Guide
Virginia Department of Transportation Design Manual

CHRISTIAN ACADEMY BOULEVARD & PROPOSED ACCESS LEFT-TURN ANALYSIS



References: Volume Warrants for Left-Turn Storage Lanes at Unsignalized Grade Intersections
 Harmelink, M.D.

Tennessee Department of Transportation Design Manual

Signal Warrants

INTERSECTION: **Sherrill Blvd & Park 40/Christian Academy Blvd w Expansion 2017**
 JOB NUMBER: **219096**
 DATE: **08/15/2017**

85TH PERCENTILE SPEED:	45	PEDESTRIAN GAPS/HOUR :	28
POPULATION:	350,000	ESTABLISHED SCHOOL CROSSING, MINIMUM 20 Xing (YES/NO):	NO
NUMBER OF APPROACHES:	4	NEAREST SIGNALIZED INTERSECTION:	0
LANES ON MAIN STREET:	2	IMPROVE PROGRESSION-PLATOONING (YES/NO):	NO
MINOR STREET APPROACH LANES:	2	MAJOR ROUTES (YES/NO):	NO
		WARRANTS IN 5 YRS (YES/NO):	NO
PEDESTRIANS:	N/A	ALTERNATIVES TO A SIGNAL EXPLORED:	YES
		NUMBER OF ACCIDENTS:	0
4-HOUR VOLUME (4-CONSECUTIVE 15MIN PERIODS):	N/A	PEAK HOUR DELAY (VEH-HR):	0
MAJOR:	0	PROXIMITY OF RR ON MINOR APPROACH TO MAJOR STREET:	0
0% MINOR:	0	RAIL TRAFFIC FREQUENCY:	0
		MINOR APPROACH HIGH-OCCUPANCY BUSES :	0.0%
EXISTING OR PROPOSED SIGNAL SYSTEM (YES/NO):	N/A	TRACTOR-TRAILER PERCENTAGE	0.0%

HOUR	MAIN STREET			MINOR STREET								
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A	INTERRUPTION WARRANT 1B		COMBINATION WARRANT A&B	4-HOUR WARRANT 2		PEAK HOUR WARRANT 3B	
		420	630		140	70						
24-1	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO
1-2	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO
2-3	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO
3-4	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO
4-5	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO
5-6	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO
6-7	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO
7-8	554	132%	88%	216	154%	YES	309%	NO	109%	YES	64%	NO
8-9	556	132%	88%	161	115%	YES	230%	NO	81%	NO	48%	NO
9-10	329	78%	52%	106	75%	NO	151%	NO	31%	NO	22%	NO
10-11	297	71%	47%	73	52%	NO	104%	NO	20%	NO	14%	NO
11-12	343	82%	54%	67	48%	NO	96%	NO	20%	NO	14%	NO
12-13	447	106%	71%	62	44%	NO	89%	NO	24%	NO	15%	NO
13-14	430	102%	68%	109	78%	NO	156%	NO	41%	NO	27%	NO
14-15	346	82%	55%	90	64%	NO	129%	NO	28%	NO	19%	NO
15-16	394	94%	63%	133	95%	YES/NO	190%	NO	46%	NO	31%	NO
16-17	391	93%	62%	172	123%	YES/NO	246%	NO	58%	NO	39%	NO
17-18	467	111%	74%	121	86%	NO	173%	NO	49%	NO	31%	NO
18-19	336	80%	53%	103	74%	NO	147%	NO	31%	NO	22%	NO
19-20	196	47%	31%	57	41%	NO	81%	NO	13%	NO	10%	NO
20-21	131	31%	21%	43	30%	NO	61%	NO	9%	NO	7%	NO
21-22	75	18%	12%	28	20%	NO	40%	NO	5%	NO	4%	NO
22-23	49	12%	8%	16	11%	NO	23%	NO	3%	NO	2%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO

	WARRANT		WARRANT	>=90%	PRIORITY
	WARRANT	DESCRIPTION	OBTAINED?	HOURS	POINTS
S U M M A R Y	1 A	MINIMUM VOLUME:	NO	2	22
	B	INTERRUPTION:	NO	0	0
	A & B	COMBINATION:	NO	2	N/A
	2	FOUR-HOUR:	NO	1	16
	3 A	PEAK HOUR DELAY:	N/A	N/A	0
	B	PEAK HOUR VOLUME:	NO	0	0
	4 No data collected	MINIMUM PED. VOLUMES:	N/A	N/A	N/A
	5	SCHOOL CROSSING:	NO	N/A	0
	6	CORD. SIGNAL SYSTEM:	NO	N/A	0
	7	ACCIDENT EXPERIENCE:	NO	5	0
	8	ROADWAY NETWORK:	NO	0	N/A
	9	INTERSECTION NEAR A GRADE CROSS	N/A	0	0
	PRIORITY VALUE				56

INTERSECTION: **Sherrill Blvd & Park 40/Christian Academy Blvd 2017**
 JOB NUMBER: **219096**
 DATE: **09/07/2017**

85TH PERCENTILE SPEED:	45	PEDESTRIAN GAPS/HOUR :	28
POPULATION:	350,000	ESTABLISHED SCHOOL CROSSING, MINIMUM 20 Xing (YES/NO):	NO
NUMBER OF APPROACHES:	4	NEAREST SIGNALIZED INTERSECTION:	0
LANES ON MAIN STREET:	2	IMPROVE PROGRESSION-PLATOONING (YES/NO):	NO
MINOR STREET APPROACH LANES:	2	MAJOR ROUTES (YES/NO):	NO
		WARRANTS IN 5 YRS (YES/NO):	NO
PEDESTRIANS:	N/A	ALTERNATIVES TO A SIGNAL EXPLORED:	YES
		NUMBER OF ACCIDENTS:	0
4-HOUR VOLUME (4-CONSECUTIVE 15MIN PERIODS):	N/A	PEAK HOUR DELAY (VEH-HR):	0
MAJOR:	0	PROXIMITY OF RR ON MINOR APPROACH TO MAJOR STREET:	0
0% MINOR:	0	RAIL TRAFFIC FREQUENCY:	0
		MINOR APPROACH HIGH-OCCUPANCY BUSES :	0.0%
EXISTING OR PROPOSED SIGNAL SYSTEM (YES/NO):	N/A	TRACTOR-TRAILER PERCENTAGE	0.0%

HOUR	MAIN STREET			MINOR STREET									
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A		INTERRUPTION WARRANT 1B		COMBINATION WARRANT A&B	4-HOUR WARRANT 2		PEAK HOUR WARRANT 3B	
		420	630		140		70						
24-1	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
1-2	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
2-3	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
3-4	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
4-5	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
5-6	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
6-7	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
7-8	550	131%	87%	216	154%	YES	309%	NO	YES	108%	YES	64%	NO
8-9	554	132%	88%	161	115%	YES	230%	NO	YES	81%	NO	48%	NO
9-10	329	78%	52%	106	75%	NO	151%	NO	NO	31%	NO	22%	NO
10-11	297	71%	47%	73	52%	NO	104%	NO	NO	20%	NO	14%	NO
11-12	338	81%	54%	67	48%	NO	96%	NO	NO	20%	NO	14%	NO
12-13	446	106%	71%	62	44%	NO	89%	NO	NO	24%	NO	15%	NO
13-14	430	102%	68%	109	78%	NO	156%	NO	NO	41%	NO	27%	NO
14-15	342	82%	54%	90	64%	NO	129%	NO	NO	27%	NO	19%	NO
15-16	394	94%	63%	133	95%	YES/NO	190%	NO	NO	46%	NO	30%	NO
16-17	390	93%	62%	172	123%	YES/NO	246%	NO	NO	58%	NO	39%	NO
17-18	463	110%	73%	121	86%	NO	173%	NO	NO	49%	NO	31%	NO
18-19	335	80%	53%	103	74%	NO	147%	NO	NO	31%	NO	22%	NO
19-20	196	47%	31%	57	41%	NO	81%	NO	NO	13%	NO	10%	NO
20-21	130	31%	21%	43	30%	NO	61%	NO	NO	9%	NO	7%	NO
21-22	75	18%	12%	28	20%	NO	40%	NO	NO	5%	NO	4%	NO
22-23	49	12%	8%	16	11%	NO	23%	NO	NO	3%	NO	2%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO

WARRANT	WARRANT DESCRIPTION		WARRANT OBTAINED?	HOURS	>=90% HOURS	PRIORITY POINTS
S U M M A R Y	1 A	MINIMUM VOLUME:	NO	2	2	22
	B	INTERUPTION:	NO	0	0	0
	A & B	COMBINATION:	NO	2	N/A	18
	2	FOUR-HOUR:	NO	1	0	16
	3 A	PEAK HOUR DELAY:	N/A	N/A	N/A	0
	B	PEAK HOUR VOLUME:	NO	0	0	0
	4 No data collected	MINIMUM PED. VOLUMES:	N/A	N/A	N/A	N/A
	5	SCHOOL CROSSING:	NO	N/A	N/A	0
	6	CORD. SIGNAL SYSTEM:	NO	N/A	N/A	0
	7	ACCIDENT EXPERIENCE:	NO	5	N/A	0
	8	ROADWAY NETWORK:	NO	0	N/A	0
	9	INTERSECTION NEAR A GRADE CROSS	N/A	0	0	0
PRIORITY VALUE						56

INTERSECTION: **Sherrill Blvd & Park 40/Christian Academy Blvd w MOB 2017**
 JOB NUMBER: **219096**
 DATE: **08/15/2017**

85TH PERCENTILE SPEED:	45	PEDESTRIAN GAPS/HOUR :	28
POPULATION:	350,000	ESTABLISHED SCHOOL CROSSING, MINIMUM 20 Xing (YES/NO):	NO
		NEAREST SIGNALIZED INTERSECTION:	0
		IMPROVE PROGRESSION-PLATOONING (YES/NO):	NO
NUMBER OF APPROACHES:	4	MAJOR ROUTES (YES/NO):	NO
LANES ON MAIN STREET:	2	WARRANTS IN 5 YRS (YES/NO):	NO
MINOR STREET APPROACH LANES:	2		
		ALTERNATIVES TO A SIGNAL EXPLORED:	YES
PEDESTRIANS:	N/A	NUMBER OF ACCIDENTS:	0
4-HOUR VOLUME (4-CONSECUTIVE 15MIN PERIODS):	N/A	PEAK HOUR DELAY (VEH-HR):	0
MAJOR:	0		
0% MINOR:	0	PROXIMITY OF RR ON MINOR APPROACH TO MAJOR STREET:	0
		RAIL TRAFFIC FREQUENCY:	0
		MINOR APPROACH HIGH-OCCUPANCY BUSES :	0.0%
EXISTING OR PROPOSED SIGNAL SYSTEM (YES/NO):	N/A	TRACTOR-TRAILER PERCENTAGE	0.0%

HOUR	MAIN STREET			MINOR STREET									
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A		INTERRUPTION WARRANT 1B		COMBINATION WARRANT A&B	4-HOUR WARRANT 2		PEAK HOUR WARRANT 3B	
		420	630		140	70							
24-1	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
1-2	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
2-3	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
3-4	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
4-5	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
5-6	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
6-7	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
7-8	741	176%	118%	229	163%	YES	327%	YES	YES	191%	YES	95%	YES/NO
8-9	792	189%	126%	218	156%	YES	311%	YES	YES	210%	YES	100%	YES
9-10	512	122%	81%	224	160%	YES	320%	NO	YES	101%	YES	62%	NO
10-11	469	112%	74%	185	132%	YES	264%	NO	NO	75%	NO	48%	NO
11-12	496	118%	79%	206	147%	YES	295%	NO	NO	90%	YES/NO	56%	NO
12-13	603	143%	96%	190	136%	YES	271%	YES/NO	YES	109%	YES	62%	NO
13-14	602	143%	96%	218	155%	YES	311%	YES/NO	YES	124%	YES	70%	NO
14-15	477	114%	76%	195	139%	YES	278%	NO	NO	81%	NO	51%	NO
15-16	502	119%	80%	249	178%	YES	356%	NO	YES	110%	YES	68%	NO
16-17	478	114%	76%	327	233%	YES	467%	NO	NO	136%	YES	86%	NO
17-18	496	118%	79%	208	149%	YES	297%	NO	NO	91%	YES/NO	56%	NO
18-19	336	80%	53%	103	74%	NO	147%	NO	NO	31%	NO	22%	NO
19-20	196	47%	31%	57	41%	NO	81%	NO	NO	13%	NO	10%	NO
20-21	131	31%	21%	43	30%	NO	61%	NO	NO	9%	NO	7%	NO
21-22	75	18%	12%	28	20%	NO	40%	NO	NO	5%	NO	4%	NO
22-23	49	12%	8%	16	11%	NO	23%	NO	NO	3%	NO	2%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO

	WARRANT		WARRANT OBTAINED?	HOURS	>=90% HOURS	PRIORITY POINTS
	WARRANT	DESCRIPTION				
S U M M A R Y	1 A	MINIMUM VOLUME:	YES	11	0	121
	B	INTERRUPTION:	NO	2	2	20
	A & B	COMBINATION:	NO	6	N/A	54
	2	FOUR-HOUR:	YES	7	2	112
	3 A	PEAK HOUR DELAY:	N/A	N/A	N/A	0
	B	PEAK HOUR VOLUME:	YES	1	1	56
	4 No data collected	MINIMUM PED. VOLUMES:	N/A	N/A	N/A	N/A
	5	SCHOOL CROSSING:	NO	N/A	N/A	0
	6	CORD. SIGNAL SYSTEM:	NO	N/A	N/A	0
	7	ACCIDENT EXPERIENCE:	NO	11	N/A	0
	8	ROADWAY NETWORK:	NO	2	N/A	0
	9	INTERSECTION NEAR A GRADE CROSS	N/A	0	0	0
PRIORITY VALUE						363

INTERSECTION: **Dutchtown Rd & Christian Academy Blvd 2017**
 JOB NUMBER: **221989**
 DATE: **09/12/2017**

85TH PERCENTILE SPEED:	45	PEDESTRIAN GAPS/HOUR :	28
POPULATION:	350,000	ESTABLISHED SCHOOL CROSSING, MINIMUM 20 Xing (YES/NO):	NO
		NEAREST SIGNALIZED INTERSECTION:	0
		IMPROVE PROGRESSION-PLATOONING (YES/NO):	NO
NUMBER OF APPROACHES:	3	MAJOR ROUTES (YES/NO):	NO
LANES ON MAIN STREET:	1	WARRANTS IN 5 YRS (YES/NO):	NO
MINOR STREET APPROACH LANES:	2		
		ALTERNATIVES TO A SIGNAL EXPLORED:	YES
PEDESTRIANS:	N/A	NUMBER OF ACCIDENTS:	0
4-HOUR VOLUME (4-CONSECUTIVE 15MIN PERIODS):	N/A	PEAK HOUR DELAY (VEH-HR):	0
MAJOR:	0		
0% MINOR:	0	PROXIMITY OF RR ON MINOR APPROACH TO MAJOR STREET:	0
		RAIL TRAFFIC FREQUENCY:	0
		MINOR APPROACH HIGH-OCCUPANCY BUSES :	0.0%
EXISTING OR PROPOSED SIGNAL SYSTEM (YES/NO):	N/A	TRACTOR-TRAILER PERCENTAGE	0.0%

HOUR	MAIN STREET			MINOR STREET									
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A	INTERRUPTION WARRANT 1B		COMBINATION WARRANT A&B	4-HOUR WARRANT 2		PEAK HOUR WARRANT 3B		
		420	525		140	70							
24-1	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
1-2	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
2-3	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
3-4	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
4-5	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
5-6	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
6-7	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
7-8	973	232%	185%	61	44%	NO	87%	NO	NO	76%	NO	53%	NO
8-9	751	179%	143%	39	28%	NO	56%	NO	NO	44%	NO	22%	NO
9-10	650	155%	124%	45	32%	NO	64%	NO	NO	39%	NO	21%	NO
10-11	650	155%	124%	45	32%	NO	64%	NO	NO	39%	NO	21%	NO
11-12	544	130%	104%	50	36%	NO	71%	NO	NO	33%	NO	19%	NO
12-13	824	196%	157%	69	49%	NO	99%	YES/NO	NO	86%	NO	44%	NO
13-14	700	167%	133%	65	46%	NO	93%	YES/NO	NO	64%	NO	33%	NO
14-15	579	138%	110%	62	44%	NO	89%	NO	NO	45%	NO	25%	NO
15-16	844	201%	161%	140	100%	YES	200%	YES	YES	175%	YES	94%	YES/NO
16-17	1,080	257%	206%	99	71%	NO	141%	YES	NO	124%	YES	106%	YES
17-18	1,647	392%	314%	164	117%	YES	234%	YES	YES	205%	YES	164%	YES
18-19	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
19-20	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
20-21	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
21-22	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
22-23	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO

WARRANT	WARRANT DESCRIPTION		WARRANT OBTAINED?	HOURS	>=90% HOURS	PRIORITY POINTS
SUMMARY	1 A	MINIMUM VOLUME:	NO	2	0	22
	B	INTERRUPTION:	NO	3	2	30
	A & B	COMBINATION:	NO	2	N/A	18
	2	FOUR-HOUR:	NO	3	0	48
	3 A	PEAK HOUR DELAY:	N/A	N/A	N/A	0
	B	PEAK HOUR VOLUME:	YES	2	1	112
	4 No data collected	MINIMUM PED. VOLUMES:	N/A	N/A	N/A	N/A
	5	SCHOOL CROSSING:	NO	N/A	N/A	0
	6	CORD. SIGNAL SYSTEM:	NO	N/A	N/A	0
	7	ACCIDENT EXPERIENCE:	NO	7	N/A	0
	8	ROADWAY NETWORK:	NO	3	N/A	0
	9	INTERSECTION NEAR A GRADE CROSS	N/A	0	0	0
PRIORITY VALUE						230

INTERSECTION: **Dutchtown Rd & Christian Academy Blvd 2017 w MOB**
 JOB NUMBER: **221989**
 DATE: **09/12/2017**

85TH PERCENTILE SPEED:	45	PEDESTRIAN GAPS/HOUR :	28
POPULATION:	350,000	ESTABLISHED SCHOOL CROSSING, MINIMUM 20 Xing (YES/NO):	NO
NUMBER OF APPROACHES:	3	NEAREST SIGNALIZED INTERSECTION:	0
LANES ON MAIN STREET:	1	IMPROVE PROGRESSION-PLATOONING (YES/NO):	NO
MINOR STREET APPROACH LANES:	2	MAJOR ROUTES (YES/NO):	NO
		WARRANTS IN 5 YRS (YES/NO):	NO
PEDESTRIANS:	N/A	ALTERNATIVES TO A SIGNAL EXPLORED:	YES
		NUMBER OF ACCIDENTS:	0
PEAK-HOUR VOLUME (4-CONSECUTIVE 15MIN PERIODS):	N/A	PEAK HOUR DELAY (VEH-HR):	0
MAJOR:	0		
0% MINOR:	0	PROXIMITY OF RR ON MINOR APPROACH TO MAJOR STREET:	0
		RAIL TRAFFIC FREQUENCY:	0
		MINOR APPROACH HIGH-OCCUPANCY BUSES :	0.0%
EXISTING OR PROPOSED SIGNAL SYSTEM (YES/NO):	N/A	TRACTOR-TRAILER PERCENTAGE	0.0%

HOUR	MAIN STREET			MINOR STREET									
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A	INTERRUPTION WARRANT 1B		COMBINATION WARRANT A&B	4-HOUR WARRANT 2		PEAK HOUR WARRANT 3B		
		420	525		140	70							
24-1	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO	
1-2	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO	
2-3	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO	
3-4	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO	
4-5	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO	
5-6	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO	
6-7	0	0%	0%	0	0%	NO	0%	NO	0%	NO	0%	NO	
7-8	1,005	239%	191%	64	46%	NO	91%	YES/NO	NO	80%	NO	59%	NO
8-9	790	188%	150%	51	37%	NO	73%	NO	NO	64%	NO	31%	NO
9-10	676	161%	129%	71	50%	NO	101%	YES	NO	65%	NO	34%	NO
10-11	675	161%	129%	69	49%	NO	99%	YES/NO	NO	64%	NO	33%	NO
11-12	564	134%	108%	80	57%	NO	115%	YES	NO	56%	NO	31%	NO
12-13	845	201%	161%	97	69%	NO	138%	YES	NO	121%	YES	65%	NO
13-14	725	173%	138%	88	63%	NO	126%	YES	NO	93%	YES/NO	47%	NO
14-15	597	142%	114%	85	60%	NO	121%	YES	NO	64%	NO	35%	NO
15-16	858	204%	163%	165	118%	YES	236%	YES	YES	206%	YES	114%	YES
16-17	1,088	259%	207%	132	95%	YES/NO	189%	YES	YES	166%	YES	144%	YES
17-18	1,648	392%	314%	183	131%	YES	261%	YES	YES	229%	YES	183%	YES
18-19	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
19-20	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
20-21	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
21-22	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
22-23	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO

	WARRANT		WARRANT	HOURS	>=90%	PRIORITY
	WARRANT	DESCRIPTION	OBTAINED?		HOURS	POINTS
S U M M A R Y	1 A	MINIMUM VOLUME:	NO	2	1	22
	B	INTERRUPTION:	YES	8	2	80
	A & B	COMBINATION:	NO	3	N/A	27
	2	FOUR-HOUR:	YES	4	1	64
	3 A	PEAK HOUR DELAY:	N/A	N/A	N/A	0
	B	PEAK HOUR VOLUME:	YES	3	0	168
	4 No data collected	MINIMUM PED. VOLUMES:	N/A	N/A	N/A	N/A
	5	SCHOOL CROSSING:	NO	N/A	N/A	0
	6	CORD. SIGNAL SYSTEM:	NO	N/A	N/A	0
	7	ACCIDENT EXPERIENCE:	NO	10	N/A	0
	8	ROADWAY NETWORK:	NO	4	N/A	0
	9	INTERSECTION NEAR A GRADE CROSS	N/A	0	0	0
PRIORITY VALUE						361

INTERSECTION:		Sherrill Blvd & Park 40/Christian Academy Blvd 2017 (Phase 1)	
JOB NUMBER:		219096	
DATE:		11/01/2017	
85TH PERCENTILE SPEED:		45	
POPULATION:		350,000	
NUMBER OF APPROACHES:		4	
LANES ON MAIN STREET:		2	
MINOR STREET APPROACH LANES:		2	
PEDESTRIANS:		N/A	
K-HOUR VOLUME (4-CONSECUTIVE 15MIN PERIODS)		N/A	
MAJOR:		0	
0%	MINOR:	0	
EXISTING OR PROPOSED SIGNAL SYSTEM (YES/NO):		N/A	
PEDESTRIAN GAPS/HOUR :		28	
ESTABLISHED SCHOOL CROSSING, MINIMUM 20 Xing (YES/NO):		NO	
NEAREST SIGNALIZED INTERSECTION:		0	
IMPROVE PROGRESSION-PLATOONING (YES/NO):		NO	
MAJOR ROUTES (YES/NO):		NO	
WARRANTS IN 5 YRS (YES/NO):		NO	
ALTERNATIVES TO A SIGNAL EXPLORED:		YES	
NUMBER OF ACCIDENTS:		0	
PEAK HOUR DELAY (VEH-HR):		0	
PROXIMITY OF RR ON MINOR APPROACH TO MAJOR STREET:		0	0
RAIL TRAFFIC FREQUENCY:		0	0
MINOR APPROACH HIGH-OCCUPACY BUSES :		0.0%	0
TRACTOR-TRAILER PERCENTAGE		0.0%	0

Synchro Reports

Timings

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing AM Peak

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	602	227	908	1111
Future Volume (vph)	602	227	908	1111
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	23.0	23.0	39.0	39.0
Actuated g/C Ratio	0.33	0.33	0.56	0.56
v/c Ratio	0.67	0.57	0.33	0.46
Control Delay	22.7	22.1	9.3	9.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.7	22.1	9.3	9.5
LOS	C	C	A	A
Approach Delay	22.5		9.3	9.5
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 64 (91%), Referenced to phase 2:NBSB, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 13.3

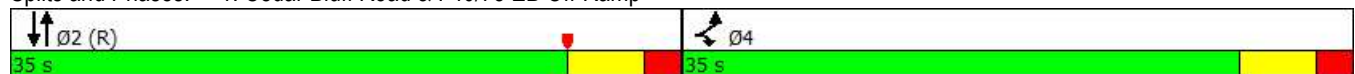
Intersection LOS: B

Intersection Capacity Utilization 47.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing AM Peak

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	765	280	1164	1307
v/c Ratio	0.67	0.57	0.33	0.46
Control Delay	22.7	22.1	9.3	9.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.7	22.1	9.3	9.5
Queue Length 50th (ft)	143	100	71	104
Queue Length 95th (ft)	150	114	94	130
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1537	655	3573	2850
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	0.43	0.33	0.46
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing AM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	602	227	0	908	1111	0
Future Volume (vph)	602	227	0	908	1111	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.99	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3462	1455		6408	5111	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3462	1455		6408	5111	
Peak-hour factor, PHF	0.82	0.73	1.00	0.78	0.85	1.00
Adj. Flow (vph)	734	311	0	1164	1307	0
RTOR Reduction (vph)	5	13	0	0	0	0
Lane Group Flow (vph)	760	267	0	1164	1307	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	21.0	21.0		37.0	37.0	
Effective Green, g (s)	23.0	23.0		39.0	39.0	
Actuated g/C Ratio	0.33	0.33		0.56	0.56	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1137	478		3570	2847	
v/s Ratio Prot	c0.22	0.18		0.18	c0.26	
v/s Ratio Perm						
v/c Ratio	0.67	0.56		0.33	0.46	
Uniform Delay, d1	20.2	19.3		8.4	9.2	
Progression Factor	1.00	1.00		1.00	0.92	
Incremental Delay, d2	1.2	0.8		0.2	0.5	
Delay (s)	21.4	20.1		8.6	9.0	
Level of Service	C	C		A	A	
Approach Delay (s)	21.0			8.6	9.0	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			47.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing AM Peak
Medical Office Center

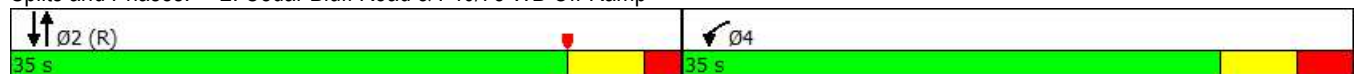
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	719	1268	479
Future Volume (vph)	719	1268	479
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	25.0	37.0	37.0
Actuated g/C Ratio	0.36	0.53	0.53
v/c Ratio	0.68	0.45	0.24
Control Delay	21.6	13.2	5.2
Queue Delay	0.0	0.0	0.0
Total Delay	21.6	13.2	5.2
LOS	C	B	A
Approach Delay	21.6	13.2	5.2
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 27 (39%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 47.7%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing AM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	856	1565	647
v/c Ratio	0.68	0.45	0.24
Control Delay	21.6	13.2	5.2
Queue Delay	0.0	0.0	0.0
Total Delay	21.6	13.2	5.2
Queue Length 50th (ft)	156	120	39
Queue Length 95th (ft)	169	150	39
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1563	3513	2658
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.55	0.45	0.24
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing AM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	719	0	1268	0	0	479
Future Volume (vph)	719	0	1268	0	0	479
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.84	1.00	0.81	1.00	1.00	0.74
Adj. Flow (vph)	856	0	1565	0	0	647
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	856	0	1565	0	0	647
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	22.0		35.0			35.0
Effective Green, g (s)	25.0		37.0			37.0
Actuated g/C Ratio	0.36		0.53			0.53
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1260		3517			2660
v/s Ratio Prot	c0.24		c0.24			0.13
v/s Ratio Perm						
v/c Ratio	0.68		0.44			0.24
Uniform Delay, d1	19.1		10.2			8.9
Progression Factor	1.00		1.17			0.53
Incremental Delay, d2	1.2		0.4			0.2
Delay (s)	20.3		12.3			4.9
Level of Service	C		B			A
Approach Delay (s)	20.3		12.3			4.9
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			47.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 3: Cedar Bluff Road & Park West Blvd

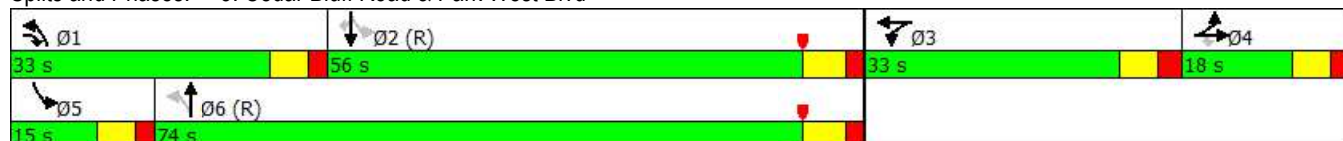
Existing AM Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	37	58	172	130	298	266	534	28	501	57
Future Volume (vph)	37	58	172	130	298	266	534	28	501	57
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	18.0	18.0	33.0	33.0	33.0	33.0	74.0	15.0	56.0	56.0
Total Split (%)	12.9%	12.9%	23.6%	23.6%	23.6%	23.6%	52.9%	10.7%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	16.6	16.6	39.1	26.9	26.9	85.0	74.8	72.6	62.0	62.0
Actuated g/C Ratio	0.12	0.12	0.28	0.19	0.19	0.61	0.53	0.52	0.44	0.44
v/c Ratio	0.39	0.87	0.36	0.52	0.79	0.61	0.38	0.13	0.38	0.11
Control Delay	64.5	98.2	43.2	57.0	59.8	21.6	14.1	9.6	23.4	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0
Total Delay	64.5	98.2	43.2	57.0	59.8	22.2	14.2	9.6	23.4	2.9
LOS	E	F	D	E	E	C	B	A	C	A
Approach Delay		70.4			59.1		16.1		20.1	
Approach LOS		E			E		B		C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 36 (26%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 33.3
 Intersection LOS: C
 Intersection Capacity Utilization 58.9%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

3: Cedar Bluff Road & Park West Blvd

Existing AM Peak

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	80	167	154	163	531	313	1013	44	604	92
v/c Ratio	0.39	0.87	0.36	0.52	0.79	0.61	0.38	0.13	0.38	0.11
Control Delay	64.5	98.2	43.2	57.0	59.8	21.6	14.1	9.6	23.4	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0
Total Delay	64.5	98.2	43.2	57.0	59.8	22.2	14.2	9.6	23.4	2.9
Queue Length 50th (ft)	70	162	122	145	237	141	174	13	202	7
Queue Length 95th (ft)	61	#275	134	176	264	248	146	13	248	11
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	203	192	530	335	722	601	2663	367	1599	810
Starvation Cap Reductn	0	0	0	0	0	74	318	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.87	0.29	0.49	0.74	0.59	0.43	0.12	0.38	0.11

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

Existing AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	58	172	130	298	113	266	534	162	28	501	57
Future Volume (vph)	37	58	172	130	298	113	266	534	162	28	501	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Fr _t	1.00	0.91	0.85	1.00	0.96		1.00	0.97		1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1627	1512	1618	3376		1770	4923		1745	3610	1615
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00		0.32	1.00		0.26	1.00	1.00
Satd. Flow (perm)	1719	1627	1512	1618	3376		587	4923		484	3610	1615
Peak-hour factor, PHF	0.46	0.81	0.69	0.72	0.80	0.81	0.85	0.67	0.75	0.64	0.83	0.62
Adj. Flow (vph)	80	72	249	181	372	140	313	797	216	44	604	92
RTOR Reduction (vph)	0	0	0	0	24	0	0	33	0	0	0	51
Lane Group Flow (vph)	80	167	154	163	507	0	313	980	0	44	604	41
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	13.6	13.6	30.6	24.4	24.4		82.5	71.1		64.9	59.5	59.5
Effective Green, g (s)	16.6	16.6	34.6	26.9	26.9		84.5	73.6		70.9	62.0	62.0
Actuated g/C Ratio	0.12	0.12	0.25	0.19	0.19		0.60	0.53		0.51	0.44	0.44
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	203	192	373	310	648		514	2588		320	1598	715
v/s Ratio Prot	0.05	c0.10	0.06	0.10	c0.15		c0.08	0.20		0.01	0.17	
v/s Ratio Perm			0.05				c0.28			0.06		0.03
v/c Ratio	0.39	0.87	0.41	0.53	0.78		0.61	0.38		0.14	0.38	0.06
Uniform Delay, d ₁	57.0	60.6	44.2	50.8	53.8		15.0	19.7		17.5	26.1	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.27	0.76		0.75	0.85	1.00
Incremental Delay, d ₂	0.9	31.3	0.5	1.2	5.9		1.6	0.4		0.1	0.6	0.1
Delay (s)	58.0	92.0	44.7	52.0	59.7		20.6	15.3		13.2	22.8	22.4
Level of Service	E	F	D	D	E		C	B		B	C	C
Approach Delay (s)		67.0			57.9			16.5			22.2	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			33.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			58.9%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

Existing AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	41	21	131	17	1	206	599	44	883
Future Volume (vph)	41	21	131	17	1	206	599	44	883
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	23.0	23.0	41.0	23.0	23.0	41.0	117.0	76.0	76.0
Total Split (%)	16.4%	16.4%	29.3%	16.4%	16.4%	29.3%	83.6%	54.3%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	13.8	13.8	32.2		13.8	122.5	122.7	101.3	101.3
Actuated g/C Ratio	0.10	0.10	0.23		0.10	0.88	0.88	0.72	0.72
v/c Ratio	0.41	0.17	0.37		0.18	0.67	0.32	0.19	0.43
Control Delay	67.2	58.4	19.2		41.9	15.7	2.4	11.1	10.4
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	58.4	19.2		41.9	15.7	2.4	11.1	10.4
LOS	E	E	B		D	B	A	B	B
Approach Delay		34.6			41.9		6.0		10.4
Approach LOS		C			D		A		B

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 13 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 59.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

4: Cedar Bluff Road & Sherrill Blvd

Existing AM Peak

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	56	32	168	48	368	971	76	1119
v/c Ratio	0.41	0.17	0.37	0.18	0.67	0.32	0.19	0.43
Control Delay	67.2	58.4	19.2	41.9	15.7	2.4	11.1	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	58.4	19.2	41.9	15.7	2.4	11.1	10.4
Queue Length 50th (ft)	49	27	55	14	124	99	21	201
Queue Length 95th (ft)	74	43	76	4	86	138	37	361
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	196	271	678	372	768	3014	395	2581
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.12	0.25	0.13	0.48	0.32	0.19	0.43
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

Existing AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	21	131	17	1	10	206	599	194	44	883	140
Future Volume (vph)	41	21	131	17	1	10	206	599	194	44	883	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.95		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3141		1906	3414		1761	3561	
Flt Permitted	0.72	1.00	1.00		0.80		0.21	1.00		0.29	1.00	
Satd. Flow (perm)	1409	1947	1655		2575		417	3414		547	3561	
Peak-hour factor, PHF	0.73	0.66	0.78	0.61	0.25	0.63	0.56	0.88	0.67	0.58	0.92	0.88
Adj. Flow (vph)	56	32	168	28	4	16	368	681	290	76	960	159
RTOR Reduction (vph)	0	0	73	0	15	0	0	24	0	0	6	0
Lane Group Flow (vph)	56	32	95	0	33	0	368	947	0	76	1113	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	9.7	9.7	25.4		9.7		118.8	118.8		98.1	98.1	
Effective Green, g (s)	12.2	12.2	29.4		12.2		120.8	120.8		100.1	100.1	
Actuated g/C Ratio	0.09	0.09	0.21		0.09		0.86	0.86		0.71	0.71	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	122	169	347		224		548	2945		391	2546	
v/s Ratio Prot		0.02	0.03				c0.08	0.28			0.31	
v/s Ratio Perm	c0.04		0.02		0.01		c0.49			0.14		
v/c Ratio	0.46	0.19	0.27		0.15		0.67	0.32		0.19	0.44	
Uniform Delay, d1	60.8	59.3	46.3		59.1		6.2	1.8		6.6	8.3	
Progression Factor	1.00	1.00	1.00		1.00		2.48	1.25		1.00	1.00	
Incremental Delay, d2	2.7	0.5	0.3		0.3		2.8	0.3		1.1	0.5	
Delay (s)	63.5	59.9	46.6		59.4		18.2	2.6		7.7	8.8	
Level of Service	E	E	D		E		B	A		A	A	
Approach Delay (s)		52.0			59.4			6.8			8.7	
Approach LOS		D			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			59.2%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings 5: Cedar Bluff Road & Fox Lonas Rd

Existing AM Peak
Medical Office Center

	←	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↖	↑↓	↖	↑↓	
Traffic Volume (vph)	150	111	2	718	358	528	
Future Volume (vph)	150	111	2	718	358	528	
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	
Protected Phases		1		2	1	6	4
Permitted Phases	8	8	2		6		
Detector Phase	8	1	2	2	1	6	
Switch Phase							
Minimum Initial (s)	8.0	6.0	20.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	26.5	11.5	26.5	22.0
Total Split (s)	30.0	22.0	48.0	48.0	22.0	70.0	30.0
Total Split (%)	30.0%	22.0%	48.0%	48.0%	22.0%	70.0%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes	Yes		
Recall Mode	None	None	C-Min	C-Min	None	C-Min	None
Act Effct Green (s)	19.8	46.5	41.5	41.5	68.7	67.7	
Actuated g/C Ratio	0.20	0.46	0.42	0.42	0.69	0.68	
v/c Ratio	0.79	0.19	0.01	1.03	1.20	0.31	
Control Delay	57.8	11.3	12.5	56.8	138.2	7.5	
Queue Delay	0.0	0.0	0.0	2.5	0.0	0.0	
Total Delay	57.8	11.3	12.5	59.3	138.2	7.5	
LOS	E	B	B	E	F	A	
Approach Delay				59.2		61.5	
Approach LOS				E		E	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 26 (26%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.20
 Intersection Signal Delay: 57.8
 Intersection Capacity Utilization 71.7%
 Analysis Period (min) 15

Intersection LOS: E
ICU Level of Service C

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↑ Ø2 (R)	→ Ø4
22 s	48 s	30 s
↓ Ø6 (R)		↘ Ø8
70 s		30 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

Existing AM Peak
Medical Office Center

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	221	148	4	1517	526	748
v/c Ratio	0.79	0.19	0.01	1.03	1.20	0.31
Control Delay	57.8	11.3	12.5	56.8	138.2	7.5
Queue Delay	0.0	0.0	0.0	2.5	0.0	0.0
Total Delay	57.8	11.3	12.5	59.3	138.2	7.5
Queue Length 50th (ft)	133	36	1	~518	~370	94
Queue Length 95th (ft)	148	56	m2	442	#389	101
Internal Link Dist (ft)				493		1729
Turn Bay Length (ft)	200		100		100	
Base Capacity (vph)	338	761	284	1467	439	2380
Starvation Cap Reductn	0	0	0	10	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.19	0.01	1.04	1.20	0.31

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

Existing AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	150	0	111	2	718	323	358	528	2
Future Volume (vph)	0	0	0	150	0	111	2	718	323	358	528	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	0.95	
Frt				1.00		0.85	1.00	0.95		1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583	1770	3348		1761	3519	
Flt Permitted				0.76		1.00	0.37	1.00		0.09	1.00	
Satd. Flow (perm)				1410		1583	685	3348		158	3519	
Peak-hour factor, PHF	0.92	0.92	0.92	0.68	0.92	0.75	0.50	0.74	0.59	0.68	0.71	0.50
Adj. Flow (vph)	0	0	0	221	0	148	4	970	547	526	744	4
RTOR Reduction (vph)	0	0	0	0	0	28	0	78	0	0	0	0
Lane Group Flow (vph)	0	0	0	221	0	120	4	1439	0	526	748	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				19.8		40.5	41.5	41.5		67.7	67.7	
Effective Green, g (s)				19.8		40.5	41.5	41.5		67.7	67.7	
Actuated g/C Ratio				0.20		0.40	0.42	0.42		0.68	0.68	
Clearance Time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				279		641	284	1389		438	2382	
v/s Ratio Prot						0.04		0.43		c0.25	0.21	
v/s Ratio Perm				c0.16		0.04	0.01			c0.56		
v/c Ratio				0.79		0.19	0.01	1.04		1.20	0.31	
Uniform Delay, d1				38.1		19.2	17.2	29.2		32.1	6.6	
Progression Factor				1.00		1.00	0.72	0.87		1.00	1.00	
Incremental Delay, d2				14.2		0.1	0.1	33.5		110.5	0.3	
Delay (s)				52.4		19.3	12.4	59.0		142.6	7.0	
Level of Service				D		B	B	E		F	A	
Approach Delay (s)		0.0			39.1			58.9			63.0	
Approach LOS		A			D			E			E	
Intersection Summary												
HCM 2000 Control Delay			58.2									
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			100.0							18.0		
Intersection Capacity Utilization			71.7%							C		
Analysis Period (min)			15									
c Critical Lane Group												

Timings 6: Cedar Bluff Road & Dutchtown Rd

Existing AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	100	62	60	45	160	264	589	28	528
Future Volume (vph)	100	62	60	45	160	264	589	28	528
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	13.0	22.0	20.0	13.0	22.0	20.0	52.0	13.0	45.0
Total Split (%)	13.0%	22.0%	20.0%	13.0%	22.0%	20.0%	52.0%	13.0%	45.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	33.5	24.2	43.5	25.1	17.6	52.8	44.6	40.0	32.9
Actuated g/C Ratio	0.34	0.24	0.44	0.25	0.18	0.53	0.45	0.40	0.33
v/c Ratio	0.54	0.16	0.10	0.15	0.87	0.88	0.49	0.13	0.74
Control Delay	33.1	34.5	2.2	24.4	67.4	47.4	21.7	9.8	27.8
Queue Delay	0.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	33.8	34.5	2.2	24.4	67.4	47.4	22.0	9.8	27.8
LOS	C	C	A	C	E	D	C	A	C
Approach Delay		26.5			60.4		29.0		26.9
Approach LOS		C			E		C		C

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 15 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 32.1
 Intersection Capacity Utilization 70.2%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
13 s	52 s	13 s	22 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
20 s	45 s	13 s	22 s

Queues

6: Cedar Bluff Road & Dutchtown Rd

Existing AM Peak

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	161	72	72	56	286	297	777	44	852
v/c Ratio	0.54	0.16	0.10	0.15	0.87	0.88	0.49	0.13	0.74
Control Delay	33.1	34.5	2.2	24.4	67.4	47.4	21.7	9.8	27.8
Queue Delay	0.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	33.8	34.5	2.2	24.4	67.4	47.4	22.0	9.8	27.8
Queue Length 50th (ft)	70	37	0	23	178	120	204	11	130
Queue Length 95th (ft)	87	78	10	49	185	#240	191	m12	128
Internal Link Dist (ft)	2065				1954		1139		493
Turn Bay Length (ft)	200		200		150		100		50
Base Capacity (vph)	297	450	757	370	327	347	1676	334	1337
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	26	0	0	0	0	0	331	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.16	0.10	0.15	0.87	0.86	0.58	0.13	0.64

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

Existing AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	62	60	45	160	18	264	589	8	28	528	171
Future Volume (vph)	100	62	60	45	160	18	264	589	8	28	528	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1824		1770	3531		1761	3388	
Flt Permitted	0.23	1.00	1.00	0.71	1.00		0.14	1.00		0.34	1.00	
Satd. Flow (perm)	426	1863	1583	1323	1824		255	3531		630	3388	
Peak-hour factor, PHF	0.62	0.86	0.83	0.80	0.65	0.45	0.89	0.77	0.67	0.64	0.83	0.79
Adj. Flow (vph)	161	72	72	56	246	40	297	765	12	44	636	216
RTOR Reduction (vph)	0	0	45	0	6	0	0	1	0	0	37	0
Lane Group Flow (vph)	161	72	27	56	280	0	297	776	0	44	815	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	35.8	24.2	37.6	25.0	18.8		51.1	41.0		35.8	31.7	
Effective Green, g (s)	35.8	24.2	37.6	25.0	18.8		51.1	41.0		35.8	31.7	
Actuated g/C Ratio	0.36	0.24	0.38	0.25	0.19		0.51	0.41		0.36	0.32	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	308	450	690	358	342		333	1447		271	1073	
v/s Ratio Prot	c0.06	0.04	0.01	0.01	c0.15		c0.12	0.22		0.01	0.24	
v/s Ratio Perm	0.13		0.01	0.03			c0.34			0.05		
v/c Ratio	0.52	0.16	0.04	0.16	0.82		0.89	0.54		0.16	0.76	
Uniform Delay, d1	23.9	29.9	19.8	29.0	39.0		22.1	22.3		21.1	30.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.75	0.85	
Incremental Delay, d2	1.6	0.2	0.0	0.2	14.2		24.5	1.4		0.3	4.8	
Delay (s)	25.5	30.1	19.8	29.2	53.1		46.6	23.7		16.2	30.8	
Level of Service	C	C	B	C	D		D	C		B	C	
Approach Delay (s)		25.2			49.2			30.1			30.1	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			70.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Existing AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	101	14	37	291	163	4	23	4	63	207	26
Future Volume (Veh/h)	38	101	14	37	291	163	4	23	4	63	207	26
Sign Control	Free			Free			Stop			Stop		
Grade	-9%			0%			0%			0%		
Peak Hour Factor	0.68	0.81	0.88	0.58	0.90	0.76	0.50	0.52	0.50	0.72	0.71	0.50
Hourly flow rate (vph)	56	125	16	64	323	214	8	44	8	88	292	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	40											
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1142											
pX, platoon unblocked												
vC, conflicting volume	537			141			732	910	70	754	811	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	537			141			732	910	70	754	811	268
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			96			0	82	99	63	0	93
cM capacity (veh/h)	1027			1440			0	247	978	237	282	730
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	56	83	58	226	376	60	88	344				
Volume Left	56	0	0	64	0	8	88	0				
Volume Right	0	0	16	0	214	8	0	52				
cSH	1027	1700	1700	1440	1700	241	237	311				
Volume to Capacity	0.05	0.05	0.03	0.04	0.22	0.25	0.37	1.11				
Queue Length 95th (ft)	4	0	0	3	0	24	41	341				
Control Delay (s)	8.7	0.0	0.0	2.4	0.0	25.3	29.0	120.4				
Lane LOS	A			A		D	D	F				
Approach Delay (s)	2.5			0.9		25.3	101.8					
Approach LOS						D	F					
Intersection Summary												
Average Delay	36.1											
Intersection Capacity Utilization	40.1%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

Existing AM Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	389	281	84	381	52	29
Future Volume (Veh/h)	389	281	84	381	52	29
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.70	0.81	0.90	0.70	0.70
Hourly flow rate (vph)	505	401	104	423	74	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			906		1336	706
vC1, stage 1 conf vol					706	
vC2, stage 2 conf vol					631	
vCu, unblocked vol			906		1336	706
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			86		79	91
cM capacity (veh/h)			751		355	436
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	906	104	423	74	41	
Volume Left	0	104	0	74	0	
Volume Right	401	0	0	0	41	
cSH	1700	751	1700	355	436	
Volume to Capacity	0.53	0.14	0.25	0.21	0.09	
Queue Length 95th (ft)	0	12	0	19	8	
Control Delay (s)	0.0	10.6	0.0	17.8	14.1	
Lane LOS		B		C	B	
Approach Delay (s)	0.0	2.1		16.5		
Approach LOS				C		
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			55.6%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

Existing AM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	254	414	16	325	40
Future Volume (Veh/h)	2	254	414	16	325	40
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.25	0.73	0.85	0.40	0.74	0.67
Hourly flow rate (vph)	8	348	487	40	439	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	527				697	264
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	527				697	264
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				0	92
cM capacity (veh/h)	1036				372	735
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	124	232	325	202	439	60
Volume Left	8	0	0	0	439	0
Volume Right	0	0	0	40	0	60
cSH	1036	1700	1700	1700	372	735
Volume to Capacity	0.01	0.14	0.19	0.12	1.18	0.08
Queue Length 95th (ft)	1	0	0	0	442	7
Control Delay (s)	0.6	0.0	0.0	0.0	137.2	10.3
Lane LOS	A				F	B
Approach Delay (s)	0.2		0.0		121.9	
Approach LOS					F	
Intersection Summary						
Average Delay			44.1			
Intersection Capacity Utilization			36.6%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

Existing AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	287	299	259	185	71	99	271	13	322
Future Volume (vph)	287	299	259	185	71	99	271	13	322
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	33.0	32.0	32.0	16.0	15.0	12.0	50.0	12.0	50.0
Total Split (%)	30.0%	29.1%	29.1%	14.5%	13.6%	10.9%	45.5%	10.9%	45.5%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	40.0	24.0	24.0	10.0	11.1	54.9	52.7	51.0	44.7
Actuated g/C Ratio	0.36	0.22	0.22	0.09	0.10	0.50	0.48	0.46	0.41
v/c Ratio	0.74	0.86	0.41	0.90	0.53	0.44	0.33	0.05	0.43
Control Delay	37.6	61.5	5.0	80.6	55.4	20.1	16.9	13.8	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	61.5	5.0	80.6	55.4	20.1	16.9	13.8	21.8
LOS	D	E	A	F	E	C	B	B	C
Approach Delay		34.1			73.9		17.6		21.6
Approach LOS		C			E		B		C

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 85 (77%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 32.5

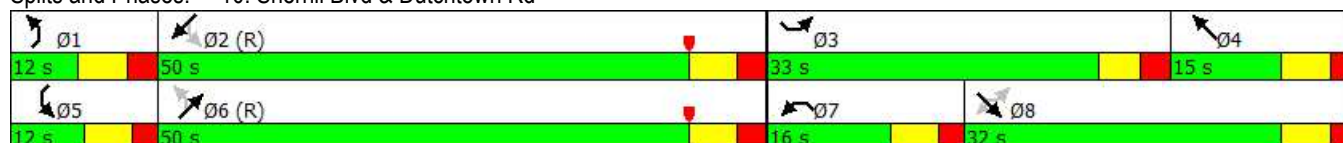
Intersection LOS: C

Intersection Capacity Utilization 62.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

Existing AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	368	348	370	280	101	160	553	20	613
v/c Ratio	0.74	0.86	0.41	0.90	0.53	0.44	0.33	0.05	0.43
Control Delay	37.6	61.5	5.0	80.6	55.4	20.1	16.9	13.8	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	61.5	5.0	80.6	55.4	20.1	16.9	13.8	21.8
Queue Length 50th (ft)	200	232	0	102	63	59	97	7	143
Queue Length 95th (ft)	243	#340	5	105	#124	65	123	14	152
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	533	440	941	312	190	361	1656	431	1416
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.79	0.39	0.90	0.53	0.44	0.33	0.05	0.43

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

Existing AM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 							 	
Traffic Volume (vph)	287	299	259	185	71	7	99	271	122	13	322	140
Future Volume (vph)	287	299	259	185	71	7	99	271	122	13	322	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1818		1770	3369		1770	3376	
Flt Permitted	0.45	1.00	1.00	0.95	1.00		0.32	1.00		0.44	1.00	
Satd. Flow (perm)	836	1863	2787	3433	1818		588	3369		813	3376	
Peak-hour factor, PHF	0.78	0.86	0.70	0.66	0.84	0.44	0.62	0.72	0.69	0.65	0.76	0.74
Adj. Flow (vph)	368	348	370	280	85	16	160	376	177	20	424	189
RTOR Reduction (vph)	0	0	289	0	6	0	0	47	0	0	45	0
Lane Group Flow (vph)	368	348	81	280	95	0	160	506	0	20	568	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	40.0	24.0	24.0	10.0	11.1		55.4	49.1		47.1	44.7	
Effective Green, g (s)	40.0	24.0	24.0	10.0	11.1		55.4	49.1		47.1	44.7	
Actuated g/C Ratio	0.36	0.22	0.22	0.09	0.10		0.50	0.45		0.43	0.41	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	498	406	608	312	183		363	1503		368	1371	
v/s Ratio Prot	c0.15	c0.19		0.08	0.05		c0.03	c0.15		0.00	0.17	
v/s Ratio Perm	0.11		0.03				c0.20			0.02		
v/c Ratio	0.74	0.86	0.13	0.90	0.52		0.44	0.34		0.05	0.41	
Uniform Delay, d1	28.3	41.4	34.6	49.5	46.9		15.7	19.8		18.2	23.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.7	16.2	0.1	26.4	2.5		0.9	0.6		0.1	0.9	
Delay (s)	34.0	57.5	34.7	75.9	49.4		16.6	20.5		18.3	24.2	
Level of Service	C	E	C	E	D		B	C		B	C	
Approach Delay (s)		41.8			68.9			19.6			24.0	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			35.8				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)			25.0		
Intersection Capacity Utilization			62.3%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing PM Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	430	415	1125	1005
Future Volume (vph)	430	415	1125	1005
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	32.0	32.0	48.0	48.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	22.0	22.0	50.0	50.0
Actuated g/C Ratio	0.28	0.28	0.62	0.62
v/c Ratio	0.69	0.67	0.31	0.33
Control Delay	26.7	25.2	7.7	8.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.7	25.2	7.7	8.8
LOS	C	C	A	A
Approach Delay	26.3		7.7	8.8
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 13.6
 Intersection Capacity Utilization 43.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing PM Peak

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	671	307	1223	1058
v/c Ratio	0.69	0.67	0.31	0.33
Control Delay	26.7	25.2	7.7	8.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.7	25.2	7.7	8.8
Queue Length 50th (ft)	139	107	72	113
Queue Length 95th (ft)	160	173	113	145
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1226	563	4005	3194
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	0.55	0.31	0.33
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing PM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	430	415	0	1125	1005	0
Future Volume (vph)	430	415	0	1125	1005	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.96	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3388	1455		6408	5111	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3388	1455		6408	5111	
Peak-hour factor, PHF	0.85	0.88	1.00	0.92	0.95	1.00
Adj. Flow (vph)	506	472	0	1223	1058	0
RTOR Reduction (vph)	46	61	0	0	0	0
Lane Group Flow (vph)	625	246	0	1223	1058	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	20.0	20.0		48.0	48.0	
Effective Green, g (s)	22.0	22.0		50.0	50.0	
Actuated g/C Ratio	0.28	0.28		0.62	0.62	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	931	400		4005	3194	
v/s Ratio Prot	c0.18	0.17		0.19	c0.21	
v/s Ratio Perm						
v/c Ratio	0.67	0.62		0.31	0.33	
Uniform Delay, d1	25.8	25.3		7.0	7.1	
Progression Factor	1.00	1.00		1.00	1.12	
Incremental Delay, d2	1.5	2.0		0.2	0.3	
Delay (s)	27.3	27.3		7.1	8.2	
Level of Service	C	C		A	A	
Approach Delay (s)	27.3			7.1	8.2	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			13.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			43.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing PM Peak
Medical Office Center

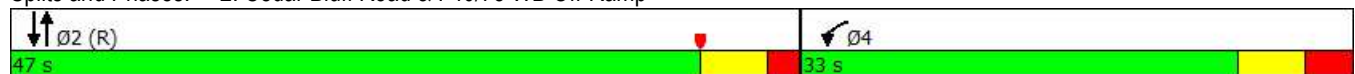
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	703	1110	573
Future Volume (vph)	703	1110	573
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	33.0	47.0	47.0
Total Split (%)	41.3%	58.8%	58.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	25.5	46.5	46.5
Actuated g/C Ratio	0.32	0.58	0.58
v/c Ratio	0.72	0.31	0.24
Control Delay	27.8	7.1	9.0
Queue Delay	0.0	0.0	0.0
Total Delay	27.8	7.1	9.0
LOS	C	A	A
Approach Delay	27.8	7.1	9.0
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 43.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing PM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	808	1194	690
v/c Ratio	0.72	0.31	0.24
Control Delay	27.8	7.1	9.0
Queue Delay	0.0	0.0	0.0
Total Delay	27.8	7.1	9.0
Queue Length 50th (ft)	178	68	83
Queue Length 95th (ft)	217	80	69
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1279	3869	2927
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.63	0.31	0.24
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing PM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	703	0	1110	0	0	573
Future Volume (vph)	703	0	1110	0	0	573
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.87	1.00	0.93	1.00	1.00	0.83
Adj. Flow (vph)	808	0	1194	0	0	690
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	808	0	1194	0	0	690
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	22.5		44.5			44.5
Effective Green, g (s)	25.5		46.5			46.5
Actuated g/C Ratio	0.32		0.58			0.58
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1125		3868			2926
v/s Ratio Prot	c0.23		c0.18			0.14
v/s Ratio Perm						
v/c Ratio	0.72		0.31			0.24
Uniform Delay, d1	24.1		8.5			8.1
Progression Factor	1.00		0.77			1.04
Incremental Delay, d2	1.8		0.2			0.2
Delay (s)	25.9		6.8			8.6
Level of Service	C		A			A
Approach Delay (s)	25.9		6.8			8.6
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			13.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.45			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			43.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 3: Cedar Bluff Road & Park West Blvd

Existing PM Peak
Medical Office Center

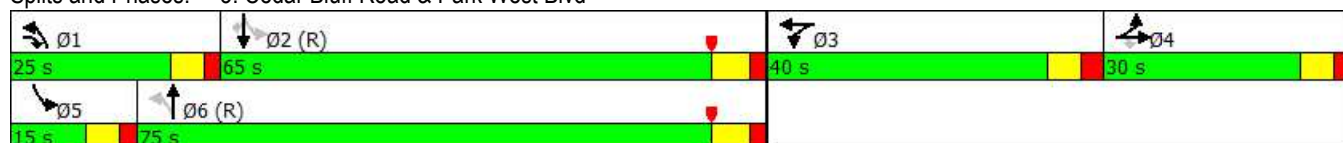
												
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR		
Lane Configurations												
Traffic Volume (vph)	54	15	233	231	55	132	426	25	690	23		
Future Volume (vph)	54	15	233	231	55	132	426	25	690	23		
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm		
Protected Phases	4	4	1	3	3	1	6	5	2			
Permitted Phases			4			6		2		2		
Detector Phase	4	4	1	3	3	1	6	5	2	2		
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0		
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5		
Total Split (s)	30.0	30.0	25.0	40.0	40.0	25.0	75.0	15.0	65.0	65.0		
Total Split (%)	18.8%	18.8%	15.6%	25.0%	25.0%	15.6%	46.9%	9.4%	40.6%	40.6%		
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5		
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0		
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5		
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0		
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag		
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max		
Act Effct Green (s)	22.8	22.8	39.3	25.8	25.8	99.7	89.3	93.9	82.9	82.9		
Actuated g/C Ratio	0.14	0.14	0.25	0.16	0.16	0.62	0.56	0.59	0.52	0.52		
v/c Ratio	0.29	0.69	0.39	0.71	0.57	0.38	0.21	0.09	0.43	0.04		
Control Delay	63.1	80.7	52.0	78.0	43.6	14.3	13.8	13.2	23.1	0.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	63.1	80.7	52.0	78.0	43.6	14.3	13.8	13.2	23.1	0.1		
LOS	E	F	D	E	D	B	B	B	C	A		
Approach Delay		66.0			55.4		13.9		21.7			
Approach LOS		E			E		B		C			

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 50 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 33.1
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

3: Cedar Bluff Road & Park West Blvd

Existing PM Peak

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	72	153	146	185	356	152	581	48	812	32
v/c Ratio	0.29	0.69	0.39	0.71	0.57	0.38	0.21	0.09	0.43	0.04
Control Delay	63.1	80.7	52.0	78.0	43.6	14.3	13.8	13.2	23.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.1	80.7	52.0	78.0	43.6	14.3	13.8	13.2	23.1	0.1
Queue Length 50th (ft)	68	162	135	204	127	69	110	17	227	0
Queue Length 95th (ft)	97	135	182	248	89	124	139	22	258	0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	287	261	447	364	821	461	2795	535	1870	909
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.59	0.33	0.51	0.43	0.33	0.21	0.09	0.43	0.04
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

Existing PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	15	233	231	55	123	132	426	55	25	690	23
Future Volume (vph)	54	15	233	231	55	123	132	426	55	25	690	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.88	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1561	1512	1618	3236		1770	4996		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.99		0.25	1.00		0.42	1.00	1.00
Satd. Flow (perm)	1719	1561	1512	1618	3236		464	4996		772	3610	1615
Peak-hour factor, PHF	0.75	0.54	0.86	0.80	0.60	0.77	0.87	0.83	0.81	0.52	0.85	0.72
Adj. Flow (vph)	72	28	271	289	92	160	152	513	68	48	812	32
RTOR Reduction (vph)	0	0	0	0	100	0	0	9	0	0	0	15
Lane Group Flow (vph)	72	153	146	185	256	0	152	572	0	48	812	17
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	19.8	19.8	30.8	23.3	23.3		96.6	85.6		86.2	80.4	80.4
Effective Green, g (s)	22.8	22.8	34.8	25.8	25.8		99.4	88.1		92.2	82.9	82.9
Actuated g/C Ratio	0.14	0.14	0.22	0.16	0.16		0.62	0.55		0.58	0.52	0.52
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	244	222	328	260	521		394	2750		498	1870	836
v/s Ratio Prot	0.04	c0.10	c0.04	c0.11	0.08		0.03	0.11		0.01	c0.22	
v/s Ratio Perm			0.06				0.21			0.05		0.01
v/c Ratio	0.30	0.69	0.45	0.71	0.49		0.39	0.21		0.10	0.43	0.02
Uniform Delay, d1	61.4	65.2	54.2	63.6	61.1		14.9	18.2		14.8	24.0	18.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.80	0.71		0.91	0.85	1.00
Incremental Delay, d2	0.5	7.9	0.7	8.3	0.5		0.4	0.2		0.1	0.7	0.0
Delay (s)	61.9	73.1	54.9	71.9	61.7		12.4	13.1		13.5	21.0	18.8
Level of Service	E	E	D	E	E		B	B		B	C	B
Approach Delay (s)		63.8			65.1			13.0			20.5	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			34.2			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			53.4%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

Timings 4: Cedar Bluff Road & Sherrill Blvd

Existing PM Peak
Medical Office Center

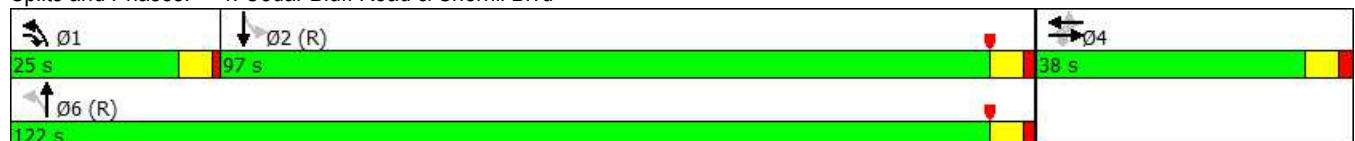
									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	129	3	40	83	0	52	650	7	865
Future Volume (vph)	129	3	40	83	0	52	650	7	865
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	38.0	38.0	25.0	38.0	38.0	25.0	122.0	97.0	97.0
Total Split (%)	23.8%	23.8%	15.6%	23.8%	23.8%	15.6%	76.3%	60.6%	60.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	27.5	27.5	39.6		27.5	126.0	125.5	113.9	113.9
Actuated g/C Ratio	0.17	0.17	0.25		0.17	0.79	0.78	0.71	0.71
v/c Ratio	0.78	0.04	0.12		0.33	0.18	0.36	0.04	0.44
Control Delay	87.9	51.7	10.3		39.1	4.2	4.5	9.0	11.0
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	87.9	51.7	10.3		39.1	4.2	4.5	9.0	11.0
LOS	F	D	B		D	A	A	A	B
Approach Delay		67.2			39.1		4.5		10.9
Approach LOS		E			D		A		B

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 97 (61%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 14.6
 Intersection Capacity Utilization 59.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

4: Cedar Bluff Road & Sherrill Blvd

Existing PM Peak

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	152	12	52	155	72	1009	16	1135
v/c Ratio	0.78	0.04	0.12	0.33	0.18	0.36	0.04	0.44
Control Delay	87.9	51.7	10.3	39.1	4.2	4.5	9.0	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.9	51.7	10.3	39.1	4.2	4.5	9.0	11.0
Queue Length 50th (ft)	153	11	0	50	11	91	5	244
Queue Length 95th (ft)	215	8	23	83	17	81	7	270
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	246	419	583	573	525	2792	374	2585
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.03	0.09	0.27	0.14	0.36	0.04	0.44
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

Existing PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	3	40	83	0	5	52	650	16	7	865	5
Future Volume (vph)	129	3	40	83	0	5	52	650	16	7	865	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3215		1906	3562		1761	3633	
Flt Permitted	0.59	1.00	1.00		0.74		0.20	1.00		0.28	1.00	
Satd. Flow (perm)	1143	1947	1655		2476		406	3562		526	3633	
Peak-hour factor, PHF	0.85	0.25	0.77	0.58	0.92	0.42	0.72	0.66	0.67	0.44	0.77	0.42
Adj. Flow (vph)	152	12	52	143	0	12	72	985	24	16	1123	12
RTOR Reduction (vph)	0	0	40	0	42	0	0	1	0	0	0	0
Lane Group Flow (vph)	152	12	12	0	113	0	72	1008	0	16	1135	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	25.0	25.0	31.6		25.0		123.5	123.5		111.9	111.9	
Effective Green, g (s)	27.5	27.5	35.6		27.5		125.5	125.5		113.9	113.9	
Actuated g/C Ratio	0.17	0.17	0.22		0.17		0.78	0.78		0.71	0.71	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	196	334	368		425		399	2793		374	2586	
v/s Ratio Prot		0.01	0.00				0.01	c0.28			c0.31	
v/s Ratio Perm	c0.13		0.01		0.05		0.13			0.03		
v/c Ratio	0.78	0.04	0.03		0.27		0.18	0.36		0.04	0.44	
Uniform Delay, d1	63.3	55.2	48.7		57.5		5.7	5.2		6.8	9.7	
Progression Factor	1.00	1.00	1.00		1.00		0.72	0.74		1.00	1.00	
Incremental Delay, d2	17.3	0.0	0.0		0.3		0.2	0.4		0.2	0.5	
Delay (s)	80.6	55.2	48.7		57.8		4.3	4.2		7.1	10.2	
Level of Service	F	E	D		E		A	A		A	B	
Approach Delay (s)		71.5			57.8			4.2			10.2	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			59.0%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

Existing PM Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	69	44	733	50	864	
Future Volume (vph)	69	44	733	50	864	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	25.0	20.0	70.0	20.0	90.0	25.0
Total Split (%)	21.7%	17.4%	60.9%	17.4%	78.3%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	12.4	22.1	84.5	93.9	94.2	
Actuated g/C Ratio	0.11	0.19	0.73	0.82	0.82	
v/c Ratio	0.56	0.15	0.42	0.16	0.31	
Control Delay	61.8	10.0	5.8	3.9	3.9	
Queue Delay	0.0	0.0	0.1	0.0	0.0	
Total Delay	61.8	10.0	5.9	3.9	3.9	
LOS	E	B	A	A	A	
Approach Delay			5.9		3.9	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 34 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 7.3
 Intersection Capacity Utilization 54.1%
 Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service A

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
20 s	70 s	25 s
↓ Ø6 (R)		↖ Ø8
90 s		25 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

Existing PM Peak
Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	84	52	1070	64	891
v/c Ratio	0.56	0.15	0.42	0.16	0.31
Control Delay	61.8	10.0	5.8	3.9	3.9
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	61.8	10.0	5.9	3.9	3.9
Queue Length 50th (ft)	60	0	121	8	81
Queue Length 95th (ft)	97	27	172	18	130
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	232	452	2520	505	2885
Starvation Cap Reductn	0	0	384	0	0
Spillback Cap Reductn	0	0	0	0	28
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.12	0.50	0.13	0.31
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

Existing PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	69	0	44	0	733	207	50	864	0
Future Volume (vph)	0	0	0	69	0	44	0	733	207	50	864	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.96		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3408		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.22	1.00	
Satd. Flow (perm)				1410		1583		3408		412	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.82	0.92	0.85	0.92	0.91	0.78	0.78	0.97	0.92
Adj. Flow (vph)	0	0	0	84	0	52	0	805	265	64	891	0
RTOR Reduction (vph)	0	0	0	0	0	45	0	18	0	0	0	0
Lane Group Flow (vph)	0	0	0	84	0	7	0	1052	0	64	891	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				10.8		16.1		80.9		91.7	91.7	
Effective Green, g (s)				10.8		16.1		80.9		91.7	91.7	
Actuated g/C Ratio				0.09		0.14		0.70		0.80	0.80	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				132		221		2397		390	2808	
v/s Ratio Prot						0.00		c0.31		0.01	c0.25	
v/s Ratio Perm				c0.06		0.00				0.12		
v/c Ratio				0.64		0.03		0.44		0.16	0.32	
Uniform Delay, d1				50.2		42.7		7.3		3.5	3.2	
Progression Factor				1.00		1.00		0.69		1.00	1.00	
Incremental Delay, d2				9.6		0.1		0.5		0.2	0.3	
Delay (s)				59.9		42.8		5.6		3.7	3.5	
Level of Service				E		D		A		A	A	
Approach Delay (s)		0.0			53.3			5.6			3.5	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.7									
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			54.1%							A		
Analysis Period (min)			15									
c Critical Lane Group												

Timings 6: Cedar Bluff Road & Dutchtown Rd

Existing PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	163	83	48	20	133	190	543	19	793
Future Volume (vph)	163	83	48	20	133	190	543	19	793
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	20.0	30.0	22.0	15.0	25.0	22.0	57.0	13.0	48.0
Total Split (%)	17.4%	26.1%	19.1%	13.0%	21.7%	19.1%	49.6%	11.3%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	37.4	29.2	51.6	24.5	17.2	65.4	57.3	49.3	42.4
Actuated g/C Ratio	0.33	0.25	0.45	0.21	0.15	0.57	0.50	0.43	0.37
v/c Ratio	0.63	0.22	0.08	0.13	0.81	0.93	0.39	0.07	0.79
Control Delay	38.5	37.0	2.0	27.4	65.7	64.9	20.0	13.2	41.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	37.0	2.0	27.4	65.7	64.9	20.0	13.2	41.3
LOS	D	D	A	C	E	E	C	B	D
Approach Delay		32.2			59.9		33.8		40.7
Approach LOS		C			E		C		D

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 14 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 38.9

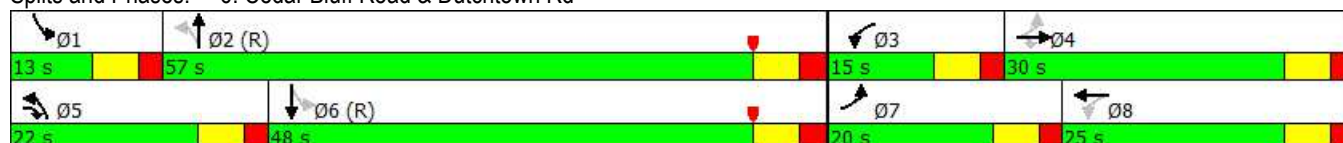
Intersection LOS: D

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues

6: Cedar Bluff Road & Dutchtown Rd

Existing PM Peak

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	209	104	60	40	224	302	679	24	1015
v/c Ratio	0.63	0.22	0.08	0.13	0.81	0.93	0.39	0.07	0.79
Control Delay	38.5	37.0	2.0	27.4	65.7	64.9	20.0	13.2	41.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	37.0	2.0	27.4	65.7	64.9	20.0	13.2	41.3
Queue Length 50th (ft)	112	62	0	19	149	170	181	10	390
Queue Length 95th (ft)	153	102	7	24	208	157	212	19	434
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200	200		150	100		50		
Base Capacity (vph)	334	472	764	330	307	330	1756	379	1318
Starvation Cap Reductn	0	0	0	0	0	0	0	0	6
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.22	0.08	0.12	0.73	0.92	0.39	0.06	0.77
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

Existing PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	83	48	20	133	27	190	543	29	19	793	87
Future Volume (vph)	163	83	48	20	133	27	190	543	29	19	793	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1788		1770	3508		1761	3457	
Flt Permitted	0.29	1.00	1.00	0.69	1.00		0.09	1.00		0.39	1.00	
Satd. Flow (perm)	542	1863	1583	1285	1788		170	3508		729	3457	
Peak-hour factor, PHF	0.78	0.80	0.80	0.50	0.81	0.45	0.63	0.85	0.72	0.79	0.89	0.70
Adj. Flow (vph)	209	104	60	40	164	60	302	639	40	24	891	124
RTOR Reduction (vph)	0	0	36	0	12	0	0	4	0	0	10	0
Lane Group Flow (vph)	209	104	24	40	212	0	302	675	0	24	1005	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	40.1	29.2	45.6	24.5	19.6		62.4	52.4		44.0	40.0	
Effective Green, g (s)	40.1	29.2	45.6	24.5	19.6		62.4	52.4		44.0	40.0	
Actuated g/C Ratio	0.35	0.25	0.40	0.21	0.17		0.54	0.46		0.38	0.35	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	343	473	710	294	304		320	1598		314	1202	
v/s Ratio Prot	c0.08	0.06	0.00	0.01	c0.12		c0.13	0.19		0.00	0.29	
v/s Ratio Perm	0.14		0.01	0.02			c0.38			0.03		
v/c Ratio	0.61	0.22	0.03	0.14	0.70		0.94	0.42		0.08	0.84	
Uniform Delay, d1	28.6	33.9	21.2	36.4	44.9		33.5	21.1		22.2	34.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.11	
Incremental Delay, d2	3.1	0.2	0.0	0.2	6.8		35.5	0.8		0.1	6.8	
Delay (s)	31.7	34.1	21.2	36.6	51.8		69.0	21.9		22.3	45.1	
Level of Service	C	C	C	D	D		E	C		C	D	
Approach Delay (s)		30.7			49.5			36.4			44.6	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			40.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			73.3%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Existing PM Peak
Medical Office Center

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	26	281	7	18	119	59	17	33	15	58	77	5		
Future Volume (Veh/h)	26	281	7	18	119	59	17	33	15	58	77	5		
Sign Control	Free			Free			Stop			Stop				
Grade	-9%			0%			0%			0%				
Peak Hour Factor	0.65	0.80	0.58	0.64	0.69	0.87	0.71	0.59	0.63	0.54	0.84	0.42		
Hourly flow rate (vph)	40	351	12	28	172	68	24	56	24	107	92	12		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)									40					
Median type	None				None									
Median storage veh														
Upstream signal (ft)														
1142														
pX, platoon unblocked														
vC, conflicting volume	240			363			637			733	182	546	705	120
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	240			363			637			733	182	546	705	120
tC, single (s)	4.1			4.1			7.5			6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)														
tF (s)	2.2			2.2			3.5			4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			91			83	97	69	73	99
cM capacity (veh/h)	1324			1192			272			328	830	341	340	909
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	40	234	129	114	154	104	107	104						
Volume Left	40	0	0	28	0	24	107	0						
Volume Right	0	0	12	0	68	24	0	12						
cSH	1324	1700	1700	1192	1700	404	341	367						
Volume to Capacity	0.03	0.14	0.08	0.02	0.09	0.26	0.31	0.28						
Queue Length 95th (ft)	2	0	0	2	0	25	33	29						
Control Delay (s)	7.8	0.0	0.0	2.1	0.0	18.0	20.3	18.6						
Lane LOS	A			A			C			C	C			
Approach Delay (s)	0.8			0.9			18.0			19.5				
Approach LOS							C			C				
Intersection Summary														
Average Delay				6.6										
Intersection Capacity Utilization				33.6%			ICU Level of Service			A				
Analysis Period (min)				15										

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

Existing PM Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	809	99	49	690	125	39
Future Volume (Veh/h)	809	99	49	690	125	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.60	0.61	0.88	0.89	0.51
Hourly flow rate (vph)	861	165	80	784	140	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1026		1888	944
vC1, stage 1 conf vol					944	
vC2, stage 2 conf vol					944	
vCu, unblocked vol			1026		1888	944
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			88		45	76
cM capacity (veh/h)			677		252	318
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	1026	80	784	140	76	
Volume Left	0	80	0	140	0	
Volume Right	165	0	0	0	76	
cSH	1700	677	1700	252	318	
Volume to Capacity	0.60	0.12	0.46	0.55	0.24	
Queue Length 95th (ft)	0	10	0	77	23	
Control Delay (s)	0.0	11.0	0.0	35.7	19.8	
Lane LOS		B		E	C	
Approach Delay (s)	0.0	1.0		30.1		
Approach LOS				D		
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			62.2%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

Existing PM Peak
Medical Office Center



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (veh/h)	0	295	208	0	8	0
Future Volume (Veh/h)	0	295	208	0	8	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.87	0.54	0.92	0.25	0.92
Hourly flow rate (vph)	0	339	385	0	32	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	385				554	192
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	385				554	192
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				93	100
cM capacity (veh/h)	1170				462	817
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	113	226	257	128	32	0
Volume Left	0	0	0	0	32	0
Volume Right	0	0	0	0	0	0
cSH	1170	1700	1700	1700	462	1700
Volume to Capacity	0.00	0.13	0.15	0.08	0.07	0.00
Queue Length 95th (ft)	0	0	0	0	6	0
Control Delay (s)	0.0	0.0	0.0	0.0	13.4	0.0
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		13.4	
Approach LOS					B	
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			18.2%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

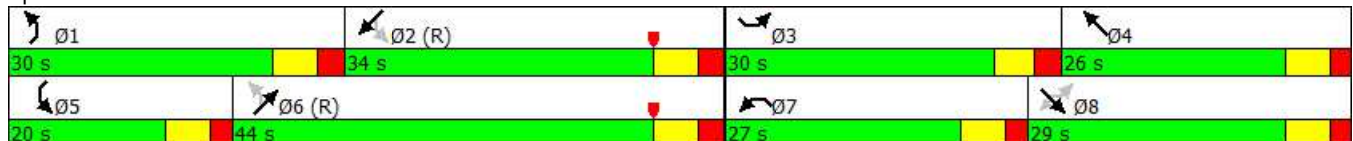
Existing PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	290	147	97	341	204	237	538	11	387
Future Volume (vph)	290	147	97	341	204	237	538	11	387
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	30.0	29.0	29.0	27.0	26.0	30.0	44.0	20.0	34.0
Total Split (%)	25.0%	24.2%	24.2%	22.5%	21.7%	25.0%	36.7%	16.7%	28.3%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	45.6	23.1	23.1	19.6	20.2	58.8	50.8	38.9	31.7
Actuated g/C Ratio	0.38	0.19	0.19	0.16	0.17	0.49	0.42	0.32	0.26
v/c Ratio	0.90	0.59	0.22	0.81	0.91	0.79	0.58	0.12	0.57
Control Delay	56.5	51.8	2.8	60.7	82.2	33.7	29.5	19.6	41.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.5	51.8	2.8	60.7	82.2	33.7	29.5	19.6	41.5
LOS	E	D	A	E	F	C	C	B	D
Approach Delay		43.8			69.0		30.7		40.2
Approach LOS		D			E		C		D

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 73 (61%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 44.0
 Intersection LOS: D
 Intersection Capacity Utilization 73.6%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

Existing PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	358	213	152	455	285	365	855	32	524
v/c Ratio	0.90	0.59	0.22	0.81	0.91	0.79	0.58	0.12	0.57
Control Delay	56.5	51.8	2.8	60.7	82.2	33.7	29.5	19.6	41.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.5	51.8	2.8	60.7	82.2	33.7	29.5	19.6	41.5
Queue Length 50th (ft)	211	152	0	174	218	180	281	13	188
Queue Length 95th (ft)	#287	172	0	188	#291	171	265	11	225
Internal Link Dist (ft)	1094		6715			2069		1876	
Turn Bay Length (ft)	200	225		175	475		100		
Base Capacity (vph)	420	363	704	600	315	491	1478	368	927
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.59	0.22	0.76	0.90	0.74	0.58	0.09	0.57

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

Existing PM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 							 	
Traffic Volume (vph)	290	147	97	341	204	13	237	538	86	11	387	41
Future Volume (vph)	290	147	97	341	204	13	237	538	86	11	387	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1843		1770	3472		1770	3487	
Flt Permitted	0.19	1.00	1.00	0.95	1.00		0.27	1.00		0.32	1.00	
Satd. Flow (perm)	350	1863	2787	3433	1843		496	3472		603	3487	
Peak-hour factor, PHF	0.81	0.69	0.64	0.75	0.77	0.65	0.65	0.72	0.80	0.34	0.82	0.79
Adj. Flow (vph)	358	213	152	455	265	20	365	747	108	32	472	52
RTOR Reduction (vph)	0	0	123	0	2	0	0	8	0	0	7	0
Lane Group Flow (vph)	358	213	29	455	283	0	365	847	0	32	517	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	45.6	23.1	23.1	19.6	20.2		58.8	48.4		36.1	31.7	
Effective Green, g (s)	45.6	23.1	23.1	19.6	20.2		58.8	48.4		36.1	31.7	
Actuated g/C Ratio	0.38	0.19	0.19	0.16	0.17		0.49	0.40		0.30	0.26	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	399	358	536	560	310		461	1400		224	921	
v/s Ratio Prot	c0.17	0.11		0.13	0.15		c0.14	0.24		0.01	0.15	
v/s Ratio Perm	c0.17		0.01				c0.25			0.04		
v/c Ratio	0.90	0.59	0.05	0.81	0.91		0.79	0.60		0.14	0.56	
Uniform Delay, d1	30.8	44.2	39.5	48.4	49.0		21.5	28.3		29.9	38.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.0	2.6	0.0	8.8	29.4		9.0	1.9		0.3	2.5	
Delay (s)	52.8	46.8	39.6	57.2	78.4		30.5	30.2		30.2	40.6	
Level of Service	D	D	D	E	E		C	C		C	D	
Approach Delay (s)		48.3			65.4			30.3			40.0	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			44.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			25.0			
Intersection Capacity Utilization			73.6%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing Midday Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	325	400	1119	948
Future Volume (vph)	325	400	1119	948
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	27.0	27.0	43.0	43.0
Total Split (%)	38.6%	38.6%	61.4%	61.4%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	17.8	17.8	44.2	44.2
Actuated g/C Ratio	0.25	0.25	0.63	0.63
v/c Ratio	0.64	0.63	0.30	0.35
Control Delay	23.2	23.1	6.6	7.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.2	23.1	6.6	7.0
LOS	C	C	A	A
Approach Delay	23.2		6.6	7.0
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 47.7%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing Midday Peak

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	586	269	1230	1129
v/c Ratio	0.64	0.63	0.30	0.35
Control Delay	23.2	23.1	6.6	7.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.2	23.1	6.6	7.0
Queue Length 50th (ft)	100	80	61	90
Queue Length 95th (ft)	113	142	97	100
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1155	527	4046	3227
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.51	0.51	0.30	0.35
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing Midday Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	325	400	0	1119	948	0
Future Volume (vph)	325	400	0	1119	948	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.95	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3365	1455		6408	5111	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3365	1455		6408	5111	
Peak-hour factor, PHF	0.80	0.89	1.00	0.91	0.84	1.00
Adj. Flow (vph)	406	449	0	1230	1129	0
RTOR Reduction (vph)	54	54	0	0	0	0
Lane Group Flow (vph)	532	215	0	1230	1129	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	15.8	15.8		42.2	42.2	
Effective Green, g (s)	17.8	17.8		44.2	44.2	
Actuated g/C Ratio	0.25	0.25		0.63	0.63	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	855	369		4046	3227	
v/s Ratio Prot	c0.16	0.15		0.19	c0.22	
v/s Ratio Perm						
v/c Ratio	0.62	0.58		0.30	0.35	
Uniform Delay, d1	23.1	22.8		5.9	6.1	
Progression Factor	1.00	1.00		1.00	1.02	
Incremental Delay, d2	1.0	1.5		0.2	0.3	
Delay (s)	24.1	24.3		6.1	6.5	
Level of Service	C	C		A	A	
Approach Delay (s)	24.2			6.1	6.5	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			11.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.43			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			47.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing Midday Peak
Medical Office Center

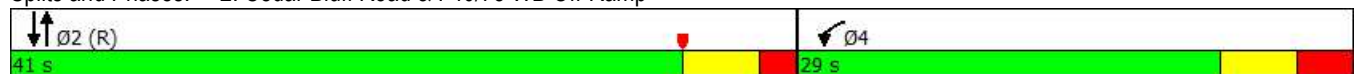
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↘	↑↑↑	↑↑↑
Traffic Volume (vph)	707	1443	423
Future Volume (vph)	707	1443	423
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	29.0	41.0	41.0
Total Split (%)	41.4%	58.6%	58.6%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	22.1	39.9	39.9
Actuated g/C Ratio	0.32	0.57	0.57
v/c Ratio	0.69	0.40	0.19
Control Delay	24.2	11.0	7.2
Queue Delay	0.0	0.0	0.0
Total Delay	24.2	11.0	7.2
LOS	C	B	A
Approach Delay	24.2	11.0	7.2
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 41 (59%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 47.7%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing Midday Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	768	1503	557
v/c Ratio	0.69	0.40	0.19
Control Delay	24.2	11.0	7.2
Queue Delay	0.0	0.0	0.0
Total Delay	24.2	11.0	7.2
Queue Length 50th (ft)	146	72	61
Queue Length 95th (ft)	191	178	34
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1260	3791	2867
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.61	0.40	0.19
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing Midday Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	707	0	1443	0	0	423
Future Volume (vph)	707	0	1443	0	0	423
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	1.00	0.96	1.00	1.00	0.76
Adj. Flow (vph)	768	0	1503	0	0	557
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	768	0	1503	0	0	557
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	19.1		37.9			37.9
Effective Green, g (s)	22.1		39.9			39.9
Actuated g/C Ratio	0.32		0.57			0.57
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1114		3793			2869
v/s Ratio Prot	c0.22		c0.23			0.11
v/s Ratio Perm						
v/c Ratio	0.69		0.40			0.19
Uniform Delay, d1	20.9		8.4			7.3
Progression Factor	1.00		1.21			0.92
Incremental Delay, d2	1.4		0.3			0.1
Delay (s)	22.4		10.4			6.8
Level of Service	C		B			A
Approach Delay (s)	22.4		10.4			6.8
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay			13.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.50			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			47.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 3: Cedar Bluff Road & Park West Blvd

Existing Midday Peak
Medical Office Center

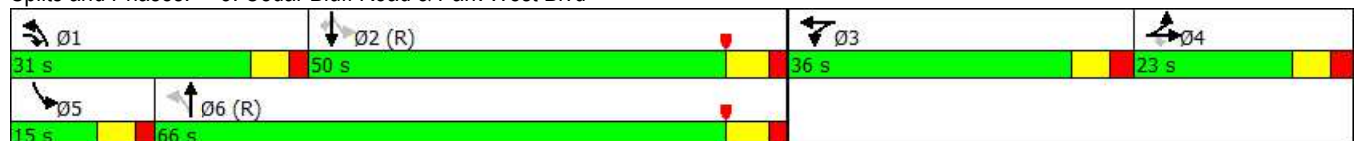
										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	70	33	214	104	169	248	612	25	376	38
Future Volume (vph)	70	33	214	104	169	248	612	25	376	38
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	23.0	23.0	31.0	36.0	36.0	31.0	66.0	15.0	50.0	50.0
Total Split (%)	16.4%	16.4%	22.1%	25.7%	25.7%	22.1%	47.1%	10.7%	35.7%	35.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.2	20.2	43.4	20.5	20.5	87.8	77.4	74.9	64.1	64.1
Actuated g/C Ratio	0.14	0.14	0.31	0.15	0.15	0.63	0.55	0.54	0.46	0.46
v/c Ratio	0.35	0.63	0.29	0.50	0.67	0.58	0.29	0.12	0.30	0.06
Control Delay	56.8	68.0	36.2	62.0	55.0	21.9	14.8	11.1	22.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Total Delay	56.8	68.0	36.2	62.0	55.0	23.0	14.8	11.1	22.7	0.2
LOS	E	E	D	E	E	C	B	B	C	A
Approach Delay		53.6			56.8		17.2		19.8	
Approach LOS		D			E		B		B	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 36 (26%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 30.3
 Intersection Capacity Utilization 52.8%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service A

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues
3: Cedar Bluff Road & Park West Blvd

Existing Midday Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	88	147	137	119	357	340	813	48	501	52
v/c Ratio	0.35	0.63	0.29	0.50	0.67	0.58	0.29	0.12	0.30	0.06
Control Delay	56.8	68.0	36.2	62.0	55.0	21.9	14.8	11.1	22.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Total Delay	56.8	68.0	36.2	62.0	55.0	23.0	14.8	11.1	22.7	0.2
Queue Length 50th (ft)	73	133	100	110	148	141	140	14	128	0
Queue Length 95th (ft)	108	127	140	152	154	222	169	17	140	0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	266	250	547	369	800	646	2766	434	1652	831
Starvation Cap Reductn	0	0	0	0	0	128	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.59	0.25	0.32	0.45	0.66	0.29	0.11	0.30	0.06
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

Existing Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	33	214	104	169	95	248	612	74	25	376	38
Future Volume (vph)	70	33	214	104	169	95	248	612	74	25	376	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.91	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1613	1512	1618	3343		1770	4982		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.38	1.00		0.33	1.00	1.00
Satd. Flow (perm)	1719	1613	1512	1618	3343		704	4982		612	3610	1615
Peak-hour factor, PHF	0.80	0.59	0.94	0.79	0.74	0.82	0.73	0.87	0.67	0.52	0.75	0.73
Adj. Flow (vph)	88	56	228	132	228	116	340	703	110	48	501	52
RTOR Reduction (vph)	0	0	0	0	41	0	0	12	0	0	0	28
Lane Group Flow (vph)	88	147	137	119	316	0	340	801	0	48	501	24
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	17.2	17.2	34.9	18.0	18.0		85.3	73.7		67.2	61.6	61.6
Effective Green, g (s)	20.2	20.2	38.9	20.5	20.5		87.3	76.2		73.2	64.1	64.1
Actuated g/C Ratio	0.14	0.14	0.28	0.15	0.15		0.62	0.54		0.52	0.46	0.46
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	248	232	420	236	489		588	2711		389	1652	739
v/s Ratio Prot	0.05	c0.09	0.05	0.07	c0.09		c0.08	0.16		0.01	0.14	
v/s Ratio Perm			0.04				c0.28			0.06		0.01
v/c Ratio	0.35	0.63	0.33	0.50	0.65		0.58	0.30		0.12	0.30	0.03
Uniform Delay, d1	54.0	56.4	40.1	55.1	56.3		13.3	17.3		16.4	23.9	20.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.34	0.81		0.81	0.83	1.00
Incremental Delay, d2	0.6	4.9	0.3	1.2	2.6		1.1	0.3		0.1	0.4	0.1
Delay (s)	54.7	61.3	40.5	56.3	58.9		18.8	14.3		13.4	20.4	21.0
Level of Service	D	E	D	E	E		B	B		B	C	C
Approach Delay (s)		52.1			58.3			15.6			19.9	
Approach LOS		D			E			B			B	

Intersection Summary

HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

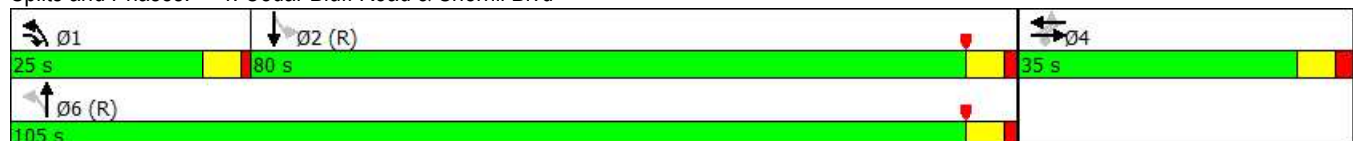
Existing Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	117	18	134	105	9	165	726	22	803
Future Volume (vph)	117	18	134	105	9	165	726	22	803
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	35.0	35.0	25.0	35.0	35.0	25.0	105.0	80.0	80.0
Total Split (%)	25.0%	25.0%	17.9%	25.0%	25.0%	17.9%	75.0%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	23.5	23.5	37.5		23.5	110.0	109.5	96.0	96.0
Actuated g/C Ratio	0.17	0.17	0.27		0.17	0.79	0.78	0.69	0.69
v/c Ratio	0.71	0.07	0.36		0.40	0.38	0.33	0.07	0.39
Control Delay	75.1	46.3	15.1		47.0	7.3	3.7	10.0	10.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	75.1	46.3	15.1		47.0	7.3	3.7	10.0	10.8
LOS	E	D	B		D	A	A	A	B
Approach Delay		40.0			47.0		4.3		10.8
Approach LOS		D			D		A		B

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 70 (50%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 14.4
 Intersection LOS: B
 Intersection Capacity Utilization 61.3%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues
4: Cedar Bluff Road & Sherrill Blvd

Existing Midday Peak
Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	131	24	191	176	188	908	28	968
v/c Ratio	0.71	0.07	0.36	0.40	0.38	0.33	0.07	0.39
Control Delay	75.1	46.3	15.1	47.0	7.3	3.7	10.0	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.1	46.3	15.1	47.0	7.3	3.7	10.0	10.8
Queue Length 50th (ft)	114	19	45	66	28	76	8	182
Queue Length 95th (ft)	175	36	55	55	48	97	21	282
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	247	438	660	583	608	2768	399	2469
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.05	0.29	0.30	0.31	0.33	0.07	0.39
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

Existing Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	18	134	105	9	22	165	726	44	22	803	51
Future Volume (vph)	117	18	134	105	9	22	165	726	44	22	803	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3186		1906	3537		1761	3596	
Flt Permitted	0.56	1.00	1.00		0.76		0.25	1.00		0.31	1.00	
Satd. Flow (perm)	1098	1947	1655		2521		493	3537		582	3596	
Peak-hour factor, PHF	0.89	0.75	0.70	0.85	0.56	0.61	0.88	0.86	0.69	0.79	0.90	0.67
Adj. Flow (vph)	131	24	191	124	16	36	188	844	64	28	892	76
RTOR Reduction (vph)	0	0	96	0	17	0	0	3	0	0	3	0
Lane Group Flow (vph)	131	24	95	0	159	0	188	905	0	28	965	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	21.0	21.0	29.5		21.0		107.5	107.5		94.0	94.0	
Effective Green, g (s)	23.5	23.5	33.5		23.5		109.5	109.5		96.0	96.0	
Actuated g/C Ratio	0.17	0.17	0.24		0.17		0.78	0.78		0.69	0.69	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	184	326	396		423		491	2766		399	2465	
v/s Ratio Prot		0.01	0.02				c0.03	0.26			0.27	
v/s Ratio Perm	c0.12		0.04		0.06		c0.27			0.05		
v/c Ratio	0.71	0.07	0.24		0.37		0.38	0.33		0.07	0.39	
Uniform Delay, d1	55.1	49.1	43.0		51.7		5.2	4.5		7.3	9.5	
Progression Factor	1.00	1.00	1.00		1.00		1.22	0.68		1.00	1.00	
Incremental Delay, d2	12.2	0.1	0.2		0.6		0.4	0.3		0.3	0.5	
Delay (s)	67.3	49.2	43.2		52.3		6.7	3.4		7.6	9.9	
Level of Service	E	D	D		D		A	A		A	A	
Approach Delay (s)		52.7			52.3			3.9			9.9	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			15.9				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			61.3%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

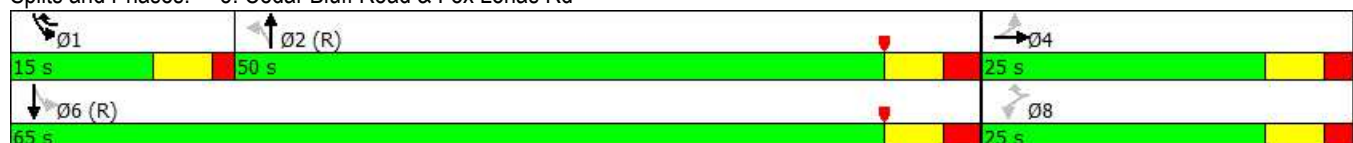
Existing Midday Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	71	34	560	74	752	
Future Volume (vph)	71	34	560	74	752	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	25.0	15.0	50.0	15.0	65.0	25.0
Total Split (%)	27.8%	16.7%	55.6%	16.7%	72.2%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	10.8	21.3	56.7	70.5	70.8	
Actuated g/C Ratio	0.12	0.24	0.63	0.78	0.79	
v/c Ratio	0.47	0.15	0.35	0.23	0.29	
Control Delay	45.4	6.9	6.3	4.3	4.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	45.4	6.9	6.3	4.3	4.1	
LOS	D	A	A	A	A	
Approach Delay			6.3		4.1	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 28 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 6.9
 Intersection Capacity Utilization 55.6%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd



Queues
5: Cedar Bluff Road & Fox Lonas Rd

Existing Midday Peak
Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	80	64	772	123	800
v/c Ratio	0.47	0.15	0.35	0.23	0.29
Control Delay	45.4	6.9	6.3	4.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.4	6.9	6.3	4.3	4.1
Queue Length 50th (ft)	43	0	57	15	63
Queue Length 95th (ft)	83	5	93	22	107
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	297	461	2181	570	2769
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.14	0.35	0.22	0.29
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

Existing Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	71	0	34	0	560	116	74	752	0
Future Volume (vph)	0	0	0	71	0	34	0	560	116	74	752	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3441		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.31	1.00	
Satd. Flow (perm)				1410		1583		3441		567	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.92	0.53	0.92	0.89	0.81	0.60	0.94	0.92
Adj. Flow (vph)	0	0	0	80	0	64	0	629	143	123	800	0
RTOR Reduction (vph)	0	0	0	0	0	52	0	16	0	0	0	0
Lane Group Flow (vph)	0	0	0	80	0	12	0	756	0	123	800	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				9.2		16.5		55.5		68.3	68.3	
Effective Green, g (s)				9.2		16.5		55.5		68.3	68.3	
Actuated g/C Ratio				0.10		0.18		0.62		0.76	0.76	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				144		290		2121		527	2672	
v/s Ratio Prot						0.00		c0.22		0.02	c0.23	
v/s Ratio Perm				c0.06		0.00				0.16		
v/c Ratio				0.56		0.04		0.36		0.23	0.30	
Uniform Delay, d1				38.5		30.2		8.5		3.4	3.4	
Progression Factor				1.00		1.00		0.66		1.00	1.00	
Incremental Delay, d2				4.6		0.1		0.5		0.2	0.3	
Delay (s)				43.0		30.3		6.0		3.6	3.7	
Level of Service				D		C		A		A	A	
Approach Delay (s)		0.0			37.4			6.0			3.7	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.3									
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			90.0							18.0		
Intersection Capacity Utilization			55.6%							B		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

Existing Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	59	34	50	42	66	128	493	16	753
Future Volume (vph)	59	34	50	42	66	128	493	16	753
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	13.0	17.0	15.0	13.0	17.0	15.0	47.0	13.0	45.0
Total Split (%)	14.4%	18.9%	16.7%	14.4%	18.9%	16.7%	52.2%	14.4%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	14.5	9.3	18.4	17.7	9.5	57.6	52.6	51.0	44.1
Actuated g/C Ratio	0.16	0.10	0.20	0.20	0.11	0.64	0.58	0.57	0.49
v/c Ratio	0.32	0.23	0.14	0.32	0.46	0.44	0.30	0.06	0.50
Control Delay	29.8	39.5	1.3	28.3	41.1	11.9	14.0	6.0	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	39.5	1.3	28.3	41.1	11.9	14.0	6.0	18.0
LOS	C	D	A	C	D	B	B	A	B
Approach Delay		22.8			34.7		13.6		17.6
Approach LOS		C			C		B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 18 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 18.0

Intersection LOS: B

Intersection Capacity Utilization 55.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
13 s	47 s	13 s	17 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	45 s	13 s	17 s

Queues
6: Cedar Bluff Road & Dutchtown Rd

Existing Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	80	44	60	91	92	173	616	32	865
v/c Ratio	0.32	0.23	0.14	0.32	0.46	0.44	0.30	0.06	0.50
Control Delay	29.8	39.5	1.3	28.3	41.1	11.9	14.0	6.0	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	39.5	1.3	28.3	41.1	11.9	14.0	6.0	18.0
Queue Length 50th (ft)	35	24	0	40	45	40	113	4	201
Queue Length 95th (ft)	55	46	1	36	87	60	163	7	274
Internal Link Dist (ft)	2065			1954			1139	493	
Turn Bay Length (ft)	200	200		150	100			50	
Base Capacity (vph)	257	227	427	291	230	404	2084	522	1774
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.19	0.14	0.31	0.40	0.43	0.30	0.06	0.49
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

Existing Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	34	50	42	66	8	128	493	40	16	753	54
Future Volume (vph)	59	34	50	42	66	8	128	493	40	16	753	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1814		1770	3491		1761	3482	
Flt Permitted	0.70	1.00	1.00	0.49	1.00		0.22	1.00		0.42	1.00	
Satd. Flow (perm)	1299	1863	1583	909	1814		407	3491		776	3482	
Peak-hour factor, PHF	0.74	0.77	0.83	0.46	0.87	0.50	0.74	0.88	0.71	0.50	0.94	0.84
Adj. Flow (vph)	80	44	60	91	76	16	173	560	56	32	801	64
RTOR Reduction (vph)	0	0	50	0	9	0	0	7	0	0	6	0
Lane Group Flow (vph)	80	44	10	91	83	0	173	609	0	32	859	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.3	6.1	14.8	19.3	9.1		54.0	45.3		44.4	40.5	
Effective Green, g (s)	13.3	6.1	14.8	19.3	9.1		54.0	45.3		44.4	40.5	
Actuated g/C Ratio	0.15	0.07	0.16	0.21	0.10		0.60	0.50		0.49	0.45	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	229	126	365	292	183		375	1757		425	1566	
v/s Ratio Prot	0.03	0.02	0.00	c0.04	c0.05		c0.04	0.17		0.00	c0.25	
v/s Ratio Perm	0.02		0.00	0.03			0.23			0.03		
v/c Ratio	0.35	0.35	0.03	0.31	0.45		0.46	0.35		0.08	0.55	
Uniform Delay, d1	34.2	40.1	31.6	29.3	38.1		9.7	13.4		11.8	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.66	0.92	
Incremental Delay, d2	0.9	1.7	0.0	0.6	1.8		0.9	0.5		0.1	1.4	
Delay (s)	35.2	41.7	31.6	29.9	39.9		10.6	14.0		7.9	17.9	
Level of Service	D	D	C	C	D		B	B		A	B	
Approach Delay (s)		35.6			34.9			13.3			17.6	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.1				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			24.5		
Intersection Capacity Utilization			55.0%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Existing Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	224	17	29	181	36	7	20	23	24	45	9
Future Volume (Veh/h)	20	224	17	29	181	36	7	20	23	24	45	9
Sign Control	Free			Free			Stop			Stop		
Grade	-9%			0%			0%			0%		
Peak Hour Factor	0.83	0.92	0.61	0.60	0.73	0.75	0.88	0.83	0.57	0.75	0.66	0.56
Hourly flow rate (vph)	24	243	28	48	248	48	8	24	40	32	68	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	40											
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1142											
pX, platoon unblocked												
vC, conflicting volume	296			271			575	697	136	550	687	148
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	296			271			575	697	136	550	687	148
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			98	93	95	91	80	98
cM capacity (veh/h)	1262			1289			321	343	888	362	348	872
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	24	162	109	172	172	72	32	84				
Volume Left	24	0	0	48	0	8	32	0				
Volume Right	0	0	28	0	48	40	0	16				
cSH	1262	1700	1700	1289	1700	759	362	393				
Volume to Capacity	0.02	0.10	0.06	0.04	0.10	0.09	0.09	0.21				
Queue Length 95th (ft)	1	0	0	3	0	8	7	20				
Control Delay (s)	7.9	0.0	0.0	2.4	0.0	12.6	15.9	16.6				
Lane LOS	A			A		B	C	C				
Approach Delay (s)	0.6			1.2		12.6	16.4					
Approach LOS						B	C					
Intersection Summary												
Average Delay	4.1											
Intersection Capacity Utilization	31.7%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

Existing Midday Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	406	63	17	338	56	13
Future Volume (Veh/h)	406	63	17	338	56	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.72	0.47	0.78	0.82	0.81
Hourly flow rate (vph)	489	88	36	433	68	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			577		1038	533
vC1, stage 1 conf vol					533	
vC2, stage 2 conf vol					505	
vCu, unblocked vol			577		1038	533
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		85	97
cM capacity (veh/h)			996		462	547
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	577	36	433	68	16	
Volume Left	0	36	0	68	0	
Volume Right	88	0	0	0	16	
cSH	1700	996	1700	462	547	
Volume to Capacity	0.34	0.04	0.25	0.15	0.03	
Queue Length 95th (ft)	0	3	0	13	2	
Control Delay (s)	0.0	8.7	0.0	14.1	11.8	
Lane LOS		A		B	B	
Approach Delay (s)	0.0	0.7		13.7		
Approach LOS				B		
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			35.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

Existing Midday Peak
Medical Office Center



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (veh/h)	0	367	224	0	147	3
Future Volume (Veh/h)	0	367	224	0	147	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.95	0.66	0.92	0.48	0.25
Hourly flow rate (vph)	0	386	339	0	306	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	339				532	170
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	339				532	170
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				36	99
cM capacity (veh/h)	1217				477	845
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	129	257	226	113	306	12
Volume Left	0	0	0	0	306	0
Volume Right	0	0	0	0	0	12
cSH	1217	1700	1700	1700	477	845
Volume to Capacity	0.00	0.15	0.13	0.07	0.64	0.01
Queue Length 95th (ft)	0	0	0	0	111	1
Control Delay (s)	0.0	0.0	0.0	0.0	25.0	9.3
Lane LOS					D	A
Approach Delay (s)	0.0		0.0		24.4	
Approach LOS					C	
Intersection Summary						
Average Delay			7.5			
Intersection Capacity Utilization			25.0%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

Existing Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	66	166	142	85	208	123	148	28	55
Future Volume (vph)	66	166	142	85	208	123	148	28	55
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	15.0	20.0	20.0	15.0	20.0	15.0	30.0	15.0	30.0
Total Split (%)	18.8%	25.0%	25.0%	18.8%	25.0%	18.8%	37.5%	18.8%	37.5%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	21.3	13.3	13.3	8.3	16.1	36.7	31.6	32.9	25.4
Actuated g/C Ratio	0.27	0.17	0.17	0.10	0.20	0.46	0.40	0.41	0.32
v/c Ratio	0.32	0.72	0.34	0.46	0.78	0.25	0.24	0.12	0.18
Control Delay	20.8	46.0	6.1	37.8	47.8	13.1	11.5	12.0	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	46.0	6.1	37.8	47.8	13.1	11.5	12.0	9.3
LOS	C	D	A	D	D	B	B	B	A
Approach Delay		25.3			44.2		12.0		9.9
Approach LOS		C			D		B		A

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 65 (81%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 24.4

Intersection LOS: C

Intersection Capacity Utilization 52.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	30 s	15 s	20 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	30 s	15 s	20 s

Queues
10: Sherrill Blvd & Dutchtown Rd

Existing Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	96	224	218	163	291	137	332	60	199
v/c Ratio	0.32	0.72	0.34	0.46	0.78	0.25	0.24	0.12	0.18
Control Delay	20.8	46.0	6.1	37.8	47.8	13.1	11.5	12.0	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	46.0	6.1	37.8	47.8	13.1	11.5	12.0	9.3
Queue Length 50th (ft)	32	106	0	39	140	37	36	15	14
Queue Length 95th (ft)	48	142	7	38	#222	68	53	17	25
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	320	330	673	386	374	544	1395	531	1104
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.68	0.32	0.42	0.78	0.25	0.24	0.11	0.18

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

Existing Midday Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	66	166	142	85	208	14	123	148	98	28	55	85
Future Volume (vph)	66	166	142	85	208	14	123	148	98	28	55	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1840		1770	3315		1770	3211	
Flt Permitted	0.39	1.00	1.00	0.95	1.00		0.54	1.00		0.55	1.00	
Satd. Flow (perm)	731	1863	2787	3433	1840		1010	3315		1027	3211	
Peak-hour factor, PHF	0.69	0.74	0.65	0.52	0.78	0.58	0.90	0.77	0.70	0.47	0.72	0.69
Adj. Flow (vph)	96	224	218	163	267	24	137	192	140	60	76	123
RTOR Reduction (vph)	0	0	178	0	4	0	0	91	0	0	86	0
Lane Group Flow (vph)	96	224	40	163	287	0	137	241	0	60	113	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	21.2	14.5	14.5	8.3	16.1		36.0	28.1		28.9	24.3	
Effective Green, g (s)	21.2	14.5	14.5	8.3	16.1		36.0	28.1		28.9	24.3	
Actuated g/C Ratio	0.26	0.18	0.18	0.10	0.20		0.45	0.35		0.36	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	280	337	505	356	370		529	1164		413	975	
v/s Ratio Prot	0.03	0.12		c0.05	c0.16		c0.03	0.07		0.01	0.04	
v/s Ratio Perm	0.06		0.01				c0.09			0.04		
v/c Ratio	0.34	0.66	0.08	0.46	0.78		0.26	0.21		0.15	0.12	
Uniform Delay, d1	23.0	30.5	27.2	33.7	30.2		13.2	18.2		16.9	20.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	4.9	0.1	0.9	9.8		0.3	0.4		0.2	0.2	
Delay (s)	23.7	35.4	27.3	34.7	40.0		13.5	18.6		17.1	20.3	
Level of Service	C	D	C	C	D		B	B		B	C	
Approach Delay (s)		30.0			38.1			17.1			19.6	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			27.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			52.8%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing PM School Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	393	318	975	877
Future Volume (vph)	393	318	975	877
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	32.0	32.0	48.0	48.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	21.0	21.0	51.0	51.0
Actuated g/C Ratio	0.26	0.26	0.64	0.64
v/c Ratio	0.68	0.67	0.28	0.34
Control Delay	26.5	26.4	7.2	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.5	26.4	7.2	8.1
LOS	C	C	A	A
Approach Delay	26.5		7.2	8.1
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.2
 Intersection Capacity Utilization 44.1%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

Existing PM School Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	643	294	1147	1096
v/c Ratio	0.68	0.67	0.28	0.34
Control Delay	26.5	26.4	7.2	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.5	26.4	7.2	8.1
Queue Length 50th (ft)	130	105	64	109
Queue Length 95th (ft)	150	106	98	110
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1230	559	4083	3256
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.52	0.53	0.28	0.34
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Existing PM School Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	393	318	0	975	877	0
Future Volume (vph)	393	318	0	975	877	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.96	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3375	1455		6408	5111	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3375	1455		6408	5111	
Peak-hour factor, PHF	0.85	0.67	1.00	0.85	0.80	1.00
Adj. Flow (vph)	462	475	0	1147	1096	0
RTOR Reduction (vph)	57	57	0	0	0	0
Lane Group Flow (vph)	586	237	0	1147	1096	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	19.0	19.0		49.0	49.0	
Effective Green, g (s)	21.0	21.0		51.0	51.0	
Actuated g/C Ratio	0.26	0.26		0.64	0.64	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	885	381		4085	3258	
v/s Ratio Prot	c0.17	0.16		0.18	c0.21	
v/s Ratio Perm						
v/c Ratio	0.66	0.62		0.28	0.34	
Uniform Delay, d1	26.3	26.0		6.4	6.7	
Progression Factor	1.00	1.00		1.00	1.08	
Incremental Delay, d2	1.5	2.3		0.2	0.3	
Delay (s)	27.8	28.3		6.6	7.5	
Level of Service	C	C		A	A	
Approach Delay (s)	27.9			6.6	7.5	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			13.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.43			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			44.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing PM School Peak
Medical Office Center

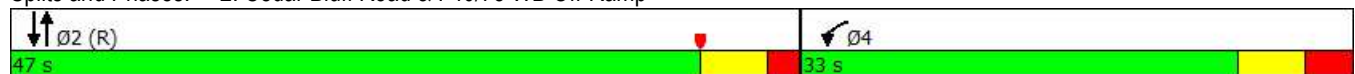
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	617	1368	614
Future Volume (vph)	617	1368	614
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	33.0	47.0	47.0
Total Split (%)	41.3%	58.8%	58.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	22.4	49.6	49.6
Actuated g/C Ratio	0.28	0.62	0.62
v/c Ratio	0.66	0.39	0.23
Control Delay	28.6	6.5	7.0
Queue Delay	0.0	0.0	0.0
Total Delay	28.6	6.5	7.0
LOS	C	A	A
Approach Delay	28.6	6.5	7.0
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.4
 Intersection Capacity Utilization 44.1%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing PM School Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	656	1629	722
v/c Ratio	0.66	0.39	0.23
Control Delay	28.6	6.5	7.0
Queue Delay	0.0	0.0	0.0
Total Delay	28.6	6.5	7.0
Queue Length 50th (ft)	148	90	93
Queue Length 95th (ft)	184	97	53
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1279	4127	3122
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.51	0.39	0.23
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

Existing PM School Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	617	0	1368	0	0	614
Future Volume (vph)	617	0	1368	0	0	614
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.94	1.00	0.84	1.00	0.92	0.85
Adj. Flow (vph)	656	0	1629	0	0	722
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	656	0	1629	0	0	722
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	19.4		47.6			47.6
Effective Green, g (s)	22.4		49.6			49.6
Actuated g/C Ratio	0.28		0.62			0.62
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	988		4126			3121
v/s Ratio Prot	c0.19		c0.24			0.14
v/s Ratio Perm						
v/c Ratio	0.66		0.39			0.23
Uniform Delay, d1	25.5		7.6			6.7
Progression Factor	1.00		0.76			0.96
Incremental Delay, d2	1.3		0.3			0.2
Delay (s)	26.8		6.1			6.6
Level of Service	C		A			A
Approach Delay (s)	26.8		6.1			6.6
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			10.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			44.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 3: Cedar Bluff Road & Park West Blvd

Existing PM School Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	92	7	210	155	142	154	540	19	589	24
Future Volume (vph)	92	7	210	155	142	154	540	19	589	24
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	30.0	30.0	25.0	40.0	40.0	25.0	75.0	15.0	65.0	65.0
Total Split (%)	18.8%	18.8%	15.6%	25.0%	25.0%	15.6%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	22.9	22.9	40.9	25.2	25.2	100.4	92.8	92.3	81.9	81.9
Actuated g/C Ratio	0.14	0.14	0.26	0.16	0.16	0.63	0.58	0.58	0.51	0.51
v/c Ratio	0.50	0.67	0.38	0.65	0.72	0.49	0.28	0.07	0.47	0.04
Control Delay	69.4	78.9	50.1	75.0	65.1	19.3	13.6	13.5	24.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.4	78.9	50.1	75.0	65.1	19.3	13.6	13.5	24.4	0.1
LOS	E	E	D	E	E	B	B	B	C	A
Approach Delay		65.9			68.0		14.7		23.0	
Approach LOS		E			E		B		C	

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 50 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 35.0

Intersection LOS: C

Intersection Capacity Utilization 51.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	65 s	40 s	30 s
 Ø5	 Ø6 (R)		
15 s	75 s		

Queues

3: Cedar Bluff Road & Park West Blvd

Existing PM School Peak

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	124	146	146	166	400	188	817	28	866	40
v/c Ratio	0.50	0.67	0.38	0.65	0.72	0.49	0.28	0.07	0.47	0.04
Control Delay	69.4	78.9	50.1	75.0	65.1	19.3	13.6	13.5	24.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.4	78.9	50.1	75.0	65.1	19.3	13.6	13.5	24.4	0.1
Queue Length 50th (ft)	122	154	133	182	202	85	158	10	240	0
Queue Length 95th (ft)	147	137	149	241	136	160	175	21	217	0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	292	260	448	364	782	441	2898	441	1847	899
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.56	0.33	0.46	0.51	0.43	0.28	0.06	0.47	0.04
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

Existing PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	7	210	155	142	116	154	540	80	19	589	24
Future Volume (vph)	92	7	210	155	142	116	154	540	80	19	589	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.86	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1534	1512	1618	3350		1770	4977		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.23	1.00		0.33	1.00	1.00
Satd. Flow (perm)	1719	1534	1512	1618	3350		421	4977		599	3610	1615
Peak-hour factor, PHF	0.74	0.58	0.75	0.84	0.55	0.94	0.82	0.77	0.69	0.68	0.68	0.60
Adj. Flow (vph)	124	12	280	185	258	123	188	701	116	28	866	40
RTOR Reduction (vph)	0	0	0	0	31	0	0	11	0	0	0	20
Lane Group Flow (vph)	124	146	146	166	369	0	188	806	0	28	866	20
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	19.9	19.9	32.4	22.7	22.7		97.9	87.9		83.4	79.4	79.4
Effective Green, g (s)	22.9	22.9	36.4	25.2	25.2		99.9	90.4		89.4	81.9	81.9
Actuated g/C Ratio	0.14	0.14	0.23	0.16	0.16		0.62	0.57		0.56	0.51	0.51
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	246	219	343	254	527		385	2812		384	1847	826
v/s Ratio Prot	0.07	c0.10	0.04	0.10	c0.11		c0.04	0.16		0.00	0.24	
v/s Ratio Perm			0.06				c0.26			0.04		0.01
v/c Ratio	0.50	0.67	0.43	0.65	0.70		0.49	0.29		0.07	0.47	0.02
Uniform Delay, d1	63.3	64.9	52.9	63.3	63.8		15.8	18.1		15.8	25.1	19.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.07	0.72		0.92	0.86	1.00
Incremental Delay, d2	1.2	6.7	0.6	5.3	3.7		0.7	0.2		0.1	0.8	0.1
Delay (s)	64.5	71.7	53.5	68.6	67.6		17.6	13.3		14.6	22.3	19.4
Level of Service	E	E	D	E	E		B	B		B	C	B
Approach Delay (s)		63.1			67.9			14.1			21.9	
Approach LOS		E			E			B			C	

Intersection Summary

HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

Existing PM School Peak
Medical Office Center

								
Lane Group	EBL	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	72	72	69	0	76	582	15	909
Future Volume (vph)	72	72	69	0	76	582	15	909
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		1		4	1	6		2
Permitted Phases	4	4	4		6		2	
Detector Phase	4	1	4	4	1	6	2	2
Switch Phase								
Minimum Initial (s)	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	38.0	25.0	38.0	38.0	25.0	122.0	97.0	97.0
Total Split (%)	23.8%	15.6%	23.8%	23.8%	15.6%	76.3%	60.6%	60.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag		Lead			Lead		Lag	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	20.9	33.2		20.9	132.6	132.1	120.3	120.3
Actuated g/C Ratio	0.13	0.21		0.13	0.83	0.83	0.75	0.75
v/c Ratio	0.65	0.24		0.29	0.23	0.27	0.05	0.42
Control Delay	83.2	12.8		34.0	3.8	2.5	6.7	8.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	83.2	12.8		34.0	3.8	2.5	6.7	8.2
LOS	F	B		C	A	A	A	A
Approach Delay				34.0		2.7		8.2
Approach LOS				C		A		A

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 97 (61%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 54.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd

 Ø1	 Ø2 (R)	 Ø4
25 s	97 s	38 s
 Ø6 (R)		
122 s		

Queues

4: Cedar Bluff Road & Sherrill Blvd

Existing PM School Peak

Medical Office Center

							
Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	107	100	108	100	793	24	1133
v/c Ratio	0.65	0.24	0.29	0.23	0.27	0.05	0.42
Control Delay	83.2	12.8	34.0	3.8	2.5	6.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.2	12.8	34.0	3.8	2.5	6.7	8.2
Queue Length 50th (ft)	108	10	28	15	62	6	200
Queue Length 95th (ft)	122	32	57	19	67	12	260
Internal Link Dist (ft)			642		919		1139
Turn Bay Length (ft)	90			75		85	
Base Capacity (vph)	272	542	580	555	2920	490	2729
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.18	0.19	0.18	0.27	0.05	0.42
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

Existing PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	0	72	69	0	2	76	582	37	15	909	10
Future Volume (vph)	72	0	72	69	0	2	76	582	37	15	909	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5		3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00		1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00		0.85		0.99		1.00	0.99		1.00	1.00	
Flt Protected	0.95		1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849		1655		3216		1906	3537		1761	3627	
Flt Permitted	0.65		1.00		0.75		0.21	1.00		0.35	1.00	
Satd. Flow (perm)	1265		1655		2507		425	3537		652	3627	
Peak-hour factor, PHF	0.67	0.92	0.72	0.69	0.92	0.25	0.76	0.79	0.66	0.62	0.82	0.42
Adj. Flow (vph)	107	0	100	100	0	8	100	737	56	24	1109	24
RTOR Reduction (vph)	0	0	72	0	44	0	0	2	0	0	0	0
Lane Group Flow (vph)	107	0	28	0	64	0	100	791	0	24	1133	0
Turn Type	Perm		pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	18.4		25.2		18.4		130.1	130.1		118.3	118.3	
Effective Green, g (s)	20.9		29.2		20.9		132.1	132.1		120.3	120.3	
Actuated g/C Ratio	0.13		0.18		0.13		0.83	0.83		0.75	0.75	
Clearance Time (s)	6.0		5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0		2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	165		302		327		432	2920		490	2727	
v/s Ratio Prot			0.01				0.01	c0.22			c0.31	
v/s Ratio Perm	c0.08		0.01		0.03		0.18			0.04		
v/c Ratio	0.65		0.09		0.19		0.23	0.27		0.05	0.42	
Uniform Delay, d1	66.1		54.4		62.0		4.0	3.1		5.1	7.2	
Progression Factor	1.00		1.00		1.00		0.87	0.67		1.00	1.00	
Incremental Delay, d2	8.5		0.1		0.3		0.2	0.2		0.2	0.5	
Delay (s)	74.5		54.5		62.3		3.7	2.3		5.3	7.6	
Level of Service	E		D		E		A	A		A	A	
Approach Delay (s)		64.9			62.3			2.5			7.6	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			13.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			54.6%				ICU Level of Service			A		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

Existing PM School Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	72	20	634	94	535	
Future Volume (vph)	72	20	634	94	535	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	30.0	20.0	65.0	20.0	85.0	30.0
Total Split (%)	26.1%	17.4%	56.5%	17.4%	73.9%	26%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	15.8	30.1	72.9	87.7	86.7	
Actuated g/C Ratio	0.14	0.26	0.63	0.76	0.75	
v/c Ratio	0.67	0.09	0.45	0.37	0.24	
Control Delay	63.1	8.8	6.9	6.6	4.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	63.1	8.8	7.0	6.6	4.9	
LOS	E	A	A	A	A	
Approach Delay			7.0		5.3	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 34 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 10.0
 Intersection Capacity Utilization 51.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
20 s	65 s	30 s
↓ Ø6 (R)		↘ Ø8
85 s		30 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

Existing PM School Peak
Medical Office Center

										
Lane Group	WBL	WBR	NBT	SBL	SBT					
Lane Group Flow (vph)	129	40	981	157	645					
v/c Ratio	0.67	0.09	0.45	0.37	0.24					
Control Delay	63.1	8.8	6.9	6.6	4.9					
Queue Delay	0.0	0.0	0.0	0.0	0.0					
Total Delay	63.1	8.8	7.0	6.6	4.9					
Queue Length 50th (ft)	92	0	91	26	64					
Queue Length 95th (ft)	87	4	100	35	96					
Internal Link Dist (ft)			493		1729					
Turn Bay Length (ft)	200			100						
Base Capacity (vph)	294	526	2192	497	2656					
Starvation Cap Reductn	0	0	67	0	0					
Spillback Cap Reductn	0	0	0	0	0					
Storage Cap Reductn	0	0	0	0	0					
Reduced v/c Ratio	0.44	0.08	0.46	0.32	0.24					
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

Existing PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	72	0	20	0	634	141	94	535	0
Future Volume (vph)	0	0	0	72	0	20	0	634	141	94	535	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3437		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.23	1.00	
Satd. Flow (perm)				1410		1583		3437		431	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.56	0.92	0.50	0.92	0.80	0.75	0.60	0.83	0.92
Adj. Flow (vph)	0	0	0	129	0	40	0	792	188	157	645	0
RTOR Reduction (vph)	0	0	0	0	0	32	0	14	0	0	0	0
Lane Group Flow (vph)	0	0	0	129	0	8	0	967	0	157	645	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				15.8		24.1		72.9		86.7	86.7	
Effective Green, g (s)				15.8		24.1		72.9		86.7	86.7	
Actuated g/C Ratio				0.14		0.21		0.63		0.75	0.75	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				193		331		2178		420	2655	
v/s Ratio Prot						0.00		c0.28		c0.03	0.18	
v/s Ratio Perm				c0.09		0.00				0.25		
v/c Ratio				0.67		0.03		0.44		0.37	0.24	
Uniform Delay, d1				47.1		36.1		10.7		5.4	4.3	
Progression Factor				1.00		1.00		0.56		1.00	1.00	
Incremental Delay, d2				8.5		0.0		0.6		0.6	0.2	
Delay (s)				55.6		36.1		6.6		5.9	4.5	
Level of Service				E		D		A		A	A	
Approach Delay (s)		0.0			51.0			6.6			4.8	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.7									
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			51.5%							A		
Analysis Period (min)			15									
c Critical Lane Group												

Timings 6: Cedar Bluff Road & Dutchtown Rd

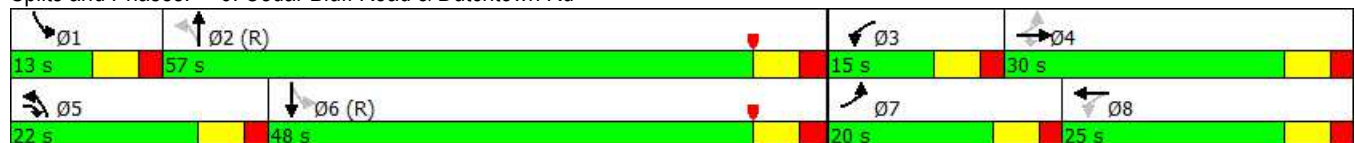
Existing PM School Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	76	59	75	19	125	170	542	15	490
Future Volume (vph)	76	59	75	19	125	170	542	15	490
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	20.0	30.0	22.0	15.0	25.0	22.0	57.0	13.0	48.0
Total Split (%)	17.4%	26.1%	19.1%	13.0%	21.7%	19.1%	49.6%	11.3%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	35.8	27.4	45.1	23.9	16.5	67.0	59.1	55.7	48.9
Actuated g/C Ratio	0.31	0.24	0.39	0.21	0.14	0.58	0.51	0.48	0.43
v/c Ratio	0.41	0.17	0.15	0.13	0.70	0.48	0.41	0.06	0.47
Control Delay	31.5	35.8	4.2	26.5	58.7	16.9	20.6	11.8	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	35.8	4.2	26.5	58.7	16.9	20.6	11.8	27.0
LOS	C	D	A	C	E	B	C	B	C
Approach Delay		23.8			53.1		19.8		26.5
Approach LOS		C			D		B		C

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 14 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 26.0
 Intersection LOS: C
 Intersection Capacity Utilization 59.2%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues

6: Cedar Bluff Road & Dutchtown Rd

Existing PM School Peak

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	136	77	100	40	188	200	749	24	692
v/c Ratio	0.41	0.17	0.15	0.13	0.70	0.48	0.41	0.06	0.47
Control Delay	31.5	35.8	4.2	26.5	58.7	16.9	20.6	11.8	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	35.8	4.2	26.5	58.7	16.9	20.6	11.8	27.0
Queue Length 50th (ft)	75	48	0	21	129	65	187	5	203
Queue Length 95th (ft)	65	71	18	21	166	121	231	15	281
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200	200		150	100		50		
Base Capacity (vph)	349	448	736	328	317	464	1855	382	1514
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.17	0.14	0.12	0.59	0.43	0.40	0.06	0.46
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

Existing PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	59	75	19	125	16	170	542	25	15	490	102
Future Volume (vph)	76	59	75	19	125	16	170	542	25	15	490	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1821		1770	3514		1761	3438	
Flt Permitted	0.35	1.00	1.00	0.71	1.00		0.26	1.00		0.35	1.00	
Satd. Flow (perm)	657	1863	1583	1317	1821		491	3514		641	3438	
Peak-hour factor, PHF	0.56	0.77	0.75	0.47	0.78	0.57	0.85	0.76	0.69	0.62	0.84	0.94
Adj. Flow (vph)	136	77	100	40	160	28	200	713	36	24	583	109
RTOR Reduction (vph)	0	0	66	0	6	0	0	3	0	0	13	0
Lane Group Flow (vph)	136	77	34	40	182	0	200	746	0	24	679	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	38.3	27.4	39.1	23.9	19.0		64.2	54.3		50.4	46.5	
Effective Green, g (s)	38.3	27.4	39.1	23.9	19.0		64.2	54.3		50.4	46.5	
Actuated g/C Ratio	0.33	0.24	0.34	0.21	0.17		0.56	0.47		0.44	0.40	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	347	443	620	293	300		404	1659		318	1390	
v/s Ratio Prot	c0.05	0.04	0.01	0.01	c0.10		c0.05	0.21		0.00	0.20	
v/s Ratio Perm	0.09		0.02	0.02			c0.23			0.03		
v/c Ratio	0.39	0.17	0.05	0.14	0.61		0.50	0.45		0.08	0.49	
Uniform Delay, d1	28.3	34.8	25.5	36.9	44.5		14.4	20.3		18.4	25.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.84	1.03	
Incremental Delay, d2	0.7	0.2	0.0	0.2	3.5		1.0	0.9		0.1	1.2	
Delay (s)	29.1	35.0	25.6	37.1	48.0		15.3	21.2		15.6	27.3	
Level of Service	C	C	C	D	D		B	C		B	C	
Approach Delay (s)		29.4			46.1			20.0			26.9	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			26.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			59.2%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Existing PM School Peak
Medical Office Center

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	22	162	8	17	116	57	5	30	18	62	70	10		
Future Volume (Veh/h)	22	162	8	17	116	57	5	30	18	62	70	10		
Sign Control	Free			Free			Stop			Stop				
Grade	-9%			0%			0%			0%				
Peak Hour Factor	0.79	0.94	1.00	0.71	0.76	0.84	0.42	0.68	0.56	0.74	0.70	0.62		
Hourly flow rate (vph)	28	172	8	24	153	68	12	44	32	84	100	16		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)									40					
Median type	None				None									
Median storage (veh)														
Upstream signal (ft)	1142													
pX, platoon unblocked														
vC, conflicting volume	221				180				422	501	90	399	471	110
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	221				180				422	501	90	399	471	110
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				98				97	90	97	82	79	98
cM capacity (veh/h)	1345				1393				412	453	950	465	471	922
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	28	115	65	100	144	88	84	116						
Volume Left	28	0	0	24	0	12	84	0						
Volume Right	0	0	8	0	68	32	0	16						
cSH	1345	1700	1700	1393	1700	698	465	505						
Volume to Capacity	0.02	0.07	0.04	0.02	0.09	0.13	0.18	0.23						
Queue Length 95th (ft)	2	0	0	1	0	11	16	22						
Control Delay (s)	7.7	0.0	0.0	1.9	0.0	12.3	14.4	14.2						
Lane LOS	A				A				B	B	B			
Approach Delay (s)	1.0				0.8				12.3	14.3				
Approach LOS							B	B						
Intersection Summary														
Average Delay				5.9										
Intersection Capacity Utilization				30.4%		ICU Level of Service				A				
Analysis Period (min)				15										

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

Existing PM School Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	287	102	52	403	104	36
Future Volume (Veh/h)	287	102	52	403	104	36
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.77	0.93	0.84	0.57	0.75
Hourly flow rate (vph)	399	132	56	480	182	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			531		1057	465
vC1, stage 1 conf vol					465	
vC2, stage 2 conf vol					592	
vCu, unblocked vol			531		1057	465
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		59	92
cM capacity (veh/h)			1036		445	597
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	531	56	480	182	48	
Volume Left	0	56	0	182	0	
Volume Right	132	0	0	0	48	
cSH	1700	1036	1700	445	597	
Volume to Capacity	0.31	0.05	0.28	0.41	0.08	
Queue Length 95th (ft)	0	4	0	49	7	
Control Delay (s)	0.0	8.7	0.0	18.6	11.6	
Lane LOS		A		C	B	
Approach Delay (s)	0.0	0.9		17.1		
Approach LOS				C		
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			40.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

Existing PM School Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	3	365	250	0	77	2
Future Volume (Veh/h)	3	365	250	0	77	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.25	0.76	0.77	0.92	0.45	0.25
Hourly flow rate (vph)	12	480	325	0	171	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	325				589	162
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325				589	162
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				61	99
cM capacity (veh/h)	1231				435	854
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	172	320	217	108	171	8
Volume Left	12	0	0	0	171	0
Volume Right	0	0	0	0	0	8
cSH	1231	1700	1700	1700	435	854
Volume to Capacity	0.01	0.19	0.13	0.06	0.39	0.01
Queue Length 95th (ft)	1	0	0	0	46	1
Control Delay (s)	0.6	0.0	0.0	0.0	18.5	9.3
Lane LOS	A				C	A
Approach Delay (s)	0.2		0.0		18.1	
Approach LOS					C	
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			23.1%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

Existing PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	141	192	79	228	119	101	145	35	176
Future Volume (vph)	141	192	79	228	119	101	145	35	176
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	30.0	29.0	29.0	27.0	26.0	30.0	44.0	20.0	34.0
Total Split (%)	25.0%	24.2%	24.2%	22.5%	21.7%	25.0%	36.7%	16.7%	28.3%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	38.6	23.0	23.0	21.0	28.4	55.0	45.9	48.9	40.5
Actuated g/C Ratio	0.32	0.19	0.19	0.18	0.24	0.46	0.38	0.41	0.34
v/c Ratio	0.48	1.20	0.15	0.95	0.38	0.29	0.30	0.15	0.32
Control Delay	27.8	154.6	0.5	75.6	41.7	19.5	23.0	18.0	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	154.6	0.5	75.6	41.7	19.5	23.0	18.0	19.1
LOS	C	F	A	E	D	B	C	B	B
Approach Delay		96.1			68.0		22.2		19.0
Approach LOS		F			E		C		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 73 (61%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.20

Intersection Signal Delay: 57.7

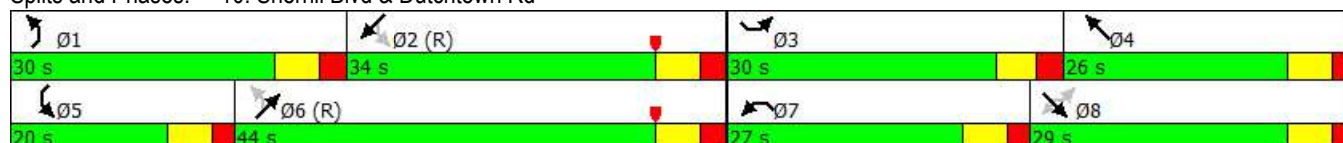
Intersection LOS: E

Intersection Capacity Utilization 51.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

Existing PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	220	427	104	570	165	131	401	67	383
v/c Ratio	0.48	1.20	0.15	0.95	0.38	0.29	0.30	0.15	0.32
Control Delay	27.8	154.6	0.5	75.6	41.7	19.5	23.0	18.0	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	154.6	0.5	75.6	41.7	19.5	23.0	18.0	19.1
Queue Length 50th (ft)	112	~400	0	227	105	55	96	27	68
Queue Length 95th (ft)	116	205	0	114	159	79	69	30	94
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	587	357	695	600	437	575	1330	534	1213
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	1.20	0.15	0.95	0.38	0.23	0.30	0.13	0.32

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

Existing PM School Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	141	192	79	228	119	8	101	145	79	35	176	65
Future Volume (vph)	141	192	79	228	119	8	101	145	79	35	176	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1836		1770	3371		1770	3313	
Flt Permitted	0.65	1.00	1.00	0.95	1.00		0.43	1.00		0.52	1.00	
Satd. Flow (perm)	1216	1863	2787	3433	1836		809	3371		961	3313	
Peak-hour factor, PHF	0.64	0.45	0.76	0.40	0.80	0.50	0.77	0.53	0.62	0.52	0.80	0.40
Adj. Flow (vph)	220	427	104	570	149	16	131	274	127	67	220	162
RTOR Reduction (vph)	0	0	84	0	3	0	0	41	0	0	95	0
Lane Group Flow (vph)	220	427	20	570	162	0	131	360	0	67	288	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	38.6	23.0	23.0	21.0	28.4		55.2	44.7		47.3	40.5	
Effective Green, g (s)	38.6	23.0	23.0	21.0	28.4		55.2	44.7		47.3	40.5	
Actuated g/C Ratio	0.32	0.19	0.19	0.18	0.24		0.46	0.37		0.39	0.34	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	463	357	534	600	434		456	1255		424	1118	
v/s Ratio Prot	0.06	c0.23		c0.17	c0.09		c0.03	c0.11		0.01	0.09	
v/s Ratio Perm	0.09		0.01				c0.11			0.05		
v/c Ratio	0.48	1.20	0.04	0.95	0.37		0.29	0.29		0.16	0.26	
Uniform Delay, d1	31.5	48.5	39.5	49.0	38.3		19.2	26.4		22.9	28.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	112.4	0.0	24.6	0.5		0.3	0.6		0.2	0.6	
Delay (s)	32.3	160.9	39.5	73.6	38.9		19.5	27.0		23.1	29.4	
Level of Service	C	F	D	E	D		B	C		C	C	
Approach Delay (s)		106.4			65.8			25.2			28.5	
Approach LOS		F			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			62.6			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			51.4%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background AM Peak
Medical Office Center

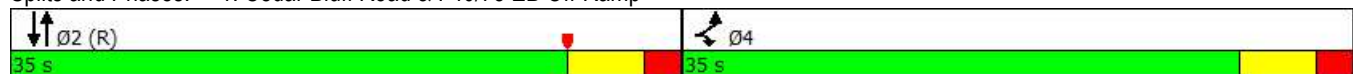
				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	672	250	1007	1227
Future Volume (vph)	672	250	1007	1227
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	22.8	22.8	39.2	39.2
Actuated g/C Ratio	0.33	0.33	0.56	0.56
v/c Ratio	0.67	0.50	0.31	0.47
Control Delay	22.7	20.5	9.1	9.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.7	20.5	9.1	9.1
LOS	C	C	A	A
Approach Delay	22.2		9.1	9.1
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 64 (91%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 52.2%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2019 Background AM Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	757	245	1095	1334
v/c Ratio	0.67	0.50	0.31	0.47
Control Delay	22.7	20.5	9.1	9.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.7	20.5	9.1	9.1
Queue Length 50th (ft)	141	84	65	105
Queue Length 95th (ft)	169	134	105	137
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1538	654	3586	2860
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.49	0.37	0.31	0.47
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background AM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	672	250	0	1007	1227	0
Future Volume (vph)	672	250	0	1007	1227	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.99	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3463	1455		6408	5111	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3463	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	730	272	0	1095	1334	0
RTOR Reduction (vph)	5	12	0	0	0	0
Lane Group Flow (vph)	752	233	0	1095	1334	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	20.8	20.8		37.2	37.2	
Effective Green, g (s)	22.8	22.8		39.2	39.2	
Actuated g/C Ratio	0.33	0.33		0.56	0.56	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1127	473		3588	2862	
v/s Ratio Prot	c0.22	0.16		0.17	c0.26	
v/s Ratio Perm						
v/c Ratio	0.67	0.49		0.31	0.47	
Uniform Delay, d1	20.3	19.0		8.2	9.2	
Progression Factor	1.00	1.00		1.00	0.87	
Incremental Delay, d2	1.2	0.3		0.2	0.5	
Delay (s)	21.5	19.2		8.4	8.5	
Level of Service	C	B		A	A	
Approach Delay (s)	21.0			8.4	8.5	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			12.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background AM Peak
Medical Office Center

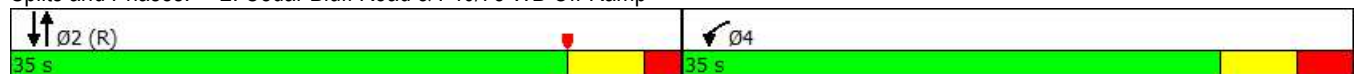
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	793	1412	534
Future Volume (vph)	793	1412	534
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	25.1	36.9	36.9
Actuated g/C Ratio	0.36	0.53	0.53
v/c Ratio	0.68	0.44	0.22
Control Delay	21.5	13.0	5.2
Queue Delay	0.0	0.0	0.0
Total Delay	21.5	13.0	5.2
LOS	C	B	A
Approach Delay	21.5	13.0	5.2
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 27 (39%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 52.2%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background AM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	862	1535	580
v/c Ratio	0.68	0.44	0.22
Control Delay	21.5	13.0	5.2
Queue Delay	0.0	0.0	0.0
Total Delay	21.5	13.0	5.2
Queue Length 50th (ft)	157	115	37
Queue Length 95th (ft)	187	163	47
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1563	3504	2650
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.55	0.44	0.22
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background AM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	793	0	1412	0	0	534
Future Volume (vph)	793	0	1412	0	0	534
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	862	0	1535	0	0	580
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	862	0	1535	0	0	580
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	22.1		34.9			34.9
Effective Green, g (s)	25.1		36.9			36.9
Actuated g/C Ratio	0.36		0.53			0.53
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1265		3508			2653
v/s Ratio Prot	c0.24		c0.23			0.12
v/s Ratio Perm						
v/c Ratio	0.68		0.44			0.22
Uniform Delay, d1	19.1		10.2			8.8
Progression Factor	1.00		1.15			0.53
Incremental Delay, d2	1.2		0.4			0.2
Delay (s)	20.3		12.1			4.9
Level of Service	C		B			A
Approach Delay (s)	20.3		12.1			4.9
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay			13.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

2019 Background AM Peak
Medical Office Center

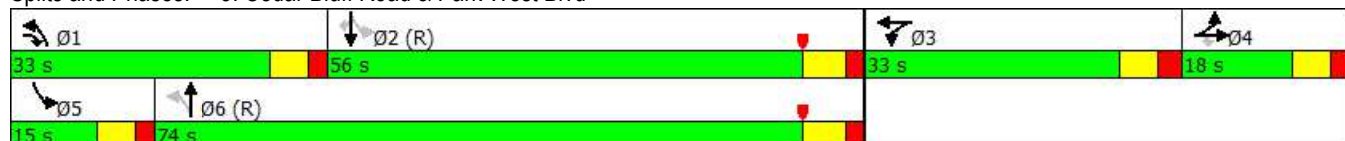
										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	42	65	198	143	341	307	589	31	552	65
Future Volume (vph)	42	65	198	143	341	307	589	31	552	65
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	18.0	18.0	33.0	33.0	33.0	33.0	74.0	15.0	56.0	56.0
Total Split (%)	12.9%	12.9%	23.6%	23.6%	23.6%	23.6%	52.9%	10.7%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	15.7	15.7	39.0	26.6	26.6	86.2	78.6	72.8	62.4	62.4
Actuated g/C Ratio	0.11	0.11	0.28	0.19	0.19	0.62	0.56	0.52	0.45	0.45
v/c Ratio	0.24	0.80	0.33	0.45	0.79	0.63	0.30	0.09	0.37	0.09
Control Delay	60.7	90.8	41.7	54.9	60.0	23.0	11.6	9.4	25.4	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
Total Delay	60.7	90.8	41.7	54.9	60.0	23.6	11.6	9.4	25.4	2.1
LOS	E	F	D	D	E	C	B	A	C	A
Approach Delay		66.2			58.9		15.0		22.3	
Approach LOS		E			E		B		C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 36 (26%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 32.9
 Intersection Capacity Utilization 64.8%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2019 Background AM Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	46	148	138	139	523	334	835	34	600	71
v/c Ratio	0.24	0.80	0.33	0.45	0.79	0.63	0.30	0.09	0.37	0.09
Control Delay	60.7	90.8	41.7	54.9	60.0	23.0	11.6	9.4	25.4	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
Total Delay	60.7	90.8	41.7	54.9	60.0	23.6	11.6	9.4	25.4	2.1
Queue Length 50th (ft)	39	141	105	123	236	163	141	13	203	1
Queue Length 95th (ft)	82	#276	162	196	303	291	166	16	276	20
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	193	184	520	335	722	609	2790	420	1609	814
Starvation Cap Reductn	0	0	0	0	0	75	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.80	0.27	0.41	0.72	0.63	0.30	0.08	0.37	0.09

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Background AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	65	198	143	341	125	307	589	179	31	552	65
Future Volume (vph)	42	65	198	143	341	125	307	589	179	31	552	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.92	0.85	1.00	0.96		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1640	1512	1618	3378		1770	4907		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.32	1.00		0.33	1.00	1.00
Satd. Flow (perm)	1719	1640	1512	1618	3378		593	4907		598	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	71	215	155	371	136	334	640	195	34	600	71
RTOR Reduction (vph)	0	0	0	0	23	0	0	36	0	0	0	39
Lane Group Flow (vph)	46	148	138	139	500	0	334	799	0	34	600	32
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	12.7	12.7	30.5	24.1	24.1		83.7	73.7		63.9	59.9	59.9
Effective Green, g (s)	15.7	15.7	34.5	26.6	26.6		85.7	76.2		69.9	62.4	62.4
Actuated g/C Ratio	0.11	0.11	0.25	0.19	0.19		0.61	0.54		0.50	0.45	0.45
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	192	183	372	307	641		529	2670		355	1609	719
v/s Ratio Prot	0.03	c0.09	0.05	0.09	c0.15		c0.09	0.16		0.00	0.17	
v/s Ratio Perm			0.04				c0.30			0.04		0.02
v/c Ratio	0.24	0.81	0.37	0.45	0.78		0.63	0.30		0.10	0.37	0.04
Uniform Delay, d1	56.7	60.7	43.8	50.2	53.9		14.7	17.4		17.9	25.8	21.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.36	0.74		0.76	0.92	1.00
Incremental Delay, d2	0.5	21.9	0.5	0.8	5.7		2.0	0.3		0.1	0.6	0.1
Delay (s)	57.2	82.6	44.2	51.0	59.6		21.9	13.0		13.6	24.4	22.0
Level of Service	E	F	D	D	E		C	B		B	C	C
Approach Delay (s)		63.1			57.8			15.6			23.6	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			32.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			64.8%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

2019 Background AM Peak
Medical Office Center

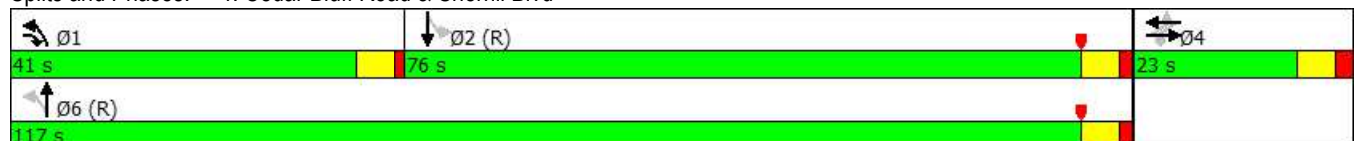
									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	46	21	144	17	1	227	661	44	976
Future Volume (vph)	46	21	144	17	1	227	661	44	976
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	23.0	23.0	41.0	23.0	23.0	41.0	117.0	76.0	76.0
Total Split (%)	16.4%	16.4%	29.3%	16.4%	16.4%	29.3%	83.6%	54.3%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	13.2	13.2	26.5		13.2	123.1	123.3	107.0	107.0
Actuated g/C Ratio	0.09	0.09	0.19		0.09	0.88	0.88	0.76	0.76
v/c Ratio	0.37	0.13	0.42		0.12	0.53	0.30	0.11	0.45
Control Delay	66.7	58.3	27.7		41.4	9.9	2.2	7.2	7.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	58.3	27.7		41.4	9.9	2.2	7.2	7.8
LOS	E	E	C		D	A	A	A	A
Approach Delay		39.2			41.4		3.8		7.8
Approach LOS		D			D		A		A

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 13 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 9.1
 Intersection Capacity Utilization 63.8%
 Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service B

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues
4: Cedar Bluff Road & Sherrill Blvd

2019 Background AM Peak
Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	50	23	157	30	247	929	48	1233
v/c Ratio	0.37	0.13	0.42	0.12	0.53	0.30	0.11	0.45
Control Delay	66.7	58.3	27.7	41.4	9.9	2.2	7.2	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	58.3	27.7	41.4	9.9	2.2	7.2	7.8
Queue Length 50th (ft)	44	20	67	8	51	94	10	188
Queue Length 95th (ft)	85	48	121	24	115	131	33	331
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	199	271	657	372	746	3054	436	2727
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.08	0.24	0.08	0.33	0.30	0.11	0.45
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2019 Background AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	21	144	17	1	10	227	661	194	44	976	158
Future Volume (vph)	46	21	144	17	1	10	227	661	194	44	976	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.94		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3122		1906	3453		1761	3563	
Flt Permitted	0.74	1.00	1.00		0.81		0.19	1.00		0.31	1.00	
Satd. Flow (perm)	1434	1947	1655		2606		377	3453		570	3563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	23	157	18	1	11	247	718	211	48	1061	172
RTOR Reduction (vph)	0	0	59	0	10	0	0	14	0	0	5	0
Lane Group Flow (vph)	50	23	98	0	20	0	247	915	0	48	1228	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	9.1	9.1	19.7		9.1		119.4	119.4		103.8	103.8	
Effective Green, g (s)	11.6	11.6	23.7		11.6		121.4	121.4		105.8	105.8	
Actuated g/C Ratio	0.08	0.08	0.17		0.08		0.87	0.87		0.76	0.76	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	118	161	280		215		464	2994		430	2692	
v/s Ratio Prot		0.01	0.03				c0.05	0.27			0.34	
v/s Ratio Perm	c0.03		0.03		0.01		c0.41			0.08		
v/c Ratio	0.42	0.14	0.35		0.09		0.53	0.31		0.11	0.46	
Uniform Delay, d1	61.0	59.6	51.3		59.3		4.2	1.7		4.6	6.4	
Progression Factor	1.00	1.00	1.00		1.00		3.55	1.17		1.00	1.00	
Incremental Delay, d2	2.4	0.4	0.6		0.2		0.9	0.3		0.5	0.6	
Delay (s)	63.5	60.0	51.9		59.5		15.7	2.2		5.1	6.9	
Level of Service	E	E	D		E		B	A		A	A	
Approach Delay (s)		55.2			59.5			5.1			6.9	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			63.8%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2019 Background AM Peak
Medical Office Center

	↖	↗	↖	↑	↘	↓	
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↖	↑↓	↘	↗↖	
Traffic Volume (vph)	165	122	2	794	395	587	
Future Volume (vph)	165	122	2	794	395	587	
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	
Protected Phases		1		2	1	6	4
Permitted Phases	8	8	2		6		
Detector Phase	8	1	2	2	1	6	
Switch Phase							
Minimum Initial (s)	8.0	6.0	20.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	26.5	11.5	26.5	22.0
Total Split (s)	30.0	22.0	48.0	48.0	22.0	70.0	30.0
Total Split (%)	30.0%	22.0%	48.0%	48.0%	22.0%	70.0%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes	Yes		
Recall Mode	None	None	C-Min	C-Min	None	C-Min	None
Act Effct Green (s)	17.7	48.2	39.8	39.8	70.8	69.8	
Actuated g/C Ratio	0.18	0.48	0.40	0.40	0.71	0.70	
v/c Ratio	0.72	0.17	0.01	0.90	0.85	0.26	
Control Delay	54.4	8.5	12.0	31.7	44.0	6.4	
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0	
Total Delay	54.4	8.5	12.0	32.0	44.0	6.4	
LOS	D	A	B	C	D	A	
Approach Delay				31.9		21.5	
Approach LOS				C		C	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 26 (26%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 28.0
 Intersection Capacity Utilization 77.7%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
22 s	48 s	30 s
↓ Ø6 (R)		↗ Ø8
70 s		30 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2019 Background AM Peak
Medical Office Center

						
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	179	133	2	1250	429	640
v/c Ratio	0.72	0.17	0.01	0.90	0.85	0.26
Control Delay	54.4	8.5	12.0	31.7	44.0	6.4
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	54.4	8.5	12.0	32.0	44.0	6.4
Queue Length 50th (ft)	108	22	1	365	210	70
Queue Length 95th (ft)	170	56	m1	473	#466	115
Internal Link Dist (ft)				493		1729
Turn Bay Length (ft)	200		100		100	
Base Capacity (vph)	338	798	316	1452	507	2459
Starvation Cap Reductn	0	0	0	21	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.17	0.01	0.87	0.85	0.26

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2019 Background AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	165	0	122	2	794	356	395	587	2
Future Volume (vph)	0	0	0	165	0	122	2	794	356	395	587	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	0.95	
Frt				1.00		0.85	1.00	0.95		1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583	1770	3375		1761	3520	
Flt Permitted				0.76		1.00	0.41	1.00		0.09	1.00	
Satd. Flow (perm)				1410		1583	762	3375		164	3520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	179	0	133	2	863	387	429	638	2
RTOR Reduction (vph)	0	0	0	0	0	39	0	53	0	0	0	0
Lane Group Flow (vph)	0	0	0	179	0	94	2	1197	0	429	640	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				17.7		42.2	39.8	39.8		69.8	69.8	
Effective Green, g (s)				17.7		42.2	39.8	39.8		69.8	69.8	
Actuated g/C Ratio				0.18		0.42	0.40	0.40		0.70	0.70	
Clearance Time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				249		668	303	1343		505	2456	
v/s Ratio Prot						0.03		0.35		c0.21	0.18	
v/s Ratio Perm				c0.13		0.02	0.00			c0.39		
v/c Ratio				0.72		0.14	0.01	0.89		0.85	0.26	
Uniform Delay, d1				38.8		17.8	18.2	28.1		27.7	5.6	
Progression Factor				1.00		1.00	0.68	0.86		1.00	1.00	
Incremental Delay, d2				9.5		0.1	0.0	9.0		12.6	0.3	
Delay (s)				48.3		17.9	12.4	33.1		40.4	5.8	
Level of Service				D		B	B	C		D	A	
Approach Delay (s)		0.0			35.3			33.1			19.7	
Approach LOS		A			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			27.9									
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			100.0							18.0		
Intersection Capacity Utilization			77.7%							D		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

6: Cedar Bluff Road & Dutchtown Rd

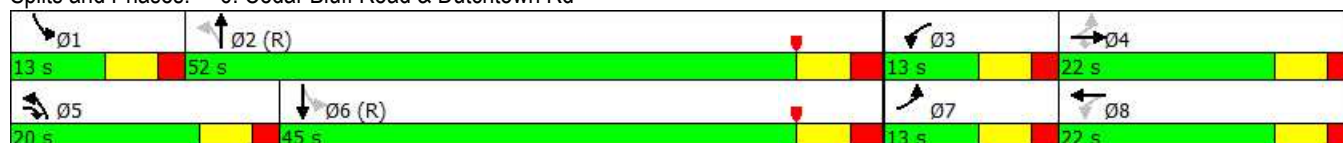
2019 Background AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	110	68	66	50	176	291	651	31	587
Future Volume (vph)	110	68	66	50	176	291	651	31	587
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	13.0	22.0	20.0	13.0	22.0	20.0	52.0	13.0	45.0
Total Split (%)	13.0%	22.0%	20.0%	13.0%	22.0%	20.0%	52.0%	13.0%	45.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	27.8	19.5	39.1	22.3	14.8	57.4	49.2	44.2	37.3
Actuated g/C Ratio	0.28	0.20	0.39	0.22	0.15	0.57	0.49	0.44	0.37
v/c Ratio	0.42	0.20	0.11	0.16	0.77	0.83	0.41	0.09	0.65
Control Delay	30.0	36.7	2.2	25.5	59.1	34.4	18.7	9.2	24.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	36.7	2.2	25.5	59.1	34.4	18.8	9.2	24.7
LOS	C	D	A	C	E	C	B	A	C
Approach Delay		24.3			52.3		23.5		24.1
Approach LOS		C			D		C		C

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 15 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 27.0
 Intersection Capacity Utilization 75.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues
6: Cedar Bluff Road & Dutchtown Rd

2019 Background AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	120	74	72	54	213	316	718	34	843
v/c Ratio	0.42	0.20	0.11	0.16	0.77	0.83	0.41	0.09	0.65
Control Delay	30.0	36.7	2.2	25.5	59.1	34.4	18.7	9.2	24.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	36.7	2.2	25.5	59.1	34.4	18.8	9.2	24.7
Queue Length 50th (ft)	54	39	0	23	126	107	173	7	254
Queue Length 95th (ft)	102	84	15	53	#227	#237	216	m16	307
Internal Link Dist (ft)	2065			1954			1139	493	
Turn Bay Length (ft)	200	200		150	100			50	
Base Capacity (vph)	289	363	695	333	300	393	1818	388	1393
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	98	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.20	0.10	0.16	0.71	0.80	0.42	0.09	0.61

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2019 Background AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	68	66	50	176	20	291	651	9	31	587	189
Future Volume (vph)	110	68	66	50	176	20	291	651	9	31	587	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1834		1770	3532		1761	3393	
Flt Permitted	0.34	1.00	1.00	0.71	1.00		0.17	1.00		0.38	1.00	
Satd. Flow (perm)	640	1863	1583	1320	1834		321	3532		702	3393	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	74	72	54	191	22	316	708	10	34	638	205
RTOR Reduction (vph)	0	0	48	0	4	0	0	1	0	0	32	0
Lane Group Flow (vph)	120	74	24	54	209	0	316	717	0	34	811	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	29.3	19.5	33.1	22.3	16.0		55.7	45.6		40.2	36.1	
Effective Green, g (s)	29.3	19.5	33.1	22.3	16.0		55.7	45.6		40.2	36.1	
Actuated g/C Ratio	0.29	0.20	0.33	0.22	0.16		0.56	0.46		0.40	0.36	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	298	363	618	322	293		375	1610		325	1224	
v/s Ratio Prot	c0.04	0.04	0.01	0.01	c0.11		c0.11	0.20		0.00	0.24	
v/s Ratio Perm	c0.08		0.01	0.03			c0.35			0.04		
v/c Ratio	0.40	0.20	0.04	0.17	0.71		0.84	0.45		0.10	0.66	
Uniform Delay, d1	27.2	33.7	22.7	31.1	39.8		16.2	18.6		18.2	26.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.78	0.88	
Incremental Delay, d2	0.9	0.3	0.0	0.2	8.0		15.7	0.9		0.1	2.8	
Delay (s)	28.1	34.0	22.7	31.4	47.8		31.8	19.5		14.4	26.3	
Level of Service	C	C	C	C	D		C	B		B	C	
Approach Delay (s)		28.3			44.5			23.2			25.8	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			75.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Background AM Peak
Medical Office Center

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		 			 									
Traffic Volume (veh/h)	42	113	15	41	324	180	4	25	4	69	228	29		
Future Volume (Veh/h)	42	113	15	41	324	180	4	25	4	69	228	29		
Sign Control	Free			Free			Stop			Stop				
Grade	-9%			0%			0%			0%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	46	123	16	45	352	196	4	27	4	75	248	32		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)									40					
Median type	None				None									
Median storage (veh)														
Upstream signal (ft)														
1142														
pX, platoon unblocked														
vC, conflicting volume	548				139				645	861	70	707	771	274
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	548				139				645	861	70	707	771	274
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95				97				96	90	100	73	19	96
cM capacity (veh/h)	1018				1442				104	270	979	280	304	724
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	46	82	57	221	372	35	75	280						
Volume Left	46	0	0	45	0	4	75	0						
Volume Right	0	0	16	0	196	4	0	32						
cSH	1018	1700	1700	1442	1700	281	280	326						
Volume to Capacity	0.05	0.05	0.03	0.03	0.22	0.12	0.27	0.86						
Queue Length 95th (ft)	4	0	0	2	0	11	26	194						
Control Delay (s)	8.7	0.0	0.0	1.8	0.0	20.1	22.5	56.9						
Lane LOS	A				A	C	C	F						
Approach Delay (s)	2.2				0.7	20.1	49.6							
Approach LOS							C	E						
Intersection Summary														
Average Delay			16.4											
Intersection Capacity Utilization			43.3%		ICU Level of Service				A					
Analysis Period (min)			15											

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Background AM Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↙	↗	↙	↗
Traffic Volume (veh/h)	429	310	93	420	57	32
Future Volume (Veh/h)	429	310	93	420	57	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	466	337	101	457	62	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			803		1294	634
vC1, stage 1 conf vol			634			
vC2, stage 2 conf vol			659			
vCu, unblocked vol			803		1294	634
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)			5.4			
tF (s)			2.2		3.5	3.3
p0 queue free %			88		83	93
cM capacity (veh/h)			821		366	479
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	803	101	457	62	35	
Volume Left	0	101	0	62	0	
Volume Right	337	0	0	0	35	
cSH	1700	821	1700	366	479	
Volume to Capacity	0.47	0.12	0.27	0.17	0.07	
Queue Length 95th (ft)	0	10	0	15	6	
Control Delay (s)	0.0	10.0	0.0	16.8	13.1	
Lane LOS		B		C	B	
Approach Delay (s)	0.0	1.8		15.5		
Approach LOS				C		
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			60.0%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2019 Background AM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	291	484	18	358	44
Future Volume (Veh/h)	2	291	484	18	358	44
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	316	526	20	389	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	546				698	273
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	546				698	273
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	93
cM capacity (veh/h)	1019				374	725
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	107	211	351	195	389	48
Volume Left	2	0	0	0	389	0
Volume Right	0	0	0	20	0	48
cSH	1019	1700	1700	1700	374	725
Volume to Capacity	0.00	0.12	0.21	0.11	1.04	0.07
Queue Length 95th (ft)	0	0	0	0	326	5
Control Delay (s)	0.2	0.0	0.0	0.0	91.5	10.3
Lane LOS	A				F	B
Approach Delay (s)	0.1		0.0		82.6	
Approach LOS					F	
Intersection Summary						
Average Delay			27.7			
Intersection Capacity Utilization			40.5%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2019 Background AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	316	334	286	206	79	109	299	14	355
Future Volume (vph)	316	334	286	206	79	109	299	14	355
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	33.0	32.0	32.0	16.0	15.0	12.0	50.0	12.0	50.0
Total Split (%)	30.0%	29.1%	29.1%	14.5%	13.6%	10.9%	45.5%	10.9%	45.5%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	40.3	24.4	24.4	9.8	12.6	54.6	52.4	51.1	44.8
Actuated g/C Ratio	0.37	0.22	0.22	0.09	0.11	0.50	0.48	0.46	0.41
v/c Ratio	0.69	0.88	0.36	0.73	0.45	0.31	0.29	0.03	0.39
Control Delay	35.1	64.0	5.1	63.4	51.9	16.9	16.2	13.8	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	64.0	5.1	63.4	51.9	16.9	16.2	13.8	21.0
LOS	D	E	A	E	D	B	B	B	C
Approach Delay		36.3			59.9		16.3		20.8
Approach LOS		D			E		B		C

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 85 (77%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 31.0

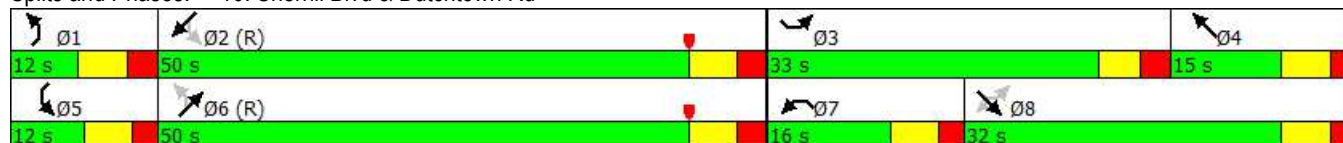
Intersection LOS: C

Intersection Capacity Utilization 65.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Background AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	343	363	311	224	95	118	476	15	553
v/c Ratio	0.69	0.88	0.36	0.73	0.45	0.31	0.29	0.03	0.39
Control Delay	35.1	64.0	5.1	63.4	51.9	16.9	16.2	13.8	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	64.0	5.1	63.4	51.9	16.9	16.2	13.8	21.0
Queue Length 50th (ft)	183	244	0	80	60	43	79	5	125
Queue Length 95th (ft)	272	#395	38	#131	#132	75	141	16	172
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	540	440	896	312	212	386	1648	464	1419
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.82	0.35	0.72	0.45	0.31	0.29	0.03	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Background AM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	316	334	286	206	79	8	109	299	139	14	355	154
Future Volume (vph)	316	334	286	206	79	8	109	299	139	14	355	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1836		1770	3371		1770	3379	
Flt Permitted	0.47	1.00	1.00	0.95	1.00		0.35	1.00		0.48	1.00	
Satd. Flow (perm)	878	1863	2787	3433	1836		658	3371		894	3379	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	343	363	311	224	86	9	118	325	151	15	386	167
RTOR Reduction (vph)	0	0	242	0	4	0	0	46	0	0	43	0
Lane Group Flow (vph)	343	363	69	224	91	0	118	430	0	15	510	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	40.3	24.5	24.5	9.8	12.6		54.7	48.8		47.2	44.8	
Effective Green, g (s)	40.3	24.5	24.5	9.8	12.6		54.7	48.8		47.2	44.8	
Actuated g/C Ratio	0.37	0.22	0.22	0.09	0.11		0.50	0.44		0.43	0.41	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	497	414	620	305	210		386	1495		402	1376	
v/s Ratio Prot	c0.14	c0.19		0.07	0.05		c0.02	0.13		0.00	c0.15	
v/s Ratio Perm	0.12		0.02				c0.14			0.02		
v/c Ratio	0.69	0.88	0.11	0.73	0.44		0.31	0.29		0.04	0.37	
Uniform Delay, d1	27.6	41.3	34.1	48.8	45.4		15.4	19.5		18.1	22.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	18.4	0.1	8.8	1.4		0.5	0.5		0.0	0.8	
Delay (s)	31.7	59.7	34.2	57.7	46.8		15.9	20.0		18.1	23.5	
Level of Service	C	E	C	E	D		B	C		B	C	
Approach Delay (s)		42.4			54.4			19.2			23.4	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			34.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)			25.0		
Intersection Capacity Utilization			65.8%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background PM Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	479	458	1244	1114
Future Volume (vph)	479	458	1244	1114
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	32.0	32.0	48.0	48.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	22.8	22.8	49.2	49.2
Actuated g/C Ratio	0.28	0.28	0.62	0.62
v/c Ratio	0.70	0.70	0.34	0.39
Control Delay	26.8	29.0	8.3	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.8	29.0	8.3	9.6
LOS	C	C	A	A
Approach Delay	27.5		8.3	9.6
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 14.2
 Intersection Capacity Utilization 47.1%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2019 Background PM Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	700	319	1352	1211
v/c Ratio	0.70	0.70	0.34	0.39
Control Delay	26.8	29.0	8.3	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.8	29.0	8.3	9.6
Queue Length 50th (ft)	147	128	85	134
Queue Length 95th (ft)	185	205	127	161
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1221	546	3942	3144
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.58	0.34	0.39
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background PM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	479	458	0	1244	1114	0
Future Volume (vph)	479	458	0	1244	1114	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.96	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3384	1455		6408	5111	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3384	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	521	498	0	1352	1211	0
RTOR Reduction (vph)	41	41	0	0	0	0
Lane Group Flow (vph)	659	278	0	1352	1211	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	20.8	20.8		47.2	47.2	
Effective Green, g (s)	22.8	22.8		49.2	49.2	
Actuated g/C Ratio	0.29	0.29		0.62	0.62	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	964	414		3940	3143	
v/s Ratio Prot	c0.19	0.19		0.21	c0.24	
v/s Ratio Perm						
v/c Ratio	0.68	0.67		0.34	0.39	
Uniform Delay, d1	25.4	25.3		7.5	7.8	
Progression Factor	1.00	1.00		1.00	1.12	
Incremental Delay, d2	1.6	3.4		0.2	0.3	
Delay (s)	27.0	28.7		7.8	9.0	
Level of Service	C	C		A	A	
Approach Delay (s)	27.5			7.8	9.0	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			13.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			47.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background PM Peak
Medical Office Center

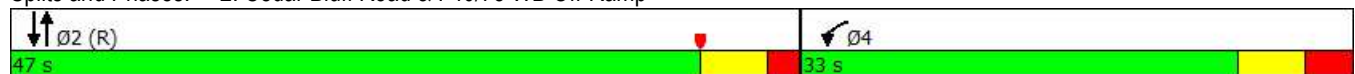
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	775	1233	646
Future Volume (vph)	775	1233	646
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	33.0	47.0	47.0
Total Split (%)	41.3%	58.8%	58.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	26.0	46.0	46.0
Actuated g/C Ratio	0.32	0.58	0.58
v/c Ratio	0.73	0.35	0.24
Control Delay	27.8	7.2	8.8
Queue Delay	0.0	0.0	0.0
Total Delay	27.8	7.2	8.8
LOS	C	A	A
Approach Delay	27.8	7.2	8.8
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 13.6
 Intersection Capacity Utilization 47.1%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background PM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	842	1340	702
v/c Ratio	0.73	0.35	0.24
Control Delay	27.8	7.2	8.8
Queue Delay	0.0	0.0	0.0
Total Delay	27.8	7.2	8.8
Queue Length 50th (ft)	185	75	81
Queue Length 95th (ft)	239	87	72
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1279	3823	2891
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.66	0.35	0.24
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background PM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	775	0	1233	0	0	646
Future Volume (vph)	775	0	1233	0	0	646
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	842	0	1340	0	0	702
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	842	0	1340	0	0	702
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	23.0		44.0			44.0
Effective Green, g (s)	26.0		46.0			46.0
Actuated g/C Ratio	0.32		0.58			0.58
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1147		3826			2894
v/s Ratio Prot	c0.24		c0.20			0.14
v/s Ratio Perm						
v/c Ratio	0.73		0.35			0.24
Uniform Delay, d1	23.9		9.0			8.4
Progression Factor	1.00		0.73			0.99
Incremental Delay, d2	2.1		0.2			0.2
Delay (s)	26.1		6.9			8.5
Level of Service	C		A			A
Approach Delay (s)	26.1		6.9			8.5
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.49			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			47.1%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Timings

3: Cedar Bluff Road & Park West Blvd

2019 Background PM Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	62	21	279	255	65	154	470	28	761	26
Future Volume (vph)	62	21	279	255	65	154	470	28	761	26
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	30.0	30.0	25.0	40.0	40.0	25.0	75.0	15.0	65.0	65.0
Total Split (%)	18.8%	18.8%	15.6%	25.0%	25.0%	15.6%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	24.4	24.4	41.5	24.0	24.0	100.1	92.4	92.9	82.4	82.4
Actuated g/C Ratio	0.15	0.15	0.26	0.15	0.15	0.63	0.58	0.58	0.52	0.52
v/c Ratio	0.26	0.70	0.41	0.70	0.56	0.42	0.20	0.06	0.44	0.03
Control Delay	60.6	79.5	50.7	79.0	41.6	15.7	12.1	13.8	23.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.6	79.5	50.7	79.0	41.6	15.7	12.1	13.8	23.8	0.1
LOS	E	E	D	E	D	B	B	B	C	A
Approach Delay		64.5			54.3		12.9		22.7	
Approach LOS		E			D		B		C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 50 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 32.6
 Intersection Capacity Utilization 58.8%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service B

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	65 s	40 s	30 s
 Ø5	 Ø6 (R)		
15 s	75 s		

Queues

2019 Background PM Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	67	165	161	169	327	167	577	30	827	28
v/c Ratio	0.26	0.70	0.41	0.70	0.56	0.42	0.20	0.06	0.44	0.03
Control Delay	60.6	79.5	50.7	79.0	41.6	15.7	12.1	13.8	23.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.6	79.5	50.7	79.0	41.6	15.7	12.1	13.8	23.8	0.1
Queue Length 50th (ft)	63	174	148	186	109	76	108	11	223	0
Queue Length 95th (ft)	109	254	204	267	156	156	151	29	268	0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	296	267	461	364	821	455	2895	536	1860	904
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.62	0.35	0.46	0.40	0.37	0.20	0.06	0.44	0.03
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Background PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	21	279	255	65	136	154	470	61	28	761	26
Future Volume (vph)	62	21	279	255	65	136	154	470	61	28	761	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.87	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1549	1512	1618	3228		1770	4998		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.98		0.24	1.00		0.42	1.00	1.00
Satd. Flow (perm)	1719	1549	1512	1618	3228		452	4998		779	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	23	303	277	71	148	167	511	66	30	827	28
RTOR Reduction (vph)	0	0	0	0	105	0	0	8	0	0	0	14
Lane Group Flow (vph)	67	165	161	169	222	0	167	569	0	30	827	14
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	21.4	21.4	33.0	21.5	21.5		97.6	87.5		84.1	80.0	80.0
Effective Green, g (s)	24.4	24.4	37.0	24.0	24.0		99.6	90.0		90.1	82.5	82.5
Actuated g/C Ratio	0.15	0.15	0.23	0.15	0.15		0.62	0.56		0.56	0.52	0.52
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	262	236	349	242	484		393	2811		481	1861	832
v/s Ratio Prot	0.04	c0.11	c0.04	c0.10	0.07		0.04	0.11		0.00	c0.23	
v/s Ratio Perm			0.07				0.23			0.03		0.01
v/c Ratio	0.26	0.70	0.46	0.70	0.46		0.42	0.20		0.06	0.44	0.02
Uniform Delay, d1	59.8	64.3	52.9	64.6	62.1		15.2	17.3		15.5	24.3	18.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.88	0.67		0.94	0.86	1.00
Incremental Delay, d2	0.4	8.1	0.7	7.8	0.5		0.5	0.2		0.0	0.7	0.0
Delay (s)	60.2	72.4	53.6	72.4	62.6		13.8	11.7		14.6	21.6	19.0
Level of Service	E	E	D	E	E		B	B		B	C	B
Approach Delay (s)		62.6			65.9			12.2			21.3	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			33.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			58.8%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

2019 Background PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	145	3	44	83	0	57	719	7	955
Future Volume (vph)	145	3	44	83	0	57	719	7	955
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	38.0	38.0	25.0	38.0	38.0	25.0	122.0	97.0	97.0
Total Split (%)	23.8%	23.8%	15.6%	23.8%	23.8%	15.6%	76.3%	60.6%	60.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	26.3	26.3	38.3		26.3	127.2	126.7	115.2	115.2
Actuated g/C Ratio	0.16	0.16	0.24		0.16	0.80	0.79	0.72	0.72
v/c Ratio	0.72	0.01	0.11		0.21	0.14	0.28	0.02	0.40
Control Delay	81.2	51.3	10.7		27.7	3.5	3.9	8.3	9.9
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	81.2	51.3	10.7		27.7	3.5	3.9	8.3	9.9
LOS	F	D	B		C	A	A	A	A
Approach Delay		64.6			27.7		3.9		9.9
Approach LOS		E			C		A		A

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 97 (61%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 13.5
 Intersection LOS: B
 Intersection Capacity Utilization 61.8%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues
4: Cedar Bluff Road & Sherrill Blvd

2019 Background PM Peak
Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	158	3	48	95	62	799	8	1046
v/c Ratio	0.72	0.01	0.11	0.21	0.14	0.28	0.02	0.40
Control Delay	81.2	51.3	10.7	27.7	3.5	3.9	8.3	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.2	51.3	10.7	27.7	3.5	3.9	8.3	9.9
Queue Length 50th (ft)	159	3	0	21	8	59	2	207
Queue Length 95th (ft)	231	13	34	46	16	75	9	301
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	286	419	568	577	564	2822	467	2618
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.01	0.08	0.16	0.11	0.28	0.02	0.40
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2019 Background PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	3	44	83	0	5	57	719	16	7	955	7
Future Volume (vph)	145	3	44	83	0	5	57	719	16	7	955	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3223		1906	3563		1761	3635	
Flt Permitted	0.68	1.00	1.00		0.74		0.23	1.00		0.35	1.00	
Satd. Flow (perm)	1331	1947	1655		2492		460	3563		648	3635	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	3	48	90	0	5	62	782	17	8	1038	8
RTOR Reduction (vph)	0	0	38	0	43	0	0	1	0	0	0	0
Lane Group Flow (vph)	158	3	10	0	52	0	62	798	0	8	1046	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	23.8	23.8	30.2		23.8		124.7	124.7		113.3	113.3	
Effective Green, g (s)	26.3	26.3	34.2		26.3		126.7	126.7		115.3	115.3	
Actuated g/C Ratio	0.16	0.16	0.21		0.16		0.79	0.79		0.72	0.72	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	218	320	353		409		440	2821		466	2619	
v/s Ratio Prot		0.00	0.00				0.01	c0.22			c0.29	
v/s Ratio Perm	c0.12		0.00		0.02		0.10			0.01		
v/c Ratio	0.72	0.01	0.03		0.13		0.14	0.28		0.02	0.40	
Uniform Delay, d1	63.4	55.9	49.8		57.1		4.9	4.5		6.3	8.8	
Progression Factor	1.00	1.00	1.00		1.00		0.65	0.74		1.00	1.00	
Incremental Delay, d2	11.3	0.0	0.0		0.1		0.1	0.2		0.1	0.5	
Delay (s)	74.7	56.0	49.8		57.2		3.3	3.6		6.4	9.2	
Level of Service	E	E	D		E		A	A		A	A	
Approach Delay (s)		68.7			57.2			3.5			9.2	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			14.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			61.8%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2019 Background PM Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↑	↘	↗	
Traffic Volume (vph)	76	49	813	55	489	
Future Volume (vph)	76	49	813	55	489	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	25.0	20.0	70.0	20.0	90.0	25.0
Total Split (%)	21.7%	17.4%	60.9%	17.4%	78.3%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	12.3	22.0	84.6	94.0	94.3	
Actuated g/C Ratio	0.11	0.19	0.74	0.82	0.82	
v/c Ratio	0.55	0.15	0.45	0.15	0.18	
Control Delay	61.8	9.9	6.5	3.9	3.3	
Queue Delay	0.0	0.0	0.1	0.0	0.0	
Total Delay	61.8	9.9	6.5	3.9	3.3	
LOS	E	A	A	A	A	
Approach Delay			6.5		3.4	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 34 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 8.1
 Intersection Capacity Utilization 52.3%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
20 s	70 s	25 s
↓ Ø6 (R)		↗ Ø8
90 s		25 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2019 Background PM Peak
Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	83	53	1132	60	532
v/c Ratio	0.55	0.15	0.45	0.15	0.18
Control Delay	61.8	9.9	6.5	3.9	3.3
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	61.8	9.9	6.5	3.9	3.3
Queue Length 50th (ft)	59	0	156	8	42
Queue Length 95th (ft)	107	31	184	20	71
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	232	451	2531	484	2888
Starvation Cap Reductn	0	0	286	0	0
Spillback Cap Reductn	0	0	0	0	70
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.12	0.50	0.12	0.19
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2019 Background PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	76	0	49	0	813	228	55	489	0
Future Volume (vph)	0	0	0	76	0	49	0	813	228	55	489	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3423		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.21	1.00	
Satd. Flow (perm)				1410		1583		3423		380	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	83	0	53	0	884	248	60	532	0
RTOR Reduction (vph)	0	0	0	0	0	46	0	15	0	0	0	0
Lane Group Flow (vph)	0	0	0	83	0	7	0	1117	0	60	532	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				10.7		16.0		81.0		91.8	91.8	
Effective Green, g (s)				10.7		16.0		81.0		91.8	91.8	
Actuated g/C Ratio				0.09		0.14		0.70		0.80	0.80	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				131		220		2410		366	2811	
v/s Ratio Prot						0.00		c0.33		0.01	c0.15	
v/s Ratio Perm				c0.06		0.00				0.12		
v/c Ratio				0.63		0.03		0.46		0.16	0.19	
Uniform Delay, d1				50.3		42.8		7.5		3.7	2.8	
Progression Factor				1.00		1.00		0.74		1.00	1.00	
Incremental Delay, d2				9.6		0.1		0.6		0.2	0.1	
Delay (s)				59.9		42.9		6.1		3.9	2.9	
Level of Service				E		D		A		A	A	
Approach Delay (s)		0.0			53.2			6.1			3.0	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.6									
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			52.3%							A		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

6: Cedar Bluff Road & Dutchtown Rd

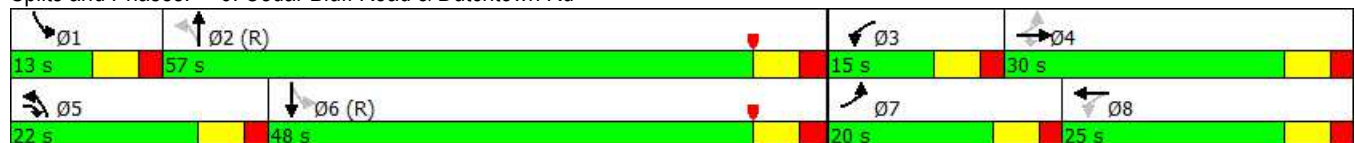
2019 Background PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	180	92	53	22	147	209	604	21	877
Future Volume (vph)	180	92	53	22	147	209	604	21	877
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	20.0	30.0	22.0	15.0	25.0	22.0	57.0	13.0	48.0
Total Split (%)	17.4%	26.1%	19.1%	13.0%	21.7%	19.1%	49.6%	11.3%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	36.1	28.2	47.9	22.8	16.0	66.8	58.8	53.5	46.7
Actuated g/C Ratio	0.31	0.25	0.42	0.20	0.14	0.58	0.51	0.47	0.41
v/c Ratio	0.58	0.22	0.08	0.08	0.75	0.76	0.38	0.06	0.75
Control Delay	37.2	37.2	1.8	27.3	62.7	37.2	19.4	13.9	37.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Total Delay	37.2	37.2	1.8	27.3	62.7	37.2	19.4	13.9	37.6
LOS	D	D	A	C	E	D	B	B	D
Approach Delay		31.4			58.8		23.8		37.1
Approach LOS		C			E		C		D

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 14 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 33.4
 Intersection LOS: C
 Intersection Capacity Utilization 78.8%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues

2019 Background PM Peak

6: Cedar Bluff Road & Dutchtown Rd

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	196	100	58	24	193	227	692	23	1057
v/c Ratio	0.58	0.22	0.08	0.08	0.75	0.76	0.38	0.06	0.75
Control Delay	37.2	37.2	1.8	27.3	62.7	37.2	19.4	13.9	37.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Total Delay	37.2	37.2	1.8	27.3	62.7	37.2	19.4	13.9	37.6
Queue Length 50th (ft)	108	61	0	12	132	94	178	9	389
Queue Length 95th (ft)	171	111	11	31	209	#185	234	22	465
Internal Link Dist (ft)	2065				1954		1139		493
Turn Bay Length (ft)	200	200		150	100		50		
Base Capacity (vph)	341	457	741	318	306	331	1798	402	1413
Starvation Cap Reductn	0	0	0	0	0	0	0	0	62
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.22	0.08	0.08	0.63	0.69	0.38	0.06	0.78

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2019 Background PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	92	53	22	147	30	209	604	32	21	877	96
Future Volume (vph)	180	92	53	22	147	30	209	604	32	21	877	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1815		1770	3512		1761	3470	
Flt Permitted	0.33	1.00	1.00	0.69	1.00		0.10	1.00		0.39	1.00	
Satd. Flow (perm)	622	1863	1583	1290	1815		192	3512		720	3470	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	100	58	24	160	33	227	657	35	23	953	104
RTOR Reduction (vph)	0	0	37	0	7	0	0	3	0	0	7	0
Lane Group Flow (vph)	196	100	21	24	186	0	227	689	0	23	1050	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	38.5	28.2	41.9	22.7	18.4		64.0	54.1		48.2	44.3	
Effective Green, g (s)	38.5	28.2	41.9	22.7	18.4		64.0	54.1		48.2	44.3	
Actuated g/C Ratio	0.33	0.25	0.36	0.20	0.16		0.56	0.47		0.42	0.39	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	348	456	659	272	290		294	1652		337	1336	
v/s Ratio Prot	c0.07	0.05	0.00	0.00	c0.10		c0.09	0.20		0.00	0.30	
v/s Ratio Perm	0.12		0.01	0.01			c0.34			0.03		
v/c Ratio	0.56	0.22	0.03	0.09	0.64		0.77	0.42		0.07	0.79	
Uniform Delay, d1	29.3	34.6	23.5	37.5	45.2		24.4	20.1		19.7	31.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.09	1.10	
Incremental Delay, d2	2.1	0.2	0.0	0.1	4.8		11.9	0.8		0.1	4.7	
Delay (s)	31.4	34.9	23.5	37.7	50.0		36.2	20.8		21.5	39.1	
Level of Service	C	C	C	D	D		D	C		C	D	
Approach Delay (s)		31.1			48.7			24.6			38.7	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			78.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Background PM Peak
Medical Office Center

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Traffic Volume (veh/h)	29	313	8	20	133	65	19	36	17	64	85	6						
Future Volume (Veh/h)	29	313	8	20	133	65	19	36	17	64	85	6						
Sign Control	Free			Free			Stop			Stop								
Grade	-9%			0%			0%			0%								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92						
Hourly flow rate (vph)	32	340	9	22	145	71	21	39	18	70	92	7						
Pedestrians																		
Lane Width (ft)																		
Walking Speed (ft/s)																		
Percent Blockage																		
Right turn flare (veh)									40									
Median type	None				None													
Median storage (veh)																		
Upstream signal (ft)																		
1142																		
pX, platoon unblocked																		
vC, conflicting volume	216				349				578	668	174	478	638	108				
vC1, stage 1 conf vol																		
vC2, stage 2 conf vol																		
vCu, unblocked vol	216				349				578	668	174	478	638	108				
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9				
tC, 2 stage (s)																		
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3				
p0 queue free %	98				98				93	89	98	83	76	99				
cM capacity (veh/h)	1351				1207				312	362	839	409	377	925				
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2										
Volume Total	32	227	122	94	144	78	70	99										
Volume Left	32	0	0	22	0	21	70	0										
Volume Right	0	0	9	0	71	18	0	7										
cSH	1351	1700	1700	1207	1700	447	409	393										
Volume to Capacity	0.02	0.13	0.07	0.02	0.08	0.17	0.17	0.25										
Queue Length 95th (ft)	2	0	0	1	0	16	15	25										
Control Delay (s)	7.7	0.0	0.0	2.0	0.0	15.7	15.6	17.2										
Lane LOS	A				A				C	C	C							
Approach Delay (s)	0.6				0.8				15.7	16.5								
Approach LOS							C	C										
Intersection Summary																		
Average Delay				5.1														
Intersection Capacity Utilization				35.5%	ICU Level of Service			A										
Analysis Period (min)				15														

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Background PM Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↖	↘	↖
Traffic Volume (veh/h)	892	109	54	761	138	43
Future Volume (Veh/h)	892	109	54	761	138	43
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	970	118	59	827	150	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1088		1974	1029
vC1, stage 1 conf vol					1029	
vC2, stage 2 conf vol					945	
vCu, unblocked vol			1088		1974	1029
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			91		39	83
cM capacity (veh/h)			641		244	284
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	1088	59	827	150	47	
Volume Left	0	59	0	150	0	
Volume Right	118	0	0	0	47	
cSH	1700	641	1700	244	284	
Volume to Capacity	0.64	0.09	0.49	0.61	0.17	
Queue Length 95th (ft)	0	8	0	91	15	
Control Delay (s)	0.0	11.2	0.0	40.8	20.2	
Lane LOS		B		E	C	
Approach Delay (s)	0.0	0.7		35.8		
Approach LOS				E		
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			67.9%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2019 Background PM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	0	353	243	0	9	0
Future Volume (Veh/h)	0	353	243	0	9	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	384	264	0	10	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	264				456	132
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264				456	132
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1297				533	893
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	128	256	176	88	10	0
Volume Left	0	0	0	0	10	0
Volume Right	0	0	0	0	0	0
cSH	1297	1700	1700	1700	533	1700
Volume to Capacity	0.00	0.15	0.10	0.05	0.02	0.00
Queue Length 95th (ft)	0	0	0	0	1	0
Control Delay (s)	0.0	0.0	0.0	0.0	11.9	0.0
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		11.9	
Approach LOS					B	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			19.8%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

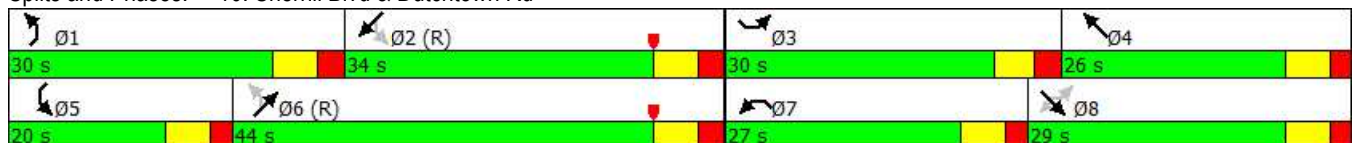
2019 Background PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	320	164	107	382	228	261	593	12	427
Future Volume (vph)	320	164	107	382	228	261	593	12	427
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	30.0	29.0	29.0	27.0	26.0	30.0	44.0	20.0	34.0
Total Split (%)	25.0%	24.2%	24.2%	22.5%	21.7%	25.0%	36.7%	16.7%	28.3%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	44.7	22.7	22.7	18.8	19.5	60.0	55.0	42.8	36.2
Actuated g/C Ratio	0.37	0.19	0.19	0.16	0.16	0.50	0.46	0.36	0.30
v/c Ratio	0.87	0.51	0.17	0.77	0.87	0.62	0.47	0.04	0.48
Control Delay	51.1	49.1	0.5	58.7	76.9	25.2	24.8	18.4	37.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.1	49.1	0.5	58.7	76.9	25.2	24.8	18.4	37.2
LOS	D	D	A	E	E	C	C	B	D
Approach Delay		41.4			65.8		24.9		36.8
Approach LOS		D			E		C		D

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 73 (61%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 40.4
 Intersection LOS: D
 Intersection Capacity Utilization 79.1%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Background PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	348	178	116	415	263	284	750	13	513
v/c Ratio	0.87	0.51	0.17	0.77	0.87	0.62	0.47	0.04	0.48
Control Delay	51.1	49.1	0.5	58.7	76.9	25.2	24.8	18.4	37.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.1	49.1	0.5	58.7	76.9	25.2	24.8	18.4	37.2
Queue Length 50th (ft)	193	122	0	159	198	133	193	5	173
Queue Length 95th (ft)	#336	198	0	212	#344	198	300	16	246
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	428	364	705	600	312	518	1596	415	1060
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.49	0.16	0.69	0.84	0.55	0.47	0.03	0.48

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Background PM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	320	164	107	382	228	14	261	593	97	12	427	45
Future Volume (vph)	320	164	107	382	228	14	261	593	97	12	427	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1847		1770	3465		1770	3489	
Flt Permitted	0.22	1.00	1.00	0.95	1.00		0.30	1.00		0.37	1.00	
Satd. Flow (perm)	407	1863	2787	3433	1847		563	3465		684	3489	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	178	116	415	248	15	284	645	105	13	464	49
RTOR Reduction (vph)	0	0	94	0	2	0	0	9	0	0	6	0
Lane Group Flow (vph)	348	178	22	415	261	0	284	741	0	13	507	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	44.7	22.7	22.7	18.8	19.5		60.0	51.4		38.8	36.2	
Effective Green, g (s)	44.7	22.7	22.7	18.8	19.5		60.0	51.4		38.8	36.2	
Actuated g/C Ratio	0.37	0.19	0.19	0.16	0.16		0.50	0.43		0.32	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	401	352	527	537	300		455	1484		244	1052	
v/s Ratio Prot	c0.16	0.10		0.12	0.14		c0.09	0.21		0.00	0.15	
v/s Ratio Perm	c0.16		0.01				c0.22			0.02		
v/c Ratio	0.87	0.51	0.04	0.77	0.87		0.62	0.50		0.05	0.48	
Uniform Delay, d1	30.7	43.6	39.8	48.6	49.0		19.2	24.9		27.7	34.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.6	1.1	0.0	6.8	23.0		2.7	1.2		0.1	1.6	
Delay (s)	48.3	44.8	39.8	55.4	72.0		21.9	26.1		27.8	35.8	
Level of Service	D	D	D	E	E		C	C		C	D	
Approach Delay (s)		45.8			61.8			25.0			35.6	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			40.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			79.1%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background Midday Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	367	441	1242	1048
Future Volume (vph)	367	441	1242	1048
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	27.0	27.0	43.0	43.0
Total Split (%)	38.6%	38.6%	61.4%	61.4%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	18.1	18.1	43.9	43.9
Actuated g/C Ratio	0.26	0.26	0.63	0.63
v/c Ratio	0.65	0.65	0.34	0.36
Control Delay	23.3	23.8	6.9	6.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.3	23.8	6.9	6.8
LOS	C	C	A	A
Approach Delay	23.4		6.9	6.8
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 40 (57%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 11.2
 Intersection Capacity Utilization 52.2%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2019 Background Midday Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	600	278	1350	1139
v/c Ratio	0.65	0.65	0.34	0.36
Control Delay	23.3	23.8	6.9	6.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.3	23.8	6.9	6.8
Queue Length 50th (ft)	103	84	70	114
Queue Length 95th (ft)	138	153	108	152
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1150	525	4015	3202
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.52	0.53	0.34	0.36
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background Midday Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	367	441	0	1242	1048	0
Future Volume (vph)	367	441	0	1242	1048	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.95	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3355	1455		6408	5111	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3355	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	399	479	0	1350	1139	0
RTOR Reduction (vph)	53	53	0	0	0	0
Lane Group Flow (vph)	547	225	0	1350	1139	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	16.1	16.1		41.9	41.9	
Effective Green, g (s)	18.1	18.1		43.9	43.9	
Actuated g/C Ratio	0.26	0.26		0.63	0.63	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	867	376		4018	3205	
v/s Ratio Prot	c0.16	0.15		0.21	c0.22	
v/s Ratio Perm						
v/c Ratio	0.63	0.60		0.34	0.36	
Uniform Delay, d1	23.0	22.8		6.2	6.3	
Progression Factor	1.00	1.00		1.00	0.98	
Incremental Delay, d2	1.1	1.7		0.2	0.3	
Delay (s)	24.1	24.5		6.4	6.4	
Level of Service	C	C		A	A	
Approach Delay (s)	24.2			6.4	6.4	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			11.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background Midday Peak
Medical Office Center

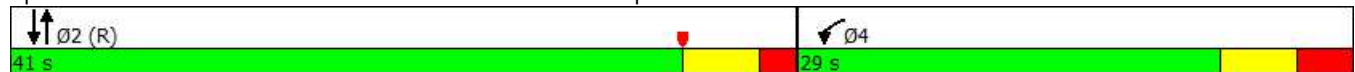
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	779	1608	473
Future Volume (vph)	779	1608	473
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	29.0	41.0	41.0
Total Split (%)	41.4%	58.6%	58.6%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	23.1	38.9	38.9
Actuated g/C Ratio	0.33	0.56	0.56
v/c Ratio	0.73	0.47	0.18
Control Delay	24.6	7.4	7.4
Queue Delay	0.0	0.0	0.0
Total Delay	24.6	7.4	7.4
LOS	C	A	A
Approach Delay	24.6	7.4	7.4
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 41 (59%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 52.2%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background Midday Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	847	1748	514
v/c Ratio	0.73	0.47	0.18
Control Delay	24.6	7.4	7.4
Queue Delay	0.0	0.0	0.0
Total Delay	24.6	7.4	7.4
Queue Length 50th (ft)	157	74	49
Queue Length 95th (ft)	214	85	41
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1260	3702	2800
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.67	0.47	0.18
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background Midday Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	779	0	1608	0	0	473
Future Volume (vph)	779	0	1608	0	0	473
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	847	0	1748	0	0	514
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	847	0	1748	0	0	514
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	20.1		36.9			36.9
Effective Green, g (s)	23.1		38.9			38.9
Actuated g/C Ratio	0.33		0.56			0.56
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1164		3698			2797
v/s Ratio Prot	c0.24		c0.26			0.10
v/s Ratio Perm						
v/c Ratio	0.73		0.47			0.18
Uniform Delay, d1	20.7		9.4			7.7
Progression Factor	1.00		0.72			0.92
Incremental Delay, d2	2.0		0.4			0.1
Delay (s)	22.6		7.1			7.2
Level of Service	C		A			A
Approach Delay (s)	22.6		7.1			7.2
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			11.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings 3: Cedar Bluff Road & Park West Blvd

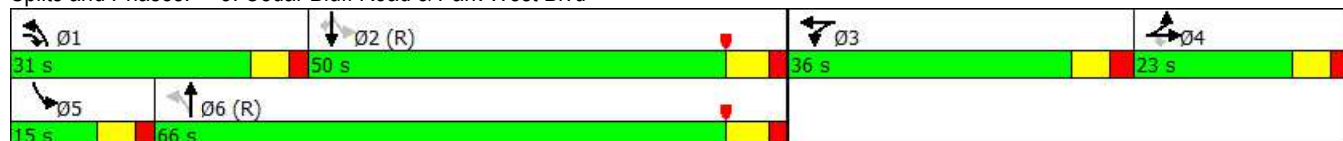
2019 Background Midday Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	78	38	246	115	197	290	675	28	381	44
Future Volume (vph)	78	38	246	115	197	290	675	28	381	44
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	23.0	23.0	31.0	36.0	36.0	31.0	66.0	15.0	50.0	50.0
Total Split (%)	16.4%	16.4%	22.1%	25.7%	25.7%	22.1%	47.1%	10.7%	35.7%	35.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	21.5	21.5	43.9	19.7	19.7	87.4	79.8	74.8	64.4	64.4
Actuated g/C Ratio	0.15	0.15	0.31	0.14	0.14	0.62	0.57	0.53	0.46	0.46
v/c Ratio	0.32	0.64	0.32	0.49	0.66	0.50	0.29	0.08	0.25	0.06
Control Delay	54.9	67.6	36.5	62.5	54.3	14.8	11.4	11.2	22.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Total Delay	54.9	67.6	36.5	62.5	54.3	15.6	11.4	11.2	22.1	0.1
LOS	D	E	D	E	D	B	B	B	C	A
Approach Delay		52.8			56.3		12.6		19.3	
Approach LOS		D			E		B		B	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 36 (26%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 28.3
 Intersection LOS: C
 Intersection Capacity Utilization 57.0%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2019 Background Midday Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	85	156	152	112	341	315	823	30	414	48
v/c Ratio	0.32	0.64	0.32	0.49	0.66	0.50	0.29	0.08	0.25	0.06
Control Delay	54.9	67.6	36.5	62.5	54.3	14.8	11.4	11.2	22.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Total Delay	54.9	67.6	36.5	62.5	54.3	15.6	11.4	11.2	22.1	0.1
Queue Length 50th (ft)	70	142	111	105	139	118	144	8	102	0
Queue Length 95th (ft)	119	215	151	169	188	259	191	22	138	1
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	276	253	561	369	803	687	2860	432	1660	835
Starvation Cap Reductn	0	0	0	0	0	152	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.62	0.27	0.30	0.42	0.59	0.29	0.07	0.25	0.06
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Background Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	38	246	115	197	105	290	675	82	28	381	44
Future Volume (vph)	78	38	246	115	197	105	290	675	82	28	381	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.89	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1582	1512	1618	3338		1770	5003		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.43	1.00		0.33	1.00	1.00
Satd. Flow (perm)	1719	1582	1512	1618	3338		803	5003		605	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	41	267	125	214	114	315	734	89	30	414	48
RTOR Reduction (vph)	0	0	0	0	45	0	0	9	0	0	0	26
Lane Group Flow (vph)	85	156	152	112	296	0	315	814	0	30	414	22
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	18.5	18.5	35.5	17.2	17.2		84.8	74.8		65.8	61.8	61.8
Effective Green, g (s)	21.5	21.5	39.5	19.7	19.7		86.8	77.3		71.8	64.3	64.3
Actuated g/C Ratio	0.15	0.15	0.28	0.14	0.14		0.62	0.55		0.51	0.46	0.46
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	263	242	426	227	469		629	2762		367	1658	741
v/s Ratio Prot	0.05	c0.10	0.05	0.07	c0.09		c0.07	0.16		0.00	0.11	
v/s Ratio Perm			0.05				c0.24			0.04		0.01
v/c Ratio	0.32	0.64	0.36	0.49	0.63		0.50	0.29		0.08	0.25	0.03
Uniform Delay, d1	52.8	55.7	40.1	55.5	56.7		12.9	16.8		16.9	23.1	20.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.91	0.65		0.82	0.84	1.00
Incremental Delay, d2	0.5	5.1	0.4	1.2	2.4		0.4	0.2		0.1	0.3	0.1
Delay (s)	53.3	60.8	40.5	56.8	59.2		12.1	11.2		13.9	19.9	20.8
Level of Service	D	E	D	E	E		B	B		B	B	C
Approach Delay (s)		51.3			58.6			11.4			19.6	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			28.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			57.0%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Timings

4: Cedar Bluff Road & Sherrill Blvd

2019 Background Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	131	18	148	105	9	182	801	22	887
Future Volume (vph)	131	18	148	105	9	182	801	22	887
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	35.0	35.0	25.0	35.0	35.0	25.0	105.0	80.0	80.0
Total Split (%)	25.0%	25.0%	17.9%	25.0%	25.0%	17.9%	75.0%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	23.7	23.7	37.9		23.7	109.8	109.3	95.6	95.6
Actuated g/C Ratio	0.17	0.17	0.27		0.17	0.78	0.78	0.68	0.68
v/c Ratio	0.71	0.06	0.31		0.34	0.42	0.33	0.06	0.42
Control Delay	73.0	45.9	14.9		46.6	8.6	3.6	10.1	11.3
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	45.9	14.9		46.6	8.6	3.6	10.1	11.3
LOS	E	D	B		D	A	A	B	B
Approach Delay		42.4			46.6		4.4		11.3
Approach LOS		D			D		A		B

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 70 (50%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 14.2

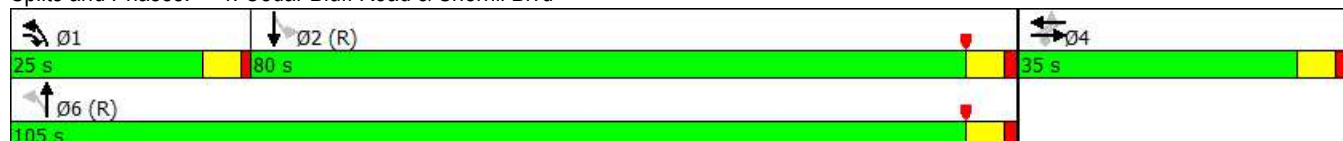
Intersection LOS: B

Intersection Capacity Utilization 64.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

2019 Background Midday Peak

4: Cedar Bluff Road & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	142	20	161	148	198	919	24	1029
v/c Ratio	0.71	0.06	0.31	0.34	0.42	0.33	0.06	0.42
Control Delay	73.0	45.9	14.9	46.6	8.6	3.6	10.1	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	45.9	14.9	46.6	8.6	3.6	10.1	11.3
Queue Length 50th (ft)	123	15	39	56	28	72	7	201
Queue Length 95th (ft)	189	37	89	85	50	96	22	308
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	266	438	650	576	583	2769	393	2464
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.05	0.25	0.26	0.34	0.33	0.06	0.42
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2019 Background Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	18	148	105	9	22	182	801	44	22	887	60
Future Volume (vph)	131	18	148	105	9	22	182	801	44	22	887	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3196		1906	3547		1761	3604	
Flt Permitted	0.61	1.00	1.00		0.76		0.23	1.00		0.31	1.00	
Satd. Flow (perm)	1186	1947	1655		2509		453	3547		576	3604	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	142	20	161	114	10	24	198	871	48	24	964	65
RTOR Reduction (vph)	0	0	80	0	12	0	0	2	0	0	3	0
Lane Group Flow (vph)	142	20	81	0	136	0	198	917	0	24	1026	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	21.2	21.2	29.9		21.2		107.3	107.3		93.6	93.6	
Effective Green, g (s)	23.7	23.7	33.9		23.7		109.3	109.3		95.6	95.6	
Actuated g/C Ratio	0.17	0.17	0.24		0.17		0.78	0.78		0.68	0.68	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	200	329	400		424		464	2769		393	2461	
v/s Ratio Prot		0.01	0.02				c0.03	0.26			0.28	
v/s Ratio Perm	c0.12		0.03		0.05		c0.30			0.04		
v/c Ratio	0.71	0.06	0.20		0.32		0.43	0.33		0.06	0.42	
Uniform Delay, d1	54.9	48.8	42.3		51.1		5.7	4.5		7.3	9.8	
Progression Factor	1.00	1.00	1.00		1.00		1.36	0.65		1.00	1.00	
Incremental Delay, d2	11.0	0.1	0.2		0.4		0.5	0.3		0.3	0.5	
Delay (s)	65.9	48.9	42.5		51.5		8.2	3.2		7.6	10.4	
Level of Service	E	D	D		D		A	A		A	B	
Approach Delay (s)		53.2			51.5			4.1			10.3	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			64.1%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2019 Background Midday Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↕	↖	↕	
Traffic Volume (vph)	78	37	620	82	835	
Future Volume (vph)	78	37	620	82	835	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	25.0	15.0	50.0	15.0	65.0	25.0
Total Split (%)	27.8%	16.7%	55.6%	16.7%	72.2%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	11.1	21.1	60.5	70.2	70.5	
Actuated g/C Ratio	0.12	0.23	0.67	0.78	0.78	
v/c Ratio	0.49	0.10	0.35	0.17	0.33	
Control Delay	45.7	7.4	6.1	4.2	4.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	45.7	7.4	6.1	4.2	4.4	
LOS	D	A	A	A	A	
Approach Delay			6.1		4.4	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 28 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 7.0
 Intersection Capacity Utilization 58.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd



Queues

2019 Background Midday Peak

5: Cedar Bluff Road & Fox Lonas Rd

Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	85	40	813	89	908
v/c Ratio	0.49	0.10	0.35	0.17	0.33
Control Delay	45.7	7.4	6.1	4.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.7	7.4	6.1	4.2	4.4
Queue Length 50th (ft)	46	0	62	11	77
Queue Length 95th (ft)	88	21	100	27	127
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	297	449	2327	552	2758
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.09	0.35	0.16	0.33
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2019 Background Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	78	0	37	0	620	128	82	835	0
Future Volume (vph)	0	0	0	78	0	37	0	620	128	82	835	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3448		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.29	1.00	
Satd. Flow (perm)				1410		1583		3448		544	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	85	0	40	0	674	139	89	908	0
RTOR Reduction (vph)	0	0	0	0	0	33	0	14	0	0	0	0
Lane Group Flow (vph)	0	0	0	85	0	7	0	799	0	89	908	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				9.5		15.1		56.9		68.0	68.0	
Effective Green, g (s)				9.5		15.1		56.9		68.0	68.0	
Actuated g/C Ratio				0.11		0.17		0.63		0.76	0.76	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				148		265		2179		486	2661	
v/s Ratio Prot						0.00		c0.23		0.01	c0.26	
v/s Ratio Perm				c0.06		0.00				0.13		
v/c Ratio				0.57		0.03		0.37		0.18	0.34	
Uniform Delay, d1				38.3		31.3		7.9		3.4	3.6	
Progression Factor				1.00		1.00		0.65		1.00	1.00	
Incremental Delay, d2				5.3		0.0		0.5		0.2	0.3	
Delay (s)				43.6		31.3		5.6		3.6	4.0	
Level of Service				D		C		A		A	A	
Approach Delay (s)		0.0			39.7			5.6			3.9	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0									
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			90.0							18.0		
Intersection Capacity Utilization			58.2%								B	
Analysis Period (min)			15									
c Critical Lane Group												

Timings

6: Cedar Bluff Road & Dutchtown Rd

2019 Background Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	65	37	55	46	73	141	546	18	836
Future Volume (vph)	65	37	55	46	73	141	546	18	836
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	13.0	17.0	15.0	13.0	17.0	15.0	47.0	13.0	45.0
Total Split (%)	14.4%	18.9%	16.7%	14.4%	18.9%	16.7%	52.2%	14.4%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	17.2	12.6	24.1	15.0	9.5	58.9	55.8	51.8	45.2
Actuated g/C Ratio	0.19	0.14	0.27	0.17	0.11	0.65	0.62	0.58	0.50
v/c Ratio	0.27	0.15	0.12	0.19	0.45	0.44	0.29	0.04	0.56
Control Delay	28.1	36.3	1.1	26.8	42.4	11.7	12.1	4.9	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	36.3	1.1	26.8	42.4	11.7	12.1	4.9	17.8
LOS	C	D	A	C	D	B	B	A	B
Approach Delay		20.5			36.8		12.0		17.6
Approach LOS		C			D		B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 18 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 17.0

Intersection LOS: B

Intersection Capacity Utilization 58.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
13 s	47 s	13 s	17 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	45 s	13 s	17 s

Queues

2019 Background Midday Peak

6: Cedar Bluff Road & Dutchtown Rd

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	40	60	50	89	153	641	20	974
v/c Ratio	0.27	0.15	0.12	0.19	0.45	0.44	0.29	0.04	0.56
Control Delay	28.1	36.3	1.1	26.8	42.4	11.7	12.1	4.9	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	36.3	1.1	26.8	42.4	11.7	12.1	4.9	17.8
Queue Length 50th (ft)	31	21	0	22	45	34	84	2	231
Queue Length 95th (ft)	64	51	5	50	90	63	165	6	303
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200		200	150		100		50	
Base Capacity (vph)	269	275	522	264	229	365	2187	520	1784
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.15	0.11	0.19	0.39	0.42	0.29	0.04	0.55
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2019 Background Midday Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	37	55	46	73	9	141	546	44	18	836	60
Future Volume (vph)	65	37	55	46	73	9	141	546	44	18	836	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1831		1770	3499		1761	3486	
Flt Permitted	0.58	1.00	1.00	0.73	1.00		0.18	1.00		0.41	1.00	
Satd. Flow (perm)	1078	1863	1583	1362	1831		334	3499		757	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	40	60	50	79	10	153	593	48	20	909	65
RTOR Reduction (vph)	0	0	47	0	5	0	0	6	0	0	5	0
Lane Group Flow (vph)	71	40	13	50	84	0	153	635	0	20	969	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	17.5	11.0	19.3	13.7	9.1		55.6	47.3		44.2	41.6	
Effective Green, g (s)	17.5	11.0	19.3	13.7	9.1		55.6	47.3		44.2	41.6	
Actuated g/C Ratio	0.19	0.12	0.21	0.15	0.10		0.62	0.53		0.49	0.46	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	259	227	444	228	185		338	1838		400	1611	
v/s Ratio Prot	c0.02	0.02	0.00	0.01	c0.05		c0.04	0.18		0.00	c0.28	
v/s Ratio Perm	0.03		0.01	0.02			0.24			0.02		
v/c Ratio	0.27	0.18	0.03	0.22	0.45		0.45	0.35		0.05	0.60	
Uniform Delay, d1	30.4	35.4	27.9	33.3	38.1		9.8	12.4		11.8	18.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.59	0.91	
Incremental Delay, d2	0.6	0.4	0.0	0.5	1.8		1.0	0.5		0.1	1.6	
Delay (s)	31.0	35.8	28.0	33.8	39.9		10.8	12.9		7.0	17.9	
Level of Service	C	D	C	C	D		B	B		A	B	
Approach Delay (s)		31.1			37.7			12.5			17.7	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			58.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Background Midday Peak
Medical Office Center

																
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (veh/h)	22	248	19	32	203	40	8	22	25	26	50	10				
Future Volume (Veh/h)	22	248	19	32	203	40	8	22	25	26	50	10				
Sign Control	Free			Free			Stop			Stop						
Grade	-9%			0%			0%			0%						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92				
Hourly flow rate (vph)	24	270	21	35	221	43	9	24	27	28	54	11				
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)									40							
Median type	None				None											
Median storage (veh)																
Upstream signal (ft)																
1142																
pX, platoon unblocked																
vC, conflicting volume	264				291				547	662	146	508	652	132		
vC1, stage 1 conf vol																
vC2, stage 2 conf vol																
vCu, unblocked vol	264				291				547	662	146	508	652	132		
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9		
tC, 2 stage (s)																
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3		
p0 queue free %	98				97				97	93	97	93	85	99		
cM capacity (veh/h)	1297				1268				356	363	875	398	368	893		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2								
Volume Total	24	180	111	146	154	60	28	65								
Volume Left	24	0	0	35	0	9	28	0								
Volume Right	0	0	21	0	43	27	0	11								
cSH	1297	1700	1700	1268	1700	656	398	409								
Volume to Capacity	0.02	0.11	0.07	0.03	0.09	0.09	0.07	0.16								
Queue Length 95th (ft)	1	0	0	2	0	8	6	14								
Control Delay (s)	7.8	0.0	0.0	2.1	0.0	12.9	14.7	15.5								
Lane LOS	A				A				B	B	C					
Approach Delay (s)	0.6				1.0				12.9	15.2						
Approach LOS																
Intersection Summary																
Average Delay				3.5												
Intersection Capacity Utilization				33.4%	ICU Level of Service					A						
Analysis Period (min)				15												

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Background Midday Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	448	69	19	373	62	14
Future Volume (Veh/h)	448	69	19	373	62	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	487	75	21	405	67	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			562		972	524
vC1, stage 1 conf vol					524	
vC2, stage 2 conf vol					447	
vCu, unblocked vol			562		972	524
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		86	97
cM capacity (veh/h)			1009		487	553
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	562	21	405	67	15	
Volume Left	0	21	0	67	0	
Volume Right	75	0	0	0	15	
cSH	1700	1009	1700	487	553	
Volume to Capacity	0.33	0.02	0.24	0.14	0.03	
Queue Length 95th (ft)	0	2	0	12	2	
Control Delay (s)	0.0	8.6	0.0	13.6	11.7	
Lane LOS		A		B	B	
Approach Delay (s)	0.0	0.4		13.2		
Approach LOS				B		
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			37.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2019 Background Midday Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	0	418	276	0	162	3
Future Volume (Veh/h)	0	418	276	0	162	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	454	300	0	176	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	300				527	150
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	300				527	150
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				63	100
cM capacity (veh/h)	1258				481	870
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	151	303	200	100	176	3
Volume Left	0	0	0	0	176	0
Volume Right	0	0	0	0	0	3
cSH	1258	1700	1700	1700	481	870
Volume to Capacity	0.00	0.18	0.12	0.06	0.37	0.00
Queue Length 95th (ft)	0	0	0	0	41	0
Control Delay (s)	0.0	0.0	0.0	0.0	16.7	9.2
Lane LOS					C	A
Approach Delay (s)	0.0		0.0		16.6	
Approach LOS					C	
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			27.2%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2019 Background Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	73	187	157	97	231	136	163	31	61
Future Volume (vph)	73	187	157	97	231	136	163	31	61
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	15.0	20.0	20.0	15.0	20.0	15.0	30.0	15.0	30.0
Total Split (%)	18.8%	25.0%	25.0%	18.8%	25.0%	18.8%	37.5%	18.8%	37.5%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	20.6	14.1	14.1	7.7	14.1	39.5	34.4	34.6	27.7
Actuated g/C Ratio	0.26	0.18	0.18	0.10	0.18	0.49	0.43	0.43	0.35
v/c Ratio	0.28	0.62	0.26	0.32	0.82	0.25	0.20	0.07	0.14
Control Delay	20.3	39.5	3.0	36.0	52.8	12.7	11.2	11.5	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	39.5	3.0	36.0	52.8	12.7	11.2	11.5	9.5
LOS	C	D	A	D	D	B	B	B	A
Approach Delay		22.4			48.1		11.7		9.9
Approach LOS		C			D		B		A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 65 (81%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 23.9
 Intersection Capacity Utilization 54.8%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service A

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	30 s	15 s	20 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	30 s	15 s	20 s

Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Background Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	79	203	171	105	267	148	300	34	168
v/c Ratio	0.28	0.62	0.26	0.32	0.82	0.25	0.20	0.07	0.14
Control Delay	20.3	39.5	3.0	36.0	52.8	12.7	11.2	11.5	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	39.5	3.0	36.0	52.8	12.7	11.2	11.5	9.5
Queue Length 50th (ft)	26	93	0	25	126	40	32	8	12
Queue Length 95th (ft)	55	164	15	48	#253	73	63	23	34
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	303	338	684	386	337	589	1497	572	1180
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.60	0.25	0.27	0.79	0.25	0.20	0.06	0.14

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Background Midday Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	73	187	157	97	231	15	136	163	113	31	61	94
Future Volume (vph)	73	187	157	97	231	15	136	163	113	31	61	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1846		1770	3322		1770	3217	
Flt Permitted	0.36	1.00	1.00	0.95	1.00		0.56	1.00		0.57	1.00	
Satd. Flow (perm)	677	1863	2787	3433	1846		1035	3322		1059	3217	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	203	171	105	251	16	148	177	123	34	66	102
RTOR Reduction (vph)	0	0	141	0	2	0	0	76	0	0	68	0
Lane Group Flow (vph)	79	203	30	105	265	0	148	224	0	34	100	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	20.6	14.1	14.1	6.5	14.1		38.7	30.8		30.6	26.5	
Effective Green, g (s)	20.6	14.1	14.1	6.5	14.1		38.7	30.8		30.6	26.5	
Actuated g/C Ratio	0.26	0.18	0.18	0.08	0.18		0.48	0.39		0.38	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	263	328	491	278	325		573	1278		441	1065	
v/s Ratio Prot	0.02	0.11		c0.03	c0.14		c0.03	0.07		0.00	0.03	
v/s Ratio Perm	0.05		0.01				c0.10			0.03		
v/c Ratio	0.30	0.62	0.06	0.38	0.81		0.26	0.18		0.08	0.09	
Uniform Delay, d1	23.3	30.5	27.4	34.8	31.7		11.8	16.2		15.6	18.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	3.5	0.1	0.9	14.4		0.2	0.3		0.1	0.2	
Delay (s)	23.9	33.9	27.5	35.7	46.1		12.0	16.5		15.6	18.6	
Level of Service	C	C	C	D	D		B	B		B	B	
Approach Delay (s)		29.8			43.1			15.0			18.1	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			27.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			25.0			
Intersection Capacity Utilization			54.8%			ICU Level of Service			A			
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background PM School Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	437	351	1078	972
Future Volume (vph)	437	351	1078	972
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	32.0	32.0	48.0	48.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	20.2	20.2	51.8	51.8
Actuated g/C Ratio	0.25	0.25	0.65	0.65
v/c Ratio	0.66	0.62	0.28	0.32
Control Delay	28.1	23.6	6.8	7.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.1	23.6	6.8	7.2
LOS	C	C	A	A
Approach Delay	26.7		6.8	7.2
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.5
 Intersection Capacity Utilization 48.0%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background PM School Peak

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	590	267	1172	1057
v/c Ratio	0.66	0.62	0.28	0.32
Control Delay	28.1	23.6	6.8	7.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.1	23.6	6.8	7.2
Queue Length 50th (ft)	126	86	64	105
Queue Length 95th (ft)	159	153	102	121
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1219	564	4147	3307
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.47	0.28	0.32
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Background PM School Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	437	351	0	1078	972	0
Future Volume (vph)	437	351	0	1078	972	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.97	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3406	1455		6408	5111	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3406	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	475	382	0	1172	1057	0
RTOR Reduction (vph)	31	64	0	0	0	0
Lane Group Flow (vph)	559	203	0	1172	1057	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	18.2	18.2		49.8	49.8	
Effective Green, g (s)	20.2	20.2		51.8	51.8	
Actuated g/C Ratio	0.25	0.25		0.65	0.65	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	860	367		4149	3309	
v/s Ratio Prot	c0.16	0.14		0.18	c0.21	
v/s Ratio Perm						
v/c Ratio	0.65	0.55		0.28	0.32	
Uniform Delay, d1	26.7	26.0		6.1	6.3	
Progression Factor	1.00	1.00		1.00	1.04	
Incremental Delay, d2	1.3	1.0		0.2	0.2	
Delay (s)	28.0	27.0		6.3	6.8	
Level of Service	C	C		A	A	
Approach Delay (s)	27.7			6.3	6.8	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.41			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			48.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background PM School Peak
Medical Office Center

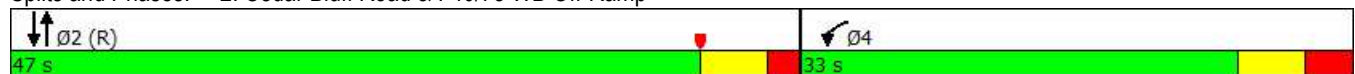
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	680	1515	689
Future Volume (vph)	680	1515	689
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	33.0	47.0	47.0
Total Split (%)	41.3%	58.8%	58.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effect Green (s)	24.2	47.8	47.8
Actuated g/C Ratio	0.30	0.60	0.60
v/c Ratio	0.69	0.41	0.25
Control Delay	27.9	7.8	8.2
Queue Delay	0.0	0.0	0.0
Total Delay	27.9	7.8	8.2
LOS	C	A	A
Approach Delay	27.9	7.8	8.2
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.6
 Intersection Capacity Utilization 48.0%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background PM School Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	739	1647	749
v/c Ratio	0.69	0.41	0.25
Control Delay	27.9	7.8	8.2
Queue Delay	0.0	0.0	0.0
Total Delay	27.9	7.8	8.2
Queue Length 50th (ft)	166	96	98
Queue Length 95th (ft)	205	111	87
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1279	3976	3007
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.58	0.41	0.25
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Background PM School Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	680	0	1515	0	0	689
Future Volume (vph)	680	0	1515	0	0	689
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	739	0	1647	0	0	749
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	739	0	1647	0	0	749
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	21.2		45.8			45.8
Effective Green, g (s)	24.2		47.8			47.8
Actuated g/C Ratio	0.30		0.60			0.60
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1067		3976			3007
v/s Ratio Prot	c0.21		c0.25			0.15
v/s Ratio Perm						
v/c Ratio	0.69		0.41			0.25
Uniform Delay, d1	24.6		8.6			7.6
Progression Factor	1.00		0.82			0.99
Incremental Delay, d2	1.6		0.3			0.2
Delay (s)	26.2		7.4			7.7
Level of Service	C		A			A
Approach Delay (s)	26.2		7.4			7.7
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			11.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			48.0%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Timings

3: Cedar Bluff Road & Park West Blvd

2019 Background PM School Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	103	11	250	171	161	177	595	21	649	27
Future Volume (vph)	103	11	250	171	161	177	595	21	649	27
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	30.0	30.0	25.0	40.0	40.0	25.0	75.0	15.0	65.0	65.0
Total Split (%)	18.8%	18.8%	15.6%	25.0%	25.0%	15.6%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	22.6	22.6	40.7	24.0	24.0	101.8	94.4	93.6	83.3	83.3
Actuated g/C Ratio	0.14	0.14	0.25	0.15	0.15	0.64	0.59	0.58	0.52	0.52
v/c Ratio	0.46	0.66	0.37	0.69	0.58	0.42	0.25	0.05	0.38	0.03
Control Delay	68.1	78.9	49.9	78.4	48.7	13.8	12.3	13.6	23.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	78.9	49.9	78.4	48.7	13.8	12.3	13.6	23.0	0.1
LOS	E	E	D	E	D	B	B	B	C	A
Approach Delay		65.5			58.6		12.6		21.9	
Approach LOS		E			E		B		C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 50 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 32.3
 Intersection Capacity Utilization 55.8%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service B

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	65 s	40 s	30 s
 Ø5	 Ø6 (R)		
15 s	75 s		

Queues

3: Cedar Bluff Road & Park West Blvd

2019 Background PM School Peak

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	112	143	141	167	333	192	743	23	705	29
v/c Ratio	0.46	0.66	0.37	0.69	0.58	0.42	0.25	0.05	0.38	0.03
Control Delay	68.1	78.9	49.9	78.4	48.7	13.8	12.3	13.6	23.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	78.9	49.9	78.4	48.7	13.8	12.3	13.6	23.0	0.1
Queue Length 50th (ft)	109	151	129	184	130	86	140	8	187	0
Queue Length 95th (ft)	169	223	178	262	176	167	188	24	234	0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	292	261	445	364	811	510	2951	477	1879	912
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.55	0.32	0.46	0.41	0.38	0.25	0.05	0.38	0.03
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Background PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	11	250	171	161	128	177	595	88	21	649	27
Future Volume (vph)	103	11	250	171	161	128	177	595	88	21	649	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.86	0.85	1.00	0.94		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1534	1512	1618	3291		1770	4987		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.30	1.00		0.36	1.00	1.00
Satd. Flow (perm)	1719	1534	1512	1618	3291		551	4987		657	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	12	272	186	175	139	192	647	96	23	705	29
RTOR Reduction (vph)	0	0	0	0	78	0	0	9	0	0	0	14
Lane Group Flow (vph)	112	143	141	167	255	0	192	734	0	23	705	15
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	19.6	19.6	32.1	21.5	21.5		99.4	89.5		84.8	80.9	80.9
Effective Green, g (s)	22.6	22.6	36.1	24.0	24.0		101.4	92.0		90.8	83.4	83.4
Actuated g/C Ratio	0.14	0.14	0.23	0.15	0.15		0.63	0.58		0.57	0.52	0.52
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	242	216	341	242	493		459	2867		419	1881	841
v/s Ratio Prot	0.07	c0.09	0.04	c0.10	0.08		c0.04	0.15		0.00	0.20	
v/s Ratio Perm			0.06				c0.23			0.03		0.01
v/c Ratio	0.46	0.66	0.41	0.69	0.52		0.42	0.26		0.05	0.37	0.02
Uniform Delay, d1	63.1	65.1	52.9	64.5	62.7		13.7	16.9		15.2	22.8	18.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.81	0.69		0.94	0.88	1.00
Incremental Delay, d2	1.0	6.7	0.6	7.6	0.7		0.4	0.2		0.0	0.5	0.0
Delay (s)	64.1	71.8	53.5	72.0	63.3		11.5	11.8		14.3	20.7	18.5
Level of Service	E	E	D	E	E		B	B		B	C	B
Approach Delay (s)		63.1			66.2			11.8			20.4	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			32.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			55.8%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

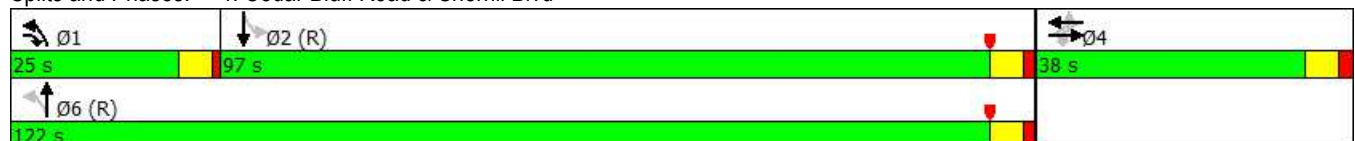
2019 Background PM School Peak
Medical Office Center

								
Lane Group	EBL	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	82	79	69	0	84	643	15	1003
Future Volume (vph)	82	79	69	0	84	643	15	1003
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		1		4	1	6		2
Permitted Phases	4	4	4		6		2	
Detector Phase	4	1	4	4	1	6	2	2
Switch Phase								
Minimum Initial (s)	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	38.0	25.0	38.0	38.0	25.0	122.0	97.0	97.0
Total Split (%)	23.8%	15.6%	23.8%	23.8%	15.6%	76.3%	60.6%	60.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag		Lead			Lead		Lag	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	18.2	30.2		18.2	135.3	134.8	123.3	123.3
Actuated g/C Ratio	0.11	0.19		0.11	0.85	0.84	0.77	0.77
v/c Ratio	0.57	0.22		0.23	0.20	0.25	0.03	0.39
Control Delay	80.6	8.9		26.4	3.0	2.2	5.6	6.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	80.6	8.9		26.4	3.0	2.2	5.6	6.9
LOS	F	A		C	A	A	A	A
Approach Delay				26.4		2.3		6.9
Approach LOS				C		A		A

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 97 (61%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 8.9
 Intersection Capacity Utilization 56.8%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues
4: Cedar Bluff Road & Sherrill Blvd

2019 Background PM School Peak
Medical Office Center

							
Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	86	77	91	739	16	1103
v/c Ratio	0.57	0.22	0.23	0.20	0.25	0.03	0.39
Control Delay	80.6	8.9	26.4	3.0	2.2	5.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.6	8.9	26.4	3.0	2.2	5.6	6.9
Queue Length 50th (ft)	90	0	13	13	56	4	175
Queue Length 95th (ft)	148	42	38	16	60	12	260
Internal Link Dist (ft)			642		919		1139
Turn Bay Length (ft)	90			75		85	
Base Capacity (vph)	295	519	581	580	2988	530	2798
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.17	0.13	0.16	0.25	0.03	0.39
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2019 Background PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	0	79	69	0	2	84	643	37	15	1003	12
Future Volume (vph)	82	0	79	69	0	2	84	643	37	15	1003	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5		3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00		1.00		0.95		1.00	0.95		1.00	0.95	
Flt	1.00		0.85		1.00		1.00	0.99		1.00	1.00	
Flt Protected	0.95		1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849		1655		3232		1906	3546		1761	3632	
Flt Permitted	0.70		1.00		0.74		0.22	1.00		0.37	1.00	
Satd. Flow (perm)	1371		1655		2511		449	3546		688	3632	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	0	86	75	0	2	91	699	40	16	1090	13
RTOR Reduction (vph)	0	0	72	0	45	0	0	2	0	0	0	0
Lane Group Flow (vph)	89	0	14	0	32	0	91	737	0	16	1103	0
Turn Type	Perm		pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	15.7		22.2		15.7		132.8	132.8		121.3	121.3	
Effective Green, g (s)	18.2		26.2		18.2		134.8	134.8		123.3	123.3	
Actuated g/C Ratio	0.11		0.16		0.11		0.84	0.84		0.77	0.77	
Clearance Time (s)	6.0		5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0		2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	155		271		285		455	2987		530	2798	
v/s Ratio Prot			0.00				0.01	c0.21			c0.30	
v/s Ratio Perm	c0.06		0.01		0.01		0.16			0.02		
v/c Ratio	0.57		0.05		0.11		0.20	0.25		0.03	0.39	
Uniform Delay, d1	67.2		56.4		63.6		3.2	2.5		4.3	6.0	
Progression Factor	1.00		1.00		1.00		0.83	0.74		1.00	1.00	
Incremental Delay, d2	5.1		0.1		0.2		0.2	0.2		0.1	0.4	
Delay (s)	72.3		56.5		63.8		2.8	2.0		4.4	6.5	
Level of Service	E		E		E		A	A		A	A	
Approach Delay (s)		64.5			63.8			2.1			6.4	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			56.8%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2019 Background PM School Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	79	22	703	104	592	
Future Volume (vph)	79	22	703	104	592	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	30.0	20.0	65.0	20.0	85.0	30.0
Total Split (%)	26.1%	17.4%	56.5%	17.4%	73.9%	26%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effect Green (s)	12.5	23.0	80.0	93.8	94.1	
Actuated g/C Ratio	0.11	0.20	0.70	0.82	0.82	
v/c Ratio	0.56	0.07	0.39	0.24	0.22	
Control Delay	61.8	7.6	5.4	4.2	3.5	
Queue Delay	0.0	0.0	0.1	0.0	0.0	
Total Delay	61.8	7.6	5.5	4.2	3.5	
LOS	E	A	A	A	A	
Approach Delay			5.5		3.6	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 34 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 51.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
20 s	65 s	30 s
↓ Ø6 (R)		↖ Ø8
85 s		30 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2019 Background PM School Peak
Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	86	24	932	113	643
v/c Ratio	0.56	0.07	0.39	0.24	0.22
Control Delay	61.8	7.6	5.4	4.2	3.5
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	61.8	7.6	5.5	4.2	3.5
Queue Length 50th (ft)	62	0	77	15	54
Queue Length 95th (ft)	110	16	105	34	90
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	294	440	2405	555	2880
Starvation Cap Reductn	0	0	269	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.05	0.44	0.20	0.22
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2019 Background PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	79	0	22	0	703	155	104	592	0
Future Volume (vph)	0	0	0	79	0	22	0	703	155	104	592	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3444		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.26	1.00	
Satd. Flow (perm)				1410		1583		3444		484	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	86	0	24	0	764	168	113	643	0
RTOR Reduction (vph)	0	0	0	0	0	20	0	10	0	0	0	0
Lane Group Flow (vph)	0	0	0	86	0	4	0	922	0	113	643	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				10.9		18.2		78.8		91.6	91.6	
Effective Green, g (s)				10.9		18.2		78.8		91.6	91.6	
Actuated g/C Ratio				0.09		0.16		0.69		0.80	0.80	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				133		250		2359		466	2805	
v/s Ratio Prot						0.00		c0.27		0.02	c0.18	
v/s Ratio Perm				c0.06		0.00				0.18		
v/c Ratio				0.65		0.02		0.39		0.24	0.23	
Uniform Delay, d1				50.2		40.8		7.8		3.4	2.9	
Progression Factor				1.00		1.00		0.60		1.00	1.00	
Incremental Delay, d2				10.3		0.0		0.5		0.3	0.2	
Delay (s)				60.5		40.9		5.2		3.7	3.1	
Level of Service				E		D		A		A	A	
Approach Delay (s)		0.0			56.2			5.2			3.2	
Approach LOS		A			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.5									
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			51.9%							A		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

6: Cedar Bluff Road & Dutchtown Rd

2019 Background PM School Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	84	65	83	21	138	187	602	17	542
Future Volume (vph)	84	65	83	21	138	187	602	17	542
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	20.0	30.0	22.0	15.0	25.0	22.0	57.0	13.0	48.0
Total Split (%)	17.4%	26.1%	19.1%	13.0%	21.7%	19.1%	49.6%	11.3%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	31.6	24.3	41.9	22.3	15.6	70.8	65.3	59.5	52.7
Actuated g/C Ratio	0.27	0.21	0.36	0.19	0.14	0.62	0.57	0.52	0.46
v/c Ratio	0.31	0.18	0.14	0.08	0.68	0.46	0.34	0.04	0.45
Control Delay	32.3	38.4	4.8	28.1	58.8	14.6	16.1	10.5	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	38.4	4.8	28.1	58.8	14.6	16.1	10.5	24.1
LOS	C	D	A	C	E	B	B	B	C
Approach Delay		24.2			55.1		15.8		23.8
Approach LOS		C			E		B		C

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 14 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 23.3

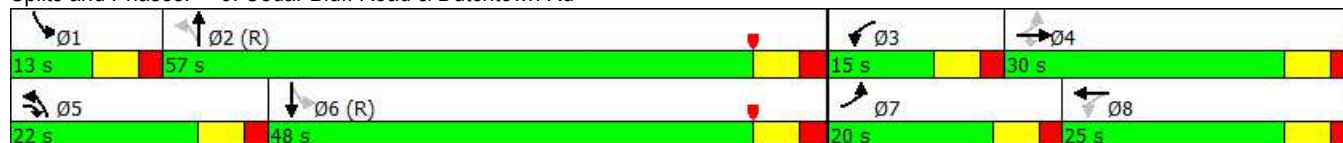
Intersection LOS: C

Intersection Capacity Utilization 62.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues

6: Cedar Bluff Road & Dutchtown Rd

2019 Background PM School Peak

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	91	71	90	23	170	203	684	18	711
v/c Ratio	0.31	0.18	0.14	0.08	0.68	0.46	0.34	0.04	0.45
Control Delay	32.3	38.4	4.8	28.1	58.8	14.6	16.1	10.5	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	38.4	4.8	28.1	58.8	14.6	16.1	10.5	24.1
Queue Length 50th (ft)	51	46	0	12	118	61	118	4	193
Queue Length 95th (ft)	83	82	30	29	182	120	241	20	297
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200		200	150		100		50	
Base Capacity (vph)	326	415	692	317	313	487	2011	443	1604
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.17	0.13	0.07	0.54	0.42	0.34	0.04	0.44
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2019 Background PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	65	83	21	138	18	187	602	28	17	542	112
Future Volume (vph)	84	65	83	21	138	18	187	602	28	17	542	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1830		1770	3516		1761	3431	
Flt Permitted	0.38	1.00	1.00	0.71	1.00		0.27	1.00		0.39	1.00	
Satd. Flow (perm)	700	1863	1583	1324	1830		502	3516		726	3431	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	71	90	23	150	20	203	654	30	18	589	122
RTOR Reduction (vph)	0	0	62	0	4	0	0	2	0	0	14	0
Lane Group Flow (vph)	91	71	28	23	166	0	203	682	0	18	697	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	34.6	24.3	35.9	22.3	18.0		67.9	59.3		52.9	50.3	
Effective Green, g (s)	34.6	24.3	35.9	22.3	18.0		67.9	59.3		52.9	50.3	
Actuated g/C Ratio	0.30	0.21	0.31	0.19	0.16		0.59	0.52		0.46	0.44	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	309	393	576	273	286		424	1813		357	1500	
v/s Ratio Prot	c0.03	0.04	0.00	0.00	c0.09		c0.05	0.19		0.00	0.20	
v/s Ratio Perm	0.06		0.01	0.01			c0.23			0.02		
v/c Ratio	0.29	0.18	0.05	0.08	0.58		0.48	0.38		0.05	0.46	
Uniform Delay, d1	30.1	37.2	27.6	37.9	45.0		12.5	16.7		16.9	22.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.87	1.03	
Incremental Delay, d2	0.5	0.2	0.0	0.1	2.8		0.9	0.6		0.1	1.0	
Delay (s)	30.6	37.4	27.7	38.0	47.8		13.4	17.3		14.8	24.5	
Level of Service	C	D	C	D	D		B	B		B	C	
Approach Delay (s)		31.5			46.7			16.4			24.2	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			23.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			62.7%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Background PM School Peak
Medical Office Center

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	24	181	9	19	129	63	6	33	20	68	77	11		
Future Volume (Veh/h)	24	181	9	19	129	63	6	33	20	68	77	11		
Sign Control	Free			Free			Stop			Stop				
Grade	-9%			0%			0%			0%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	26	197	10	21	140	68	7	36	22	74	84	12		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)									40					
Median type	None				None									
Median storage veh														
Upstream signal (ft)														
1142														
pX, platoon unblocked														
vC, conflicting volume	208				207				420	504	104	384	475	104
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	208				207				420	504	104	384	475	104
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				98				98	92	98	85	82	99
cM capacity (veh/h)	1360				1361				429	453	931	490	470	931
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	26	131	76	91	138	65	74	96						
Volume Left	26	0	0	21	0	7	74	0						
Volume Right	0	0	10	0	68	22	0	12						
cSH	1360	1700	1700	1361	1700	679	490	501						
Volume to Capacity	0.02	0.08	0.04	0.02	0.08	0.10	0.15	0.19						
Queue Length 95th (ft)	1	0	0	1	0	8	13	18						
Control Delay (s)	7.7	0.0	0.0	1.9	0.0	12.2	13.7	13.9						
Lane LOS	A				A				B	B	B			
Approach Delay (s)	0.9				0.7				12.2	13.8				
Approach LOS							B	B						
Intersection Summary														
Average Delay			5.0											
Intersection Capacity Utilization			31.9%			ICU Level of Service			A					
Analysis Period (min)			15											

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Background PM School Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	316	112	57	444	115	40
Future Volume (Veh/h)	316	112	57	444	115	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	343	122	62	483	125	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			465		1011	404
vC1, stage 1 conf vol					404	
vC2, stage 2 conf vol					607	
vCu, unblocked vol			465		1011	404
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			94		72	93
cM capacity (veh/h)			1096		452	647
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	465	62	483	125	43	
Volume Left	0	62	0	125	0	
Volume Right	122	0	0	0	43	
cSH	1700	1096	1700	452	647	
Volume to Capacity	0.27	0.06	0.28	0.28	0.07	
Queue Length 95th (ft)	0	4	0	28	5	
Control Delay (s)	0.0	8.5	0.0	16.0	11.0	
Lane LOS		A		C	B	
Approach Delay (s)	0.0	1.0		14.7		
Approach LOS				B		
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			43.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2019 Background PM School Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	426	288	0	85	2
Future Volume (Veh/h)	3	426	288	0	85	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	463	313	0	92	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	313				550	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	313				550	156
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				80	100
cM capacity (veh/h)	1244				464	861
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	157	309	209	104	92	2
Volume Left	3	0	0	0	92	0
Volume Right	0	0	0	0	0	2
cSH	1244	1700	1700	1700	464	861
Volume to Capacity	0.00	0.18	0.12	0.06	0.20	0.00
Queue Length 95th (ft)	0	0	0	0	18	0
Control Delay (s)	0.2	0.0	0.0	0.0	14.7	9.2
Lane LOS	A				B	A
Approach Delay (s)	0.1		0.0		14.6	
Approach LOS					B	
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			25.3%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

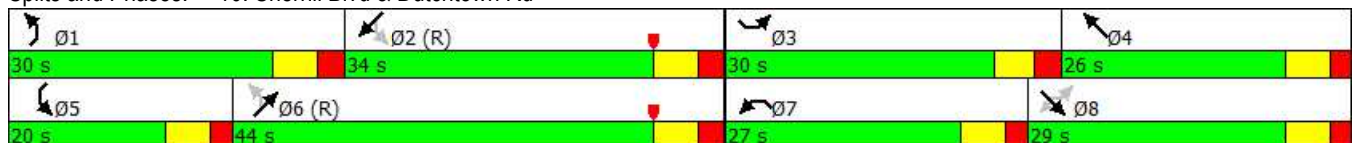
2019 Background PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	155	213	87	256	134	111	160	39	194
Future Volume (vph)	155	213	87	256	134	111	160	39	194
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	30.0	29.0	29.0	27.0	26.0	30.0	44.0	20.0	34.0
Total Split (%)	25.0%	24.2%	24.2%	22.5%	21.7%	25.0%	36.7%	16.7%	28.3%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	33.4	19.7	19.7	15.0	21.0	64.5	56.2	58.1	50.7
Actuated g/C Ratio	0.28	0.16	0.16	0.12	0.18	0.54	0.47	0.48	0.42
v/c Ratio	0.44	0.76	0.15	0.65	0.48	0.20	0.17	0.07	0.20
Control Delay	31.5	63.4	0.5	57.0	48.2	15.4	14.5	15.1	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	63.4	0.5	57.0	48.2	15.4	14.5	15.1	21.1
LOS	C	E	A	E	D	B	B	B	C
Approach Delay		40.5			53.8		14.7		20.3
Approach LOS		D			D		B		C

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 73 (61%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 33.9
 Intersection LOS: C
 Intersection Capacity Utilization 53.8%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Background PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	168	232	95	278	156	121	271	42	289
v/c Ratio	0.44	0.76	0.15	0.65	0.48	0.20	0.17	0.07	0.20
Control Delay	31.5	63.4	0.5	57.0	48.2	15.4	14.5	15.1	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	63.4	0.5	57.0	48.2	15.4	14.5	15.1	21.1
Queue Length 50th (ft)	94	173	0	107	108	43	41	14	62
Queue Length 95th (ft)	134	250	0	147	168	88	81	37	111
Internal Link Dist (ft)	1094			6715			2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	504	363	704	600	345	702	1616	669	1458
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.64	0.13	0.46	0.45	0.17	0.17	0.06	0.20
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Background PM School Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	155	213	87	256	134	9	111	160	89	39	194	72
Future Volume (vph)	155	213	87	256	134	9	111	160	89	39	194	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1845		1770	3349		1770	3396	
Flt Permitted	0.59	1.00	1.00	0.95	1.00		0.53	1.00		0.58	1.00	
Satd. Flow (perm)	1095	1863	2787	3433	1845		987	3349		1089	3396	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	232	95	278	146	10	121	174	97	42	211	78
RTOR Reduction (vph)	0	0	79	0	2	0	0	50	0	0	24	0
Lane Group Flow (vph)	168	232	16	278	154	0	121	221	0	42	265	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	33.4	19.7	19.7	15.0	21.0		64.6	55.0		56.5	50.7	
Effective Green, g (s)	33.4	19.7	19.7	15.0	21.0		64.6	55.0		56.5	50.7	
Actuated g/C Ratio	0.28	0.16	0.16	0.12	0.18		0.54	0.46		0.47	0.42	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	381	305	457	429	322		593	1534		545	1434	
v/s Ratio Prot	0.05	c0.12		c0.08	0.08		c0.02	0.07		0.00	0.08	
v/s Ratio Perm	0.07		0.01				c0.09			0.03		
v/c Ratio	0.44	0.76	0.03	0.65	0.48		0.20	0.14		0.08	0.19	
Uniform Delay, d1	34.5	47.9	42.2	50.0	44.6		13.8	18.8		17.2	21.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	10.7	0.0	3.4	1.1		0.2	0.2		0.1	0.3	
Delay (s)	35.4	58.5	42.2	53.3	45.7		14.0	19.0		17.3	22.0	
Level of Service	D	E	D	D	D		B	B		B	C	
Approach Delay (s)		47.5			50.6			17.5			21.4	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			36.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			53.8%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected AM Peak
Medical Office Center

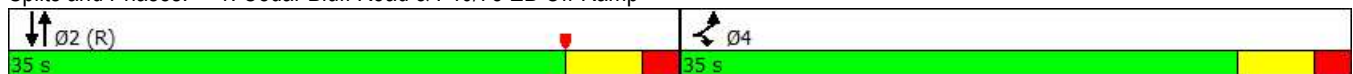
				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	709	250	1035	1235
Future Volume (vph)	709	250	1035	1235
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	23.6	23.6	38.4	38.4
Actuated g/C Ratio	0.34	0.34	0.55	0.55
v/c Ratio	0.68	0.49	0.32	0.48
Control Delay	22.4	19.6	9.7	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.4	19.6	9.7	9.6
LOS	C	B	A	A
Approach Delay	21.8		9.7	9.6
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 64 (91%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.2
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected AM Peak

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	798	245	1125	1342
v/c Ratio	0.68	0.49	0.32	0.48
Control Delay	22.4	19.6	9.7	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.4	19.6	9.7	9.6
Queue Length 50th (ft)	148	83	70	109
Queue Length 95th (ft)	176	130	111	142
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1537	653	3511	2800
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.52	0.38	0.32	0.48
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected AM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	709	250	0	1035	1235	0
Future Volume (vph)	709	250	0	1035	1235	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Frt	0.99	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3464	1455		6408	5111	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3464	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	771	272	0	1125	1342	0
RTOR Reduction (vph)	4	11	0	0	0	0
Lane Group Flow (vph)	794	234	0	1125	1342	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	21.6	21.6		36.4	36.4	
Effective Green, g (s)	23.6	23.6		38.4	38.4	
Actuated g/C Ratio	0.34	0.34		0.55	0.55	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1167	490		3515	2803	
v/s Ratio Prot	c0.23	0.16		0.18	c0.26	
v/s Ratio Perm						
v/c Ratio	0.68	0.48		0.32	0.48	
Uniform Delay, d1	20.0	18.3		8.7	9.7	
Progression Factor	1.00	1.00		1.00	0.87	
Incremental Delay, d2	1.3	0.3		0.2	0.5	
Delay (s)	21.3	18.6		8.9	9.0	
Level of Service	C	B		A	A	
Approach Delay (s)	20.6			8.9	9.0	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			53.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected AM Peak
Medical Office Center

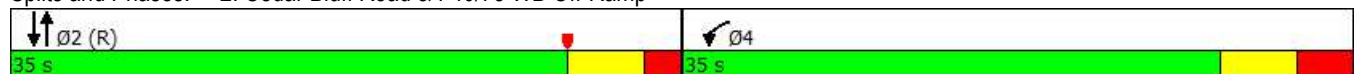
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	793	1478	551
Future Volume (vph)	793	1478	551
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	25.1	36.9	36.9
Actuated g/C Ratio	0.36	0.53	0.53
v/c Ratio	0.68	0.46	0.23
Control Delay	21.5	12.8	5.0
Queue Delay	0.0	0.0	0.0
Total Delay	21.5	12.8	5.0
LOS	C	B	A
Approach Delay	21.5	12.8	5.0
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 27 (39%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 53.4%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected AM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	862	1607	599
v/c Ratio	0.68	0.46	0.23
Control Delay	21.5	12.8	5.0
Queue Delay	0.0	0.0	0.0
Total Delay	21.5	12.8	5.0
Queue Length 50th (ft)	157	121	37
Queue Length 95th (ft)	187	170	m47
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1563	3504	2650
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.55	0.46	0.23

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected AM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	793	0	1478	0	0	551
Future Volume (vph)	793	0	1478	0	0	551
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	862	0	1607	0	0	599
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	862	0	1607	0	0	599
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	22.1		34.9			34.9
Effective Green, g (s)	25.1		36.9			36.9
Actuated g/C Ratio	0.36		0.53			0.53
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1265		3508			2653
v/s Ratio Prot	c0.24		c0.24			0.12
v/s Ratio Perm						
v/c Ratio	0.68		0.46			0.23
Uniform Delay, d1	19.1		10.3			8.9
Progression Factor	1.00		1.12			0.51
Incremental Delay, d2	1.2		0.4			0.2
Delay (s)	20.3		12.0			4.7
Level of Service	C		B			A
Approach Delay (s)	20.3		12.0			4.7
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.55			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			53.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

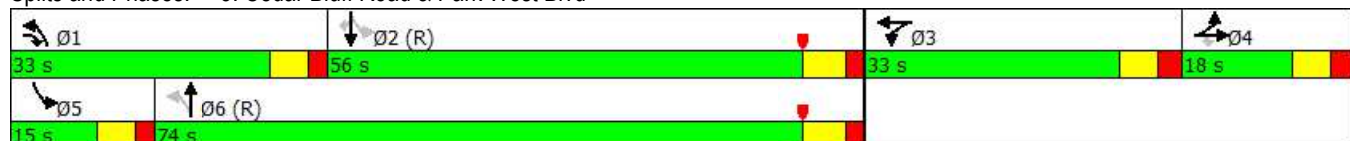
2019 Projected AM Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	42	65	203	143	341	307	655	36	575	65
Future Volume (vph)	42	65	203	143	341	307	655	36	575	65
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	18.0	18.0	33.0	33.0	33.0	33.0	74.0	15.0	56.0	56.0
Total Split (%)	12.9%	12.9%	23.6%	23.6%	23.6%	23.6%	52.9%	10.7%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	15.2	15.2	38.6	27.5	27.5	85.8	75.7	72.4	61.9	61.9
Actuated g/C Ratio	0.11	0.11	0.28	0.20	0.20	0.61	0.54	0.52	0.44	0.44
v/c Ratio	0.25	0.85	0.34	0.44	0.84	0.65	0.34	0.11	0.39	0.09
Control Delay	61.8	98.3	42.0	53.8	60.7	24.6	13.1	9.1	22.5	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
Total Delay	61.8	98.3	42.0	53.8	60.7	25.2	13.1	9.1	22.5	1.1
LOS	E	F	D	D	E	C	B	A	C	A
Approach Delay		69.9			59.4		16.3		19.7	
Approach LOS		E			E		B		B	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 36 (26%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 33.4
 Intersection LOS: C
 Intersection Capacity Utilization 66.7%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2019 Projected AM Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	46	151	141	139	584	334	907	39	625	71
v/c Ratio	0.25	0.85	0.34	0.44	0.84	0.65	0.34	0.11	0.39	0.09
Control Delay	61.8	98.3	42.0	53.8	60.7	24.6	13.1	9.1	22.5	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
Total Delay	61.8	98.3	42.0	53.8	60.7	25.2	13.1	9.1	22.5	1.1
Queue Length 50th (ft)	39	145	108	121	256	171	155	8	215	1
Queue Length 95th (ft)	m80	#288	166	196	331	297	179	m17	274	12
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	187	178	515	335	732	596	2693	399	1596	809
Starvation Cap Reductn	0	0	0	0	0	72	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.85	0.27	0.41	0.80	0.64	0.34	0.10	0.39	0.09

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	65	203	143	341	181	307	655	179	36	575	65
Future Volume (vph)	42	65	203	143	341	181	307	655	179	36	575	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Fr _t	1.00	0.92	0.85	1.00	0.95		1.00	0.97		1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1637	1512	1618	3338		1770	4921		1745	3610	1615
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00		0.30	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1719	1637	1512	1618	3338		567	4921		555	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	71	221	155	371	197	334	712	195	39	625	71
RTOR Reduction (vph)	0	0	0	0	42	0	0	33	0	0	0	40
Lane Group Flow (vph)	46	151	141	139	542	0	334	874	0	39	625	31
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	12.2	12.2	30.0	25.0	25.0		83.3	72.0		64.8	59.5	59.5
Effective Green, g (s)	15.2	15.2	34.0	27.5	27.5		85.3	74.5		70.8	62.0	62.0
Actuated g/C Ratio	0.11	0.11	0.24	0.20	0.20		0.61	0.53		0.51	0.44	0.44
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	186	177	367	317	655		515	2618		351	1598	715
v/s Ratio Prot	0.03	c0.09	0.05	0.09	c0.16		c0.09	0.18		0.01	0.17	
v/s Ratio Perm			0.04				c0.30			0.05		0.02
v/c Ratio	0.25	0.85	0.38	0.44	0.83		0.65	0.33		0.11	0.39	0.04
Uniform Delay, d ₁	57.2	61.3	44.3	49.5	54.0		15.1	18.6		17.5	26.3	22.2
Progression Factor	1.01	1.00	0.99	1.00	1.00		1.43	0.74		0.72	0.80	1.00
Incremental Delay, d ₂	0.5	30.4	0.5	0.7	8.3		2.3	0.3		0.1	0.6	0.1
Delay (s)	58.1	91.8	44.4	50.2	62.3		23.8	14.1		12.8	21.6	22.3
Level of Service	E	F	D	D	E		C	B		B	C	C
Approach Delay (s)		67.4			60.0			16.7			21.2	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			33.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			66.7%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

2019 Projected AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	49	21	172	17	1	350	661	44	976
Future Volume (vph)	49	21	172	17	1	350	661	44	976
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	23.0	23.0	41.0	23.0	23.0	41.0	117.0	76.0	76.0
Total Split (%)	16.4%	16.4%	29.3%	16.4%	16.4%	29.3%	83.6%	54.3%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	13.4	13.4	36.8		13.4	122.9	123.1	96.7	96.7
Actuated g/C Ratio	0.10	0.10	0.26		0.10	0.88	0.88	0.69	0.69
v/c Ratio	0.39	0.12	0.38		0.12	0.69	0.30	0.12	0.50
Control Delay	66.9	58.0	24.8		41.1	18.0	2.1	12.2	13.3
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	66.9	58.0	24.8		41.1	18.0	2.1	12.2	13.3
LOS	E	E	C		D	B	A	B	B
Approach Delay		36.2			41.1		6.7		13.2
Approach LOS		D			D		A		B

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 13 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.7
 Intersection Capacity Utilization 71.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

4: Cedar Bluff Road & Sherrill Blvd

2019 Projected AM Peak

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	53	23	187	30	380	929	48	1243
v/c Ratio	0.39	0.12	0.38	0.12	0.69	0.30	0.12	0.50
Control Delay	66.9	58.0	24.8	41.1	18.0	2.1	12.2	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.9	58.0	24.8	41.1	18.0	2.1	12.2	13.3
Queue Length 50th (ft)	46	20	83	8	133	92	14	270
Queue Length 95th (ft)	90	47	127	24	m235	127	44	453
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	199	271	660	372	721	3048	394	2464
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.08	0.28	0.08	0.53	0.30	0.12	0.50

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2019 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	21	172	17	1	10	350	661	194	44	976	167
Future Volume (vph)	49	21	172	17	1	10	350	661	194	44	976	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.94		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3122		1906	3453		1761	3559	
Flt Permitted	0.74	1.00	1.00		0.81		0.17	1.00		0.31	1.00	
Satd. Flow (perm)	1434	1947	1655		2609		337	3453		570	3559	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	23	187	18	1	11	380	718	211	48	1061	182
RTOR Reduction (vph)	0	0	54	0	10	0	0	14	0	0	7	0
Lane Group Flow (vph)	53	23	133	0	20	0	380	915	0	48	1236	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	9.3	9.3	30.0		9.3		119.2	119.2		93.5	93.5	
Effective Green, g (s)	11.8	11.8	34.0		11.8		121.2	121.2		95.5	95.5	
Actuated g/C Ratio	0.08	0.08	0.24		0.08		0.87	0.87		0.68	0.68	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	120	164	401		219		546	2989		388	2427	
v/s Ratio Prot		0.01	0.05				c0.11	0.27			0.35	
v/s Ratio Perm	c0.04		0.03		0.01		c0.49			0.08		
v/c Ratio	0.44	0.14	0.33		0.09		0.70	0.31		0.12	0.51	
Uniform Delay, d1	61.0	59.4	43.7		59.2		15.2	1.7		7.7	10.8	
Progression Factor	1.00	1.00	1.00		1.00		1.17	1.10		1.00	1.00	
Incremental Delay, d2	2.6	0.4	0.4		0.2		3.4	0.3		0.7	0.8	
Delay (s)	63.6	59.8	44.0		59.3		21.3	2.1		8.4	11.6	
Level of Service	E	E	D		E		C	A		A	B	
Approach Delay (s)		49.3			59.3			7.7			11.5	
Approach LOS		D			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			71.1%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected AM Peak
Medical Office Center

	↖	↗	↖	↑	↗	↓	
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↖	↑	↗	↗	
Traffic Volume (vph)	165	122	2	800	395	612	
Future Volume (vph)	165	122	2	800	395	612	
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	
Protected Phases		1		2	1	6	4
Permitted Phases	8	8	2		6		
Detector Phase	8	1	2	2	1	6	
Switch Phase							
Minimum Initial (s)	8.0	6.0	20.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	26.5	11.5	26.5	22.0
Total Split (s)	30.0	22.0	48.0	48.0	22.0	70.0	30.0
Total Split (%)	30.0%	22.0%	48.0%	48.0%	22.0%	70.0%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes	Yes		
Recall Mode	None	None	C-Min	C-Min	None	C-Min	None
Act Effct Green (s)	17.7	48.1	39.9	39.9	70.8	69.8	
Actuated g/C Ratio	0.18	0.48	0.40	0.40	0.71	0.70	
v/c Ratio	0.72	0.17	0.01	0.90	0.85	0.27	
Control Delay	54.4	8.7	11.5	31.8	44.3	6.5	
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0	
Total Delay	54.4	8.7	11.5	32.1	44.3	6.5	
LOS	D	A	B	C	D	A	
Approach Delay				32.1		21.3	
Approach LOS				C		C	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 26 (26%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 28.0
 Intersection Capacity Utilization 77.9%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service D

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↗ Ø4
22 s	48 s	30 s
↓ Ø6 (R)		↗ Ø8
70 s		30 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected AM Peak
Medical Office Center

						
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	179	133	2	1257	429	667
v/c Ratio	0.72	0.17	0.01	0.90	0.85	0.27
Control Delay	54.4	8.7	11.5	31.8	44.3	6.5
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	54.4	8.7	11.5	32.1	44.3	6.5
Queue Length 50th (ft)	108	23	1	369	210	73
Queue Length 95th (ft)	170	57	m1	472	#466	121
Internal Link Dist (ft)				493		1729
Turn Bay Length (ft)	200		100		100	
Base Capacity (vph)	338	796	307	1451	506	2459
Starvation Cap Reductn	0	0	0	20	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.17	0.01	0.88	0.85	0.27

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	165	0	122	2	800	356	395	612	2
Future Volume (vph)	0	0	0	165	0	122	2	800	356	395	612	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	0.95	
Frt				1.00		0.85	1.00	0.95		1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583	1770	3376		1761	3520	
Flt Permitted				0.76		1.00	0.40	1.00		0.09	1.00	
Satd. Flow (perm)				1410		1583	742	3376		164	3520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	179	0	133	2	870	387	429	665	2
RTOR Reduction (vph)	0	0	0	0	0	38	0	52	0	0	0	0
Lane Group Flow (vph)	0	0	0	179	0	95	2	1205	0	429	667	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				17.7		42.2	39.8	39.8		69.8	69.8	
Effective Green, g (s)				17.7		42.2	39.8	39.8		69.8	69.8	
Actuated g/C Ratio				0.18		0.42	0.40	0.40		0.70	0.70	
Clearance Time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				249		668	295	1343		505	2456	
v/s Ratio Prot						0.03		0.36		c0.21	0.19	
v/s Ratio Perm				c0.13		0.03	0.00			c0.39		
v/c Ratio				0.72		0.14	0.01	0.90		0.85	0.27	
Uniform Delay, d1				38.8		17.8	18.2	28.2		27.8	5.6	
Progression Factor				1.00		1.00	0.67	0.85		1.00	1.00	
Incremental Delay, d2				9.5		0.1	0.0	9.4		12.6	0.3	
Delay (s)				48.3		17.9	12.3	33.4		40.4	5.9	
Level of Service				D		B	B	C		D	A	
Approach Delay (s)		0.0			35.3			33.3			19.4	
Approach LOS		A			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			27.8									
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			100.0							18.0		
Intersection Capacity Utilization			77.9%							D		
Analysis Period (min)			15									
c Critical Lane Group												

Timings 6: Cedar Bluff Road & Dutchtown Rd

2019 Projected AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	114	68	66	50	176	291	654	31	597
Future Volume (vph)	114	68	66	50	176	291	654	31	597
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	13.0	22.0	20.0	13.0	22.0	20.0	52.0	13.0	45.0
Total Split (%)	13.0%	22.0%	20.0%	13.0%	22.0%	20.0%	52.0%	13.0%	45.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	27.4	19.4	39.2	22.1	14.8	57.7	49.6	44.4	37.5
Actuated g/C Ratio	0.27	0.19	0.39	0.22	0.15	0.58	0.50	0.44	0.38
v/c Ratio	0.44	0.20	0.11	0.17	0.77	0.84	0.41	0.09	0.67
Control Delay	31.5	36.8	2.2	26.0	59.1	37.0	18.4	8.9	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	36.8	2.2	26.0	59.1	37.0	18.4	8.9	24.8
LOS	C	D	A	C	E	D	B	A	C
Approach Delay		25.2			52.4		24.1		24.3
Approach LOS		C			D		C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 15 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 27.3

Intersection LOS: C

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
13 s	52 s	13 s	22 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
20 s	45 s	13 s	22 s

Queues
6: Cedar Bluff Road & Dutchtown Rd

2019 Projected AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	124	74	72	54	213	316	721	34	871
v/c Ratio	0.44	0.20	0.11	0.17	0.77	0.84	0.41	0.09	0.67
Control Delay	31.5	36.8	2.2	26.0	59.1	37.0	18.4	8.9	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	36.8	2.2	26.0	59.1	37.0	18.4	8.9	24.8
Queue Length 50th (ft)	56	39	0	23	126	111	174	7	265
Queue Length 95th (ft)	107	84	15	55	#227	#243	211	m15	312
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200		200	150		100		50	
Base Capacity (vph)	283	362	694	328	300	387	1816	389	1391
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	96	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.20	0.10	0.16	0.71	0.82	0.42	0.09	0.63

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2019 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	68	66	50	176	20	291	654	9	31	597	204
Future Volume (vph)	114	68	66	50	176	20	291	654	9	31	597	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1834		1770	3532		1761	3387	
Flt Permitted	0.35	1.00	1.00	0.71	1.00		0.16	1.00		0.38	1.00	
Satd. Flow (perm)	643	1863	1583	1320	1834		302	3532		700	3387	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	124	74	72	54	191	22	316	711	10	34	649	222
RTOR Reduction (vph)	0	0	48	0	4	0	0	1	0	0	35	0
Lane Group Flow (vph)	124	74	24	54	209	0	316	720	0	34	836	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.9	19.4	33.1	22.1	16.0		56.0	46.0		40.3	36.3	
Effective Green, g (s)	28.9	19.4	33.1	22.1	16.0		56.0	46.0		40.3	36.3	
Actuated g/C Ratio	0.29	0.19	0.33	0.22	0.16		0.56	0.46		0.40	0.36	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	292	361	618	319	293		370	1624		324	1229	
v/s Ratio Prot	c0.04	0.04	0.01	0.01	c0.11		c0.12	0.20		0.00	0.25	
v/s Ratio Perm	c0.08		0.01	0.03			c0.36			0.04		
v/c Ratio	0.42	0.20	0.04	0.17	0.71		0.85	0.44		0.10	0.68	
Uniform Delay, d1	27.6	33.8	22.7	31.3	39.8		17.5	18.3		18.2	26.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.78	0.88	
Incremental Delay, d2	1.0	0.3	0.0	0.3	8.0		17.2	0.9		0.1	3.0	
Delay (s)	28.6	34.1	22.7	31.5	47.8		34.7	19.2		14.4	26.6	
Level of Service	C	C	C	C	D		C	B		B	C	
Approach Delay (s)		28.5			44.5			23.9			26.2	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			76.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	120	15	41	437	199	4	25	4	92	233	31
Future Volume (Veh/h)	51	120	15	41	437	199	4	25	4	92	233	31
Sign Control	Free			Free			Stop			Stop		
Grade	-9%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	130	16	45	475	216	4	27	4	100	253	34
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									40			
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)					1142							
pX, platoon unblocked												
vC, conflicting volume	691			146			736	1029	73	862	929	346
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	691			146			736	1029	73	862	929	346
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			97			0	87	100	52	0	95
cM capacity (veh/h)	900			1434			0	211	974	209	242	651
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	55	87	59	282	454	35	100	287				
Volume Left	55	0	0	45	0	4	100	0				
Volume Right	0	0	16	0	216	4	0	34				
cSH	900	1700	1700	1434	1700	208	209	261				
Volume to Capacity	0.06	0.05	0.03	0.03	0.27	0.17	0.48	1.10				
Queue Length 95th (ft)	5	0	0	2	0	15	59	302				
Control Delay (s)	9.3	0.0	0.0	1.4	0.0	26.2	37.2	126.1				
Lane LOS	A			A		D	E	F				
Approach Delay (s)	2.5			0.6		26.2	103.1					
Approach LOS						D	F					
Intersection Summary												
Average Delay			30.7									
Intersection Capacity Utilization			47.6%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Projected AM Peak
Medical Office Center

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	429	319	108	420	60	36
Future Volume (Veh/h)	429	319	108	420	60	36
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	466	347	117	457	65	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			813		1330	640
vC1, stage 1 conf vol					640	
vC2, stage 2 conf vol					691	
vCu, unblocked vol			813		1330	640
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			86		81	92
cM capacity (veh/h)			814		351	476
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	813	117	457	65	39	
Volume Left	0	117	0	65	0	
Volume Right	347	0	0	0	39	
cSH	1700	814	1700	351	476	
Volume to Capacity	0.48	0.14	0.27	0.19	0.08	
Queue Length 95th (ft)	0	13	0	17	7	
Control Delay (s)	0.0	10.2	0.0	17.6	13.2	
Lane LOS		B		C	B	
Approach Delay (s)	0.0	2.1		16.0		
Approach LOS				C		
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			61.4%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2019 Projected AM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	2	291	484	18	363	44
Future Volume (Veh/h)	2	291	484	18	363	44
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	316	526	20	395	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	546				698	273
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	546				698	273
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	93
cM capacity (veh/h)	1019				374	725
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	107	211	351	195	395	48
Volume Left	2	0	0	0	395	0
Volume Right	0	0	0	20	0	48
cSH	1019	1700	1700	1700	374	725
Volume to Capacity	0.00	0.12	0.21	0.11	1.06	0.07
Queue Length 95th (ft)	0	0	0	0	339	5
Control Delay (s)	0.2	0.0	0.0	0.0	96.2	10.3
Lane LOS	A				F	B
Approach Delay (s)	0.1		0.0		86.9	
Approach LOS					F	
Intersection Summary						
Average Delay			29.5			
Intersection Capacity Utilization			40.7%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2019 Projected AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	320	349	286	212	82	109	304	14	357
Future Volume (vph)	320	349	286	212	82	109	304	14	357
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	33.0	32.0	32.0	16.0	15.0	12.0	50.0	12.0	50.0
Total Split (%)	30.0%	29.1%	29.1%	14.5%	13.6%	10.9%	45.5%	10.9%	45.5%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	40.8	24.9	24.9	9.9	13.0	54.1	51.9	50.8	44.5
Actuated g/C Ratio	0.37	0.23	0.23	0.09	0.12	0.49	0.47	0.46	0.40
v/c Ratio	0.69	0.90	0.36	0.75	0.45	0.31	0.31	0.03	0.39
Control Delay	34.9	66.3	5.1	64.4	51.8	17.1	15.9	13.8	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	66.3	5.1	64.4	51.8	17.1	15.9	13.8	21.2
LOS	C	E	A	E	D	B	B	B	C
Approach Delay		37.4			60.7		16.2		21.0
Approach LOS		D			E		B		C

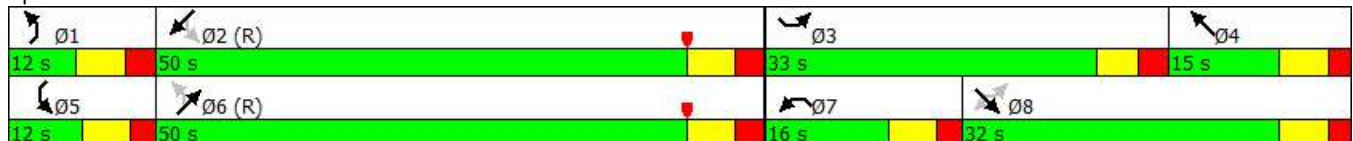
Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 85 (77%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 31.6
 Intersection Capacity Utilization 66.1%
 Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service C

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Projected AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	348	379	311	230	98	118	500	15	556
v/c Ratio	0.69	0.90	0.36	0.75	0.45	0.31	0.31	0.03	0.39
Control Delay	34.9	66.3	5.1	64.4	51.8	17.1	15.9	13.8	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	66.3	5.1	64.4	51.8	17.1	15.9	13.8	21.2
Queue Length 50th (ft)	187	258	0	82	62	43	81	5	125
Queue Length 95th (ft)	278	#421	38	#136	#138	75	144	16	173
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	545	440	896	312	220	379	1636	451	1410
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.86	0.35	0.74	0.45	0.31	0.31	0.03	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Projected AM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	320	349	286	212	82	8	109	304	156	14	357	155
Future Volume (vph)	320	349	286	212	82	8	109	304	156	14	357	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1837		1770	3359		1770	3379	
Flt Permitted	0.47	1.00	1.00	0.95	1.00		0.35	1.00		0.47	1.00	
Satd. Flow (perm)	884	1863	2787	3433	1837		655	3359		868	3379	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	379	311	230	89	9	118	330	170	15	388	168
RTOR Reduction (vph)	0	0	241	0	4	0	0	56	0	0	43	0
Lane Group Flow (vph)	348	379	70	230	94	0	118	444	0	15	513	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	40.8	24.9	24.9	9.9	13.0		54.0	48.3		46.9	44.5	
Effective Green, g (s)	40.8	24.9	24.9	9.9	13.0		54.0	48.3		46.9	44.5	
Actuated g/C Ratio	0.37	0.23	0.23	0.09	0.12		0.49	0.44		0.43	0.40	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	503	421	630	308	217		379	1474		389	1366	
v/s Ratio Prot	c0.14	c0.20		0.07	0.05		c0.02	0.13		0.00	c0.15	
v/s Ratio Perm	0.12		0.03				c0.14			0.02		
v/c Ratio	0.69	0.90	0.11	0.75	0.44		0.31	0.30		0.04	0.38	
Uniform Delay, d1	27.3	41.3	33.8	48.8	45.1		15.8	19.9		18.3	23.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	21.8	0.1	9.5	1.4		0.5	0.5		0.0	0.8	
Delay (s)	31.4	63.2	33.9	58.3	46.5		16.3	20.5		18.3	23.8	
Level of Service	C	E	C	E	D		B	C		B	C	
Approach Delay (s)		43.7			54.8			19.7			23.6	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			34.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			66.1%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2019 Projected AM Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	8	3	23	179	363	19
Future Volume (Veh/h)	8	3	23	179	363	19
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	3	25	195	395	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	553	208	416			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	553	208	416			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	98			
cM capacity (veh/h)	453	798	1139			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	12	25	98	98	263	153
Volume Left	9	25	0	0	0	0
Volume Right	3	0	0	0	0	21
cSH	604	1139	1700	1700	1700	1700
Volume to Capacity	0.02	0.02	0.06	0.06	0.15	0.09
Queue Length 95th (ft)	2	2	0	0	0	0
Control Delay (s)	12.2	8.2	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	12.2	0.9			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			27.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Sherrill Blvd & Medical Office Access RT

2019 Projected AM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	187	378	94	0	4
Future Volume (Veh/h)	0	187	378	94	0	4
Sign Control		Free	Free		Stop	
Grade		-9%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	203	411	102	0	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	513				564	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	513				564	256
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1049				456	743
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	
Volume Total	102	102	274	239	4	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	102	4	
cSH	1700	1700	1700	1700	743	
Volume to Capacity	0.06	0.06	0.16	0.14	0.01	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	9.9	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.9	
Approach LOS					A	
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			23.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: Medical Office Access & Christian Academy Blvd

2019 Projected AM Peak
Medical Office Center

						
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	326	25	28	247	7	30
Future Volume (Veh/h)	326	25	28	247	7	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	354	27	30	268	8	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			381		696	368
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			381		696	368
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	95
cM capacity (veh/h)			1177		398	678
Direction, Lane #	EB 1	WB 1	NE 1	NE 2		
Volume Total	381	298	8	33		
Volume Left	0	30	8	0		
Volume Right	27	0	0	33		
cSH	1700	1177	398	678		
Volume to Capacity	0.22	0.03	0.02	0.05		
Queue Length 95th (ft)	0	2	2	4		
Control Delay (s)	0.0	1.0	14.2	10.6		
Lane LOS		A	B	B		
Approach Delay (s)	0.0	1.0	11.3			
Approach LOS			B			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			46.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected PM Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	499	458	1261	1145
Future Volume (vph)	499	458	1261	1145
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	32.0	32.0	48.0	48.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	23.1	23.1	48.9	48.9
Actuated g/C Ratio	0.29	0.29	0.61	0.61
v/c Ratio	0.70	0.72	0.35	0.40
Control Delay	26.9	30.3	8.5	9.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.9	30.3	8.5	9.5
LOS	C	C	A	A
Approach Delay	28.0		8.5	9.5
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 14.4
 Intersection Capacity Utilization 47.8%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2019 Projected PM Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	711	329	1371	1245
v/c Ratio	0.70	0.72	0.35	0.40
Control Delay	26.9	30.3	8.5	9.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.9	30.3	8.5	9.5
Queue Length 50th (ft)	151	136	88	132
Queue Length 95th (ft)	190	217	129	163
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1219	543	3915	3122
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.61	0.35	0.40
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected PM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	499	458	0	1261	1145	0
Future Volume (vph)	499	458	0	1261	1145	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.96	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3391	1455		6408	5111	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3391	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	542	498	0	1371	1245	0
RTOR Reduction (vph)	37	37	0	0	0	0
Lane Group Flow (vph)	674	292	0	1371	1245	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	21.1	21.1		46.9	46.9	
Effective Green, g (s)	23.1	23.1		48.9	48.9	
Actuated g/C Ratio	0.29	0.29		0.61	0.61	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	979	420		3916	3124	
v/s Ratio Prot	0.20	c0.20		0.21	c0.24	
v/s Ratio Perm						
v/c Ratio	0.69	0.70		0.35	0.40	
Uniform Delay, d1	25.3	25.3		7.7	8.0	
Progression Factor	1.00	1.00		1.00	1.07	
Incremental Delay, d2	1.6	4.0		0.2	0.3	
Delay (s)	26.9	29.3		7.9	8.9	
Level of Service	C	C		A	A	
Approach Delay (s)	27.7			7.9	8.9	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			13.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.49			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			47.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected PM Peak
Medical Office Center

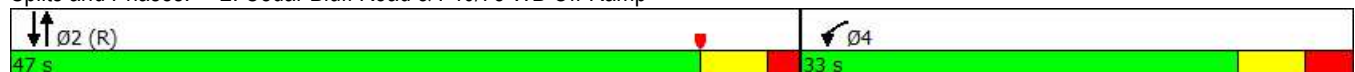
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	775	1269	719
Future Volume (vph)	775	1269	719
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	33.0	47.0	47.0
Total Split (%)	41.3%	58.8%	58.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effect Green (s)	26.0	46.0	46.0
Actuated g/C Ratio	0.32	0.58	0.58
v/c Ratio	0.73	0.36	0.27
Control Delay	27.8	7.3	8.6
Queue Delay	0.0	0.0	0.0
Total Delay	27.8	7.3	8.6
LOS	C	A	A
Approach Delay	27.8	7.3	8.6
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 13.4
 Intersection Capacity Utilization 47.8%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected PM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	842	1379	782
v/c Ratio	0.73	0.36	0.27
Control Delay	27.8	7.3	8.6
Queue Delay	0.0	0.0	0.0
Total Delay	27.8	7.3	8.6
Queue Length 50th (ft)	185	79	101
Queue Length 95th (ft)	239	90	74
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1279	3823	2891
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.66	0.36	0.27
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected PM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	775	0	1269	0	0	719
Future Volume (vph)	775	0	1269	0	0	719
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	842	0	1379	0	0	782
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	842	0	1379	0	0	782
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	23.0		44.0			44.0
Effective Green, g (s)	26.0		46.0			46.0
Actuated g/C Ratio	0.32		0.58			0.58
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1147		3826			2894
v/s Ratio Prot	c0.24		c0.21			0.16
v/s Ratio Perm						
v/c Ratio	0.73		0.36			0.27
Uniform Delay, d1	23.9		9.1			8.6
Progression Factor	1.00		0.73			0.94
Incremental Delay, d2	2.1		0.2			0.2
Delay (s)	26.1		6.9			8.3
Level of Service	C		A			A
Approach Delay (s)	26.1		6.9			8.3
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			12.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.50			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			47.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	62	21	300	255	65	154	506	49	855	26
Future Volume (vph)	62	21	300	255	65	154	506	49	855	26
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	30.0	30.0	25.0	40.0	40.0	25.0	75.0	15.0	65.0	65.0
Total Split (%)	18.8%	18.8%	15.6%	25.0%	25.0%	15.6%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	24.9	24.9	42.2	25.0	25.0	98.5	87.9	92.0	80.8	80.8
Actuated g/C Ratio	0.16	0.16	0.26	0.16	0.16	0.62	0.55	0.58	0.50	0.50
v/c Ratio	0.25	0.73	0.43	0.70	0.54	0.48	0.22	0.11	0.51	0.03
Control Delay	61.0	82.2	51.8	78.1	37.9	21.4	14.2	13.4	25.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.0	82.2	51.8	78.1	37.9	21.4	14.2	13.4	25.1	0.1
LOS	E	F	D	E	D	C	B	B	C	A
Approach Delay		66.1			51.8		15.8		23.8	
Approach LOS		E			D		B		C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 50 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 33.2
 Intersection Capacity Utilization 62.2%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service B

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	65 s	40 s	30 s
 Ø5	 Ø6 (R)		
15 s	75 s		

Queues

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM Peak

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	67	176	173	177	336	167	616	53	929	28
v/c Ratio	0.25	0.73	0.43	0.70	0.54	0.48	0.22	0.11	0.51	0.03
Control Delay	61.0	82.2	51.8	78.1	37.9	21.4	14.2	13.4	25.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.0	82.2	51.8	78.1	37.9	21.4	14.2	13.4	25.1	0.1
Queue Length 50th (ft)	62	186	160	195	103	78	120	19	268	0
Queue Length 95th (ft)	111	275	224	275	150	175	160	41	322	0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	295	266	466	364	831	413	2755	510	1823	889
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.66	0.37	0.49	0.40	0.40	0.22	0.10	0.51	0.03
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	21	300	255	65	152	154	506	61	49	855	26
Future Volume (vph)	62	21	300	255	65	152	154	506	61	49	855	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.87	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1547	1512	1618	3214		1770	5004		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.99		0.20	1.00		0.40	1.00	1.00
Satd. Flow (perm)	1719	1547	1512	1618	3214		372	5004		742	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	23	326	277	71	165	167	550	66	53	929	28
RTOR Reduction (vph)	0	0	0	0	119	0	0	8	0	0	0	14
Lane Group Flow (vph)	67	176	173	177	217	0	167	608	0	53	929	14
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	21.9	21.9	33.7	22.5	22.5		95.9	84.1		84.3	78.3	78.3
Effective Green, g (s)	24.9	24.9	37.7	25.0	25.0		98.1	86.6		90.3	80.8	80.8
Actuated g/C Ratio	0.16	0.16	0.24	0.16	0.16		0.61	0.54		0.56	0.50	0.50
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	267	240	356	252	502		348	2708		475	1823	815
v/s Ratio Prot	0.04	c0.11	c0.04	c0.11	0.07		c0.04	0.12		0.01	c0.26	
v/s Ratio Perm			0.07				0.25			0.06		0.01
v/c Ratio	0.25	0.73	0.49	0.70	0.43		0.48	0.22		0.11	0.51	0.02
Uniform Delay, d1	59.4	64.4	52.8	64.0	61.1		17.1	19.2		15.7	26.4	19.8
Progression Factor	1.01	1.01	1.01	1.00	1.00		1.14	0.70		0.89	0.83	1.00
Incremental Delay, d2	0.4	10.4	0.8	8.0	0.4		0.7	0.2		0.1	1.0	0.0
Delay (s)	60.3	75.1	54.3	71.9	61.5		20.2	13.6		14.0	23.0	19.8
Level of Service	E	E	D	E	E		C	B		B	C	B
Approach Delay (s)		64.1			65.1			15.0			22.4	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			34.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			62.2%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings

4: Cedar Bluff Road & Sherrill Blvd

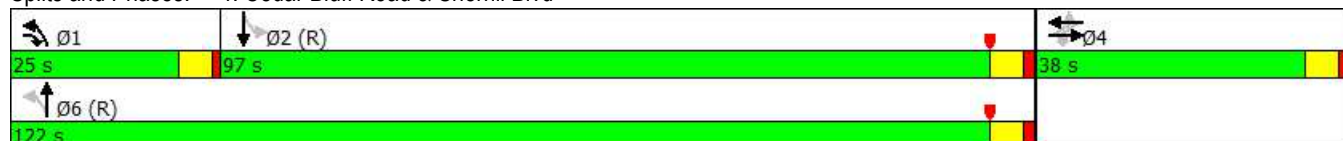
2019 Projected PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	3	159	83	0	110	719	7	955
Future Volume (vph)	156	3	159	83	0	110	719	7	955
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	38.0	38.0	25.0	38.0	38.0	25.0	122.0	97.0	97.0
Total Split (%)	23.8%	23.8%	15.6%	23.8%	23.8%	15.6%	76.3%	60.6%	60.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	27.4	27.4	40.3		27.4	126.1	125.6	113.2	113.2
Actuated g/C Ratio	0.17	0.17	0.25		0.17	0.79	0.78	0.71	0.71
v/c Ratio	0.75	0.01	0.35		0.20	0.27	0.29	0.02	0.41
Control Delay	82.1	51.0	20.2		27.3	5.2	3.6	9.1	10.9
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	82.1	51.0	20.2		27.3	5.2	3.6	9.1	10.9
LOS	F	D	C		C	A	A	A	B
Approach Delay		50.9			27.3		3.8		10.9
Approach LOS		D			C		A		B

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 97 (61%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 14.6
 Intersection LOS: B
 Intersection Capacity Utilization 62.4%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

4: Cedar Bluff Road & Sherrill Blvd

2019 Projected PM Peak

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	170	3	173	95	120	799	8	1050
v/c Ratio	0.75	0.01	0.35	0.20	0.27	0.29	0.02	0.41
Control Delay	82.1	51.0	20.2	27.3	5.2	3.6	9.1	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.1	51.0	20.2	27.3	5.2	3.6	9.1	10.9
Queue Length 50th (ft)	171	3	57	20	16	58	2	222
Queue Length 95th (ft)	249	13	118	46	27	73	10	315
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	287	419	616	577	556	2799	459	2568
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.01	0.28	0.16	0.22	0.29	0.02	0.41
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2019 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	3	159	83	0	5	110	719	16	7	955	11
Future Volume (vph)	156	3	159	83	0	5	110	719	16	7	955	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Fr _t	1.00	1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Fl _t Protected	0.95	1.00	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3223		1906	3563		1761	3633	
Fl _t Permitted	0.69	1.00	1.00		0.74		0.23	1.00		0.35	1.00	
Satd. Flow (perm)	1333	1947	1655		2490		452	3563		648	3633	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	3	173	90	0	5	120	782	17	8	1038	12
RTOR Reduction (vph)	0	0	80	0	42	0	0	1	0	0	0	0
Lane Group Flow (vph)	170	3	93	0	53	0	120	798	0	8	1050	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	24.9	24.9	32.4		24.9		123.6	123.6		111.1	111.1	
Effective Green, g (s)	27.4	27.4	36.4		27.4		125.6	125.6		113.1	113.1	
Actuated g/C Ratio	0.17	0.17	0.23		0.17		0.78	0.78		0.71	0.71	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	228	333	376		426		441	2796		458	2568	
v/s Ratio Prot		0.00	0.01				0.02	c0.22			c0.29	
v/s Ratio Perm	c0.13		0.04		0.02		0.20			0.01		
v/c Ratio	0.75	0.01	0.25		0.12		0.27	0.29		0.02	0.41	
Uniform Delay, d ₁	63.0	55.0	50.6		56.1		5.6	4.8		7.0	9.7	
Progression Factor	1.00	1.00	1.00		1.00		0.82	0.65		1.00	1.00	
Incremental Delay, d ₂	12.4	0.0	0.3		0.1		0.2	0.3		0.1	0.5	
Delay (s)	75.4	55.0	50.8		56.3		4.8	3.4		7.0	10.2	
Level of Service	E	E	D		E		A	A		A	B	
Approach Delay (s)		63.0			56.3			3.6			10.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			17.0									
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			62.4%									
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected PM Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	76	49	841	55	966	
Future Volume (vph)	76	49	841	55	966	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	25.0	20.0	70.0	20.0	90.0	25.0
Total Split (%)	21.7%	17.4%	60.9%	17.4%	78.3%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	12.3	22.0	84.6	94.0	94.3	
Actuated g/C Ratio	0.11	0.19	0.74	0.82	0.82	
v/c Ratio	0.55	0.15	0.46	0.16	0.36	
Control Delay	61.8	9.9	6.6	4.0	4.1	
Queue Delay	0.0	0.0	0.1	0.0	0.0	
Total Delay	61.8	9.9	6.6	4.0	4.1	
LOS	E	A	A	A	A	
Approach Delay			6.6		4.1	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 34 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 58.7%
 Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service B

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
20 s	70 s	25 s
↓ Ø6 (R)		↖ Ø8
90 s		25 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected PM Peak
Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	83	53	1162	60	1050
v/c Ratio	0.55	0.15	0.46	0.16	0.36
Control Delay	61.8	9.9	6.6	4.0	4.1
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	61.8	9.9	6.6	4.0	4.1
Queue Length 50th (ft)	59	0	164	8	102
Queue Length 95th (ft)	107	31	192	20	160
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	232	451	2533	474	2888
Starvation Cap Reductn	0	0	271	0	0
Spillback Cap Reductn	0	0	0	0	83
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.12	0.51	0.13	0.37
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	76	0	49	0	841	228	55	966	0
Future Volume (vph)	0	0	0	76	0	49	0	841	228	55	966	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3426		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.20	1.00	
Satd. Flow (perm)				1410		1583		3426		366	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	83	0	53	0	914	248	60	1050	0
RTOR Reduction (vph)	0	0	0	0	0	46	0	14	0	0	0	0
Lane Group Flow (vph)	0	0	0	83	0	7	0	1148	0	60	1050	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				10.7		16.0		81.0		91.8	91.8	
Effective Green, g (s)				10.7		16.0		81.0		91.8	91.8	
Actuated g/C Ratio				0.09		0.14		0.70		0.80	0.80	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				131		220		2413		356	2811	
v/s Ratio Prot						0.00		c0.34		0.01	c0.30	
v/s Ratio Perm				c0.06		0.00				0.13		
v/c Ratio				0.63		0.03		0.48		0.17	0.37	
Uniform Delay, d1				50.3		42.8		7.6		3.8	3.3	
Progression Factor				1.00		1.00		0.74		1.00	1.00	
Incremental Delay, d2				9.6		0.1		0.6		0.2	0.4	
Delay (s)				59.9		42.9		6.2		4.0	3.7	
Level of Service				E		D		A		A	A	
Approach Delay (s)		0.0			53.2			6.2			3.7	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.7									
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			58.7%							B		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

6: Cedar Bluff Road & Dutchtown Rd

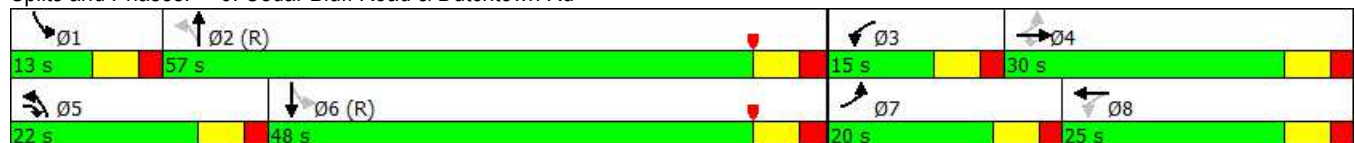
2019 Projected PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	196	92	53	22	147	209	614	21	881
Future Volume (vph)	196	92	53	22	147	209	614	21	881
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	20.0	30.0	22.0	15.0	25.0	22.0	57.0	13.0	48.0
Total Split (%)	17.4%	26.1%	19.1%	13.0%	21.7%	19.1%	49.6%	11.3%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	36.4	28.5	48.3	22.8	16.0	66.6	58.6	53.1	46.3
Actuated g/C Ratio	0.32	0.25	0.42	0.20	0.14	0.58	0.51	0.46	0.40
v/c Ratio	0.63	0.22	0.08	0.08	0.75	0.77	0.39	0.06	0.76
Control Delay	38.8	37.1	1.8	27.3	62.7	39.5	19.5	11.3	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total Delay	38.8	37.1	1.8	27.3	62.7	39.5	19.5	11.3	36.6
LOS	D	D	A	C	E	D	B	B	D
Approach Delay		32.5			58.8		24.4		36.1
Approach LOS		C			E		C		D

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 14 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 33.3
 Intersection LOS: C
 Intersection Capacity Utilization 80.0%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues
6: Cedar Bluff Road & Dutchtown Rd

2019 Projected PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	213	100	58	24	193	227	702	23	1069
v/c Ratio	0.63	0.22	0.08	0.08	0.75	0.77	0.39	0.06	0.76
Control Delay	38.8	37.1	1.8	27.3	62.7	39.5	19.5	11.3	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total Delay	38.8	37.1	1.8	27.3	62.7	39.5	19.5	11.3	36.6
Queue Length 50th (ft)	119	61	0	12	132	98	180	9	405
Queue Length 95th (ft)	184	111	11	31	209	#199	238	17	472
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200		200	150		100		50	
Base Capacity (vph)	343	461	745	318	306	325	1792	397	1402
Starvation Cap Reductn	0	0	0	0	0	0	0	0	71
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.22	0.08	0.08	0.63	0.70	0.39	0.06	0.80

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2019 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	196	92	53	22	147	30	209	614	32	21	881	102
Future Volume (vph)	196	92	53	22	147	30	209	614	32	21	881	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1815		1770	3513		1761	3467	
Flt Permitted	0.33	1.00	1.00	0.69	1.00		0.10	1.00		0.38	1.00	
Satd. Flow (perm)	622	1863	1583	1290	1815		180	3513		713	3467	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	213	100	58	24	160	33	227	667	35	23	958	111
RTOR Reduction (vph)	0	0	37	0	7	0	0	3	0	0	7	0
Lane Group Flow (vph)	213	100	21	24	186	0	227	699	0	23	1062	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	38.8	28.5	42.3	22.7	18.4		63.7	53.8		47.8	43.9	
Effective Green, g (s)	38.8	28.5	42.3	22.7	18.4		63.7	53.8		47.8	43.9	
Actuated g/C Ratio	0.34	0.25	0.37	0.20	0.16		0.55	0.47		0.42	0.38	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	353	461	664	272	290		290	1643		331	1323	
v/s Ratio Prot	c0.08	0.05	0.00	0.00	0.10		c0.09	0.20		0.00	0.31	
v/s Ratio Perm	c0.13		0.01	0.01			c0.34			0.03		
v/c Ratio	0.60	0.22	0.03	0.09	0.64		0.78	0.43		0.07	0.80	
Uniform Delay, d1	29.4	34.4	23.3	37.5	45.2		26.1	20.3		19.9	31.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.88	1.05	
Incremental Delay, d2	2.9	0.2	0.0	0.1	4.8		12.9	0.8		0.1	5.0	
Delay (s)	32.3	34.6	23.3	37.7	50.0		39.0	21.1		17.6	38.3	
Level of Service	C	C	C	D	D		D	C		B	D	
Approach Delay (s)		31.5			48.7			25.5			37.8	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			80.0%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	344	8	20	182	73	19	36	17	158	106	16
Future Volume (Veh/h)	33	344	8	20	182	73	19	36	17	158	106	16
Sign Control		Free			Free			Stop			Stop	
Grade		-9%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	374	9	22	198	79	21	39	18	172	115	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									40			
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1142							
pX, platoon unblocked												
vC, conflicting volume	277			383			668	772	192	560	736	138
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	277			383			668	772	192	560	736	138
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			91	88	98	51	65	98
cM capacity (veh/h)	1283			1172			237	314	818	351	329	884
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	36	249	134	121	178	78	172	132				
Volume Left	36	0	0	22	0	21	172	0				
Volume Right	0	0	9	0	79	18	0	17				
cSH	1283	1700	1700	1172	1700	373	351	358				
Volume to Capacity	0.03	0.15	0.08	0.02	0.10	0.21	0.49	0.37				
Queue Length 95th (ft)	2	0	0	1	0	19	65	41				
Control Delay (s)	7.9	0.0	0.0	1.6	0.0	18.2	24.7	20.8				
Lane LOS	A			A		C	C	C				
Approach Delay (s)	0.7			0.7		18.2	23.0					
Approach LOS						C	C					
Intersection Summary												
Average Delay			8.1									
Intersection Capacity Utilization			43.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Projected PM Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	892	113	61	761	148	60
Future Volume (Veh/h)	892	113	61	761	148	60
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	970	123	66	827	161	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1093		1990	1032
vC1, stage 1 conf vol					1032	
vC2, stage 2 conf vol					959	
vCu, unblocked vol			1093		1990	1032
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		33	77
cM capacity (veh/h)			638		240	283
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	1093	66	827	161	65	
Volume Left	0	66	0	161	0	
Volume Right	123	0	0	0	65	
cSH	1700	638	1700	240	283	
Volume to Capacity	0.64	0.10	0.49	0.67	0.23	
Queue Length 95th (ft)	0	9	0	107	22	
Control Delay (s)	0.0	11.3	0.0	46.1	21.5	
Lane LOS		B		E	C	
Approach Delay (s)	0.0	0.8		39.0		
Approach LOS				E		
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			68.7%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2019 Projected PM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	0	353	243	0	30	0
Future Volume (Veh/h)	0	353	243	0	30	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	384	264	0	33	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	264				456	132
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264				456	132
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	100
cM capacity (veh/h)	1297				533	893
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	128	256	176	88	33	0
Volume Left	0	0	0	0	33	0
Volume Right	0	0	0	0	0	0
cSH	1297	1700	1700	1700	533	1700
Volume to Capacity	0.00	0.15	0.10	0.05	0.06	0.00
Queue Length 95th (ft)	0	0	0	0	5	0
Control Delay (s)	0.0	0.0	0.0	0.0	12.2	0.0
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		12.2	
Approach LOS					B	
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			19.8%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

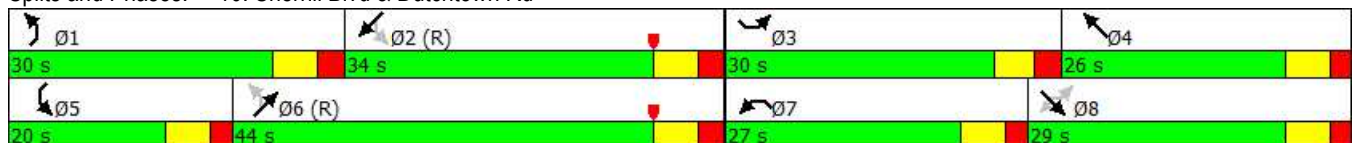
2019 Projected PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	321	171	107	407	238	261	596	12	433
Future Volume (vph)	321	171	107	407	238	261	596	12	433
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	30.0	29.0	29.0	27.0	26.0	30.0	44.0	20.0	34.0
Total Split (%)	25.0%	24.2%	24.2%	22.5%	21.7%	25.0%	36.7%	16.7%	28.3%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	44.8	22.6	22.6	19.3	19.8	59.6	54.5	42.3	35.7
Actuated g/C Ratio	0.37	0.19	0.19	0.16	0.16	0.50	0.45	0.35	0.30
v/c Ratio	0.88	0.53	0.17	0.80	0.90	0.64	0.48	0.04	0.50
Control Delay	53.0	49.9	0.5	60.1	79.6	25.8	25.2	18.5	37.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.0	49.9	0.5	60.1	79.6	25.8	25.2	18.5	37.8
LOS	D	D	A	E	E	C	C	B	D
Approach Delay		42.8			67.6		25.3		37.3
Approach LOS		D			E		C		D

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 73 (61%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 41.6
 Intersection LOS: D
 Intersection Capacity Utilization 80.0%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	349	186	116	442	274	284	762	13	524
v/c Ratio	0.88	0.53	0.17	0.80	0.90	0.64	0.48	0.04	0.50
Control Delay	53.0	49.9	0.5	60.1	79.6	25.8	25.2	18.5	37.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.0	49.9	0.5	60.1	79.6	25.8	25.2	18.5	37.8
Queue Length 50th (ft)	194	130	0	170	208	133	196	5	177
Queue Length 95th (ft)	#346	207	0	226	#365	198	306	16	252
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	424	361	702	600	314	510	1582	410	1044
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.52	0.17	0.74	0.87	0.56	0.48	0.03	0.50

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	321	171	107	407	238	14	261	596	105	12	433	49
Future Volume (vph)	321	171	107	407	238	14	261	596	105	12	433	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1847		1770	3460		1770	3486	
Flt Permitted	0.20	1.00	1.00	0.95	1.00		0.29	1.00		0.36	1.00	
Satd. Flow (perm)	380	1863	2787	3433	1847		546	3460		676	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	349	186	116	442	259	15	284	648	114	13	471	53
RTOR Reduction (vph)	0	0	94	0	2	0	0	10	0	0	6	0
Lane Group Flow (vph)	349	186	22	442	272	0	284	752	0	13	518	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	44.7	22.6	22.6	19.3	19.8		59.6	51.0		38.4	35.8	
Effective Green, g (s)	44.7	22.6	22.6	19.3	19.8		59.6	51.0		38.4	35.8	
Actuated g/C Ratio	0.37	0.19	0.19	0.16	0.17		0.50	0.42		0.32	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	397	350	524	552	304		447	1470		240	1039	
v/s Ratio Prot	c0.16	0.10		0.13	0.15		c0.09	0.22		0.00	0.15	
v/s Ratio Perm	c0.17		0.01				c0.22			0.02		
v/c Ratio	0.88	0.53	0.04	0.80	0.90		0.64	0.51		0.05	0.50	
Uniform Delay, d1	30.8	43.9	39.8	48.5	49.1		19.6	25.4		27.9	34.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.3	1.6	0.0	8.2	26.7		2.9	1.3		0.1	1.7	
Delay (s)	50.0	45.5	39.9	56.7	75.8		22.5	26.6		28.0	36.4	
Level of Service	D	D	D	E	E		C	C		C	D	
Approach Delay (s)		46.9			64.0			25.5			36.2	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			41.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			80.0%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2019 Projected PM Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	31	10	10	353	182	8
Future Volume (Veh/h)	31	10	10	353	182	8
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	11	11	384	198	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	416	104	207			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	416	104	207			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	99			
cM capacity (veh/h)	560	931	1361			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	45	11	192	192	132	75
Volume Left	34	11	0	0	0	0
Volume Right	11	0	0	0	0	9
cSH	741	1361	1700	1700	1700	1700
Volume to Capacity	0.06	0.01	0.11	0.11	0.08	0.04
Queue Length 95th (ft)	5	1	0	0	0	0
Control Delay (s)	11.1	7.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	11.1	0.2			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			19.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Sherrill Blvd & Medical Office Access RT

2019 Projected PM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	385	176	41	0	15
Future Volume (Veh/h)	0	385	176	41	0	15
Sign Control		Free	Free		Stop	
Grade		-9%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	418	191	45	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	236				422	118
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	236				422	118
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	1328				559	912
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	
Volume Total	209	209	127	109	16	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	45	16	
cSH	1700	1700	1700	1700	912	
Volume to Capacity	0.12	0.12	0.07	0.06	0.02	
Queue Length 95th (ft)	0	0	0	0	1	
Control Delay (s)	0.0	0.0	0.0	0.0	9.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			16.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: Medical Office Access & Christian Academy Blvd

2019 Projected PM Peak
Medical Office Center

						
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	154	11	12	130	27	126
Future Volume (Veh/h)	154	11	12	130	27	126
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	167	12	13	141	29	137
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			179		340	173
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			179		340	173
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	84
cM capacity (veh/h)			1397		650	871
Direction, Lane #	EB 1	WB 1	NE 1	NE 2		
Volume Total	179	154	29	137		
Volume Left	0	13	29	0		
Volume Right	12	0	0	137		
cSH	1700	1397	650	871		
Volume to Capacity	0.11	0.01	0.04	0.16		
Queue Length 95th (ft)	0	1	3	14		
Control Delay (s)	0.0	0.7	10.8	9.9		
Lane LOS		A	B	A		
Approach Delay (s)	0.0	0.7	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			26.8%	ICU Level of Service		A
Analysis Period (min)			15			

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected Midday Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	396	441	1264	1081
Future Volume (vph)	396	441	1264	1081
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	27.0	27.0	43.0	43.0
Total Split (%)	38.6%	38.6%	61.4%	61.4%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	18.6	18.6	43.4	43.4
Actuated g/C Ratio	0.27	0.27	0.62	0.62
v/c Ratio	0.66	0.66	0.35	0.37
Control Delay	23.6	24.8	7.2	7.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.6	24.8	7.2	7.0
LOS	C	C	A	A
Approach Delay	24.0		7.2	7.0
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 40 (57%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.5
 Intersection Capacity Utilization 52.9%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2019 Projected Midday Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	622	287	1374	1175
v/c Ratio	0.66	0.66	0.35	0.37
Control Delay	23.6	24.8	7.2	7.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.6	24.8	7.2	7.0
Queue Length 50th (ft)	108	92	73	112
Queue Length 95th (ft)	145	162	110	149
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1149	521	3976	3171
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.54	0.55	0.35	0.37
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected Midday Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	396	441	0	1264	1081	0
Future Volume (vph)	396	441	0	1264	1081	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.95	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3365	1455		6408	5111	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3365	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	430	479	0	1374	1175	0
RTOR Reduction (vph)	48	48	0	0	0	0
Lane Group Flow (vph)	574	239	0	1374	1175	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	16.6	16.6		41.4	41.4	
Effective Green, g (s)	18.6	18.6		43.4	43.4	
Actuated g/C Ratio	0.27	0.27		0.62	0.62	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	894	386		3972	3168	
v/s Ratio Prot	c0.17	0.16		0.21	c0.23	
v/s Ratio Perm						
v/c Ratio	0.64	0.62		0.35	0.37	
Uniform Delay, d1	22.8	22.6		6.4	6.6	
Progression Factor	1.00	1.00		1.00	0.96	
Incremental Delay, d2	1.2	2.1		0.2	0.3	
Delay (s)	23.9	24.7		6.7	6.6	
Level of Service	C	C		A	A	
Approach Delay (s)	24.2			6.7	6.6	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			11.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.45			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected Midday Peak
Medical Office Center

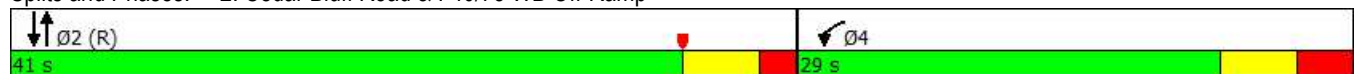
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	779	1658	549
Future Volume (vph)	779	1658	549
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	29.0	41.0	41.0
Total Split (%)	41.4%	58.6%	58.6%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	23.1	38.9	38.9
Actuated g/C Ratio	0.33	0.56	0.56
v/c Ratio	0.73	0.49	0.21
Control Delay	24.6	7.6	6.9
Queue Delay	0.0	0.0	0.0
Total Delay	24.6	7.6	6.9
LOS	C	A	A
Approach Delay	24.6	7.6	6.9
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 41 (59%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 11.9
 Intersection Capacity Utilization 52.9%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected Midday Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	847	1802	597
v/c Ratio	0.73	0.49	0.21
Control Delay	24.6	7.6	6.9
Queue Delay	0.0	0.0	0.0
Total Delay	24.6	7.6	6.9
Queue Length 50th (ft)	157	79	69
Queue Length 95th (ft)	214	91	40
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1260	3702	2800
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.67	0.49	0.21
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected Midday Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	779	0	1658	0	0	549
Future Volume (vph)	779	0	1658	0	0	549
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	847	0	1802	0	0	597
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	847	0	1802	0	0	597
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	20.1		36.9			36.9
Effective Green, g (s)	23.1		38.9			38.9
Actuated g/C Ratio	0.33		0.56			0.56
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1164		3698			2797
v/s Ratio Prot	c0.24		c0.27			0.12
v/s Ratio Perm						
v/c Ratio	0.73		0.49			0.21
Uniform Delay, d1	20.7		9.5			7.8
Progression Factor	1.00		0.72			0.83
Incremental Delay, d2	2.0		0.4			0.2
Delay (s)	22.6		7.3			6.6
Level of Service	C		A			A
Approach Delay (s)	22.6		7.3			6.6
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			11.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.9%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Timings
3: Cedar Bluff Road & Park West Blvd

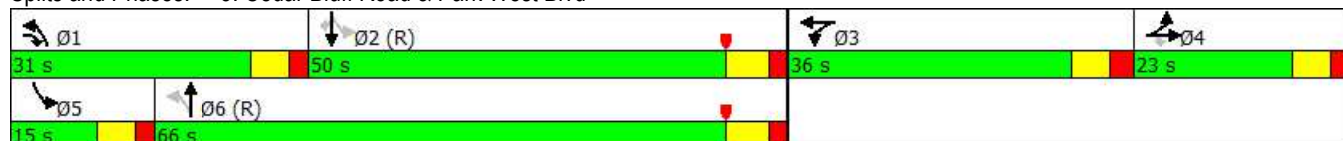
2019 Projected Midday Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	78	38	268	115	197	290	733	49	513	44
Future Volume (vph)	78	38	268	115	197	290	733	49	513	44
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	23.0	23.0	31.0	36.0	36.0	31.0	66.0	15.0	50.0	50.0
Total Split (%)	16.4%	16.4%	22.1%	25.7%	25.7%	22.1%	47.1%	10.7%	35.7%	35.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	22.5	22.5	45.2	19.9	19.9	86.1	75.5	73.8	62.8	62.8
Actuated g/C Ratio	0.16	0.16	0.32	0.14	0.14	0.62	0.54	0.53	0.45	0.45
v/c Ratio	0.31	0.67	0.33	0.49	0.69	0.58	0.33	0.14	0.34	0.06
Control Delay	53.3	67.5	36.7	61.8	49.7	21.5	13.6	13.7	25.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
Total Delay	53.3	67.5	36.7	61.8	49.7	22.5	13.6	13.7	25.9	0.2
LOS	D	E	D	E	D	C	B	B	C	A
Approach Delay		52.5			52.4		15.9		23.0	
Approach LOS		D			D		B		C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 36 (26%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 29.6
 Intersection Capacity Utilization 59.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2019 Projected Midday Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	85	169	163	112	380	315	886	53	558	48
v/c Ratio	0.31	0.67	0.33	0.49	0.69	0.58	0.33	0.14	0.34	0.06
Control Delay	53.3	67.5	36.7	61.8	49.7	21.5	13.6	13.7	25.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
Total Delay	53.3	67.5	36.7	61.8	49.7	22.5	13.6	13.7	25.9	0.2
Queue Length 50th (ft)	68	152	118	104	139	161	162	14	151	0
Queue Length 95th (ft)	120	233	168	168	191	294	204	42	233	1
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	284	260	572	369	825	610	2710	408	1620	819
Starvation Cap Reductn	0	0	0	0	0	115	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.65	0.28	0.30	0.46	0.64	0.33	0.13	0.34	0.06
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	38	268	115	197	141	290	733	82	49	513	44
Future Volume (vph)	78	38	268	115	197	141	290	733	82	49	513	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Fr _t	1.00	0.89	0.85	1.00	0.94		1.00	0.98		1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1576	1512	1618	3302		1770	5009		1745	3610	1615
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00		0.34	1.00		0.31	1.00	1.00
Satd. Flow (perm)	1719	1576	1512	1618	3302		638	5009		567	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	41	291	125	214	153	315	797	89	53	558	48
RTOR Reduction (vph)	0	0	0	0	78	0	0	8	0	0	0	26
Lane Group Flow (vph)	85	169	163	112	302	0	315	878	0	53	558	22
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	19.5	19.5	36.8	17.4	17.4		83.6	71.8		66.1	60.3	60.3
Effective Green, g (s)	22.5	22.5	40.8	19.9	19.9		85.6	74.3		72.1	62.8	62.8
Actuated g/C Ratio	0.16	0.16	0.29	0.14	0.14		0.61	0.53		0.51	0.45	0.45
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	276	253	440	229	469		546	2658		366	1619	724
v/s Ratio Prot	0.05	c0.11	0.05	0.07	c0.09		c0.08	0.18		0.01	0.15	
v/s Ratio Perm			0.06				c0.27			0.07		0.01
v/c Ratio	0.31	0.67	0.37	0.49	0.64		0.58	0.33		0.14	0.34	0.03
Uniform Delay, d ₁	51.9	55.2	39.4	55.4	56.7		14.2	18.7		17.0	25.2	21.6
Progression Factor	0.99	0.99	1.02	1.00	1.00		1.25	0.68		0.96	0.91	1.00
Incremental Delay, d ₂	0.5	5.9	0.4	1.2	2.7		1.1	0.3		0.1	0.5	0.1
Delay (s)	51.8	60.5	40.5	56.6	59.4		18.8	13.1		16.5	23.5	21.6
Level of Service	D	E	D	E	E		B	B		B	C	C
Approach Delay (s)		50.9			58.7			14.6			22.8	
Approach LOS		D			E			B			C	

Intersection Summary

HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings 4: Cedar Bluff Road & Sherrill Blvd

2019 Projected Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	141	18	268	105	9	276	801	22	887
Future Volume (vph)	141	18	268	105	9	276	801	22	887
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	35.0	35.0	25.0	35.0	35.0	25.0	105.0	80.0	80.0
Total Split (%)	25.0%	25.0%	17.9%	25.0%	25.0%	17.9%	75.0%	57.1%	57.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	24.7	24.7	42.1		24.7	108.8	108.3	91.4	91.4
Actuated g/C Ratio	0.18	0.18	0.30		0.18	0.78	0.77	0.65	0.65
v/c Ratio	0.73	0.06	0.51		0.33	0.62	0.33	0.06	0.44
Control Delay	73.9	45.3	26.8		45.7	21.6	3.6	12.5	13.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	73.9	45.3	26.8		45.7	21.6	3.6	12.5	13.7
LOS	E	D	C		D	C	A	B	B
Approach Delay		43.1			45.7		8.0		13.7
Approach LOS		D			D		A		B

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 70 (50%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 17.7

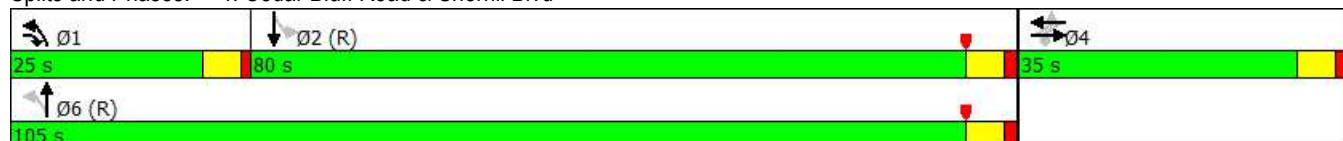
Intersection LOS: B

Intersection Capacity Utilization 66.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

2019 Projected Midday Peak

4: Cedar Bluff Road & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	153	20	291	148	300	919	24	1037
v/c Ratio	0.73	0.06	0.51	0.33	0.62	0.33	0.06	0.44
Control Delay	73.9	45.3	26.8	45.7	21.6	3.6	12.5	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.9	45.3	26.8	45.7	21.6	3.6	12.5	13.7
Queue Length 50th (ft)	133	15	140	55	64	72	7	222
Queue Length 95th (ft)	203	37	196	85	156	97	26	358
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	267	438	660	575	567	2746	376	2353
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.05	0.44	0.26	0.53	0.33	0.06	0.44
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2019 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	18	268	105	9	22	276	801	44	22	887	67
Future Volume (vph)	141	18	268	105	9	22	276	801	44	22	887	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3196		1906	3547		1761	3600	
Flt Permitted	0.61	1.00	1.00		0.76		0.22	1.00		0.31	1.00	
Satd. Flow (perm)	1192	1947	1655		2507		433	3547		576	3600	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	20	291	114	10	24	300	871	48	24	964	73
RTOR Reduction (vph)	0	0	76	0	12	0	0	2	0	0	3	0
Lane Group Flow (vph)	153	20	215	0	136	0	300	917	0	24	1034	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	22.2	22.2	34.1		22.2		106.3	106.3		89.4	89.4	
Effective Green, g (s)	24.7	24.7	38.1		24.7		108.3	108.3		91.4	91.4	
Actuated g/C Ratio	0.18	0.18	0.27		0.18		0.77	0.77		0.65	0.65	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	210	343	450		442		481	2743		376	2350	
v/s Ratio Prot		0.01	0.05				c0.06	0.26			0.29	
v/s Ratio Perm	c0.13		0.08		0.05		c0.42			0.04		
v/c Ratio	0.73	0.06	0.48		0.31		0.62	0.33		0.06	0.44	
Uniform Delay, d1	54.5	48.0	42.6		50.2		7.6	4.8		8.8	11.8	
Progression Factor	1.00	1.00	1.00		1.00		3.34	0.62		1.00	1.00	
Incremental Delay, d2	11.9	0.1	0.6		0.4		2.1	0.3		0.3	0.6	
Delay (s)	66.4	48.0	43.2		50.6		27.5	3.3		9.1	12.4	
Level of Service	E	D	D		D		C	A		A	B	
Approach Delay (s)		51.1			50.6			9.3			12.4	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			19.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			66.4%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected Midday Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	78	37	648	82	853	
Future Volume (vph)	78	37	648	82	853	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	25.0	15.0	50.0	15.0	65.0	25.0
Total Split (%)	27.8%	16.7%	55.6%	16.7%	72.2%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	11.1	21.1	60.5	70.2	70.5	
Actuated g/C Ratio	0.12	0.23	0.67	0.78	0.78	
v/c Ratio	0.49	0.10	0.36	0.18	0.34	
Control Delay	45.7	7.4	6.3	4.2	4.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	45.7	7.4	6.3	4.2	4.5	
LOS	D	A	A	A	A	
Approach Delay			6.3		4.4	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 28 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 7.0
 Intersection Capacity Utilization 58.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↑ Ø2 (R)	→ Ø4
15 s	50 s	25 s
↓ Ø6 (R)		↘ Ø8
65 s		25 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected Midday Peak
Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	85	40	843	89	927
v/c Ratio	0.49	0.10	0.36	0.18	0.34
Control Delay	45.7	7.4	6.3	4.2	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.7	7.4	6.3	4.2	4.5
Queue Length 50th (ft)	46	0	69	11	78
Queue Length 95th (ft)	88	21	105	27	131
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	297	449	2330	538	2758
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.09	0.36	0.17	0.34
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	78	0	37	0	648	128	82	853	0
Future Volume (vph)	0	0	0	78	0	37	0	648	128	82	853	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.98		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3452		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.28	1.00	
Satd. Flow (perm)				1410		1583		3452		523	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	85	0	40	0	704	139	89	927	0
RTOR Reduction (vph)	0	0	0	0	0	33	0	13	0	0	0	0
Lane Group Flow (vph)	0	0	0	85	0	7	0	830	0	89	927	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				9.5		15.1		56.9		68.0	68.0	
Effective Green, g (s)				9.5		15.1		56.9		68.0	68.0	
Actuated g/C Ratio				0.11		0.17		0.63		0.76	0.76	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				148		265		2182		472	2661	
v/s Ratio Prot						0.00		c0.24		0.01	c0.26	
v/s Ratio Perm				c0.06		0.00				0.13		
v/c Ratio				0.57		0.03		0.38		0.19	0.35	
Uniform Delay, d1				38.3		31.3		8.0		3.5	3.6	
Progression Factor				1.00		1.00		0.67		1.00	1.00	
Incremental Delay, d2				5.3		0.0		0.5		0.2	0.4	
Delay (s)				43.6		31.3		5.8		3.7	4.0	
Level of Service				D		C		A		A	A	
Approach Delay (s)		0.0			39.7			5.8			4.0	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0									
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			90.0							18.0		
Intersection Capacity Utilization			58.7%								B	
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

2019 Projected Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	82	37	55	46	73	141	557	18	843
Future Volume (vph)	82	37	55	46	73	141	557	18	843
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	13.0	17.0	15.0	13.0	17.0	15.0	47.0	13.0	45.0
Total Split (%)	14.4%	18.9%	16.7%	14.4%	18.9%	16.7%	52.2%	14.4%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	18.0	13.1	24.6	14.9	9.5	58.3	55.4	51.5	44.8
Actuated g/C Ratio	0.20	0.15	0.27	0.17	0.11	0.65	0.62	0.57	0.50
v/c Ratio	0.33	0.15	0.12	0.19	0.45	0.45	0.30	0.04	0.57
Control Delay	29.1	35.7	1.1	26.7	42.4	12.3	12.4	5.3	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	35.7	1.1	26.7	42.4	12.3	12.4	5.3	18.2
LOS	C	D	A	C	D	B	B	A	B
Approach Delay		21.6			36.8		12.3		18.0
Approach LOS		C			D		B		B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 18 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 17.4
 Intersection Capacity Utilization 60.0%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service B

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
13 s	47 s	13 s	17 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	45 s	13 s	17 s

Queues

2019 Projected Midday Peak

6: Cedar Bluff Road & Dutchtown Rd

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	40	60	50	89	153	653	20	993
v/c Ratio	0.33	0.15	0.12	0.19	0.45	0.45	0.30	0.04	0.57
Control Delay	29.1	35.7	1.1	26.7	42.4	12.3	12.4	5.3	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	35.7	1.1	26.7	42.4	12.3	12.4	5.3	18.2
Queue Length 50th (ft)	39	21	0	21	45	35	88	3	241
Queue Length 95th (ft)	77	51	5	50	90	62	167	m4	308
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200		200	150		100		50	
Base Capacity (vph)	275	283	529	262	229	353	2179	514	1771
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.14	0.11	0.19	0.39	0.43	0.30	0.04	0.56

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2019 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	37	55	46	73	9	141	557	44	18	843	71
Future Volume (vph)	82	37	55	46	73	9	141	557	44	18	843	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1831		1770	3500		1761	3481	
Flt Permitted	0.55	1.00	1.00	0.73	1.00		0.17	1.00		0.40	1.00	
Satd. Flow (perm)	1019	1863	1583	1362	1831		318	3500		748	3481	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	40	60	50	79	10	153	605	48	20	916	77
RTOR Reduction (vph)	0	0	47	0	5	0	0	6	0	0	7	0
Lane Group Flow (vph)	89	40	13	50	84	0	153	647	0	20	986	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	18.5	11.5	19.8	13.5	9.0		55.2	46.9		43.8	41.2	
Effective Green, g (s)	18.5	11.5	19.8	13.5	9.0		55.2	46.9		43.8	41.2	
Actuated g/C Ratio	0.21	0.13	0.22	0.15	0.10		0.61	0.52		0.49	0.46	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	267	238	453	224	183		328	1823		393	1593	
v/s Ratio Prot	c0.03	0.02	0.00	0.01	c0.05		c0.04	0.18		0.00	c0.28	
v/s Ratio Perm	0.04		0.01	0.02			0.24			0.02		
v/c Ratio	0.33	0.17	0.03	0.22	0.46		0.47	0.36		0.05	0.62	
Uniform Delay, d1	29.9	35.0	27.6	33.5	38.2		10.2	12.7		12.0	18.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.62	0.91	
Incremental Delay, d2	0.7	0.3	0.0	0.5	1.8		1.1	0.5		0.1	1.7	
Delay (s)	30.7	35.3	27.6	34.0	40.0		11.3	13.2		7.5	18.5	
Level of Service	C	D	C	C	D		B	B		A	B	
Approach Delay (s)		30.7			37.8			12.8			18.2	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			60.0%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected Midday Peak
Medical Office Center

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Traffic Volume (veh/h)	29	281	19	32	290	54	8	22	25	124	71	21			
Future Volume (Veh/h)	29	281	19	32	290	54	8	22	25	124	71	21			
Sign Control	Free			Free			Stop			Stop					
Grade	-9%			0%			0%			0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Hourly flow rate (vph)	32	305	21	35	315	59	9	24	27	135	77	23			
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)									40						
Median type	None				None										
Median storage (veh)															
Upstream signal (ft)															
1142															
pX, platoon unblocked															
vC, conflicting volume	374				326				668	824	163	643	804	187	
vC1, stage 1 conf vol															
vC2, stage 2 conf vol															
vCu, unblocked vol	374				326				668	824	163	643	804	187	
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9	
tC, 2 stage (s)															
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	97				97				96	92	97	57	74	97	
cM capacity (veh/h)	1181				1230				257	290	853	312	297	823	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2							
Volume Total	32	203	123	192	216	60	135	100							
Volume Left	32	0	0	35	0	9	135	0							
Volume Right	0	0	21	0	59	27	0	23							
cSH	1181	1700	1700	1230	1700	511	312	349							
Volume to Capacity	0.03	0.12	0.07	0.03	0.13	0.12	0.43	0.29							
Queue Length 95th (ft)	2	0	0	2	0	10	52	29							
Control Delay (s)	8.1	0.0	0.0	1.7	0.0	14.9	25.1	19.4							
Lane LOS	A				A				B	D	C				
Approach Delay (s)	0.7				0.8				14.9	22.7					
Approach LOS							B	C							
Intersection Summary															
Average Delay			6.4												
Intersection Capacity Utilization			42.6%			ICU Level of Service			A						
Analysis Period (min)			15												

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Projected Midday Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	448	77	30	373	73	32
Future Volume (Veh/h)	448	77	30	373	73	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	487	84	33	405	79	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT		TWLT			
Median storage (veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			571		1000	529
vC1, stage 1 conf vol					529	
vC2, stage 2 conf vol					471	
vCu, unblocked vol			571		1000	529
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		83	94
cM capacity (veh/h)			1002		475	550
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	571	33	405	79	35	
Volume Left	0	33	0	79	0	
Volume Right	84	0	0	0	35	
cSH	1700	1002	1700	475	550	
Volume to Capacity	0.34	0.03	0.24	0.17	0.06	
Queue Length 95th (ft)	0	3	0	15	5	
Control Delay (s)	0.0	8.7	0.0	14.1	12.0	
Lane LOS		A		B	B	
Approach Delay (s)	0.0	0.7		13.4		
Approach LOS				B		
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			39.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2019 Projected Midday Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	0	418	276	0	184	3
Future Volume (Veh/h)	0	418	276	0	184	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	454	300	0	200	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	300				527	150
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	300				527	150
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				58	100
cM capacity (veh/h)	1258				481	870
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	151	303	200	100	200	3
Volume Left	0	0	0	0	200	0
Volume Right	0	0	0	0	0	3
cSH	1258	1700	1700	1700	481	870
Volume to Capacity	0.00	0.18	0.12	0.06	0.42	0.00
Queue Length 95th (ft)	0	0	0	0	51	0
Control Delay (s)	0.0	0.0	0.0	0.0	17.7	9.2
Lane LOS					C	A
Approach Delay (s)	0.0		0.0		17.6	
Approach LOS					C	
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			28.4%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2019 Projected Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	76	199	157	123	242	136	168	31	67
Future Volume (vph)	76	199	157	123	242	136	168	31	67
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	15.0	20.0	20.0	15.0	20.0	15.0	30.0	15.0	30.0
Total Split (%)	18.8%	25.0%	25.0%	18.8%	25.0%	18.8%	37.5%	18.8%	37.5%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	21.2	13.4	13.4	8.0	16.1	37.4	32.3	32.4	25.5
Actuated g/C Ratio	0.26	0.17	0.17	0.10	0.20	0.47	0.40	0.40	0.32
v/c Ratio	0.27	0.69	0.26	0.39	0.75	0.27	0.23	0.07	0.16
Control Delay	20.0	43.7	3.1	36.8	45.7	13.1	11.1	11.6	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	43.7	3.1	36.8	45.7	13.1	11.1	11.6	9.7
LOS	B	D	A	D	D	B	B	B	A
Approach Delay		24.8			42.8		11.7		10.0
Approach LOS		C			D		B		B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 65 (81%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 23.6

Intersection LOS: C

Intersection Capacity Utilization 55.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	30 s	15 s	20 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	30 s	15 s	20 s

Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Projected Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	83	216	171	134	279	148	320	34	180
v/c Ratio	0.27	0.69	0.26	0.39	0.75	0.27	0.23	0.07	0.16
Control Delay	20.0	43.7	3.1	36.8	45.7	13.1	11.1	11.6	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	43.7	3.1	36.8	45.7	13.1	11.1	11.6	9.7
Queue Length 50th (ft)	27	101	0	32	133	40	33	8	13
Queue Length 95th (ft)	57	#187	15	59	#270	73	65	23	36
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	329	335	680	386	373	551	1419	537	1102
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.64	0.25	0.35	0.75	0.27	0.23	0.06	0.16

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Projected Midday Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	76	199	157	123	242	15	136	168	126	31	67	98
Future Volume (vph)	76	199	157	123	242	15	136	168	126	31	67	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1847		1770	3312		1770	3224	
Flt Permitted	0.42	1.00	1.00	0.95	1.00		0.54	1.00		0.56	1.00	
Satd. Flow (perm)	774	1863	2787	3433	1847		1007	3312		1039	3224	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	216	171	134	263	16	148	183	137	34	73	107
RTOR Reduction (vph)	0	0	140	0	2	0	0	88	0	0	74	0
Lane Group Flow (vph)	83	216	31	134	277	0	148	232	0	34	106	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	21.3	14.7	14.7	8.0	16.1		36.7	28.7		28.4	24.3	
Effective Green, g (s)	21.3	14.7	14.7	8.0	16.1		36.7	28.7		28.4	24.3	
Actuated g/C Ratio	0.27	0.18	0.18	0.10	0.20		0.46	0.36		0.35	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	288	342	512	343	371		538	1188		406	979	
v/s Ratio Prot	0.02	0.12		c0.04	c0.15		c0.03	0.07		0.00	0.03	
v/s Ratio Perm	0.05		0.01				c0.10			0.03		
v/c Ratio	0.29	0.63	0.06	0.39	0.75		0.28	0.20		0.08	0.11	
Uniform Delay, d1	22.7	30.1	27.0	33.7	30.0		12.9	17.7		17.0	20.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	3.8	0.1	0.7	7.9		0.3	0.4		0.1	0.2	
Delay (s)	23.3	33.9	27.0	34.5	37.9		13.2	18.1		17.1	20.3	
Level of Service	C	C	C	C	D		B	B		B	C	
Approach Delay (s)		29.5			36.8			16.5			19.8	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			26.2			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			55.3%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2019 Projected Midday Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	33	11	17	297	247	15
Future Volume (Veh/h)	33	11	17	297	247	15
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	12	18	323	268	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	474	142	284			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	474	142	284			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	99			
cM capacity (veh/h)	512	880	1275			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	48	18	162	162	179	105
Volume Left	36	18	0	0	0	0
Volume Right	12	0	0	0	0	16
cSH	683	1275	1700	1700	1700	1700
Volume to Capacity	0.07	0.01	0.10	0.10	0.11	0.06
Queue Length 95th (ft)	6	1	0	0	0	0
Control Delay (s)	11.7	7.9	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	11.7	0.4			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			24.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Sherrill Blvd & Medical Office Access RT

2019 Projected Midday Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	329	246	73	0	15
Future Volume (Veh/h)	0	329	246	73	0	15
Sign Control		Free	Free		Stop	
Grade		-9%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	358	267	79	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	346				486	173
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346				486	173
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	1210				511	840
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	
Volume Total	179	179	178	168	16	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	79	16	
cSH	1700	1700	1700	1700	840	
Volume to Capacity	0.11	0.11	0.10	0.10	0.02	
Queue Length 95th (ft)	0	0	0	0	1	
Control Delay (s)	0.0	0.0	0.0	0.0	9.4	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.4	
Approach LOS					A	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			19.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: Medical Office Access & Christian Academy Blvd

2019 Projected Midday Peak
Medical Office Center

	→	↘	↙	←	↗	↖
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↗			↗	↗	↗
Traffic Volume (veh/h)	86	19	22	84	28	131
Future Volume (Veh/h)	86	19	22	84	28	131
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	93	21	24	91	30	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			114		242	104
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			114		242	104
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	85
cM capacity (veh/h)			1475		734	951
Direction, Lane #	EB 1	WB 1	NE 1	NE 2		
Volume Total	114	115	30	142		
Volume Left	0	24	30	0		
Volume Right	21	0	0	142		
cSH	1700	1475	734	951		
Volume to Capacity	0.07	0.02	0.04	0.15		
Queue Length 95th (ft)	0	1	3	13		
Control Delay (s)	0.0	1.7	10.1	9.4		
Lane LOS		A	B	A		
Approach Delay (s)	0.0	1.7	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			22.3%	ICU Level of Service		A
Analysis Period (min)			15			

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected PM School Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	 		  	  
Traffic Volume (vph)	482	351	1115	997
Future Volume (vph)	482	351	1115	997
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	32.0	32.0	48.0	48.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	21.2	21.2	50.8	50.8
Actuated g/C Ratio	0.26	0.26	0.64	0.64
v/c Ratio	0.67	0.64	0.30	0.33
Control Delay	28.2	24.7	7.3	7.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.2	24.7	7.3	7.5
LOS	C	C	A	A
Approach Delay	27.1		7.3	7.5
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 13.0
 Intersection Capacity Utilization 49.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2019 Projected PM School Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	623	283	1212	1084
v/c Ratio	0.67	0.64	0.30	0.33
Control Delay	28.2	24.7	7.3	7.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.2	24.7	7.3	7.5
Queue Length 50th (ft)	136	97	70	105
Queue Length 95th (ft)	167	165	111	121
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1217	560	4070	3246
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.51	0.51	0.30	0.33
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2019 Projected PM School Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	482	351	0	1115	997	0
Future Volume (vph)	482	351	0	1115	997	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.98	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3419	1455		6408	5111	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3419	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	524	382	0	1212	1084	0
RTOR Reduction (vph)	23	58	0	0	0	0
Lane Group Flow (vph)	600	225	0	1212	1084	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	19.2	19.2		48.8	48.8	
Effective Green, g (s)	21.2	21.2		50.8	50.8	
Actuated g/C Ratio	0.26	0.26		0.63	0.63	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	906	385		4069	3245	
v/s Ratio Prot	c0.18	0.15		0.19	c0.21	
v/s Ratio Perm						
v/c Ratio	0.66	0.58		0.30	0.33	
Uniform Delay, d1	26.2	25.6		6.6	6.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	1.5		0.2	0.3	
Delay (s)	27.6	27.0		6.8	7.0	
Level of Service	C	C		A	A	
Approach Delay (s)	27.4			6.8	7.0	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			12.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.43			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			49.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected PM School Peak
Medical Office Center

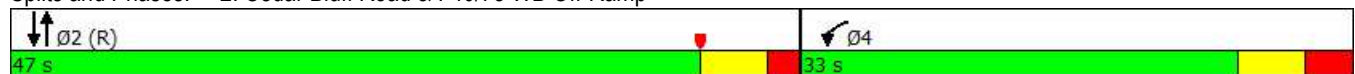
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↘	↑↑↑	↑↑↑
Traffic Volume (vph)	680	1597	747
Future Volume (vph)	680	1597	747
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	33.0	47.0	47.0
Total Split (%)	41.3%	58.8%	58.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	24.2	47.8	47.8
Actuated g/C Ratio	0.30	0.60	0.60
v/c Ratio	0.69	0.44	0.27
Control Delay	27.9	7.9	8.1
Queue Delay	0.0	0.0	0.0
Total Delay	27.9	7.9	8.1
LOS	C	A	A
Approach Delay	27.9	7.9	8.1
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.5
 Intersection Capacity Utilization 49.2%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service A

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected PM School Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	739	1736	812
v/c Ratio	0.69	0.44	0.27
Control Delay	27.9	7.9	8.1
Queue Delay	0.0	0.0	0.0
Total Delay	27.9	7.9	8.1
Queue Length 50th (ft)	166	105	109
Queue Length 95th (ft)	205	120	86
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1279	3976	3007
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.58	0.44	0.27
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2019 Projected PM School Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	680	0	1597	0	0	747
Future Volume (vph)	680	0	1597	0	0	747
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	739	0	1736	0	0	812
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	739	0	1736	0	0	812
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	21.2		45.8			45.8
Effective Green, g (s)	24.2		47.8			47.8
Actuated g/C Ratio	0.30		0.60			0.60
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1067		3976			3007
v/s Ratio Prot	c0.21		c0.26			0.16
v/s Ratio Perm						
v/c Ratio	0.69		0.44			0.27
Uniform Delay, d1	24.6		8.8			7.7
Progression Factor	1.00		0.81			0.97
Incremental Delay, d2	1.6		0.3			0.2
Delay (s)	26.2		7.5			7.7
Level of Service	C		A			A
Approach Delay (s)	26.2		7.5			7.7
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			11.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			49.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM School Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	103	11	267	171	161	177	668	38	725	27
Future Volume (vph)	103	11	267	171	161	177	668	38	725	27
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	30.0	30.0	25.0	40.0	40.0	25.0	75.0	15.0	65.0	65.0
Total Split (%)	18.8%	18.8%	15.6%	25.0%	25.0%	15.6%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	23.3	23.3	41.4	24.0	24.0	101.2	90.8	93.4	82.6	82.6
Actuated g/C Ratio	0.15	0.15	0.26	0.15	0.15	0.63	0.57	0.58	0.52	0.52
v/c Ratio	0.45	0.68	0.39	0.69	0.63	0.45	0.29	0.10	0.42	0.03
Control Delay	67.3	79.6	50.3	78.4	43.1	16.5	14.1	13.1	23.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	79.6	50.3	78.4	43.1	16.5	14.1	13.1	23.2	0.1
LOS	E	E	D	E	D	B	B	B	C	A
Approach Delay		65.6			53.8		14.5		22.0	
Approach LOS		E			D		B		C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 50 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 31.8
 Intersection Capacity Utilization 59.2%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service B

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	65 s	40 s	30 s
 Ø5	 Ø6 (R)		
15 s	75 s		

Queues

2019 Projected PM School Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	112	151	151	167	382	192	822	41	788	29
v/c Ratio	0.45	0.68	0.39	0.69	0.63	0.45	0.29	0.10	0.42	0.03
Control Delay	67.3	79.6	50.3	78.4	43.1	16.5	14.1	13.1	23.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	79.6	50.3	78.4	43.1	16.5	14.1	13.1	23.2	0.1
Queue Length 50th (ft)	108	161	140	184	130	88	160	14	225	0
Queue Length 95th (ft)	170	236	191	262	180	184	207	34	277	0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	292	260	451	364	843	473	2843	434	1863	906
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.58	0.33	0.46	0.45	0.41	0.29	0.09	0.42	0.03
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	11	267	171	161	173	177	668	88	38	725	27
Future Volume (vph)	103	11	267	171	161	173	177	668	88	38	725	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.86	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1533	1512	1618	3253		1770	4996		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.26	1.00		0.32	1.00	1.00
Satd. Flow (perm)	1719	1533	1512	1618	3253		481	4996		583	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	12	290	186	175	188	192	726	96	41	788	29
RTOR Reduction (vph)	0	0	0	0	122	0	0	8	0	0	0	14
Lane Group Flow (vph)	112	151	151	167	260	0	192	814	0	41	788	15
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	20.3	20.3	32.9	21.5	21.5		98.7	87.1		85.7	80.1	80.1
Effective Green, g (s)	23.3	23.3	36.9	24.0	24.0		100.7	89.6		91.7	82.6	82.6
Actuated g/C Ratio	0.15	0.15	0.23	0.15	0.15		0.63	0.56		0.57	0.52	0.52
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	250	223	348	242	487		420	2797		396	1863	833
v/s Ratio Prot	0.07	c0.10	0.04	c0.10	0.08		c0.04	0.16		0.01	0.22	
v/s Ratio Perm			0.06				c0.25			0.05		0.01
v/c Ratio	0.45	0.68	0.43	0.69	0.53		0.46	0.29		0.10	0.42	0.02
Uniform Delay, d1	62.5	64.8	52.6	64.5	62.8		14.7	18.5		15.0	24.0	18.9
Progression Factor	1.00	1.00	1.01	1.00	1.00		0.94	0.71		0.90	0.85	1.00
Incremental Delay, d2	0.9	7.2	0.6	7.6	0.9		0.5	0.2		0.1	0.7	0.0
Delay (s)	63.5	72.1	53.6	72.0	63.7		14.3	13.3		13.5	21.0	18.9
Level of Service	E	E	D	E	E		B	B		B	C	B
Approach Delay (s)		63.0			66.2			13.5			20.6	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			33.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			59.2%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

2019 Projected PM School Peak
Medical Office Center

								
Lane Group	EBL	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	90	172	69	0	202	643	15	1003
Future Volume (vph)	90	172	69	0	202	643	15	1003
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		1		4	1	6		2
Permitted Phases	4	4	4		6		2	
Detector Phase	4	1	4	4	1	6	2	2
Switch Phase								
Minimum Initial (s)	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	38.0	25.0	38.0	38.0	25.0	122.0	97.0	97.0
Total Split (%)	23.8%	15.6%	23.8%	23.8%	15.6%	76.3%	60.6%	60.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag		Lead			Lead		Lag	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	19.3	33.3		19.3	134.2	133.7	120.2	120.2
Actuated g/C Ratio	0.12	0.21		0.12	0.84	0.84	0.75	0.75
v/c Ratio	0.59	0.45		0.22	0.48	0.25	0.03	0.41
Control Delay	80.5	29.6		25.8	10.7	2.1	6.8	8.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	80.5	29.6		25.8	10.7	2.1	6.8	8.3
LOS	F	C		C	B	A	A	A
Approach Delay				25.8		4.1		8.2
Approach LOS				C		A		A

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 97 (61%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 11.7
 Intersection Capacity Utilization 61.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

4: Cedar Bluff Road & Sherrill Blvd

2019 Projected PM School Peak

Medical Office Center

							
Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	98	187	77	220	739	16	1113
v/c Ratio	0.59	0.45	0.22	0.48	0.25	0.03	0.41
Control Delay	80.5	29.6	25.8	10.7	2.1	6.8	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.5	29.6	25.8	10.7	2.1	6.8	8.3
Queue Length 50th (ft)	99	86	13	38	51	4	196
Queue Length 95th (ft)	159	154	38	78	60	14	297
Internal Link Dist (ft)			642		919		1139
Turn Bay Length (ft)	90			75		85	
Base Capacity (vph)	295	529	580	567	2965	516	2725
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.35	0.13	0.39	0.25	0.03	0.41
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2019 Projected PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	0	172	69	0	2	202	643	37	15	1003	21
Future Volume (vph)	90	0	172	69	0	2	202	643	37	15	1003	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5		3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00		1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00		0.85		1.00		1.00	0.99		1.00	1.00	
Flt Protected	0.95		1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849		1655		3232		1906	3546		1761	3628	
Flt Permitted	0.70		1.00		0.74		0.22	1.00		0.37	1.00	
Satd. Flow (perm)	1371		1655		2508		436	3546		688	3628	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	0	187	75	0	2	220	699	40	16	1090	23
RTOR Reduction (vph)	0	0	75	0	45	0	0	2	0	0	0	0
Lane Group Flow (vph)	98	0	112	0	32	0	220	737	0	16	1113	0
Turn Type	Perm		pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	16.8		25.3		16.8		131.7	131.7		118.2	118.2	
Effective Green, g (s)	19.3		29.3		19.3		133.7	133.7		120.2	120.2	
Actuated g/C Ratio	0.12		0.18		0.12		0.84	0.84		0.75	0.75	
Clearance Time (s)	6.0		5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0		2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	165		303		302		460	2963		516	2725	
v/s Ratio Prot			0.02				c0.03	0.21			0.31	
v/s Ratio Perm	c0.07		0.04		0.01		c0.37			0.02		
v/c Ratio	0.59		0.37		0.11		0.48	0.25		0.03	0.41	
Uniform Delay, d1	66.6		57.3		62.7		4.4	2.7		5.1	7.1	
Progression Factor	1.00		1.00		1.00		2.69	0.65		1.00	1.00	
Incremental Delay, d2	5.6		0.6		0.2		0.5	0.2		0.1	0.5	
Delay (s)	72.3		57.8		62.8		12.3	2.0		5.2	7.6	
Level of Service	E		E		E		B	A		A	A	
Approach Delay (s)		62.8			62.8			4.3			7.6	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			14.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			61.2%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected PM School Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↕	↖	↕	
Traffic Volume (vph)	79	22	725	104	616	
Future Volume (vph)	79	22	725	104	616	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	30.0	20.0	65.0	20.0	85.0	30.0
Total Split (%)	26.1%	17.4%	56.5%	17.4%	73.9%	26%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effect Green (s)	12.5	23.0	80.0	93.8	94.1	
Actuated g/C Ratio	0.11	0.20	0.70	0.82	0.82	
v/c Ratio	0.56	0.07	0.40	0.24	0.23	
Control Delay	61.8	7.6	5.7	4.3	3.6	
Queue Delay	0.0	0.0	0.1	0.0	0.0	
Total Delay	61.8	7.6	5.7	4.3	3.6	
LOS	E	A	A	A	A	
Approach Delay			5.7		3.7	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 34 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 7.5
 Intersection Capacity Utilization 52.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd



Queues
5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected PM School Peak
Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	86	24	956	113	670
v/c Ratio	0.56	0.07	0.40	0.24	0.23
Control Delay	61.8	7.6	5.7	4.3	3.6
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	61.8	7.6	5.7	4.3	3.6
Queue Length 50th (ft)	62	0	84	15	56
Queue Length 95th (ft)	110	16	113	34	94
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	294	440	2407	545	2880
Starvation Cap Reductn	0	0	246	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.05	0.44	0.21	0.23
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2019 Projected PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	79	0	22	0	725	155	104	616	0
Future Volume (vph)	0	0	0	79	0	22	0	725	155	104	616	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3446		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.25	1.00	
Satd. Flow (perm)				1410		1583		3446		469	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	86	0	24	0	788	168	113	670	0
RTOR Reduction (vph)	0	0	0	0	0	20	0	10	0	0	0	0
Lane Group Flow (vph)	0	0	0	86	0	4	0	946	0	113	670	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				10.9		18.2		78.8		91.6	91.6	
Effective Green, g (s)				10.9		18.2		78.8		91.6	91.6	
Actuated g/C Ratio				0.09		0.16		0.69		0.80	0.80	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				133		250		2361		455	2805	
v/s Ratio Prot						0.00		c0.27		0.02	c0.19	
v/s Ratio Perm				c0.06		0.00				0.18		
v/c Ratio				0.65		0.02		0.40		0.25	0.24	
Uniform Delay, d1				50.2		40.8		7.9		3.5	2.9	
Progression Factor				1.00		1.00		0.62		1.00	1.00	
Incremental Delay, d2				10.3		0.0		0.5		0.3	0.2	
Delay (s)				60.5		40.9		5.4		3.8	3.1	
Level of Service				E		D		A		A	A	
Approach Delay (s)		0.0			56.2			5.4			3.2	
Approach LOS		A			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.5									
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			52.2%							A		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

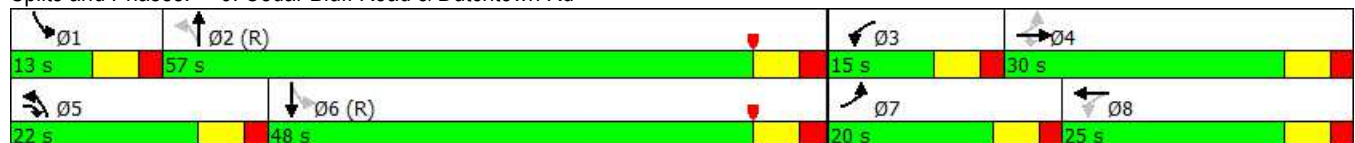
2019 Projected PM School Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	97	65	83	21	138	187	610	17	552
Future Volume (vph)	97	65	83	21	138	187	610	17	552
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	20.0	30.0	22.0	15.0	25.0	22.0	57.0	13.0	48.0
Total Split (%)	17.4%	26.1%	19.1%	13.0%	21.7%	19.1%	49.6%	11.3%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	32.8	25.2	42.9	22.3	15.6	69.9	64.4	58.5	51.7
Actuated g/C Ratio	0.29	0.22	0.37	0.19	0.14	0.61	0.56	0.51	0.45
v/c Ratio	0.34	0.17	0.14	0.08	0.68	0.49	0.35	0.04	0.48
Control Delay	32.2	37.5	4.6	27.5	58.8	15.5	16.8	10.8	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	37.5	4.6	27.5	58.8	15.5	16.8	10.8	25.1
LOS	C	D	A	C	E	B	B	B	C
Approach Delay		24.3			55.1		16.5		24.8
Approach LOS		C			E		B		C

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 14 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 24.0
 Intersection LOS: C
 Intersection Capacity Utilization 63.8%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues

2019 Projected PM School Peak

6: Cedar Bluff Road & Dutchtown Rd

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	71	90	23	170	203	693	18	738
v/c Ratio	0.34	0.17	0.14	0.08	0.68	0.49	0.35	0.04	0.48
Control Delay	32.2	37.5	4.6	27.5	58.8	15.5	16.8	10.8	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	37.5	4.6	27.5	58.8	15.5	16.8	10.8	25.1
Queue Length 50th (ft)	59	45	0	12	118	62	123	5	204
Queue Length 95th (ft)	92	80	29	29	182	123	250	20	314
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200		200	150		100		50	
Base Capacity (vph)	334	421	704	317	313	468	1993	433	1580
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.17	0.13	0.07	0.54	0.43	0.35	0.04	0.47
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2019 Projected PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	65	83	21	138	18	187	610	28	17	552	127
Future Volume (vph)	97	65	83	21	138	18	187	610	28	17	552	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1830		1770	3516		1761	3423	
Flt Permitted	0.38	1.00	1.00	0.71	1.00		0.25	1.00		0.39	1.00	
Satd. Flow (perm)	700	1863	1583	1324	1830		472	3516		719	3423	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	105	71	90	23	150	20	203	663	30	18	600	138
RTOR Reduction (vph)	0	0	61	0	4	0	0	2	0	0	15	0
Lane Group Flow (vph)	105	71	29	23	166	0	203	691	0	18	723	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	35.5	25.2	36.9	22.3	18.0		67.0	58.3		52.0	49.3	
Effective Green, g (s)	35.5	25.2	36.9	22.3	18.0		67.0	58.3		52.0	49.3	
Actuated g/C Ratio	0.31	0.22	0.32	0.19	0.16		0.58	0.51		0.45	0.43	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	323	408	590	273	286		407	1782		349	1467	
v/s Ratio Prot	c0.03	0.04	0.00	0.00	c0.09		c0.05	0.20		0.00	0.21	
v/s Ratio Perm	0.07		0.01	0.01			c0.24			0.02		
v/c Ratio	0.33	0.17	0.05	0.08	0.58		0.50	0.39		0.05	0.49	
Uniform Delay, d1	29.7	36.5	26.9	37.9	45.0		13.2	17.4		17.4	23.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.86	1.02	
Incremental Delay, d2	0.6	0.2	0.0	0.1	2.8		1.0	0.6		0.1	1.2	
Delay (s)	30.3	36.7	27.0	38.0	47.8		14.2	18.0		15.1	25.5	
Level of Service	C	D	C	D	D		B	B		B	C	
Approach Delay (s)		30.9			46.7			17.2			25.3	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			24.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			63.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	206	9	19	238	81	6	33	20	144	94	19
Future Volume (Veh/h)	33	206	9	19	238	81	6	33	20	144	94	19
Sign Control	Free			Free			Stop			Stop		
Grade	-9%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	224	10	21	259	88	7	36	22	157	102	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	40											
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
1142												
pX, platoon unblocked												
vC, conflicting volume	347			234			544	690	117	547	651	174
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	347			234			544	690	117	547	651	174
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			98	90	98	57	72	97
cM capacity (veh/h)	1209			1331			313	350	913	365	369	840
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	36	149	85	150	218	65	157	123				
Volume Left	36	0	0	21	0	7	157	0				
Volume Right	0	0	10	0	88	22	0	21				
cSH	1209	1700	1700	1331	1700	520	365	408				
Volume to Capacity	0.03	0.09	0.05	0.02	0.13	0.12	0.43	0.30				
Queue Length 95th (ft)	2	0	0	1	0	11	52	31				
Control Delay (s)	8.1	0.0	0.0	1.2	0.0	14.3	22.1	17.6				
Lane LOS	A			A		B	C	C				
Approach Delay (s)	1.1			0.5		14.3	20.1					
Approach LOS						B	C					
Intersection Summary												
Average Delay	7.2											
Intersection Capacity Utilization	40.3%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Projected PM School Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	316	122	72	444	123	53
Future Volume (Veh/h)	316	122	72	444	123	53
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	343	133	78	483	134	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			476	1048	410	
vC1, stage 1 conf vol					410	
vC2, stage 2 conf vol					639	
vCu, unblocked vol			476	1048	410	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)					5.4	
tF (s)			2.2	3.5	3.3	
p0 queue free %			93	69	91	
cM capacity (veh/h)			1086	433	642	
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	476	78	483	134	58	
Volume Left	0	78	0	134	0	
Volume Right	133	0	0	0	58	
cSH	1700	1086	1700	433	642	
Volume to Capacity	0.28	0.07	0.28	0.31	0.09	
Queue Length 95th (ft)	0	6	0	33	7	
Control Delay (s)	0.0	8.6	0.0	17.0	11.2	
Lane LOS		A		C	B	
Approach Delay (s)	0.0	1.2		15.2		
Approach LOS				C		
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			44.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2019 Projected PM School Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	426	288	0	102	2
Future Volume (Veh/h)	3	426	288	0	102	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	463	313	0	111	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	313				550	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	313				550	156
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				76	100
cM capacity (veh/h)	1244				464	861
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	157	309	209	104	111	2
Volume Left	3	0	0	0	111	0
Volume Right	0	0	0	0	0	2
cSH	1244	1700	1700	1700	464	861
Volume to Capacity	0.00	0.18	0.12	0.06	0.24	0.00
Queue Length 95th (ft)	0	0	0	0	23	0
Control Delay (s)	0.2	0.0	0.0	0.0	15.2	9.2
Lane LOS	A				C	A
Approach Delay (s)	0.1		0.0		15.1	
Approach LOS					C	
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			26.2%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

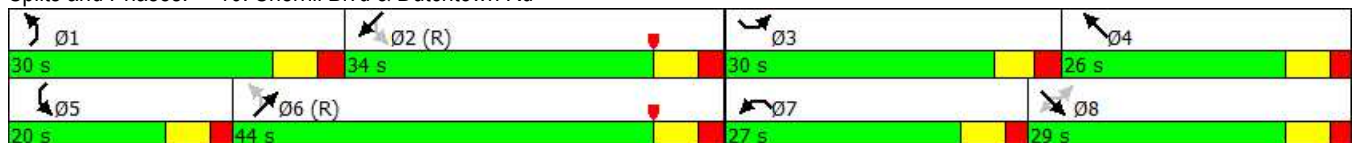
2019 Projected PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	159	228	87	277	142	111	165	39	199
Future Volume (vph)	159	228	87	277	142	111	165	39	199
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	30.0	29.0	29.0	27.0	26.0	30.0	44.0	20.0	34.0
Total Split (%)	25.0%	24.2%	24.2%	22.5%	21.7%	25.0%	36.7%	16.7%	28.3%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	34.1	20.3	20.3	15.8	22.3	63.2	54.8	56.7	49.2
Actuated g/C Ratio	0.28	0.17	0.17	0.13	0.19	0.53	0.46	0.47	0.41
v/c Ratio	0.44	0.79	0.15	0.67	0.48	0.21	0.19	0.08	0.21
Control Delay	30.7	65.3	0.5	56.9	47.1	16.0	13.9	15.7	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	65.3	0.5	56.9	47.1	16.0	13.9	15.7	21.8
LOS	C	E	A	E	D	B	B	B	C
Approach Delay		41.8			53.4		14.5		21.1
Approach LOS		D			D		B		C

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 73 (61%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 34.3
 Intersection LOS: C
 Intersection Capacity Utilization 55.2%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	173	248	95	301	164	121	294	42	298
v/c Ratio	0.44	0.79	0.15	0.67	0.48	0.21	0.19	0.08	0.21
Control Delay	30.7	65.3	0.5	56.9	47.1	16.0	13.9	15.7	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	65.3	0.5	56.9	47.1	16.0	13.9	15.7	21.8
Queue Length 50th (ft)	95	185	0	115	112	45	43	15	65
Queue Length 95th (ft)	137	270	0	157	176	88	82	37	114
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	517	363	704	600	356	685	1582	646	1417
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.68	0.13	0.50	0.46	0.18	0.19	0.07	0.21
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM School Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	159	228	87	277	142	9	111	165	106	39	199	75
Future Volume (vph)	159	228	87	277	142	9	111	165	106	39	199	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1846		1770	3332		1770	3393	
Flt Permitted	0.60	1.00	1.00	0.95	1.00		0.52	1.00		0.57	1.00	
Satd. Flow (perm)	1109	1863	2787	3433	1846		969	3332		1066	3393	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	248	95	301	154	10	121	179	115	42	216	82
RTOR Reduction (vph)	0	0	79	0	2	0	0	64	0	0	25	0
Lane Group Flow (vph)	173	248	16	301	162	0	121	230	0	42	273	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	34.1	20.3	20.3	15.8	22.3		63.3	53.6		55.0	49.2	
Effective Green, g (s)	34.1	20.3	20.3	15.8	22.3		63.3	53.6		55.0	49.2	
Actuated g/C Ratio	0.28	0.17	0.17	0.13	0.19		0.53	0.45		0.46	0.41	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	391	315	471	452	343		575	1488		522	1391	
v/s Ratio Prot	0.05	c0.13		c0.09	0.09		c0.02	0.07		0.00	0.08	
v/s Ratio Perm	0.07		0.01				c0.09			0.03		
v/c Ratio	0.44	0.79	0.03	0.67	0.47		0.21	0.15		0.08	0.20	
Uniform Delay, d1	34.1	47.8	41.7	49.6	43.6		14.5	19.7		18.0	22.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	12.2	0.0	3.7	1.0		0.2	0.2		0.1	0.3	
Delay (s)	34.9	60.0	41.7	53.3	44.6		14.7	20.0		18.1	23.0	
Level of Service	C	E	D	D	D		B	B		B	C	
Approach Delay (s)		48.2			50.2			18.4			22.4	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			36.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			55.2%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2019 Projected PM School Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	25	8	22	223	166	18
Future Volume (Veh/h)	25	8	22	223	166	18
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	9	24	242	180	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	359	100	200			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	359	100	200			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	98			
cM capacity (veh/h)	602	936	1370			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	36	24	121	121	120	80
Volume Left	27	24	0	0	0	0
Volume Right	9	0	0	0	0	20
cSH	803	1370	1700	1700	1700	1700
Volume to Capacity	0.04	0.02	0.07	0.07	0.07	0.05
Queue Length 95th (ft)	4	1	0	0	0	0
Control Delay (s)	10.7	7.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.7	0.7			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			21.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Sherrill Blvd & Medical Office Access RT

2019 Projected PM School Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	249	172	91	0	12
Future Volume (Veh/h)	0	249	172	91	0	12
Sign Control		Free	Free		Stop	
Grade		-9%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	271	187	99	0	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	286				372	143
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286				372	143
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1273				602	879
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	
Volume Total	136	136	125	161	13	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	99	13	
cSH	1700	1700	1700	1700	879	
Volume to Capacity	0.08	0.08	0.07	0.09	0.01	
Queue Length 95th (ft)	0	0	0	0	1	
Control Delay (s)	0.0	0.0	0.0	0.0	9.2	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.2	
Approach LOS					A	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			17.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: Medical Office Access & Christian Academy Blvd

2019 Projected PM School Peak
Medical Office Center

						
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	157	24	27	120	22	101
Future Volume (Veh/h)	157	24	27	120	22	101
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	171	26	29	130	24	110
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	197			372	184	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	197			372	184	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	98			96	87	
cM capacity (veh/h)	1376			615	858	
Direction, Lane #	EB 1	WB 1	NE 1	NE 2		
Volume Total	197	159	24	110		
Volume Left	0	29	24	0		
Volume Right	26	0	0	110		
cSH	1700	1376	615	858		
Volume to Capacity	0.12	0.02	0.04	0.13		
Queue Length 95th (ft)	0	2	3	11		
Control Delay (s)	0.0	1.5	11.1	9.8		
Lane LOS		A	B	A		
Approach Delay (s)	0.0	1.5	10.0			
Approach LOS			B			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			30.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

108: Sherrill Blvd & Park West Blvd

2019 Projected PM School Peak
Medical Office Center

							
Movement	NBL	NBR	NET	NER	SWL	SWT	
Lane Configurations							
Traffic Volume (veh/h)	116	33	116	168	78	225	
Future Volume (Veh/h)	116	33	116	168	78	225	
Sign Control	Stop		Free			Free	
Grade	0%		-9%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	126	36	126	183	85	245	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None		None		
Median storage veh							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	510	154			309		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	510	154			309		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	73	96			93		
cM capacity (veh/h)	459	864			1248		
Direction, Lane #	NB 1	NB 2	NE 1	NE 2	SW 1	SW 2	SW 3
Volume Total	126	36	84	225	85	122	122
Volume Left	126	0	0	0	85	0	0
Volume Right	0	36	0	183	0	0	0
cSH	459	864	1700	1700	1248	1700	1700
Volume to Capacity	0.27	0.04	0.05	0.13	0.07	0.07	0.07
Queue Length 95th (ft)	28	3	0	0	5	0	0
Control Delay (s)	15.8	9.3	0.0	0.0	8.1	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	14.3		0.0		2.1		
Approach LOS	B						
Intersection Summary							
Average Delay			3.8				
Intersection Capacity Utilization			29.4%		ICU Level of Service		A
Analysis Period (min)			15				

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

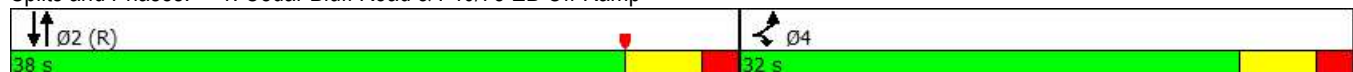
2030 Background AM Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	864	313	1278	1542
Future Volume (vph)	864	313	1278	1542
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	32.0	32.0	38.0	38.0
Total Split (%)	45.7%	45.7%	54.3%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	25.7	25.7	36.3	36.3
Actuated g/C Ratio	0.37	0.37	0.52	0.52
v/c Ratio	0.76	0.57	0.42	0.63
Control Delay	23.5	21.3	11.2	16.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.5	21.3	11.2	16.6
LOS	C	C	B	B
Approach Delay	23.0		11.2	16.6
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 38 (54%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 16.8
 Intersection Capacity Utilization 64.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2030 Background AM Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	973	306	1389	1676
v/c Ratio	0.76	0.57	0.42	0.63
Control Delay	23.5	21.3	11.2	16.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.5	21.3	11.2	16.6
Queue Length 50th (ft)	177	105	104	245
Queue Length 95th (ft)	237	181	134	287
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1389	587	3321	2649
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.70	0.52	0.42	0.63
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Background AM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	864	313	0	1278	1542	0
Future Volume (vph)	864	313	0	1278	1542	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.99	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3464	1455		6408	5111	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3464	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	939	340	0	1389	1676	0
RTOR Reduction (vph)	4	6	0	0	0	0
Lane Group Flow (vph)	969	300	0	1389	1676	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	23.7	23.7		34.3	34.3	
Effective Green, g (s)	25.7	25.7		36.3	36.3	
Actuated g/C Ratio	0.37	0.37		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1271	534		3323	2650	
v/s Ratio Prot	c0.28	0.21		0.22	c0.33	
v/s Ratio Perm						
v/c Ratio	0.76	0.56		0.42	0.63	
Uniform Delay, d1	19.5	17.7		10.4	12.1	
Progression Factor	1.00	1.00		1.00	1.24	
Incremental Delay, d2	2.5	0.8		0.4	1.0	
Delay (s)	22.0	18.5		10.7	16.0	
Level of Service	C	B		B	B	
Approach Delay (s)	21.1			10.7	16.0	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			15.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background AM Peak
Medical Office Center

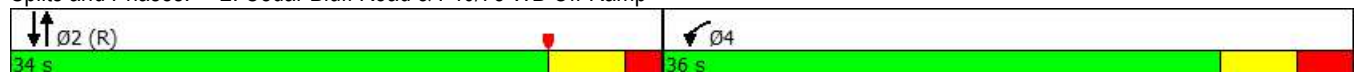
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	991	1808	684
Future Volume (vph)	991	1808	684
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	36.0	34.0	34.0
Total Split (%)	51.4%	48.6%	48.6%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	28.8	33.2	33.2
Actuated g/C Ratio	0.41	0.47	0.47
v/c Ratio	0.74	0.62	0.31
Control Delay	20.7	10.8	7.2
Queue Delay	0.0	0.1	0.0
Total Delay	20.7	10.9	7.2
LOS	C	B	A
Approach Delay	20.7	10.9	7.2
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 32 (46%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 13.0
 Intersection Capacity Utilization 64.4%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service C

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background AM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	1077	1965	743
v/c Ratio	0.74	0.62	0.31
Control Delay	20.7	10.8	7.2
Queue Delay	0.0	0.1	0.0
Total Delay	20.7	10.9	7.2
Queue Length 50th (ft)	191	140	55
Queue Length 95th (ft)	241	166	m94
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1613	3160	2390
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	181	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.67	0.66	0.31
Intersection Summary			
m Volume for 95th percentile queue is metered by upstream signal.			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background AM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	991	0	1808	0	0	684
Future Volume (vph)	991	0	1808	0	0	684
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1077	0	1965	0	0	743
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1077	0	1965	0	0	743
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	25.8		31.2			31.2
Effective Green, g (s)	28.8		33.2			33.2
Actuated g/C Ratio	0.41		0.47			0.47
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1452		3156			2387
v/s Ratio Prot	c0.31		c0.30			0.15
v/s Ratio Perm						
v/c Ratio	0.74		0.62			0.31
Uniform Delay, d1	17.4		13.7			11.3
Progression Factor	1.00		0.70			0.58
Incremental Delay, d2	1.8		0.8			0.3
Delay (s)	19.3		10.4			6.9
Level of Service	B		B			A
Approach Delay (s)	19.3		10.4			6.9
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay			12.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

2030 Background AM Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	54	87	274	179	463	427	736	39	691	87
Future Volume (vph)	54	87	274	179	463	427	736	39	691	87
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	25.7	25.7	40.0	35.6	35.6	40.0	66.7	12.0	38.7	38.7
Total Split (%)	18.4%	18.4%	28.6%	25.4%	25.4%	28.6%	47.6%	8.6%	27.6%	27.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	21.4	21.4	59.4	31.0	31.0	76.1	66.5	47.6	37.6	37.6
Actuated g/C Ratio	0.15	0.15	0.42	0.22	0.22	0.54	0.48	0.34	0.27	0.27
v/c Ratio	0.23	0.81	0.30	0.49	0.90	0.93	0.44	0.17	0.78	0.17
Control Delay	54.0	81.5	27.5	52.7	66.4	74.4	14.4	16.0	47.5	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	24.7	0.1	0.0	0.0	0.0
Total Delay	54.0	81.5	27.5	52.7	66.4	99.1	14.5	16.0	47.5	3.9
LOS	D	F	C	D	E	F	B	B	D	A
Approach Delay		55.1			63.7		40.6		41.4	
Approach LOS		E			E		D		D	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 32 (23%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 47.9
 Intersection Capacity Utilization 81.6%
 Analysis Period (min) 15

Intersection LOS: D
ICU Level of Service D

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
40 s	38.7 s	35.6 s	25.7 s
 Ø5	 Ø6 (R)		
12 s	66.7 s		

Queues

2030 Background AM Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	59	202	191	175	693	464	1042	42	751	95
v/c Ratio	0.23	0.81	0.30	0.49	0.90	0.93	0.44	0.17	0.78	0.17
Control Delay	54.0	81.5	27.5	52.7	66.4	74.4	14.4	16.0	47.5	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	24.7	0.1	0.0	0.0	0.0
Total Delay	54.0	81.5	27.5	52.7	66.4	99.1	14.5	16.0	47.5	3.9
Queue Length 50th (ft)	47	188	115	153	326	416	184	13	349	4
Queue Length 95th (ft)	92	#316	177	238	#435	#575	219	m23	427	m30
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	272	259	657	365	785	513	2369	245	969	558
Starvation Cap Reductn	0	0	0	0	0	65	369	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.78	0.29	0.48	0.88	1.04	0.52	0.17	0.78	0.17

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Background AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	87	274	179	463	156	427	736	223	39	691	87
Future Volume (vph)	54	87	274	179	463	156	427	736	223	39	691	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Fr _t	1.00	0.92	0.85	1.00	0.96		1.00	0.97		1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1637	1512	1618	3386		1770	4908		1745	3610	1615
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00		0.11	1.00		0.26	1.00	1.00
Satd. Flow (perm)	1719	1637	1512	1618	3386		204	4908		482	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	95	298	195	503	170	464	800	242	42	751	95
RTOR Reduction (vph)	0	0	0	0	21	0	0	37	0	0	0	69
Lane Group Flow (vph)	59	202	191	175	672	0	464	1005	0	42	751	26
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	18.4	18.4	50.9	28.5	28.5		73.6	62.8		39.9	35.1	35.1
Effective Green, g (s)	21.4	21.4	54.9	31.0	31.0		75.6	65.3		45.9	37.6	37.6
Actuated g/C Ratio	0.15	0.15	0.39	0.22	0.22		0.54	0.47		0.33	0.27	0.27
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	262	250	592	358	749		496	2289		228	969	433
v/s Ratio Prot	0.03	c0.12	0.08	0.11	c0.20		c0.23	0.20		0.01	0.21	
v/s Ratio Perm			0.05				c0.27			0.05		0.02
v/c Ratio	0.23	0.81	0.32	0.49	0.90		0.94	0.44		0.18	0.78	0.06
Uniform Delay, d ₁	52.0	57.3	29.6	47.6	53.0		40.3	25.1		32.4	47.3	38.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.38	0.60		0.77	0.88	1.00
Incremental Delay, d ₂	0.3	16.8	0.2	0.8	13.4		21.2	0.5		0.2	5.0	0.2
Delay (s)	52.3	74.1	29.8	48.3	66.3		76.8	15.4		25.1	46.4	38.3
Level of Service	D	E	C	D	E		E	B		C	D	D
Approach Delay (s)		52.5			62.7			34.3			44.6	
Approach LOS		D			E			C			D	

Intersection Summary

HCM 2000 Control Delay	45.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings 4: Cedar Bluff Road & Sherrill Blvd

2030 Background AM Peak
Medical Office Center

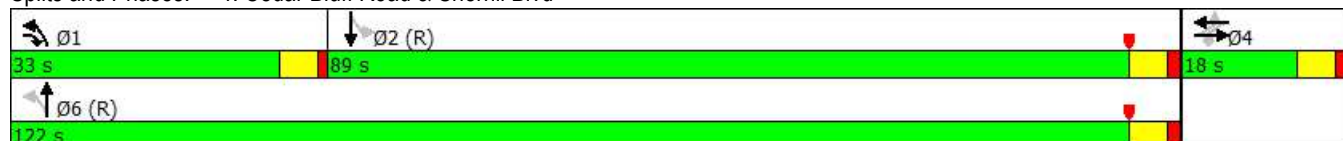
									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	62	21	181	17	1	284	829	44	1226
Future Volume (vph)	62	21	181	17	1	284	829	44	1226
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	18.0	18.0	33.0	18.0	18.0	33.0	122.0	89.0	89.0
Total Split (%)	12.9%	12.9%	23.6%	12.9%	12.9%	23.6%	87.1%	63.6%	63.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	13.2	13.2	34.5		13.2	123.1	123.3	99.0	99.0
Actuated g/C Ratio	0.09	0.09	0.25		0.09	0.88	0.88	0.71	0.71
v/c Ratio	0.50	0.13	0.44		0.12	0.71	0.36	0.14	0.62
Control Delay	72.8	59.0	31.1		42.0	21.1	0.7	11.1	13.9
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	72.8	59.0	31.1		42.0	21.1	0.7	11.1	13.9
LOS	E	E	C		D	C	A	B	B
Approach Delay		43.1			42.0		5.2		13.8
Approach LOS		D			D		A		B

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 11 (8%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 76.3%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service D

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues
4: Cedar Bluff Road & Sherrill Blvd

2030 Background AM Peak
Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	23	197	30	309	1112	48	1558
v/c Ratio	0.50	0.13	0.44	0.12	0.71	0.36	0.14	0.62
Control Delay	72.8	59.0	31.1	42.0	21.1	0.7	11.1	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.8	59.0	31.1	42.0	21.1	0.7	11.1	13.9
Queue Length 50th (ft)	58	19	101	8	91	13	15	387
Queue Length 95th (ft)	111	49	159	25	m162	21	40	566
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	148	201	559	279	551	3071	335	2525
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.11	0.35	0.11	0.56	0.36	0.14	0.62

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2030 Background AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	21	181	17	1	10	284	829	194	44	1226	207
Future Volume (vph)	62	21	181	17	1	10	284	829	194	44	1226	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.94		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3122		1906	3473		1761	3560	
Flt Permitted	0.74	1.00	1.00		0.81		0.11	1.00		0.26	1.00	
Satd. Flow (perm)	1434	1947	1655		2606		215	3473		475	3560	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	23	197	18	1	11	309	901	211	48	1333	225
RTOR Reduction (vph)	0	0	46	0	10	0	0	12	0	0	8	0
Lane Group Flow (vph)	67	23	151	0	20	0	309	1100	0	48	1550	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	9.1	9.1	27.6		9.1		119.4	119.4		95.9	95.9	
Effective Green, g (s)	11.6	11.6	31.6		11.6		121.4	121.4		97.9	97.9	
Actuated g/C Ratio	0.08	0.08	0.23		0.08		0.87	0.87		0.70	0.70	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	118	161	373		215		434	3011		332	2489	
v/s Ratio Prot		0.01	0.06				c0.10	0.32			0.44	
v/s Ratio Perm	c0.05		0.03		0.01		c0.51			0.10		
v/c Ratio	0.57	0.14	0.41		0.09		0.71	0.37		0.14	0.62	
Uniform Delay, d1	61.8	59.6	46.2		59.3		26.7	1.8		7.0	11.2	
Progression Factor	1.00	1.00	1.00		1.00		0.68	0.24		1.00	1.00	
Incremental Delay, d2	6.1	0.4	0.5		0.2		4.8	0.3		0.9	1.2	
Delay (s)	67.9	60.0	46.7		59.5		23.0	0.8		8.0	12.4	
Level of Service	E	E	D		E		C	A		A	B	
Approach Delay (s)		52.7			59.5			5.6			12.3	
Approach LOS		D			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			76.3%				ICU Level of Service			D		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2030 Background AM Peak
Medical Office Center

							
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT	Ø4
Lane Configurations							
Traffic Volume (vph)	207	153	3	999	494	750	
Future Volume (vph)	207	153	3	999	494	750	
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	
Protected Phases		1		2	1	6	4
Permitted Phases	8	8	2		6		
Detector Phase	8	1	2	2	1	6	
Switch Phase							
Minimum Initial (s)	8.0	6.0	20.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	26.5	11.5	26.5	22.0
Total Split (s)	22.0	29.9	48.1	48.1	29.9	78.0	22.0
Total Split (%)	22.0%	29.9%	48.1%	48.1%	29.9%	78.0%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes	Yes		
Recall Mode	None	None	C-Min	C-Min	None	C-Min	None
Act Effct Green (s)	16.0	46.4	41.6	41.6	72.5	71.5	
Actuated g/C Ratio	0.16	0.46	0.42	0.42	0.72	0.72	
v/c Ratio	1.00	0.22	0.01	1.08	1.06	0.33	
Control Delay	103.9	13.1	13.7	70.1	87.2	5.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	103.9	13.1	13.7	70.1	87.2	5.7	
LOS	F	B	B	E	F	A	
Approach Delay				70.0		38.0	
Approach LOS				E		D	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 12 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.08
 Intersection Signal Delay: 56.4
 Intersection Capacity Utilization 94.0%
 Analysis Period (min) 15

Intersection LOS: E
ICU Level of Service F

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

 Ø1	 Ø2 (R)	 Ø4
29.9 s	48.1 s	22 s
 Ø6 (R)		 Ø8
78 s		22 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2030 Background AM Peak
Medical Office Center

						
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	225	166	3	1570	537	818
v/c Ratio	1.00	0.22	0.01	1.08	1.06	0.33
Control Delay	103.9	13.1	13.7	70.1	87.2	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.9	13.1	13.7	70.1	87.2	5.7
Queue Length 50th (ft)	145	46	1	~578	~327	87
Queue Length 95th (ft)	#298	88	m2	m#717	#534	113
Internal Link Dist (ft)				493		1729
Turn Bay Length (ft)	200		100		100	
Base Capacity (vph)	225	754	265	1455	505	2515
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.22	0.01	1.08	1.06	0.33

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2030 Background AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	207	0	153	3	999	445	494	750	3
Future Volume (vph)	0	0	0	207	0	153	3	999	445	494	750	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	0.95	
Frt				1.00		0.85	1.00	0.95		1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583	1770	3376		1761	3520	
Flt Permitted				0.76		1.00	0.34	1.00		0.08	1.00	
Satd. Flow (perm)				1410		1583	639	3376		157	3520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	225	0	166	3	1086	484	537	815	3
RTOR Reduction (vph)	0	0	0	0	0	23	0	51	0	0	0	0
Lane Group Flow (vph)	0	0	0	225	0	143	3	1519	0	537	818	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				16.0		40.4	41.6	41.6		71.5	71.5	
Effective Green, g (s)				16.0		40.4	41.6	41.6		71.5	71.5	
Actuated g/C Ratio				0.16		0.40	0.42	0.42		0.72	0.72	
Clearance Time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				225		639	265	1404		503	2516	
v/s Ratio Prot						0.05		0.45		c0.26	0.23	
v/s Ratio Perm				c0.16		0.04	0.00			c0.50		
v/c Ratio				1.00		0.22	0.01	1.08		1.07	0.33	
Uniform Delay, d1				42.0		19.5	17.1	29.2		31.5	5.3	
Progression Factor				1.00		1.00	0.78	0.76		1.00	1.00	
Incremental Delay, d2				60.0		0.2	0.1	49.0		59.4	0.3	
Delay (s)				102.0		19.7	13.5	71.1		90.9	5.6	
Level of Service				F		B	B	E		F	A	
Approach Delay (s)		0.0			67.1			71.0			39.4	
Approach LOS		A			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			57.6									
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			100.0							18.0		
Intersection Capacity Utilization			94.0%							F		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

2030 Background AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	138	85	83	62	221	364	821	39	750
Future Volume (vph)	138	85	83	62	221	364	821	39	750
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	12.0	21.0	25.0	12.0	21.0	25.0	55.0	12.0	42.0
Total Split (%)	12.0%	21.0%	25.0%	12.0%	21.0%	25.0%	55.0%	12.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	23.6	18.6	43.7	21.6	15.4	59.6	51.9	40.5	34.0
Actuated g/C Ratio	0.24	0.19	0.44	0.22	0.15	0.60	0.52	0.40	0.34
v/c Ratio	0.74	0.27	0.12	0.22	0.93	0.95	0.49	0.14	0.90
Control Delay	54.8	40.0	3.4	29.8	81.4	61.3	17.2	9.2	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	54.8	40.0	3.4	29.8	81.4	61.3	17.6	9.2	42.9
LOS	D	D	A	C	F	E	B	A	D
Approach Delay		36.8			71.1		31.0		41.6
Approach LOS		D			E		C		D

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 16 (16%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 39.8
 Intersection Capacity Utilization 89.6%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service E

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
12 s	55 s	12 s	21 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
25 s	42 s	12 s	21 s

Queues
6: Cedar Bluff Road & Dutchtown Rd

2030 Background AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	150	92	90	67	267	396	904	42	1072
v/c Ratio	0.74	0.27	0.12	0.22	0.93	0.95	0.49	0.14	0.90
Control Delay	54.8	40.0	3.4	29.8	81.4	61.3	17.2	9.2	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	54.8	40.0	3.4	29.8	81.4	61.3	17.6	9.2	42.9
Queue Length 50th (ft)	76	53	0	32	168	194	201	8	335
Queue Length 95th (ft)	#157	101	24	67	#327	#380	258	m17	m402
Internal Link Dist (ft)	2065				1954		1139		493
Turn Bay Length (ft)	200	200		150	100		50		
Base Capacity (vph)	203	345	750	309	286	416	1835	306	1235
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	428	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.27	0.12	0.22	0.93	0.95	0.64	0.14	0.87

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2030 Background AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	85	83	62	221	25	364	821	11	39	750	236
Future Volume (vph)	138	85	83	62	221	25	364	821	11	39	750	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1834		1770	3532		1761	3395	
Flt Permitted	0.26	1.00	1.00	0.70	1.00		0.10	1.00		0.32	1.00	
Satd. Flow (perm)	481	1863	1583	1299	1834		192	3532		584	3395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	92	90	67	240	27	396	892	12	42	815	257
RTOR Reduction (vph)	0	0	56	0	4	0	0	1	0	0	32	0
Lane Group Flow (vph)	150	92	34	67	263	0	396	903	0	42	1040	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.6	18.6	37.7	21.6	16.6		57.9	48.3		36.4	32.8	
Effective Green, g (s)	25.6	18.6	37.7	21.6	16.6		57.9	48.3		36.4	32.8	
Actuated g/C Ratio	0.26	0.19	0.38	0.22	0.17		0.58	0.48		0.36	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	213	346	691	304	304		412	1705		254	1113	
v/s Ratio Prot	c0.05	0.05	0.01	0.01	c0.14		c0.18	0.26		0.01	0.31	
v/s Ratio Perm	0.13		0.01	0.04			c0.37			0.05		
v/c Ratio	0.70	0.27	0.05	0.22	0.86		0.96	0.53		0.17	0.93	
Uniform Delay, d1	30.9	34.9	19.8	31.9	40.6		29.5	18.0		20.7	32.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.84	1.07	
Incremental Delay, d2	10.1	0.4	0.0	0.4	21.6		34.2	1.2		0.3	14.3	
Delay (s)	41.0	35.3	19.8	32.3	62.3		63.8	19.1		17.6	49.1	
Level of Service	D	D	B	C	E		E	B		B	D	
Approach Delay (s)		33.7			56.2			32.7			47.9	
Approach LOS		C			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			40.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			89.6%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Background AM Peak
Medical Office Center

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	52	145	19	51	415	225	6	32	6	87	285	36												
Future Volume (Veh/h)	52	145	19	51	415	225	6	32	6	87	285	36												
Sign Control	Free			Free			Stop			Stop														
Grade	-9%			0%			0%			0%														
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92												
Hourly flow rate (vph)	57	158	21	55	451	245	7	35	7	95	310	39												
Pedestrians																								
Lane Width (ft)																								
Walking Speed (ft/s)																								
Percent Blockage																								
Right turn flare (veh)										40														
Median type	None					None																		
Median storage veh																								
Upstream signal (ft)																								
1142																								
pX, platoon unblocked																								
vC, conflicting volume	696				179			812	1088	90	894	976	348											
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	696				179			812	1088	90	894	976	348											
tC, single (s)	4.1				4.1			7.5	6.5	6.9	7.5	6.5	6.9											
tC, 2 stage (s)																								
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0	3.3											
p0 queue free %	94				96			0	82	99	49	0	94											
cM capacity (veh/h)	896				1394			0	193	951	186	224	648											
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2																
Volume Total	57	105	74	280	470	49	95	349																
Volume Left	57	0	0	55	0	7	95	0																
Volume Right	0	0	21	0	245	7	0	39																
cSH	896	1700	1700	1394	1700	187	186	242																
Volume to Capacity	0.06	0.06	0.04	0.04	0.28	0.26	0.51	1.44																
Queue Length 95th (ft)	5	0	0	3	0	25	64	498																
Control Delay (s)	9.3	0.0	0.0	1.8	0.0	31.4	42.8	258.9																
Lane LOS	A				A			D	E	F														
Approach Delay (s)	2.2				0.7			31.4	212.6															
Approach LOS						D		F																
Intersection Summary																								
Average Delay	65.5																							
Intersection Capacity Utilization	52.0%			ICU Level of Service					A															
Analysis Period (min)	15																							

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Background AM Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	536	387	116	525	72	40
Future Volume (Veh/h)	536	387	116	525	72	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	583	421	126	571	78	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1004		1616	794
vC1, stage 1 conf vol					794	
vC2, stage 2 conf vol					823	
vCu, unblocked vol			1004		1616	794
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			82		73	89
cM capacity (veh/h)			690		284	388
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	1004	126	571	78	43	
Volume Left	0	126	0	78	0	
Volume Right	421	0	0	0	43	
cSH	1700	690	1700	284	388	
Volume to Capacity	0.59	0.18	0.34	0.27	0.11	
Queue Length 95th (ft)	0	17	0	27	9	
Control Delay (s)	0.0	11.4	0.0	22.4	15.4	
Lane LOS		B		C	C	
Approach Delay (s)	0.0	2.1		19.9		
Approach LOS				C		
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			72.3%		ICU Level of Service	
Analysis Period (min)			15		C	

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2030 Background AM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	3	397	692	22	448	55
Future Volume (Veh/h)	3	397	692	22	448	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	432	752	24	487	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	776				986	388
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	776				986	388
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	90
cM capacity (veh/h)	836				244	611
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	147	288	501	275	487	60
Volume Left	3	0	0	0	487	0
Volume Right	0	0	0	24	0	60
cSH	836	1700	1700	1700	244	611
Volume to Capacity	0.00	0.17	0.29	0.16	2.00	0.10
Queue Length 95th (ft)	0	0	0	0	888	8
Control Delay (s)	0.2	0.0	0.0	0.0	496.0	11.5
Lane LOS	A				F	B
Approach Delay (s)	0.1		0.0		442.9	
Approach LOS					F	
Intersection Summary						
Average Delay			137.8			
Intersection Capacity Utilization			51.3%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Background AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	396	429	357	265	103	136	374	18	444
Future Volume (vph)	396	429	357	265	103	136	374	18	444
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	30.0	40.0	40.0	18.0	28.0	16.0	42.0	10.0	36.0
Total Split (%)	27.3%	36.4%	36.4%	16.4%	25.5%	14.5%	38.2%	9.1%	32.7%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	49.4	31.6	31.6	11.8	20.9	47.9	44.1	37.7	32.5
Actuated g/C Ratio	0.45	0.29	0.29	0.11	0.19	0.44	0.40	0.34	0.30
v/c Ratio	0.72	0.87	0.38	0.78	0.35	0.54	0.44	0.07	0.67
Control Delay	29.5	54.9	8.5	63.7	40.0	27.9	23.0	20.0	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	54.9	8.5	63.7	40.0	27.9	23.0	20.0	35.3
LOS	C	D	A	E	D	C	C	B	D
Approach Delay		32.4			56.6		24.0		34.9
Approach LOS		C			E		C		C

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 34.1

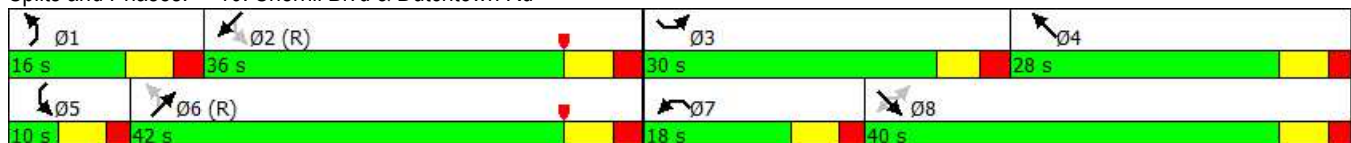
Intersection LOS: C

Intersection Capacity Utilization 77.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Background AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	430	466	388	288	123	148	612	20	693
v/c Ratio	0.72	0.87	0.38	0.78	0.35	0.54	0.44	0.07	0.67
Control Delay	29.5	54.9	8.5	63.7	40.0	27.9	23.0	20.0	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	54.9	8.5	63.7	40.0	27.9	23.0	20.0	35.3
Queue Length 50th (ft)	205	302	26	103	73	66	135	8	214
Queue Length 95th (ft)	299	#463	65	#163	128	111	216	23	283
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	606	575	1066	374	371	278	1398	304	1042
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.81	0.36	0.77	0.33	0.53	0.44	0.07	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Background AM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	396	429	357	265	103	10	136	374	189	18	444	193
Future Volume (vph)	396	429	357	265	103	10	136	374	189	18	444	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1838		1770	3361		1770	3378	
Flt Permitted	0.51	1.00	1.00	0.95	1.00		0.19	1.00		0.41	1.00	
Satd. Flow (perm)	956	1863	2787	3433	1838		358	3361		767	3378	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	430	466	388	288	112	11	148	407	205	20	483	210
RTOR Reduction (vph)	0	0	212	0	3	0	0	54	0	0	43	0
Lane Group Flow (vph)	430	466	176	288	120	0	148	558	0	20	650	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	49.4	31.6	31.6	11.8	20.9		48.1	40.5		34.1	32.5	
Effective Green, g (s)	49.4	31.6	31.6	11.8	20.9		48.1	40.5		34.1	32.5	
Actuated g/C Ratio	0.45	0.29	0.29	0.11	0.19		0.44	0.37		0.31	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	595	535	800	368	349		273	1237		252	998	
v/s Ratio Prot	c0.15	c0.25		0.08	0.07		c0.04	0.17		0.00	c0.19	
v/s Ratio Perm	0.18		0.06				0.19			0.02		
v/c Ratio	0.72	0.87	0.22	0.78	0.34		0.54	0.45		0.08	0.65	
Uniform Delay, d1	22.3	37.3	29.8	47.9	38.6		21.2	26.3		26.5	33.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	14.4	0.1	10.4	0.6		2.2	1.2		0.1	3.3	
Delay (s)	26.7	51.7	30.0	58.2	39.2		23.4	27.5		26.6	37.1	
Level of Service	C	D	C	E	D		C	C		C	D	
Approach Delay (s)		36.7			52.5			26.7			36.8	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			36.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			77.0%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Background Midday Peak
Medical Office Center

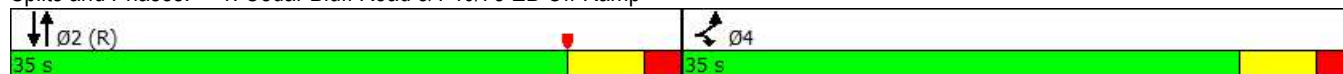
				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	484	551	1579	1319
Future Volume (vph)	484	551	1579	1319
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	24.4	24.4	37.6	37.6
Actuated g/C Ratio	0.35	0.35	0.54	0.54
v/c Ratio	0.66	0.69	0.50	0.52
Control Delay	21.1	25.3	11.7	10.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.1	25.3	11.7	10.8
LOS	C	C	B	B
Approach Delay	22.4		11.7	10.8
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 37 (53%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 14.2
 Intersection Capacity Utilization 64.4%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service C

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2030 Background Midday Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	772	353	1716	1434
v/c Ratio	0.66	0.69	0.50	0.52
Control Delay	21.1	25.3	11.7	10.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.1	25.3	11.7	10.8
Queue Length 50th (ft)	138	134	126	149
Queue Length 95th (ft)	163	196	191	224
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1495	651	3443	2746
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.52	0.54	0.50	0.52
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Background Midday Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	484	551	0	1579	1319	0
Future Volume (vph)	484	551	0	1579	1319	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.95	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3361	1455		6408	5111	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3361	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	526	599	0	1716	1434	0
RTOR Reduction (vph)	8	8	0	0	0	0
Lane Group Flow (vph)	764	345	0	1716	1434	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	22.4	22.4		35.6	35.6	
Effective Green, g (s)	24.4	24.4		37.6	37.6	
Actuated g/C Ratio	0.35	0.35		0.54	0.54	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1171	507		3442	2745	
v/s Ratio Prot	0.23	c0.24		0.27	c0.28	
v/s Ratio Perm						
v/c Ratio	0.65	0.68		0.50	0.52	
Uniform Delay, d1	19.2	19.5		10.2	10.4	
Progression Factor	1.00	1.00		1.00	0.91	
Incremental Delay, d2	1.0	2.8		0.5	0.6	
Delay (s)	20.2	22.3		10.8	10.1	
Level of Service	C	C		B	B	
Approach Delay (s)	20.9			10.8	10.1	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			13.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background Midday Peak
Medical Office Center

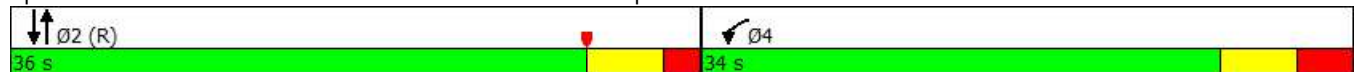
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↓↓↓
Traffic Volume (vph)	975	2062	612
Future Volume (vph)	975	2062	612
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	34.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	27.6	34.4	34.4
Actuated g/C Ratio	0.39	0.49	0.49
v/c Ratio	0.76	0.69	0.27
Control Delay	22.2	10.4	6.2
Queue Delay	0.0	0.0	0.0
Total Delay	22.2	10.4	6.2
LOS	C	B	A
Approach Delay	22.2	10.4	6.2
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 41 (59%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 64.4%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service C

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background Midday Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	1060	2241	665
v/c Ratio	0.76	0.69	0.27
Control Delay	22.2	10.4	6.2
Queue Delay	0.0	0.0	0.0
Total Delay	22.2	10.4	6.2
Queue Length 50th (ft)	191	108	39
Queue Length 95th (ft)	250	101	63
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1512	3266	2471
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	63	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.70	0.70	0.27
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background Midday Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	975	0	2062	0	0	612
Future Volume (vph)	975	0	2062	0	0	612
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1060	0	2241	0	0	665
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1060	0	2241	0	0	665
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	24.6		32.4			32.4
Effective Green, g (s)	27.6		34.4			34.4
Actuated g/C Ratio	0.39		0.49			0.49
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1391		3270			2473
v/s Ratio Prot	c0.30		c0.34			0.13
v/s Ratio Perm						
v/c Ratio	0.76		0.69			0.27
Uniform Delay, d1	18.4		13.6			10.4
Progression Factor	1.00		0.65			0.55
Incremental Delay, d2	2.3		1.0			0.2
Delay (s)	20.6		10.0			5.9
Level of Service	C		A			A
Approach Delay (s)	20.6		10.0			5.9
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			12.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

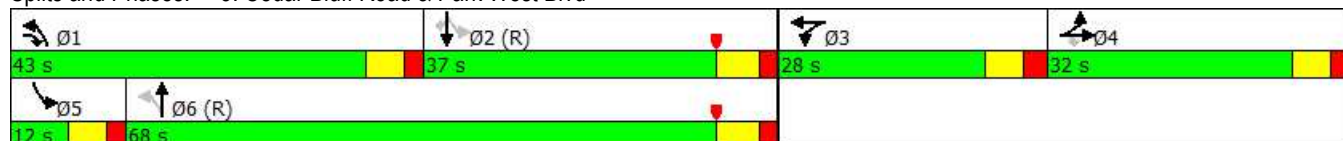
2030 Background Midday Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	101	54	340	143	278	415	844	34	518	61
Future Volume (vph)	101	54	340	143	278	415	844	34	518	61
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	32.0	32.0	43.0	28.0	28.0	43.0	68.0	12.0	37.0	37.0
Total Split (%)	22.9%	22.9%	30.7%	20.0%	20.0%	30.7%	48.6%	8.6%	26.4%	26.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	25.2	25.2	59.8	22.8	22.8	80.5	70.9	55.5	45.4	45.4
Actuated g/C Ratio	0.18	0.18	0.43	0.16	0.16	0.58	0.51	0.40	0.32	0.32
v/c Ratio	0.36	0.76	0.33	0.53	0.80	0.79	0.40	0.13	0.48	0.10
Control Delay	52.8	72.0	26.4	61.3	62.3	43.0	14.3	19.1	35.5	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.0	0.1	0.0	0.0	0.0
Total Delay	52.8	72.0	26.4	61.3	62.3	45.0	14.4	19.1	35.5	1.2
LOS	D	E	C	E	E	D	B	B	D	A
Approach Delay		50.2			62.1		23.8		31.2	
Approach LOS		D			E		C		C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 112 (80%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 36.6
 Intersection LOS: D
 Intersection Capacity Utilization 71.1%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2030 Background Midday Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	110	218	211	139	460	451	1028	37	563	66
v/c Ratio	0.36	0.76	0.33	0.53	0.80	0.79	0.40	0.13	0.48	0.10
Control Delay	52.8	72.0	26.4	61.3	62.3	43.0	14.3	19.1	35.5	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.0	0.1	0.0	0.0	0.0
Total Delay	52.8	72.0	26.4	61.3	62.3	45.0	14.4	19.1	35.5	1.2
Queue Length 50th (ft)	87	197	127	127	203	345	192	11	238	0
Queue Length 95th (ft)	145	293	171	205	269	460	224	m26	320	m8
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	349	322	731	277	607	644	2542	275	1171	639
Starvation Cap Reductn	0	0	0	0	0	86	511	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.68	0.29	0.50	0.76	0.81	0.51	0.13	0.48	0.10

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Background Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	54	340	143	278	131	415	844	102	34	518	61
Future Volume (vph)	101	54	340	143	278	131	415	844	102	34	518	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.89	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1584	1512	1618	3352		1770	5003		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.27	1.00		0.27	1.00	1.00
Satd. Flow (perm)	1719	1584	1512	1618	3352		508	5003		489	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	59	370	155	302	142	451	917	111	37	563	66
RTOR Reduction (vph)	0	0	0	0	33	0	0	10	0	0	0	45
Lane Group Flow (vph)	110	218	211	139	427	0	451	1018	0	37	563	21
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	22.2	22.2	51.3	20.3	20.3		78.0	67.1		47.8	42.9	42.9
Effective Green, g (s)	25.2	25.2	55.3	22.8	22.8		80.0	69.6		53.8	45.4	45.4
Actuated g/C Ratio	0.18	0.18	0.39	0.16	0.16		0.57	0.50		0.38	0.32	0.32
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	309	285	597	263	545		570	2487		258	1170	523
v/s Ratio Prot	0.06	c0.14	0.08	0.09	c0.13		c0.18	0.20		0.01	0.16	
v/s Ratio Perm			0.06				c0.28			0.05		0.01
v/c Ratio	0.36	0.76	0.35	0.53	0.78		0.79	0.41		0.14	0.48	0.04
Uniform Delay, d1	50.3	54.6	29.8	53.7	56.2		20.0	22.2		27.1	37.9	32.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.83	0.62		1.00	0.84	1.00
Incremental Delay, d2	0.5	11.1	0.3	1.5	7.0		5.2	0.4		0.2	1.2	0.1
Delay (s)	50.8	65.7	30.0	55.1	63.2		41.8	14.2		27.3	32.9	32.5
Level of Service	D	E	C	E	E		D	B		C	C	C
Approach Delay (s)		48.7			61.3			22.6			32.6	
Approach LOS		D			E			C			C	

Intersection Summary

HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

2030 Background Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	168	18	185	105	9	227	1005	22	1116
Future Volume (vph)	168	18	185	105	9	227	1005	22	1116
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	39.0	39.0	28.0	39.0	39.0	28.0	101.0	73.0	73.0
Total Split (%)	27.9%	27.9%	20.0%	27.9%	27.9%	20.0%	72.1%	52.1%	52.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	27.9	27.9	48.1		27.9	105.6	105.1	85.4	85.4
Actuated g/C Ratio	0.20	0.20	0.34		0.20	0.75	0.75	0.61	0.61
v/c Ratio	0.76	0.05	0.34		0.29	0.63	0.43	0.09	0.59
Control Delay	72.2	42.3	26.2		42.6	24.6	7.0	16.6	20.0
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	72.2	42.3	26.2		42.6	24.6	7.0	16.6	20.0
LOS	E	D	C		D	C	A	B	C
Approach Delay		47.8			42.6		10.2		20.0
Approach LOS		D			D		B		B

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 92 (66%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 20.3

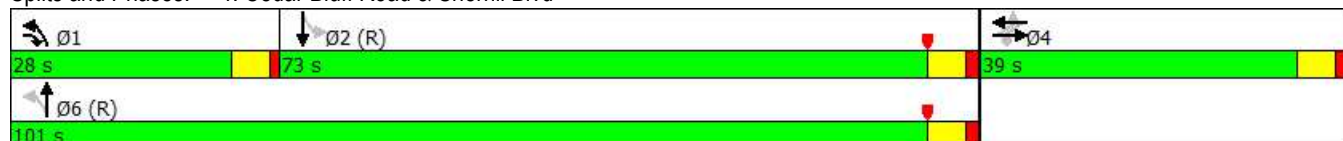
Intersection LOS: C

Intersection Capacity Utilization 72.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

2030 Background Midday Peak

4: Cedar Bluff Road & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	183	20	201	148	247	1140	24	1305
v/c Ratio	0.76	0.05	0.34	0.29	0.63	0.43	0.09	0.59
Control Delay	72.2	42.3	26.2	42.6	24.6	7.0	16.6	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.2	42.3	26.2	42.6	24.6	7.0	16.6	20.0
Queue Length 50th (ft)	158	15	106	54	130	210	9	362
Queue Length 95th (ft)	233	36	143	82	m212	262	30	565
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	306	493	691	646	492	2669	281	2199
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.04	0.29	0.23	0.50	0.43	0.09	0.59

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2030 Background Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	18	185	105	9	22	227	1005	44	22	1116	85
Future Volume (vph)	168	18	185	105	9	22	227	1005	44	22	1116	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3196		1906	3552		1761	3600	
Flt Permitted	0.62	1.00	1.00		0.75		0.13	1.00		0.25	1.00	
Satd. Flow (perm)	1209	1947	1655		2503		265	3552		462	3600	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	20	201	114	10	24	247	1092	48	24	1213	92
RTOR Reduction (vph)	0	0	28	0	12	0	0	2	0	0	3	0
Lane Group Flow (vph)	183	20	173	0	136	0	247	1138	0	24	1302	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	25.4	25.4	40.1		25.4		103.1	103.1		83.4	83.4	
Effective Green, g (s)	27.9	27.9	44.1		27.9		105.1	105.1		85.4	85.4	
Actuated g/C Ratio	0.20	0.20	0.32		0.20		0.75	0.75		0.61	0.61	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	240	388	521		498		394	2666		281	2196	
v/s Ratio Prot		0.01	0.04				c0.07	0.32			0.36	
v/s Ratio Perm	c0.15		0.06		0.05		c0.40			0.05		
v/c Ratio	0.76	0.05	0.33		0.27		0.63	0.43		0.09	0.59	
Uniform Delay, d1	52.9	45.3	36.7		47.5		14.4	6.4		11.2	16.7	
Progression Factor	1.00	1.00	1.00		1.00		1.81	0.93		1.00	1.00	
Incremental Delay, d2	13.4	0.1	0.3		0.3		2.5	0.5		0.6	1.2	
Delay (s)	66.3	45.4	37.0		47.8		28.6	6.5		11.8	17.9	
Level of Service	E	D	D		D		C	A		B	B	
Approach Delay (s)		50.7			47.8			10.4			17.8	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			72.1%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2030 Background Midday Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↑	↘	↑↑	
Traffic Volume (vph)	98	47	783	102	1438	
Future Volume (vph)	98	47	783	102	1438	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	22.0	14.0	54.0	14.0	68.0	22.0
Total Split (%)	24.4%	15.6%	60.0%	15.6%	75.6%	24%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effect Green (s)	12.3	22.7	58.9	69.0	69.3	
Actuated g/C Ratio	0.14	0.25	0.65	0.77	0.77	
v/c Ratio	0.56	0.12	0.45	0.27	0.58	
Control Delay	46.7	6.8	6.4	5.5	7.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.7	6.8	6.4	5.5	7.2	
LOS	D	A	A	A	A	
Approach Delay			6.4		7.1	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 36 (40%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 8.3
 Intersection Capacity Utilization 76.0%
 Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service D

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
14 s	54 s	22 s
↓ Ø6 (R)		↗ Ø8
68 s		22 s

Queues

2030 Background Midday Peak

5: Cedar Bluff Road & Fox Lonas Rd

Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	107	51	1025	111	1563
v/c Ratio	0.56	0.12	0.45	0.27	0.58
Control Delay	46.7	6.8	6.4	5.5	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	46.7	6.8	6.4	5.5	7.2
Queue Length 50th (ft)	58	0	85	14	191
Queue Length 95th (ft)	105	23	67	35	310
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	254	461	2283	436	2721
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.11	0.45	0.25	0.57
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2030 Background Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	98	0	47	0	783	160	102	1438	0
Future Volume (vph)	0	0	0	98	0	47	0	783	160	102	1438	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3449		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.22	1.00	
Satd. Flow (perm)				1410		1583		3449		400	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	107	0	51	0	851	174	111	1563	0
RTOR Reduction (vph)	0	0	0	0	0	42	0	15	0	0	0	0
Lane Group Flow (vph)	0	0	0	107	0	9	0	1010	0	111	1563	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				10.7		16.7		55.3		66.8	66.8	
Effective Green, g (s)				10.7		16.7		55.3		66.8	66.8	
Actuated g/C Ratio				0.12		0.19		0.61		0.74	0.74	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				167		293		2119		387	2614	
v/s Ratio Prot						0.00		0.29		0.02	c0.44	
v/s Ratio Perm				c0.08		0.00				0.19		
v/c Ratio				0.64		0.03		0.48		0.29	0.60	
Uniform Delay, d1				37.8		30.0		9.5		4.5	5.4	
Progression Factor				1.00		1.00		0.55		1.00	1.00	
Incremental Delay, d2				8.1		0.0		0.7		0.4	1.0	
Delay (s)				45.9		30.1		6.0		5.0	6.4	
Level of Service				D		C		A		A	A	
Approach Delay (s)		0.0			40.8			6.0			6.3	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.1									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			90.0							18.0		
Intersection Capacity Utilization			76.0%							D		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

2030 Background Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	81	47	69	58	91	176	690	22	1062
Future Volume (vph)	81	47	69	58	91	176	690	22	1062
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	12.0	14.0	17.0	12.0	14.0	17.0	52.0	12.0	47.0
Total Split (%)	13.3%	15.6%	18.9%	13.3%	15.6%	18.9%	57.8%	13.3%	52.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	12.1	8.0	20.6	15.1	8.2	58.9	54.0	49.9	43.4
Actuated g/C Ratio	0.13	0.09	0.23	0.17	0.09	0.65	0.60	0.55	0.48
v/c Ratio	0.42	0.31	0.17	0.26	0.65	0.67	0.39	0.06	0.73
Control Delay	37.0	43.7	2.7	30.7	56.5	25.9	11.4	5.1	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	43.7	2.7	30.7	56.5	25.9	11.4	5.1	17.8
LOS	D	D	A	C	E	C	B	A	B
Approach Delay		26.6			47.1		14.2		17.5
Approach LOS		C			D		B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 16 (18%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 18.9

Intersection LOS: B

Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
12 s	52 s	12 s	14 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
17 s	47 s	12 s	14 s

Queues

2030 Background Midday Peak

6: Cedar Bluff Road & Dutchtown Rd

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	88	51	75	63	111	191	810	24	1234
v/c Ratio	0.42	0.31	0.17	0.26	0.65	0.67	0.39	0.06	0.73
Control Delay	37.0	43.7	2.7	30.7	56.5	25.9	11.4	5.1	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	43.7	2.7	30.7	56.5	25.9	11.4	5.1	17.8
Queue Length 50th (ft)	40	28	0	28	59	46	108	2	318
Queue Length 95th (ft)	82	63	14	63	#136	116	192	m5	127
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200		200	150		100		50	
Base Capacity (vph)	210	166	477	247	172	311	2103	429	1702
Starvation Cap Reductn	0	0	0	0	0	0	0	0	5
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.31	0.16	0.26	0.65	0.61	0.39	0.06	0.73

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2030 Background Midday Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	47	69	58	91	11	176	690	55	22	1062	74
Future Volume (vph)	81	47	69	58	91	11	176	690	55	22	1062	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1833		1770	3500		1761	3487	
Flt Permitted	0.69	1.00	1.00	0.49	1.00		0.10	1.00		0.35	1.00	
Satd. Flow (perm)	1277	1863	1583	918	1833		178	3500		641	3487	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	51	75	63	99	12	191	750	60	24	1154	80
RTOR Reduction (vph)	0	0	62	0	4	0	0	6	0	0	5	0
Lane Group Flow (vph)	88	51	13	63	107	0	191	804	0	24	1229	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	12.1	6.4	15.8	18.1	9.4		56.4	48.0		43.4	41.0	
Effective Green, g (s)	12.1	6.4	15.8	18.1	9.4		56.4	48.0		43.4	41.0	
Actuated g/C Ratio	0.13	0.07	0.18	0.20	0.10		0.63	0.53		0.48	0.46	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	132	383	266	191		277	1866		338	1588	
v/s Ratio Prot	c0.03	0.03	0.00	0.02	c0.06		c0.07	0.23		0.00	c0.35	
v/s Ratio Perm	0.03		0.00	0.02			0.36			0.03		
v/c Ratio	0.44	0.39	0.03	0.24	0.56		0.69	0.43		0.07	0.77	
Uniform Delay, d1	35.5	39.9	30.8	29.8	38.3		15.8	12.7		12.2	20.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.73	0.77	
Incremental Delay, d2	1.5	1.9	0.0	0.5	3.5		7.0	0.7		0.1	3.1	
Delay (s)	37.0	41.8	30.8	30.3	41.8		22.8	13.5		9.0	18.9	
Level of Service	D	D	C	C	D		C	B		A	B	
Approach Delay (s)		36.0			37.7			15.2			18.7	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.0				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			24.5		
Intersection Capacity Utilization			68.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Background Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	315	23	40	264	50	10	28	32	33	62	12
Future Volume (Veh/h)	28	315	23	40	264	50	10	28	32	33	62	12
Sign Control	Free			Free			Stop			Stop		
Grade	-9%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	342	25	43	287	54	11	30	35	36	67	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									40			
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)					1142							
pX, platoon unblocked												
vC, conflicting volume	341				367				690	842	184	646
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	341				367				690	842	184	646
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5
tC, 2 stage (s)												
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5
p0 queue free %	98				96				96	89	96	88
cM capacity (veh/h)	1215				1188				256	281	827	299
287 844												
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	30	228	139	186	198	76	36	80				
Volume Left	30	0	0	43	0	11	36	0				
Volume Right	0	0	25	0	54	35	0	13				
cSH	1215	1700	1700	1188	1700	509	299	322				
Volume to Capacity	0.02	0.13	0.08	0.04	0.12	0.15	0.12	0.25				
Queue Length 95th (ft)	2	0	0	3	0	13	10	24				
Control Delay (s)	8.0	0.0	0.0	2.1	0.0	15.4	18.7	19.9				
Lane LOS	A				A	C			C	C		
Approach Delay (s)	0.6				1.0	15.4			19.5			
Approach LOS							C	C				
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			38.2%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Background Midday Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↖	↘	↗
Traffic Volume (veh/h)	560	87	23	466	77	18
Future Volume (Veh/h)	560	87	23	466	77	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	609	95	25	507	84	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			704		1214	656
vC1, stage 1 conf vol					656	
vC2, stage 2 conf vol					557	
vCu, unblocked vol			704		1214	656
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		80	96
cM capacity (veh/h)			894		412	465
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	704	25	507	84	20	
Volume Left	0	25	0	84	0	
Volume Right	95	0	0	0	20	
cSH	1700	894	1700	412	465	
Volume to Capacity	0.41	0.03	0.30	0.20	0.04	
Queue Length 95th (ft)	0	2	0	19	3	
Control Delay (s)	0.0	9.1	0.0	16.0	13.1	
Lane LOS		A		C	B	
Approach Delay (s)	0.0	0.4		15.4		
Approach LOS				C		
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			45.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2030 Background Midday Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	563	436	0	203	4
Future Volume (Veh/h)	0	563	436	0	203	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	612	474	0	221	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	474				780	237
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	474				780	237
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				33	99
cM capacity (veh/h)	1084				332	764
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	204	408	316	158	221	4
Volume Left	0	0	0	0	221	0
Volume Right	0	0	0	0	0	4
cSH	1084	1700	1700	1700	332	764
Volume to Capacity	0.00	0.24	0.19	0.09	0.67	0.01
Queue Length 95th (ft)	0	0	0	0	113	0
Control Delay (s)	0.0	0.0	0.0	0.0	35.0	9.7
Lane LOS					D	A
Approach Delay (s)	0.0		0.0		34.5	
Approach LOS					D	
Intersection Summary						
Average Delay			5.9			
Intersection Capacity Utilization			33.5%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Background Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	91	247	196	129	292	170	204	39	76
Future Volume (vph)	91	247	196	129	292	170	204	39	76
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	12.0	29.0	29.0	13.0	30.0	18.0	28.0	10.0	20.0
Total Split (%)	15.0%	36.3%	36.3%	16.3%	37.5%	22.5%	35.0%	12.5%	25.0%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	23.9	17.9	17.9	6.9	21.2	36.3	29.9	26.2	20.1
Actuated g/C Ratio	0.30	0.22	0.22	0.09	0.26	0.45	0.37	0.33	0.25
v/c Ratio	0.33	0.64	0.25	0.48	0.69	0.37	0.29	0.11	0.23
Control Delay	18.0	34.8	1.4	40.6	34.2	16.8	12.4	15.6	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	34.8	1.4	40.6	34.2	16.8	12.4	15.6	12.6
LOS	B	C	A	D	C	B	B	B	B
Approach Delay		19.7			36.0		13.9		13.1
Approach LOS		B			D		B		B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 21.2

Intersection LOS: C

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	20 s	12 s	30 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
10 s	28 s	13 s	29 s

Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Background Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	99	268	213	140	338	185	393	42	210
v/c Ratio	0.33	0.64	0.25	0.48	0.69	0.37	0.29	0.11	0.23
Control Delay	18.0	34.8	1.4	40.6	34.2	16.8	12.4	15.6	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	34.8	1.4	40.6	34.2	16.8	12.4	15.6	12.6
Queue Length 50th (ft)	31	121	0	35	154	55	44	11	17
Queue Length 95th (ft)	56	183	7	62	228	108	83	32	48
Internal Link Dist (ft)	1094				6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	298	535	1015	300	556	525	1343	372	905
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.50	0.21	0.47	0.61	0.35	0.29	0.11	0.23
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Background Midday Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	91	247	196	129	292	19	170	204	157	39	76	117
Future Volume (vph)	91	247	196	129	292	19	170	204	157	39	76	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1845		1770	3308		1770	3218	
Flt Permitted	0.40	1.00	1.00	0.95	1.00		0.46	1.00		0.52	1.00	
Satd. Flow (perm)	740	1863	2787	3433	1845		860	3308		968	3218	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	268	213	140	317	21	185	222	171	42	83	127
RTOR Reduction (vph)	0	0	162	0	3	0	0	115	0	0	97	0
Lane Group Flow (vph)	99	268	51	140	335	0	185	278	0	42	113	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	23.9	19.1	19.1	6.9	21.2		35.5	26.3		22.1	18.9	
Effective Green, g (s)	23.9	19.1	19.1	6.9	21.2		35.5	26.3		22.1	18.9	
Actuated g/C Ratio	0.30	0.24	0.24	0.09	0.26		0.44	0.33		0.28	0.24	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	282	444	665	296	488		496	1087		299	760	
v/s Ratio Prot	0.02	0.14		c0.04	c0.18		c0.05	0.08		0.01	0.04	
v/s Ratio Perm	0.08		0.02				c0.12			0.03		
v/c Ratio	0.35	0.60	0.08	0.47	0.69		0.37	0.26		0.14	0.15	
Uniform Delay, d1	21.0	27.1	23.6	34.8	26.4		14.1	19.7		21.5	24.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	2.3	0.0	1.2	4.0		0.5	0.6		0.2	0.4	
Delay (s)	21.8	29.4	23.7	36.0	30.4		14.6	20.2		21.7	24.6	
Level of Service	C	C	C	D	C		B	C		C	C	
Approach Delay (s)		26.0			32.0			18.4			24.1	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			25.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			60.1%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

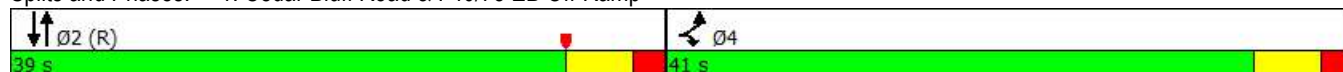
2030 Background PM Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	614	572	1568	1411
Future Volume (vph)	614	572	1568	1411
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	41.0	41.0	39.0	39.0
Total Split (%)	51.3%	51.3%	48.8%	48.8%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	30.0	30.0	42.0	42.0
Actuated g/C Ratio	0.38	0.38	0.52	0.52
v/c Ratio	0.69	0.73	0.51	0.57
Control Delay	23.4	28.7	13.9	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.4	28.7	13.9	11.0
LOS	C	C	B	B
Approach Delay	25.1		13.9	11.0
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 42 (53%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 16.1
 Intersection Capacity Utilization 57.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2030 Background PM Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	885	404	1704	1534
v/c Ratio	0.69	0.73	0.51	0.57
Control Delay	23.4	28.7	13.9	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.4	28.7	13.9	11.0
Queue Length 50th (ft)	185	181	151	175
Queue Length 95th (ft)	211	254	219	226
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1571	677	3360	2680
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.56	0.60	0.51	0.57
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Background PM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	614	572	0	1568	1411	0
Future Volume (vph)	614	572	0	1568	1411	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.96	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3387	1455		6408	5111	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3387	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	667	622	0	1704	1534	0
RTOR Reduction (vph)	6	6	0	0	0	0
Lane Group Flow (vph)	879	398	0	1704	1534	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	28.0	28.0		40.0	40.0	
Effective Green, g (s)	30.0	30.0		42.0	42.0	
Actuated g/C Ratio	0.38	0.38		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1270	545		3364	2683	
v/s Ratio Prot	0.26	c0.27		0.27	c0.30	
v/s Ratio Perm						
v/c Ratio	0.69	0.73		0.51	0.57	
Uniform Delay, d1	21.1	21.5		12.3	12.9	
Progression Factor	1.00	1.00		1.00	0.74	
Incremental Delay, d2	1.3	4.3		0.5	0.8	
Delay (s)	22.4	25.9		12.8	10.3	
Level of Service	C	C		B	B	
Approach Delay (s)	23.5			12.8	10.3	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			15.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			57.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings 2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background PM Peak
Medical Office Center

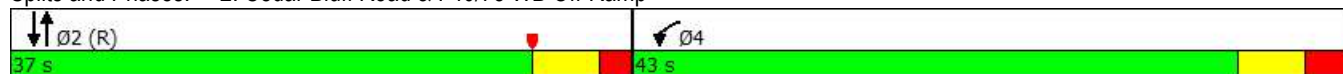
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	969	1568	850
Future Volume (vph)	969	1568	850
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	43.0	37.0	37.0
Total Split (%)	53.8%	46.3%	46.3%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	32.6	39.4	39.4
Actuated g/C Ratio	0.41	0.49	0.49
v/c Ratio	0.73	0.52	0.37
Control Delay	22.9	10.6	10.6
Queue Delay	0.0	0.0	0.0
Total Delay	22.9	10.6	10.6
LOS	C	B	B
Approach Delay	22.9	10.6	10.6
Approach LOS	C	B	B

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 48 (60%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 14.2
 Intersection Capacity Utilization 57.5%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service B

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background PM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	1053	1704	924
v/c Ratio	0.73	0.52	0.37
Control Delay	22.9	10.6	10.6
Queue Delay	0.0	0.0	0.0
Total Delay	22.9	10.6	10.6
Queue Length 50th (ft)	221	84	76
Queue Length 95th (ft)	252	96	103
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1720	3277	2479
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.61	0.52	0.37
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background PM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	969	0	1568	0	0	850
Future Volume (vph)	969	0	1568	0	0	850
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1053	0	1704	0	0	924
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1053	0	1704	0	0	924
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	29.6		37.4			37.4
Effective Green, g (s)	32.6		39.4			39.4
Actuated g/C Ratio	0.41		0.49			0.49
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1438		3277			2479
v/s Ratio Prot	c0.30		c0.26			0.18
v/s Ratio Perm						
v/c Ratio	0.73		0.52			0.37
Uniform Delay, d1	20.0		13.8			12.6
Progression Factor	1.00		0.69			0.78
Incremental Delay, d2	1.7		0.5			0.3
Delay (s)	21.7		10.1			10.1
Level of Service	C		B			B
Approach Delay (s)	21.7		10.1			10.1
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay			13.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			57.5%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

Timings

3: Cedar Bluff Road & Park West Blvd

2030 Background PM Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	83	38	416	318	93	220	587	34	951	36
Future Volume (vph)	83	38	416	318	93	220	587	34	951	36
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	38.0	38.0	27.0	34.0	34.0	27.0	71.0	17.0	61.0	61.0
Total Split (%)	23.8%	23.8%	16.9%	21.3%	21.3%	16.9%	44.4%	10.6%	38.1%	38.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	31.2	31.2	55.8	26.8	26.8	90.5	80.1	76.2	65.4	65.4
Actuated g/C Ratio	0.20	0.20	0.35	0.17	0.17	0.57	0.50	0.48	0.41	0.41
v/c Ratio	0.27	0.82	0.46	0.80	0.65	0.74	0.29	0.10	0.70	0.05
Control Delay	55.9	83.2	42.7	85.7	49.2	55.1	15.8	15.6	32.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	83.2	42.7	85.7	49.2	55.1	15.8	15.6	32.0	0.1
LOS	E	F	D	F	D	E	B	B	C	A
Approach Delay		62.0			61.8		25.6		30.3	
Approach LOS		E			E		C		C	

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 44 (28%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 40.6

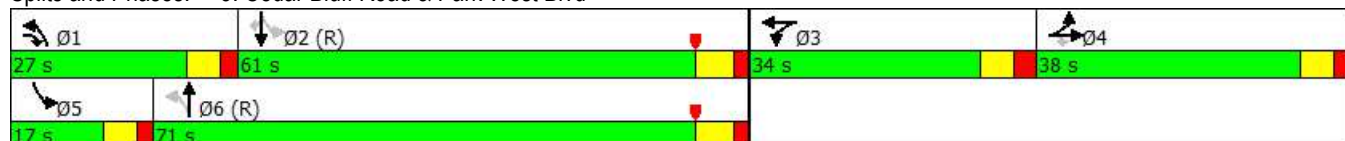
Intersection LOS: D

Intersection Capacity Utilization 73.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2030 Background PM Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	90	249	244	218	414	239	721	37	1034	39
v/c Ratio	0.27	0.82	0.46	0.80	0.65	0.74	0.29	0.10	0.70	0.05
Control Delay	55.9	83.2	42.7	85.7	49.2	55.1	15.8	15.6	32.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	83.2	42.7	85.7	49.2	55.1	15.8	15.6	32.0	0.1
Queue Length 50th (ft)	79	261	198	240	161	218	158	13	511	0
Queue Length 95th (ft)	134	372	286	348	223	328	187	m25	400	m0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	370	335	546	303	699	344	2510	431	1475	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.74	0.45	0.72	0.59	0.69	0.29	0.09	0.70	0.05

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Background PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	38	416	318	93	170	220	587	76	34	951	36
Future Volume (vph)	83	38	416	318	93	170	220	587	76	34	951	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.87	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1556	1512	1618	3235		1770	4997		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.98		0.11	1.00		0.37	1.00	1.00
Satd. Flow (perm)	1719	1556	1512	1618	3235		209	4997		672	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	41	452	346	101	185	239	638	83	37	1034	39
RTOR Reduction (vph)	0	0	0	0	95	0	0	9	0	0	0	23
Lane Group Flow (vph)	90	249	244	218	319	0	239	712	0	37	1034	16
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	28.2	28.2	47.3	24.3	24.3		88.0	76.4		68.5	62.9	62.9
Effective Green, g (s)	31.2	31.2	51.3	26.8	26.8		90.0	78.9		74.5	65.4	65.4
Actuated g/C Ratio	0.19	0.19	0.32	0.17	0.17		0.56	0.49		0.47	0.41	0.41
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	335	303	484	271	541		323	2464		370	1475	660
v/s Ratio Prot	0.05	c0.16	0.07	c0.13	0.10		c0.10	0.14		0.01	0.29	
v/s Ratio Perm			0.10				c0.32			0.04		0.01
v/c Ratio	0.27	0.82	0.50	0.80	0.59		0.74	0.29		0.10	0.70	0.02
Uniform Delay, d1	54.7	61.7	44.0	64.1	61.5		31.7	24.0		23.3	39.2	28.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.54	0.64		0.83	0.71	1.00
Incremental Delay, d2	0.3	15.9	0.6	15.4	1.4		7.1	0.3		0.1	2.5	0.1
Delay (s)	55.0	77.6	44.6	79.4	62.9		55.8	15.5		19.3	30.4	28.3
Level of Service	E	E	D	E	E		E	B		B	C	C
Approach Delay (s)		60.3			68.6			25.6			30.0	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			41.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			73.9%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

2030 Background PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	192	3	55	83	0	72	905	7	1197
Future Volume (vph)	192	3	55	83	0	72	905	7	1197
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	52.0	52.0	13.0	52.0	52.0	13.0	108.0	95.0	95.0
Total Split (%)	32.5%	32.5%	8.1%	32.5%	32.5%	8.1%	67.5%	59.4%	59.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	32.8	32.8	45.2		32.8	120.7	120.2	108.3	108.3
Actuated g/C Ratio	0.20	0.20	0.28		0.20	0.75	0.75	0.68	0.68
v/c Ratio	0.76	0.01	0.12		0.17	0.25	0.37	0.02	0.54
Control Delay	76.9	45.3	11.3		24.3	8.0	7.2	11.6	15.2
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	76.9	45.3	11.3		24.3	8.0	7.2	11.6	15.2
LOS	E	D	B		C	A	A	B	B
Approach Delay		62.1			24.3		7.3		15.1
Approach LOS		E			C		A		B

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 67 (42%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 17.0
 Intersection Capacity Utilization 69.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

2030 Background PM Peak

4: Cedar Bluff Road & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	209	3	60	95	78	1001	8	1316
v/c Ratio	0.76	0.01	0.12	0.17	0.25	0.37	0.02	0.54
Control Delay	76.9	45.3	11.3	24.3	8.0	7.2	11.6	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.9	45.3	11.3	24.3	8.0	7.2	11.6	15.2
Queue Length 50th (ft)	208	3	6	20	15	150	3	343
Queue Length 95th (ft)	285	12	39	43	m36	191	11	502
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	406	590	516	788	326	2677	355	2458
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.01	0.12	0.12	0.24	0.37	0.02	0.54

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2030 Background PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	3	55	83	0	5	72	905	16	7	1197	14
Future Volume (vph)	192	3	55	83	0	5	72	905	16	7	1197	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3223		1906	3566		1761	3633	
Flt Permitted	0.69	1.00	1.00		0.74		0.15	1.00		0.28	1.00	
Satd. Flow (perm)	1342	1947	1655		2484		299	3566		525	3633	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	3	60	90	0	5	78	984	17	8	1301	15
RTOR Reduction (vph)	0	0	39	0	41	0	0	0	0	0	0	0
Lane Group Flow (vph)	209	3	21	0	54	0	78	1001	0	8	1316	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	30.3	30.3	37.2		30.3		118.2	118.2		106.3	106.3	
Effective Green, g (s)	32.8	32.8	41.2		32.8		120.2	120.2		108.3	108.3	
Actuated g/C Ratio	0.20	0.20	0.26		0.20		0.75	0.75		0.68	0.68	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	275	399	426		509		314	2678		355	2459	
v/s Ratio Prot		0.00	0.00				0.01	c0.28			c0.36	
v/s Ratio Perm	c0.16		0.01		0.02		0.17			0.02		
v/c Ratio	0.76	0.01	0.05		0.11		0.25	0.37		0.02	0.54	
Uniform Delay, d1	59.9	50.6	44.7		51.7		9.1	6.9		8.5	13.1	
Progression Factor	1.00	1.00	1.00		1.00		1.01	0.90		1.00	1.00	
Incremental Delay, d2	11.7	0.0	0.0		0.1		0.3	0.4		0.1	0.8	
Delay (s)	71.6	50.6	44.7		51.8		9.4	6.6		8.6	13.9	
Level of Service	E	D	D		D		A	A		A	B	
Approach Delay (s)		65.4			51.8			6.8			13.9	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			17.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			69.5%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2030 Background PM Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↑	↘	↑↑	
Traffic Volume (vph)	95	61	1033	69	1202	
Future Volume (vph)	95	61	1033	69	1202	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	24.0	14.0	77.0	14.0	91.0	24.0
Total Split (%)	20.9%	12.2%	67.0%	12.2%	79.1%	21%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	13.7	26.5	78.8	89.8	88.8	
Actuated g/C Ratio	0.12	0.23	0.69	0.78	0.77	
v/c Ratio	0.62	0.16	0.61	0.27	0.48	
Control Delay	63.1	8.5	9.6	6.0	5.8	
Queue Delay	0.0	0.0	0.1	0.0	0.1	
Total Delay	63.1	8.5	9.7	6.0	5.9	
LOS	E	A	A	A	A	
Approach Delay			9.7		5.9	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 57 (50%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 9.7
 Intersection Capacity Utilization 69.3%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
14 s	77 s	24 s
↓ Ø6 (R)		↘ Ø8
91 s		24 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2030 Background PM Peak
Medical Office Center

Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	103	66	1433	75	1307
v/c Ratio	0.62	0.16	0.61	0.27	0.48
Control Delay	63.1	8.5	9.6	6.0	5.8
Queue Delay	0.0	0.0	0.1	0.0	0.1
Total Delay	63.1	8.5	9.7	6.0	5.9
Queue Length 50th (ft)	74	0	169	10	153
Queue Length 95th (ft)	125	33	m472	26	241
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	223	437	2372	297	2728
Starvation Cap Reductn	0	0	112	0	0
Spillback Cap Reductn	0	0	0	0	221
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.46	0.15	0.63	0.25	0.52

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2030 Background PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	95	0	61	0	1033	285	69	1202	0
Future Volume (vph)	0	0	0	95	0	61	0	1033	285	69	1202	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3424		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.13	1.00	
Satd. Flow (perm)				1410		1583		3424		237	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	103	0	66	0	1123	310	75	1307	0
RTOR Reduction (vph)	0	0	0	0	0	55	0	18	0	0	0	0
Lane Group Flow (vph)	0	0	0	103	0	11	0	1415	0	75	1307	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				13.7		19.3		77.7		88.8	88.8	
Effective Green, g (s)				13.7		19.3		77.7		88.8	88.8	
Actuated g/C Ratio				0.12		0.17		0.68		0.77	0.77	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				167		265		2313		257	2719	
v/s Ratio Prot						0.00		c0.41		0.01	c0.37	
v/s Ratio Perm				c0.07		0.00				0.21		
v/c Ratio				0.62		0.04		0.61		0.29	0.48	
Uniform Delay, d1				48.2		40.1		10.3		6.8	4.7	
Progression Factor				1.00		1.00		0.79		1.00	1.00	
Incremental Delay, d2				6.6		0.1		1.1		0.6	0.6	
Delay (s)				54.8		40.2		9.3		7.5	5.4	
Level of Service				D		D		A		A	A	
Approach Delay (s)		0.0			49.1			9.3			5.5	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8									
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			69.3%							C		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

2030 Background PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	225	114	66	28	183	262	771	26	1104
Future Volume (vph)	225	114	66	28	183	262	771	26	1104
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	19.0	28.0	21.0	12.0	21.0	21.0	63.0	12.0	54.0
Total Split (%)	16.5%	24.3%	18.3%	10.4%	18.3%	18.3%	54.8%	10.4%	47.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	34.8	27.6	48.6	21.0	15.0	68.2	60.5	53.2	46.7
Actuated g/C Ratio	0.30	0.24	0.42	0.18	0.13	0.59	0.53	0.46	0.41
v/c Ratio	0.86	0.28	0.10	0.12	0.99	0.95	0.48	0.09	0.94
Control Delay	61.9	40.2	3.5	31.0	103.9	72.2	18.8	9.6	42.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Total Delay	61.9	40.2	3.5	31.0	103.9	72.2	18.9	9.6	42.8
LOS	E	D	A	C	F	E	B	A	D
Approach Delay		46.3			95.8		31.9		42.1
Approach LOS		D			F		C		D

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 16 (14%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 43.4
 Intersection LOS: D
 Intersection Capacity Utilization 93.6%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues
6: Cedar Bluff Road & Dutchtown Rd

2030 Background PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	245	124	72	30	239	285	881	28	1330
v/c Ratio	0.86	0.28	0.10	0.12	0.99	0.95	0.48	0.09	0.94
Control Delay	61.9	40.2	3.5	31.0	103.9	72.2	18.8	9.6	42.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Total Delay	61.9	40.2	3.5	31.0	103.9	72.2	18.9	9.6	42.8
Queue Length 50th (ft)	148	80	0	16	174	155	224	5	488
Queue Length 95th (ft)	#268	138	21	39	#340	#326	281	m14	#604
Internal Link Dist (ft)	2065				1954		1139		493
Turn Bay Length (ft)	200		200		150		100		50
Base Capacity (vph)	286	446	720	256	242	299	1852	322	1439
Starvation Cap Reductn	0	0	0	0	0	0	0	0	18
Spillback Cap Reductn	0	0	0	0	0	0	92	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.28	0.10	0.12	0.99	0.95	0.50	0.09	0.94

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2030 Background PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	114	66	28	183	37	262	771	40	26	1104	120
Future Volume (vph)	225	114	66	28	183	37	262	771	40	26	1104	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1816		1770	3513		1761	3470	
Flt Permitted	0.22	1.00	1.00	0.68	1.00		0.08	1.00		0.30	1.00	
Satd. Flow (perm)	411	1863	1583	1262	1816		148	3513		562	3470	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	124	72	30	199	40	285	838	43	28	1200	130
RTOR Reduction (vph)	0	0	45	0	6	0	0	3	0	0	7	0
Lane Group Flow (vph)	245	124	27	30	233	0	285	878	0	28	1323	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	37.2	27.6	42.6	21.0	17.4		65.3	55.7		47.9	44.3	
Effective Green, g (s)	37.2	27.6	42.6	21.0	17.4		65.3	55.7		47.9	44.3	
Actuated g/C Ratio	0.32	0.24	0.37	0.18	0.15		0.57	0.48		0.42	0.39	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	296	447	668	246	274		295	1701		271	1336	
v/s Ratio Prot	c0.10	0.07	0.01	0.00	0.13		c0.13	0.25		0.00	0.38	
v/s Ratio Perm	c0.17		0.01	0.02			c0.42			0.04		
v/c Ratio	0.83	0.28	0.04	0.12	0.85		0.97	0.52		0.10	0.99	
Uniform Delay, d1	31.8	35.6	23.1	39.1	47.5		36.1	20.4		19.9	35.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.87	0.91	
Incremental Delay, d2	17.1	0.3	0.0	0.2	21.5		42.8	1.1		0.2	21.0	
Delay (s)	48.8	35.9	23.2	39.3	69.1		78.9	21.5		17.4	53.0	
Level of Service	D	D	C	D	E		E	C		B	D	
Approach Delay (s)		41.0			65.7			35.5			52.2	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			45.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			93.6%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Background PM Peak
Medical Office Center

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	36	401	10	25	171	81	23	45	21	80	106	7		
Future Volume (Veh/h)	36	401	10	25	171	81	23	45	21	80	106	7		
Sign Control	Free			Free			Stop			Stop				
Grade	-9%			0%			0%			0%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	39	436	11	27	186	88	25	49	23	87	115	8		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)									40					
Median type	None				None									
Median storage (veh)														
Upstream signal (ft)					1142									
pX, platoon unblocked														
vC, conflicting volume	274				447				732	848	224	604	809	137
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	274				447				732	848	224	604	809	137
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97				98				88	83	97	72	61	99
cM capacity (veh/h)	1286				1110				205	281	780	308	296	886
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	39	291	156	120	181	97	87	123						
Volume Left	39	0	0	27	0	25	87	0						
Volume Right	0	0	11	0	88	23	0	8						
cSH	1286	1700	1700	1110	1700	335	308	309						
Volume to Capacity	0.03	0.17	0.09	0.02	0.11	0.29	0.28	0.40						
Queue Length 95th (ft)	2	0	0	2	0	29	28	46						
Control Delay (s)	7.9	0.0	0.0	2.0	0.0	21.2	21.2	24.1						
Lane LOS	A				A				C	C	C			
Approach Delay (s)	0.6				0.8				21.2	22.9				
Approach LOS							C	C						
Intersection Summary														
Average Delay				6.8										
Intersection Capacity Utilization				40.5%	ICU Level of Service					A				
Analysis Period (min)				15										

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Background PM Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	1115	136	68	951	172	54
Future Volume (Veh/h)	1115	136	68	951	172	54
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1212	148	74	1034	187	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1360		2468	1286
vC1, stage 1 conf vol					1286	
vC2, stage 2 conf vol					1182	
vCu, unblocked vol			1360		2468	1286
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			85		0	71
cM capacity (veh/h)			505		174	201
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	1360	74	1034	187	59	
Volume Left	0	74	0	187	0	
Volume Right	148	0	0	0	59	
cSH	1700	505	1700	174	201	
Volume to Capacity	0.80	0.15	0.61	1.07	0.29	
Queue Length 95th (ft)	0	13	0	230	29	
Control Delay (s)	0.0	13.3	0.0	143.1	30.2	
Lane LOS		B		F	D	
Approach Delay (s)	0.0	0.9		116.0		
Approach LOS				F		
Intersection Summary						
Average Delay			10.9			
Intersection Capacity Utilization			83.1%	ICU Level of Service		E
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2030 Background PM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	0	528	346	0	11	0
Future Volume (Veh/h)	0	528	346	0	11	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	574	376	0	12	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	376				663	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	376				663	188
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1179				394	822
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	191	383	251	125	12	0
Volume Left	0	0	0	0	12	0
Volume Right	0	0	0	0	0	0
cSH	1179	1700	1700	1700	394	1700
Volume to Capacity	0.00	0.23	0.15	0.07	0.03	0.00
Queue Length 95th (ft)	0	0	0	0	2	0
Control Delay (s)	0.0	0.0	0.0	0.0	14.4	0.0
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		14.4	
Approach LOS					B	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			24.6%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Background PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	400	211	134	496	293	327	742	15	533
Future Volume (vph)	400	211	134	496	293	327	742	15	533
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	31.0	31.0	31.0	28.0	28.0	28.0	50.4	10.6	33.0
Total Split (%)	25.8%	25.8%	25.8%	23.3%	23.3%	23.3%	42.0%	8.8%	27.5%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	50.6	25.6	25.6	21.4	22.0	54.5	50.3	32.3	27.2
Actuated g/C Ratio	0.42	0.21	0.21	0.18	0.18	0.45	0.42	0.27	0.23
v/c Ratio	1.01	0.58	0.19	0.88	0.99	0.92	0.65	0.09	0.81
Control Delay	80.6	49.3	2.2	64.9	96.4	59.9	30.7	21.3	52.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.6	49.3	2.2	64.9	96.4	59.9	30.7	21.3	52.4
LOS	F	D	A	E	F	E	C	C	D
Approach Delay		57.6			77.0		38.7		51.6
Approach LOS		E			E		D		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 54.4

Intersection LOS: D

Intersection Capacity Utilization 94.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
28 s	33 s	31 s	28 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
10.6 s	50.4 s	28 s	31 s

Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Background PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	435	229	146	539	338	355	947	16	641
v/c Ratio	1.01	0.58	0.19	0.88	0.99	0.92	0.65	0.09	0.81
Control Delay	80.6	49.3	2.2	64.9	96.4	59.9	30.7	21.3	52.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.6	49.3	2.2	64.9	96.4	59.9	30.7	21.3	52.4
Queue Length 50th (ft)	~296	162	0	210	263	206	277	7	247
Queue Length 95th (ft)	#511	247	10	#297	#459	#384	406	20	#321
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	430	397	751	629	340	393	1459	187	796
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.58	0.19	0.86	0.99	0.90	0.65	0.09	0.81

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Background PM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	400	211	134	496	293	18	327	742	129	15	533	57
Future Volume (vph)	400	211	134	496	293	18	327	742	129	15	533	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1846		1770	3461		1770	3488	
Flt Permitted	0.16	1.00	1.00	0.95	1.00		0.15	1.00		0.28	1.00	
Satd. Flow (perm)	291	1863	2787	3433	1846		278	3461		520	3488	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	435	229	146	539	318	20	355	807	140	16	579	62
RTOR Reduction (vph)	0	0	115	0	2	0	0	11	0	0	7	0
Lane Group Flow (vph)	435	229	31	539	336	0	355	936	0	16	634	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	50.6	25.6	25.6	21.4	22.0		54.5	46.7		29.0	27.2	
Effective Green, g (s)	50.6	25.6	25.6	21.4	22.0		54.5	46.7		29.0	27.2	
Actuated g/C Ratio	0.42	0.21	0.21	0.18	0.18		0.45	0.39		0.24	0.23	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	430	397	594	612	338		384	1346		144	790	
v/s Ratio Prot	c0.21	c0.12		0.16	0.18		c0.16	0.27		0.00	0.18	
v/s Ratio Perm	c0.22		0.01				c0.26			0.03		
v/c Ratio	1.01	0.58	0.05	0.88	1.00		0.92	0.70		0.11	0.80	
Uniform Delay, d1	35.3	42.3	37.6	48.1	48.9		30.8	30.7		34.8	43.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	46.3	2.0	0.0	13.9	47.4		27.6	3.0		0.3	8.5	
Delay (s)	81.6	44.4	37.6	62.0	96.3		58.4	33.7		35.2	52.3	
Level of Service	F	D	D	E	F		E	C		D	D	
Approach Delay (s)		63.1			75.2			40.4			51.9	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			55.9			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			94.2%			ICU Level of Service				F		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Background PM School Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	 		  	  
Traffic Volume (vph)	556	438	1359	1230
Future Volume (vph)	556	438	1359	1230
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	32.0	32.0	48.0	48.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	23.8	23.8	48.2	48.2
Actuated g/C Ratio	0.30	0.30	0.60	0.60
v/c Ratio	0.71	0.73	0.38	0.43
Control Delay	27.4	31.6	9.1	8.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	27.4	31.6	9.1	8.9
LOS	C	C	A	A
Approach Delay	28.7		9.1	8.9
Approach LOS	C		A	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 14.4
 Intersection Capacity Utilization 60.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Background PM School Peak

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	742	338	1477	1337
v/c Ratio	0.71	0.73	0.38	0.43
Control Delay	27.4	31.6	9.1	8.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	27.4	31.6	9.1	8.9
Queue Length 50th (ft)	160	146	100	132
Queue Length 95th (ft)	203	232	141	162
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1218	535	3860	3079
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.63	0.38	0.43
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Background PM School Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	556	438	0	1359	1230	0
Future Volume (vph)	556	438	0	1359	1230	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Fr _t	0.97	0.85		1.00	1.00	
Fl _t Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3409	1455		6408	5111	
Fl _t Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3409	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	604	476	0	1477	1337	0
RTOR Reduction (vph)	27	29	0	0	0	0
Lane Group Flow (vph)	715	309	0	1477	1337	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	21.8	21.8		46.2	46.2	
Effective Green, g (s)	23.8	23.8		48.2	48.2	
Actuated g/C Ratio	0.30	0.30		0.60	0.60	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1014	432		3860	3079	
v/s Ratio Prot	0.21	c0.21		0.23	c0.26	
v/s Ratio Perm						
v/c Ratio	0.70	0.72		0.38	0.43	
Uniform Delay, d ₁	25.0	25.1		8.2	8.6	
Progression Factor	1.00	1.00		1.00	0.94	
Incremental Delay, d ₂	1.8	4.7		0.3	0.4	
Delay (s)	26.8	29.7		8.5	8.4	
Level of Service	C	C		A	A	
Approach Delay (s)	27.7			8.5	8.4	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			13.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			60.1%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background PM School Peak
Medical Office Center

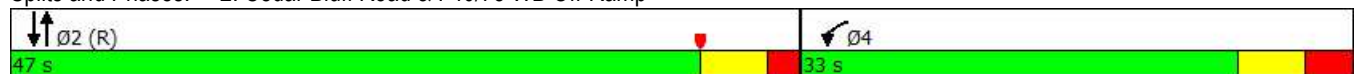
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	851	2015	896
Future Volume (vph)	851	2015	896
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	33.0	47.0	47.0
Total Split (%)	41.3%	58.8%	58.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	27.1	44.9	44.9
Actuated g/C Ratio	0.34	0.56	0.56
v/c Ratio	0.77	0.59	0.35
Control Delay	28.5	10.1	8.2
Queue Delay	0.0	0.0	0.0
Total Delay	28.5	10.1	8.2
LOS	C	B	A
Approach Delay	28.5	10.1	8.2
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 60.1%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service B

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background PM School Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	925	2190	974
v/c Ratio	0.77	0.59	0.35
Control Delay	28.5	10.1	8.2
Queue Delay	0.0	0.0	0.0
Total Delay	28.5	10.1	8.2
Queue Length 50th (ft)	203	133	138
Queue Length 95th (ft)	269	149	84
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1279	3732	2822
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.72	0.59	0.35
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Background PM School Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	851	0	2015	0	0	896
Future Volume (vph)	851	0	2015	0	0	896
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	925	0	2190	0	0	974
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	925	0	2190	0	0	974
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	24.1		42.9			42.9
Effective Green, g (s)	27.1		44.9			44.9
Actuated g/C Ratio	0.34		0.56			0.56
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1195		3735			2825
v/s Ratio Prot	c0.26		c0.33			0.19
v/s Ratio Perm						
v/c Ratio	0.77		0.59			0.34
Uniform Delay, d1	23.7		11.5			9.5
Progression Factor	1.00		0.79			0.80
Incremental Delay, d2	2.9		0.6			0.3
Delay (s)	26.6		9.7			7.9
Level of Service	C		A			A
Approach Delay (s)	26.6		9.7			7.9
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			13.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			60.1%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

2030 Background PM School Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	134	24	367	214	214	241	744	26	812	37
Future Volume (vph)	134	24	367	214	214	241	744	26	812	37
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	30.0	30.0	25.0	40.0	40.0	25.0	75.0	15.0	65.0	65.0
Total Split (%)	18.8%	18.8%	15.6%	25.0%	25.0%	15.6%	46.9%	9.4%	40.6%	40.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	27.5	27.5	49.2	28.1	28.1	92.9	85.2	81.2	70.7	70.7
Actuated g/C Ratio	0.17	0.17	0.31	0.18	0.18	0.58	0.53	0.51	0.44	0.44
v/c Ratio	0.49	0.81	0.45	0.74	0.67	0.72	0.35	0.08	0.55	0.05
Control Delay	66.0	85.7	47.4	77.5	54.2	41.4	15.5	15.9	29.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.6	0.1	0.0	0.0	0.0
Total Delay	66.0	85.7	47.4	77.5	54.2	43.9	15.6	15.9	29.9	0.1
LOS	E	F	D	E	D	D	B	B	C	A
Approach Delay		66.5			61.8		21.8		28.2	
Approach LOS		E			E		C		C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 50 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 38.9
 Intersection Capacity Utilization 69.4%
 Analysis Period (min) 15

Intersection LOS: D
ICU Level of Service C

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	65 s	40 s	30 s
 Ø5	 Ø6 (R)		
15 s	75 s		

Queues

3: Cedar Bluff Road & Park West Blvd

2030 Background PM School Peak

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	146	214	211	210	430	262	929	28	883	40
v/c Ratio	0.49	0.81	0.45	0.74	0.67	0.72	0.35	0.08	0.55	0.05
Control Delay	66.0	85.7	47.4	77.5	54.2	41.4	15.5	15.9	29.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.6	0.1	0.0	0.0	0.0
Total Delay	66.0	85.7	47.4	77.5	54.2	43.9	15.6	15.9	29.9	0.1
Queue Length 50th (ft)	136	223	178	231	190	201	204	12	248	0
Queue Length 95th (ft)	219	#381	272	319	240	312	231	m24	287	m0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	304	273	491	364	804	388	2667	367	1595	797
Starvation Cap Reductn	0	0	0	0	0	52	715	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.78	0.43	0.58	0.53	0.78	0.48	0.08	0.55	0.05

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Background PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	24	367	214	214	160	241	744	110	26	812	37
Future Volume (vph)	134	24	367	214	214	160	241	744	110	26	812	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.87	0.85	1.00	0.94		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1544	1512	1618	3298		1770	4987		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.19	1.00		0.29	1.00	1.00
Satd. Flow (perm)	1719	1544	1512	1618	3298		348	4987		528	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	26	399	233	233	174	262	809	120	28	883	40
RTOR Reduction (vph)	0	0	0	0	67	0	0	11	0	0	0	22
Lane Group Flow (vph)	146	214	211	210	363	0	262	918	0	28	883	18
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	24.5	24.5	40.7	25.6	25.6		90.4	80.3		72.3	68.2	68.2
Effective Green, g (s)	27.5	27.5	44.7	28.1	28.1		92.4	82.8		78.3	70.7	70.7
Actuated g/C Ratio	0.17	0.17	0.28	0.18	0.18		0.58	0.52		0.49	0.44	0.44
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	295	265	422	284	579		362	2580		312	1595	713
v/s Ratio Prot	0.08	c0.14	0.06	c0.13	0.11		c0.08	0.18		0.00	0.24	
v/s Ratio Perm			0.08				c0.33			0.04		0.01
v/c Ratio	0.49	0.81	0.50	0.74	0.63		0.72	0.36		0.09	0.55	0.02
Uniform Delay, d1	60.0	63.7	48.3	62.5	61.1		22.1	22.8		21.2	33.0	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.71	0.66		0.91	0.82	1.00
Incremental Delay, d2	1.0	15.9	0.7	9.1	1.8		5.4	0.3		0.1	1.2	0.1
Delay (s)	60.9	79.6	49.0	71.6	62.9		43.3	15.5		19.4	28.2	25.3
Level of Service	E	E	D	E	E		D	B		B	C	C
Approach Delay (s)		63.5			65.8			21.6			27.8	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			69.4%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

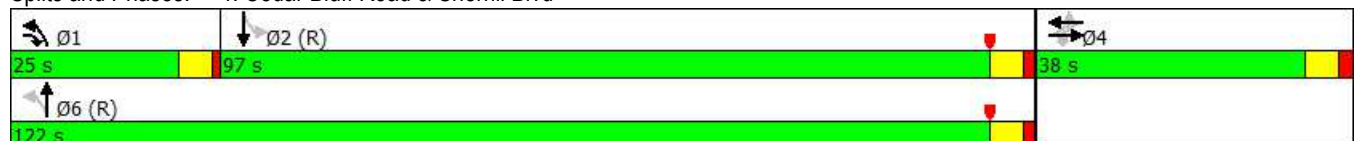
2030 Background PM School Peak
Medical Office Center

								
Lane Group	EBL	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	111	99	69	0	105	809	15	1257
Future Volume (vph)	111	99	69	0	105	809	15	1257
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		1		4	1	6		2
Permitted Phases	4	4	4		6		2	
Detector Phase	4	1	4	4	1	6	2	2
Switch Phase								
Minimum Initial (s)	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	38.0	25.0	38.0	38.0	25.0	122.0	97.0	97.0
Total Split (%)	23.8%	15.6%	23.8%	23.8%	15.6%	76.3%	60.6%	60.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag		Lead			Lead		Lag	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	21.9	34.5		21.9	131.6	131.1	119.0	119.0
Actuated g/C Ratio	0.14	0.22		0.14	0.82	0.82	0.74	0.74
v/c Ratio	0.65	0.27		0.20	0.34	0.32	0.04	0.51
Control Delay	80.4	29.4		24.4	6.3	2.2	7.2	9.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	80.4	29.4		24.4	6.3	2.2	7.2	9.9
LOS	F	C		C	A	A	A	A
Approach Delay				24.4		2.7		9.9
Approach LOS				C		A		A

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 97 (61%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 11.5
 Intersection Capacity Utilization 64.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

4: Cedar Bluff Road & Sherrill Blvd

2030 Background PM School Peak

Medical Office Center

							
Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	121	108	77	114	919	16	1388
v/c Ratio	0.65	0.27	0.20	0.34	0.32	0.04	0.51
Control Delay	80.4	29.4	24.4	6.3	2.2	7.2	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.4	29.4	24.4	6.3	2.2	7.2	9.9
Queue Length 50th (ft)	122	53	12	16	70	4	284
Queue Length 95th (ft)	186	103	37	29	81	14	418
Internal Link Dist (ft)			642		919		1139
Turn Bay Length (ft)	90			75		85	
Base Capacity (vph)	295	523	579	469	2909	428	2702
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.21	0.13	0.24	0.32	0.04	0.51
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2030 Background PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	0	99	69	0	2	105	809	37	15	1257	20
Future Volume (vph)	111	0	99	69	0	2	105	809	37	15	1257	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5		3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00		1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00		0.85		1.00		1.00	0.99		1.00	1.00	
Flt Protected	0.95		1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849		1655		3232		1906	3551		1761	3630	
Flt Permitted	0.70		1.00		0.74		0.15	1.00		0.31	1.00	
Satd. Flow (perm)	1371		1655		2502		302	3551		576	3630	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	121	0	108	75	0	2	114	879	40	16	1366	22
RTOR Reduction (vph)	0	0	38	0	44	0	0	1	0	0	1	0
Lane Group Flow (vph)	121	0	70	0	33	0	114	918	0	16	1387	0
Turn Type	Perm		pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	19.4		26.4		19.4		129.1	129.1		117.1	117.1	
Effective Green, g (s)	21.9		30.4		21.9		131.1	131.1		119.1	119.1	
Actuated g/C Ratio	0.14		0.19		0.14		0.82	0.82		0.74	0.74	
Clearance Time (s)	6.0		5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0		2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	187		314		342		337	2909		428	2702	
v/s Ratio Prot			0.01				c0.02	0.26			c0.38	
v/s Ratio Perm	c0.09		0.03		0.01		0.26			0.03		
v/c Ratio	0.65		0.22		0.10		0.34	0.32		0.04	0.51	
Uniform Delay, d1	65.4		54.8		60.4		6.1	3.5		5.4	8.5	
Progression Factor	1.00		1.00		1.00		1.18	0.51		1.00	1.00	
Incremental Delay, d2	7.5		0.3		0.1		0.4	0.3		0.2	0.7	
Delay (s)	72.9		55.1		60.5		7.6	2.1		5.5	9.2	
Level of Service	E		E		E		A	A		A	A	
Approach Delay (s)		64.5			60.5			2.7			9.1	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			64.0%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2030 Background PM School Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	99	28	892	130	661	
Future Volume (vph)	99	28	892	130	661	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	30.0	20.0	65.0	20.0	85.0	30.0
Total Split (%)	26.1%	17.4%	56.5%	17.4%	73.9%	26%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	14.1	28.3	74.7	89.4	88.4	
Actuated g/C Ratio	0.12	0.25	0.65	0.78	0.77	
v/c Ratio	0.63	0.07	0.53	0.39	0.27	
Control Delay	62.9	8.9	6.8	6.9	4.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	62.9	8.9	6.8	6.9	4.5	
LOS	E	A	A	A	A	
Approach Delay			6.8		4.9	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 34 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 8.9
 Intersection Capacity Utilization 56.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd



Queues

5: Cedar Bluff Road & Fox Lonas Rd

2030 Background PM School Peak

Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	108	30	1181	141	718
v/c Ratio	0.63	0.07	0.53	0.39	0.27
Control Delay	62.9	8.9	6.8	6.9	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	62.9	8.9	6.8	6.9	4.5
Queue Length 50th (ft)	77	0	107	21	67
Queue Length 95th (ft)	131	20	121	46	112
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	294	499	2249	438	2707
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.37	0.06	0.53	0.32	0.27
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2030 Background PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	99	0	28	0	892	194	130	661	0
Future Volume (vph)	0	0	0	99	0	28	0	892	194	130	661	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3444		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.18	1.00	
Satd. Flow (perm)				1410		1583		3444		331	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	108	0	30	0	970	211	141	718	0
RTOR Reduction (vph)	0	0	0	0	0	24	0	12	0	0	0	0
Lane Group Flow (vph)	0	0	0	108	0	6	0	1169	0	141	718	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				14.1		22.3		74.7		88.4	88.4	
Effective Green, g (s)				14.1		22.3		74.7		88.4	88.4	
Actuated g/C Ratio				0.12		0.19		0.65		0.77	0.77	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				172		306		2237		356	2707	
v/s Ratio Prot						0.00		c0.34		c0.03	0.20	
v/s Ratio Perm				c0.08		0.00				0.28		
v/c Ratio				0.63		0.02		0.52		0.40	0.27	
Uniform Delay, d1				48.0		37.5		10.7		6.0	3.9	
Progression Factor				1.00		1.00		0.53		1.00	1.00	
Incremental Delay, d2				7.0		0.0		0.8		0.7	0.2	
Delay (s)				54.9		37.5		6.5		6.7	4.1	
Level of Service				D		D		A		A	A	
Approach Delay (s)		0.0			51.2			6.5			4.5	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.5									
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			56.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Timings

6: Cedar Bluff Road & Dutchtown Rd

2030 Background PM School Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	105	81	103	26	172	234	765	21	685
Future Volume (vph)	105	81	103	26	172	234	765	21	685
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	20.0	30.0	22.0	15.0	25.0	22.0	57.0	13.0	48.0
Total Split (%)	17.4%	26.1%	19.1%	13.0%	21.7%	19.1%	49.6%	11.3%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	34.4	26.6	46.0	24.0	17.1	68.3	60.3	55.2	48.4
Actuated g/C Ratio	0.30	0.23	0.40	0.21	0.15	0.59	0.52	0.48	0.42
v/c Ratio	0.39	0.20	0.16	0.09	0.76	0.71	0.47	0.07	0.62
Control Delay	32.6	37.7	4.4	27.5	63.9	25.0	20.3	10.9	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	37.7	4.4	27.5	63.9	25.0	20.3	10.9	29.6
LOS	C	D	A	C	E	C	C	B	C
Approach Delay		24.0			59.6		21.3		29.1
Approach LOS		C			E		C		C

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 14 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 27.9

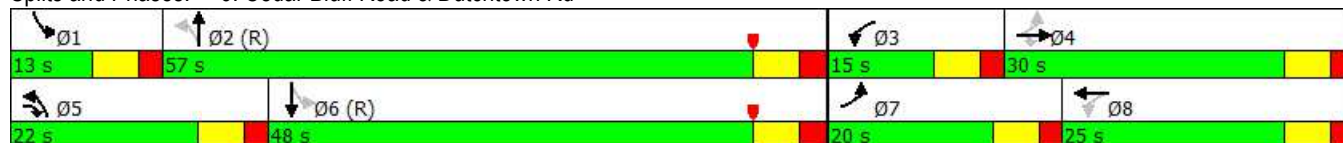
Intersection LOS: C

Intersection Capacity Utilization 73.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues

6: Cedar Bluff Road & Dutchtown Rd

2030 Background PM School Peak

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	114	88	112	28	211	254	869	23	898
v/c Ratio	0.39	0.20	0.16	0.09	0.76	0.71	0.47	0.07	0.62
Control Delay	32.6	37.7	4.4	27.5	63.9	25.0	20.3	10.9	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	37.7	4.4	27.5	63.9	25.0	20.3	10.9	29.6
Queue Length 50th (ft)	62	55	0	14	147	87	228	8	285
Queue Length 95th (ft)	104	101	35	35	#234	160	308	13	380
Internal Link Dist (ft)	2065			1954			1139		
Turn Bay Length (ft)	200		200	150		100		50	
Base Capacity (vph)	320	432	736	332	312	393	1852	341	1471
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.20	0.15	0.08	0.68	0.65	0.47	0.07	0.61

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2030 Background PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	81	103	26	172	22	234	765	34	21	685	141
Future Volume (vph)	105	81	103	26	172	22	234	765	34	21	685	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1831		1770	3517		1761	3432	
Flt Permitted	0.31	1.00	1.00	0.70	1.00		0.17	1.00		0.30	1.00	
Satd. Flow (perm)	586	1863	1583	1304	1831		316	3517		550	3432	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	88	112	28	187	24	254	832	37	23	745	153
RTOR Reduction (vph)	0	0	73	0	4	0	0	3	0	0	14	0
Lane Group Flow (vph)	114	88	39	28	207	0	254	866	0	23	884	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	37.1	26.6	40.1	24.0	19.5		65.4	55.5		49.8	45.9	
Effective Green, g (s)	37.1	26.6	40.1	24.0	19.5		65.4	55.5		49.8	45.9	
Actuated g/C Ratio	0.32	0.23	0.35	0.21	0.17		0.57	0.48		0.43	0.40	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	308	430	634	290	310		350	1697		279	1369	
v/s Ratio Prot	c0.04	0.05	0.01	0.00	c0.11		c0.09	0.25		0.00	0.26	
v/s Ratio Perm	0.08		0.02	0.02			c0.33			0.03		
v/c Ratio	0.37	0.20	0.06	0.10	0.67		0.73	0.51		0.08	0.65	
Uniform Delay, d1	29.0	35.7	24.9	36.6	44.7		16.9	20.4		18.8	28.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.85	1.01	
Incremental Delay, d2	0.8	0.2	0.0	0.1	5.4		7.3	1.1		0.1	2.3	
Delay (s)	29.7	35.9	25.0	36.7	50.1		24.2	21.5		16.1	30.6	
Level of Service	C	D	C	D	D		C	C		B	C	
Approach Delay (s)		29.8			48.5			22.1			30.3	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			73.0%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Background PM School Peak
Medical Office Center

																			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR							
Lane Configurations																			
Traffic Volume (veh/h)	30	235	11	23	166	79	7	41	25	85	96	14							
Future Volume (Veh/h)	30	235	11	23	166	79	7	41	25	85	96	14							
Sign Control	Free			Free			Stop			Stop									
Grade	-9%			0%			0%			0%									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92							
Hourly flow rate (vph)	33	255	12	25	180	86	8	45	27	92	104	15							
Pedestrians																			
Lane Width (ft)																			
Walking Speed (ft/s)																			
Percent Blockage																			
Right turn flare (veh)									40										
Median type	None				None														
Median storage (veh)																			
Upstream signal (ft)																			
1142																			
pX, platoon unblocked																			
vC, conflicting volume	266				267				534	643	134	489	606	133					
vC1, stage 1 conf vol																			
vC2, stage 2 conf vol																			
vCu, unblocked vol	266				267				534	643	134	489	606	133					
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9					
tC, 2 stage (s)																			
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3					
p0 queue free %	97				98				98	88	97	77	73	98					
cM capacity (veh/h)	1295				1294				325	373	891	393	392	892					
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2											
Volume Total	33	170	97	115	176	80	92	119											
Volume Left	33	0	0	25	0	8	92	0											
Volume Right	0	0	12	0	86	27	0	15											
cSH	1295	1700	1700	1294	1700	552	393	421											
Volume to Capacity	0.03	0.10	0.06	0.02	0.10	0.14	0.23	0.28											
Queue Length 95th (ft)	2	0	0	1	0	13	22	29											
Control Delay (s)	7.9	0.0	0.0	1.8	0.0	14.0	16.9	16.9											
Lane LOS	A				A				B	C	C								
Approach Delay (s)	0.9				0.7				14.0	16.9									
Approach LOS							B	C											
Intersection Summary																			
Average Delay				5.8															
Intersection Capacity Utilization				36.0%	ICU Level of Service			A											
Analysis Period (min)				15															

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

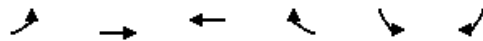
2030 Background PM School Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	396	141	72	556	143	50
Future Volume (Veh/h)	396	141	72	556	143	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	430	153	78	604	155	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			583		1266	506
vC1, stage 1 conf vol					506	
vC2, stage 2 conf vol					760	
vCu, unblocked vol			583		1266	506
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			92		58	90
cM capacity (veh/h)			991		371	566
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	583	78	604	155	54	
Volume Left	0	78	0	155	0	
Volume Right	153	0	0	0	54	
cSH	1700	991	1700	371	566	
Volume to Capacity	0.34	0.08	0.36	0.42	0.10	
Queue Length 95th (ft)	0	6	0	50	8	
Control Delay (s)	0.0	8.9	0.0	21.5	12.0	
Lane LOS		A		C	B	
Approach Delay (s)	0.0	1.0		19.0		
Approach LOS				C		
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			51.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2030 Background PM School Peak
Medical Office Center



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Volume (veh/h)	4	602	395	0	106	3
Future Volume (Veh/h)	4	602	395	0	106	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	654	429	0	115	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	429				764	214
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	429				764	214
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				66	100
cM capacity (veh/h)	1127				339	790
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	222	436	286	143	115	3
Volume Left	4	0	0	0	115	0
Volume Right	0	0	0	0	0	3
cSH	1127	1700	1700	1700	339	790
Volume to Capacity	0.00	0.26	0.17	0.08	0.34	0.00
Queue Length 95th (ft)	0	0	0	0	37	0
Control Delay (s)	0.2	0.0	0.0	0.0	21.0	9.6
Lane LOS	A				C	A
Approach Delay (s)	0.1		0.0		20.7	
Approach LOS					C	
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			32.0%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

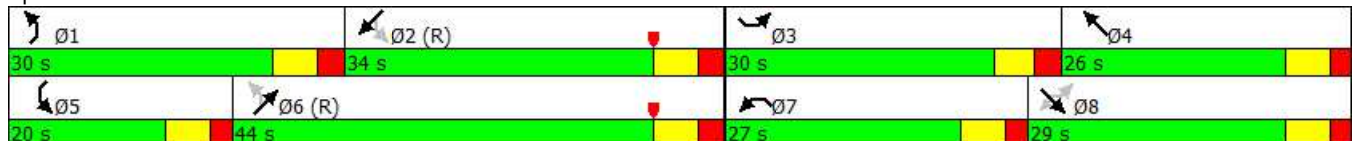
2030 Background PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	194	272	109	335	174	139	200	48	243
Future Volume (vph)	194	272	109	335	174	139	200	48	243
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	30.0	29.0	29.0	27.0	26.0	30.0	44.0	20.0	34.0
Total Split (%)	25.0%	24.2%	24.2%	22.5%	21.7%	25.0%	36.7%	16.7%	28.3%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	37.8	22.3	22.3	17.6	24.5	60.2	50.5	51.7	43.9
Actuated g/C Ratio	0.32	0.19	0.19	0.15	0.20	0.50	0.42	0.43	0.37
v/c Ratio	0.52	0.86	0.17	0.72	0.53	0.30	0.24	0.11	0.29
Control Delay	30.2	70.1	0.6	57.3	47.7	18.4	17.6	17.2	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	70.1	0.6	57.3	47.7	18.4	17.6	17.2	26.1
LOS	C	E	A	E	D	B	B	B	C
Approach Delay		43.5			53.9		17.9		25.0
Approach LOS		D			D		B		C

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 73 (61%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 36.6
 Intersection LOS: D
 Intersection Capacity Utilization 62.0%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Background PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	211	296	118	364	201	151	345	52	362
v/c Ratio	0.52	0.86	0.17	0.72	0.53	0.30	0.24	0.11	0.29
Control Delay	30.2	70.1	0.6	57.3	47.7	18.4	17.6	17.2	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	70.1	0.6	57.3	47.7	18.4	17.6	17.2	26.1
Queue Length 50th (ft)	108	218	0	140	134	64	65	20	95
Queue Length 95th (ft)	166	#367	0	186	220	107	106	43	144
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	524	367	709	600	379	611	1466	581	1267
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.81	0.17	0.61	0.53	0.25	0.24	0.09	0.29

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Background PM School Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	194	272	109	335	174	11	139	200	118	48	243	90
Future Volume (vph)	194	272	109	335	174	11	139	200	118	48	243	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1846		1770	3342		1770	3395	
Flt Permitted	0.52	1.00	1.00	0.95	1.00		0.45	1.00		0.54	1.00	
Satd. Flow (perm)	976	1863	2787	3433	1846		836	3342		1014	3395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	211	296	118	364	189	12	151	217	128	52	264	98
RTOR Reduction (vph)	0	0	96	0	2	0	0	61	0	0	26	0
Lane Group Flow (vph)	211	296	22	364	199	0	151	284	0	52	336	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	37.7	22.3	22.3	17.6	24.5		60.6	49.4		50.1	43.9	
Effective Green, g (s)	37.7	22.3	22.3	17.6	24.5		60.6	49.4		50.1	43.9	
Actuated g/C Ratio	0.31	0.19	0.19	0.15	0.20		0.51	0.41		0.42	0.37	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	408	346	517	503	376		509	1375		462	1242	
v/s Ratio Prot	0.07	c0.16		c0.11	0.11		c0.03	0.09		0.01	0.10	
v/s Ratio Perm	0.10		0.01				c0.12			0.04		
v/c Ratio	0.52	0.86	0.04	0.72	0.53		0.30	0.21		0.11	0.27	
Uniform Delay, d1	32.1	47.3	40.1	48.9	42.6		16.4	22.7		21.0	26.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	18.3	0.0	5.1	1.4		0.3	0.3		0.1	0.5	
Delay (s)	33.2	65.6	40.1	54.0	44.1		16.7	23.0		21.1	27.3	
Level of Service	C	E	D	D	D		B	C		C	C	
Approach Delay (s)		49.8			50.5			21.1			26.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			62.0%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

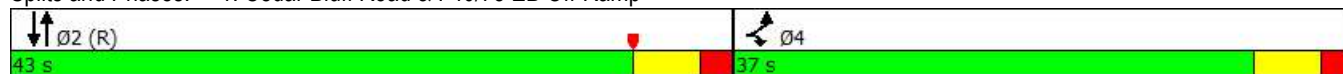
2030 Projected AM Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	902	313	1306	1549
Future Volume (vph)	902	313	1306	1549
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	37.0	37.0	43.0	43.0
Total Split (%)	46.3%	46.3%	53.8%	53.8%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	30.0	30.0	42.0	42.0
Actuated g/C Ratio	0.38	0.38	0.52	0.52
v/c Ratio	0.78	0.56	0.42	0.63
Control Delay	26.4	22.9	12.5	13.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.4	22.9	12.5	13.9
LOS	C	C	B	B
Approach Delay	25.5		12.5	13.9
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 16.9
 Intersection Capacity Utilization 65.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2030 Projected AM Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1014	306	1420	1684
v/c Ratio	0.78	0.56	0.42	0.63
Control Delay	26.4	22.9	12.5	13.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.4	22.9	12.5	13.9
Queue Length 50th (ft)	219	123	121	210
Queue Length 95th (ft)	278	198	157	257
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1432	605	3360	2680
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.71	0.51	0.42	0.63
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Projected AM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	902	313	0	1306	1549	0
Future Volume (vph)	902	313	0	1306	1549	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Frt	0.99	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3464	1455		6408	5111	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3464	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	980	340	0	1420	1684	0
RTOR Reduction (vph)	3	6	0	0	0	0
Lane Group Flow (vph)	1011	300	0	1420	1684	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	28.0	28.0		40.0	40.0	
Effective Green, g (s)	30.0	30.0		42.0	42.0	
Actuated g/C Ratio	0.38	0.38		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1299	545		3364	2683	
v/s Ratio Prot	c0.29	0.21		0.22	c0.33	
v/s Ratio Perm						
v/c Ratio	0.78	0.55		0.42	0.63	
Uniform Delay, d1	22.1	19.7		11.6	13.5	
Progression Factor	1.00	1.00		1.00	0.92	
Incremental Delay, d2	2.7	0.7		0.4	1.0	
Delay (s)	24.8	20.4		12.0	13.4	
Level of Service	C	C		B	B	
Approach Delay (s)	23.8			12.0	13.4	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			16.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			65.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected AM Peak
Medical Office Center

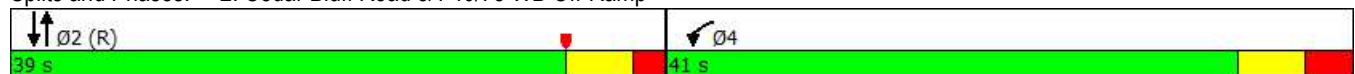
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	991	1884	701
Future Volume (vph)	991	1884	701
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	41.0	39.0	39.0
Total Split (%)	51.3%	48.8%	48.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	32.4	39.6	39.6
Actuated g/C Ratio	0.40	0.50	0.50
v/c Ratio	0.75	0.62	0.31
Control Delay	23.8	14.9	6.1
Queue Delay	0.0	0.1	0.0
Total Delay	23.8	15.1	6.1
LOS	C	B	A
Approach Delay	23.8	15.1	6.1
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 57 (71%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 15.7
 Intersection Capacity Utilization 65.6%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service C

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected AM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	1077	2048	762
v/c Ratio	0.75	0.62	0.31
Control Delay	23.8	14.9	6.1
Queue Delay	0.0	0.1	0.0
Total Delay	23.8	15.1	6.1
Queue Length 50th (ft)	227	172	46
Queue Length 95th (ft)	271	321	m54
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1632	3292	2490
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	331	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.66	0.69	0.31
Intersection Summary			
m Volume for 95th percentile queue is metered by upstream signal.			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected AM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	991	0	1884	0	0	701
Future Volume (vph)	991	0	1884	0	0	701
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1077	0	2048	0	0	762
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1077	0	2048	0	0	762
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	29.4		37.6			37.6
Effective Green, g (s)	32.4		39.6			39.6
Actuated g/C Ratio	0.40		0.50			0.50
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1429		3294			2491
v/s Ratio Prot	c0.31		c0.31			0.15
v/s Ratio Perm						
v/c Ratio	0.75		0.62			0.31
Uniform Delay, d1	20.4		14.7			12.0
Progression Factor	1.00		0.91			0.46
Incremental Delay, d2	2.0		0.8			0.2
Delay (s)	22.4		14.2			5.8
Level of Service	C		B			A
Approach Delay (s)	22.4		14.2			5.8
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay			14.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			65.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings 3: Cedar Bluff Road & Park West Blvd

2030 Projected AM Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	54	87	279	179	463	427	802	44	713	87
Future Volume (vph)	54	87	279	179	463	427	802	44	713	87
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	28.0	28.0	44.0	41.0	41.0	44.0	79.0	12.0	47.0	47.0
Total Split (%)	17.5%	17.5%	27.5%	25.6%	25.6%	27.5%	49.4%	7.5%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	23.8	23.8	66.3	36.7	36.7	88.0	78.4	55.0	45.0	45.0
Actuated g/C Ratio	0.15	0.15	0.41	0.23	0.23	0.55	0.49	0.34	0.28	0.28
v/c Ratio	0.23	0.86	0.31	0.47	0.94	0.94	0.46	0.21	0.76	0.17
Control Delay	62.3	95.5	32.4	58.1	77.8	78.0	19.5	19.0	46.0	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	47.1	0.4	0.0	0.0	0.0
Total Delay	62.3	95.5	32.4	58.1	77.8	125.1	19.9	19.0	46.0	3.7
LOS	E	F	C	E	E	F	B	B	D	A
Approach Delay		64.8			74.1		50.8		40.2	
Approach LOS		E			E		D		D	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 48 (30%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 55.5
 Intersection LOS: E
 Intersection Capacity Utilization 83.5%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
44 s	47 s	41 s	28 s
 Ø5	 Ø6 (R)		
12 s	79 s		

Queues

2030 Projected AM Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	59	207	191	175	753	464	1114	48	775	95
v/c Ratio	0.23	0.86	0.31	0.47	0.94	0.94	0.46	0.21	0.76	0.17
Control Delay	62.3	95.5	32.4	58.1	77.8	78.0	19.5	19.0	46.0	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	47.1	0.4	0.0	0.0	0.0
Total Delay	62.3	95.5	32.4	58.1	77.8	125.1	19.9	19.0	46.0	3.7
Queue Length 50th (ft)	55	224	137	175	410	484	242	20	408	11
Queue Length 95th (ft)	m101	#368	208	263	#540	#640	333	m26	488	m23
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	263	250	635	374	804	503	2439	227	1015	561
Starvation Cap Reductn	0	0	0	0	0	115	759	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.83	0.30	0.47	0.94	1.20	0.66	0.21	0.76	0.17

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	87	279	179	463	212	427	802	223	44	713	87
Future Volume (vph)	54	87	279	179	463	212	427	802	223	44	713	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.92	0.85	1.00	0.95		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1634	1512	1618	3355		1770	4920		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.11	1.00		0.24	1.00	1.00
Satd. Flow (perm)	1719	1634	1512	1618	3355		204	4920		447	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	95	303	195	503	230	464	872	242	48	775	95
RTOR Reduction (vph)	0	0	0	0	29	0	0	31	0	0	0	68
Lane Group Flow (vph)	59	207	191	175	724	0	464	1083	0	48	775	27
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	20.8	20.8	57.8	34.2	34.2		85.5	74.7		47.3	42.5	42.5
Effective Green, g (s)	23.8	23.8	61.8	36.7	36.7		87.5	77.2		53.3	45.0	45.0
Actuated g/C Ratio	0.15	0.15	0.39	0.23	0.23		0.55	0.48		0.33	0.28	0.28
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	255	243	584	371	769		493	2373		212	1015	454
v/s Ratio Prot	0.03	c0.13	0.08	0.11	c0.22		c0.23	0.22		0.01	0.21	
v/s Ratio Perm			0.05				c0.29			0.06		0.02
v/c Ratio	0.23	0.85	0.33	0.47	0.94		0.94	0.46		0.23	0.76	0.06
Uniform Delay, d1	60.0	66.4	34.5	53.3	60.6		46.2	27.5		36.6	52.6	42.0
Progression Factor	1.00	0.99	0.99	1.00	1.00		1.27	0.73		0.82	0.78	8.75
Incremental Delay, d2	0.3	23.6	0.2	0.7	19.6		22.4	0.5		0.3	4.2	0.2
Delay (s)	60.4	89.5	34.6	54.0	80.2		80.8	20.6		30.2	45.3	367.8
Level of Service	E	F	C	D	F		F	C		C	D	F
Approach Delay (s)		62.8			75.3			38.3			77.9	
Approach LOS		E			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			59.4			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			83.5%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

Timings

4: Cedar Bluff Road & Sherrill Blvd

2030 Projected AM Peak
Medical Office Center

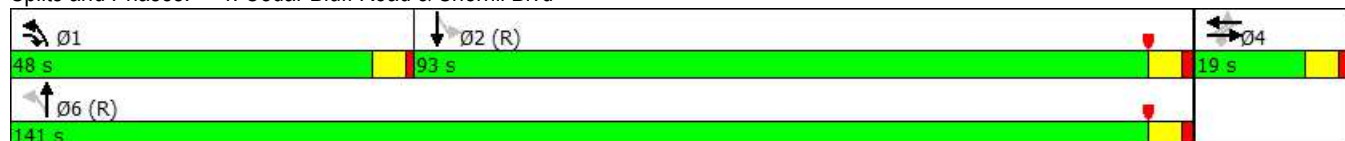
									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	64	21	208	17	1	407	829	44	1226
Future Volume (vph)	64	21	208	17	1	407	829	44	1226
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	19.0	19.0	48.0	19.0	19.0	48.0	141.0	93.0	93.0
Total Split (%)	11.9%	11.9%	30.0%	11.9%	11.9%	30.0%	88.1%	58.1%	58.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	14.1	14.1	54.3		14.1	139.4	138.9	99.2	99.2
Actuated g/C Ratio	0.09	0.09	0.34		0.09	0.87	0.87	0.62	0.62
v/c Ratio	0.56	0.14	0.38		0.12	0.82	0.37	0.16	0.71
Control Delay	86.5	68.3	32.3		48.3	43.1	0.7	17.2	24.0
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	86.5	68.3	32.3		48.3	43.1	0.7	17.2	24.0
LOS	F	E	C		D	D	A	B	C
Approach Delay		46.8			48.3		12.8		23.8
Approach LOS		D			D		B		C

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 28 (18%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 21.2
 Intersection Capacity Utilization 83.5%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues
4: Cedar Bluff Road & Sherrill Blvd

2030 Projected AM Peak
Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	70	23	226	30	442	1112	48	1568
v/c Ratio	0.56	0.14	0.38	0.12	0.82	0.37	0.16	0.71
Control Delay	86.5	68.3	32.3	48.3	43.1	0.7	17.2	24.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.5	68.3	32.3	48.3	43.1	0.7	17.2	24.0
Queue Length 50th (ft)	71	22	141	9	330	12	21	575
Queue Length 95th (ft)	128	53	201	28	m427	m14	51	748
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	139	188	674	264	632	3029	293	2214
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.12	0.34	0.11	0.70	0.37	0.16	0.71

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2030 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	21	208	17	1	10	407	829	194	44	1226	216
Future Volume (vph)	64	21	208	17	1	10	407	829	194	44	1226	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.94		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3122		1906	3473		1761	3557	
Flt Permitted	0.74	1.00	1.00		0.82		0.08	1.00		0.26	1.00	
Satd. Flow (perm)	1434	1947	1655		2622		163	3473		475	3557	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	23	226	18	1	11	442	901	211	48	1333	235
RTOR Reduction (vph)	0	0	30	0	10	0	0	12	0	0	8	0
Lane Group Flow (vph)	70	23	196	0	20	0	442	1100	0	48	1560	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	11.6	11.6	46.3		11.6		136.9	136.9		97.2	97.2	
Effective Green, g (s)	14.1	14.1	50.3		14.1		138.9	138.9		99.2	99.2	
Actuated g/C Ratio	0.09	0.09	0.31		0.09		0.87	0.87		0.62	0.62	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	126	171	520		231		541	3014		294	2205	
v/s Ratio Prot		0.01	0.09				c0.19	0.32			0.44	
v/s Ratio Perm	c0.05		0.03		0.01		c0.52			0.10		
v/c Ratio	0.56	0.13	0.38		0.09		0.82	0.37		0.16	0.71	
Uniform Delay, d1	69.9	67.3	42.7		67.0		43.4	2.0		12.9	20.6	
Progression Factor	1.00	1.00	1.00		1.00		0.85	0.20		1.00	1.00	
Incremental Delay, d2	5.2	0.4	0.3		0.2		8.5	0.3		1.2	1.9	
Delay (s)	75.2	67.7	43.0		67.2		45.3	0.7		14.0	22.5	
Level of Service	E	E	D		E		D	A		B	C	
Approach Delay (s)		51.8			67.2			13.4			22.3	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			21.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			83.5%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected AM Peak
Medical Office Center

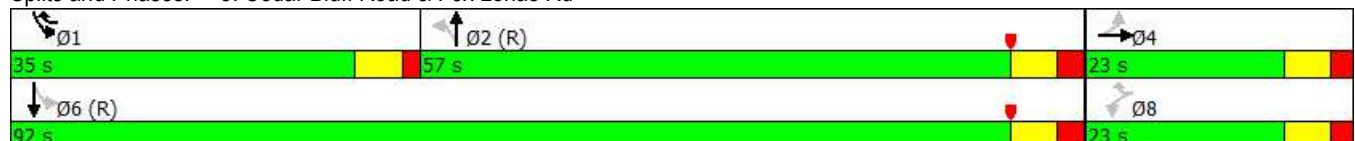
	↖	↗	↖	↑	↗	↓	
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↖	↑	↗	↗	
Traffic Volume (vph)	207	153	3	1005	494	775	
Future Volume (vph)	207	153	3	1005	494	775	
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	
Protected Phases		1		2	1	6	4
Permitted Phases	8	8	2		6		
Detector Phase	8	1	2	2	1	6	
Switch Phase							
Minimum Initial (s)	8.0	6.0	20.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	26.5	11.5	26.5	22.0
Total Split (s)	23.0	35.0	57.0	57.0	35.0	92.0	23.0
Total Split (%)	20.0%	30.4%	49.6%	49.6%	30.4%	80.0%	20%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes	Yes		
Recall Mode	None	None	C-Min	C-Min	None	C-Min	None
Act Effct Green (s)	17.0	52.5	50.5	50.5	86.5	85.5	
Actuated g/C Ratio	0.15	0.46	0.44	0.44	0.75	0.74	
v/c Ratio	1.08	0.22	0.01	1.03	1.04	0.32	
Control Delay	132.5	15.3	13.7	56.8	83.8	5.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	132.5	15.3	13.7	56.8	83.8	5.4	
LOS	F	B	B	E	F	A	
Approach Delay				56.7		35.9	
Approach LOS				E		D	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 12 (10%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.08
 Intersection Signal Delay: 51.2
 Intersection Capacity Utilization 94.2%
 Analysis Period (min) 15

Intersection LOS: D
ICU Level of Service F

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd



Queues
5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected AM Peak
Medical Office Center

						
Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	225	166	3	1576	537	845
v/c Ratio	1.08	0.22	0.01	1.03	1.04	0.32
Control Delay	132.5	15.3	13.7	56.8	83.8	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	132.5	15.3	13.7	56.8	83.8	5.4
Queue Length 50th (ft)	~186	55	1	~645	~378	95
Queue Length 95th (ft)	#344	101	m2	m#786	#594	120
Internal Link Dist (ft)				493		1729
Turn Bay Length (ft)	200		100		100	
Base Capacity (vph)	208	743	273	1526	517	2615
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	110
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.22	0.01	1.03	1.04	0.34

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	207	0	153	3	1005	445	494	775	3
Future Volume (vph)	0	0	0	207	0	153	3	1005	445	494	775	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	0.95	
Frt				1.00		0.85	1.00	0.95		1.00	1.00	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583	1770	3376		1761	3520	
Flt Permitted				0.76		1.00	0.33	1.00		0.07	1.00	
Satd. Flow (perm)				1410		1583	623	3376		132	3520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	225	0	166	3	1092	484	537	842	3
RTOR Reduction (vph)	0	0	0	0	0	23	0	44	0	0	0	0
Lane Group Flow (vph)	0	0	0	225	0	143	3	1532	0	537	845	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				17.0		46.5	50.5	50.5		85.5	85.5	
Effective Green, g (s)				17.0		46.5	50.5	50.5		85.5	85.5	
Actuated g/C Ratio				0.15		0.40	0.44	0.44		0.74	0.74	
Clearance Time (s)				6.0		5.5	6.5	6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				208		640	273	1482		516	2617	
v/s Ratio Prot						0.06		0.45		c0.27	0.24	
v/s Ratio Perm				c0.16		0.03	0.00			c0.51		
v/c Ratio				1.08		0.22	0.01	1.03		1.04	0.32	
Uniform Delay, d1				49.0		22.4	18.2	32.2		37.0	5.0	
Progression Factor				1.00		1.00	0.74	0.80		1.00	1.00	
Incremental Delay, d2				85.8		0.2	0.1	32.0		50.6	0.3	
Delay (s)				134.8		22.6	13.5	57.8		87.6	5.3	
Level of Service				F		C	B	E		F	A	
Approach Delay (s)		0.0			87.2			57.7			37.3	
Approach LOS		A			F			E			D	
Intersection Summary												
HCM 2000 Control Delay			52.7									
HCM 2000 Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			94.2%							F		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

2030 Projected AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	142	85	83	62	221	364	823	39	760
Future Volume (vph)	142	85	83	62	221	364	823	39	760
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	13.0	24.0	30.0	12.0	23.0	30.0	67.0	12.0	49.0
Total Split (%)	11.3%	20.9%	26.1%	10.4%	20.0%	26.1%	58.3%	10.4%	42.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	28.3	22.2	51.5	23.9	17.6	70.9	60.8	47.6	41.1
Actuated g/C Ratio	0.25	0.19	0.45	0.21	0.15	0.62	0.53	0.41	0.36
v/c Ratio	0.77	0.26	0.12	0.23	0.94	0.93	0.49	0.14	0.89
Control Delay	62.6	44.4	4.6	34.9	88.8	61.8	18.4	10.6	44.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.4
Total Delay	62.6	44.4	4.6	34.9	88.8	61.8	19.2	10.6	45.0
LOS	E	D	A	C	F	E	B	B	D
Approach Delay		42.1			78.0		32.1		43.7
Approach LOS		D			E		C		D

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 12 (10%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 42.4
 Intersection Capacity Utilization 90.6%
 Analysis Period (min) 15

Intersection LOS: D

ICU Level of Service E

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues
6: Cedar Bluff Road & Dutchtown Rd

2030 Projected AM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	154	92	90	67	267	396	907	42	1099
v/c Ratio	0.77	0.26	0.12	0.23	0.94	0.93	0.49	0.14	0.89
Control Delay	62.6	44.4	4.6	34.9	88.8	61.8	18.4	10.6	44.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.4
Total Delay	62.6	44.4	4.6	34.9	88.8	61.8	19.2	10.6	45.0
Queue Length 50th (ft)	93	61	0	38	197	230	215	9	397
Queue Length 95th (ft)	#190	112	31	76	#367	#413	270	m18	m458
Internal Link Dist (ft)	2065				1954		1139		493
Turn Bay Length (ft)	200		200		150		100		50
Base Capacity (vph)	200	359	767	295	284	435	1884	302	1280
Starvation Cap Reductn	0	0	0	0	0	0	0	0	22
Spillback Cap Reductn	0	0	0	0	0	0	612	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.26	0.12	0.23	0.94	0.91	0.71	0.14	0.87

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2030 Projected AM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	85	83	62	221	25	364	823	11	39	760	251
Future Volume (vph)	142	85	83	62	221	25	364	823	11	39	760	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1834		1770	3532		1761	3390	
Flt Permitted	0.22	1.00	1.00	0.70	1.00		0.09	1.00		0.31	1.00	
Satd. Flow (perm)	401	1863	1583	1299	1834		162	3532		583	3390	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	154	92	90	67	240	27	396	895	12	42	826	273
RTOR Reduction (vph)	0	0	54	0	3	0	0	1	0	0	29	0
Lane Group Flow (vph)	154	92	36	67	264	0	396	906	0	42	1070	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	30.7	22.2	45.5	23.9	18.8		69.2	58.4		44.7	39.9	
Effective Green, g (s)	30.7	22.2	45.5	23.9	18.8		69.2	58.4		44.7	39.9	
Actuated g/C Ratio	0.27	0.19	0.40	0.21	0.16		0.60	0.51		0.39	0.35	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	208	359	708	290	299		423	1793		275	1176	
v/s Ratio Prot	c0.05	0.05	0.01	0.01	c0.14		c0.19	0.26		0.01	0.32	
v/s Ratio Perm	c0.14		0.01	0.04			c0.37			0.05		
v/c Ratio	0.74	0.26	0.05	0.23	0.88		0.94	0.51		0.15	0.91	
Uniform Delay, d1	34.9	39.4	21.4	37.5	47.0		34.8	18.7		22.0	35.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.90	1.07	
Incremental Delay, d2	13.2	0.4	0.0	0.4	24.8		28.0	1.0		0.2	11.0	
Delay (s)	48.1	39.8	21.5	37.9	71.8		62.9	19.8		19.9	49.5	
Level of Service	D	D	C	D	E		E	B		B	D	
Approach Delay (s)		38.7			65.0			32.9			48.4	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			42.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			90.6%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected AM Peak
Medical Office Center

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	62	152	19	51	528	244	6	32	6	109	290	38		
Future Volume (Veh/h)	62	152	19	51	528	244	6	32	6	109	290	38		
Sign Control	Free			Free			Stop			Stop				
Grade	-9%			0%			0%			0%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	67	165	21	55	574	265	7	35	7	118	315	41		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)									40					
Median type	None				None									
Median storage (veh)														
Upstream signal (ft)					1142									
pX, platoon unblocked														
vC, conflicting volume	839				186				905	1258	93	1050	1136	420
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	839				186				905	1258	93	1050	1136	420
tC, single (s)	4.1				4.1				7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92				96				0	77	99	12	0	93
cM capacity (veh/h)	791				1386				0	149	946	134	176	582
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	67	110	76	342	552	49	118	356						
Volume Left	67	0	0	55	0	7	118	0						
Volume Right	0	0	21	0	265	7	0	41						
cSH	791	1700	1700	1386	1700	145	134	192						
Volume to Capacity	0.08	0.06	0.04	0.04	0.32	0.34	0.88	1.86						
Queue Length 95th (ft)	7	0	0	3	0	34	143	643						
Control Delay (s)	10.0	0.0	0.0	1.5	0.0	42.5	111.1	446.6						
Lane LOS	A				A				E	F	F			
Approach Delay (s)	2.6				0.6				42.5	363.1				
Approach LOS							E	F						
Intersection Summary														
Average Delay				105.0										
Intersection Capacity Utilization				56.3%	ICU Level of Service					B				
Analysis Period (min)				15										

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Projected AM Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	536	397	131	525	74	44
Future Volume (Veh/h)	536	397	131	525	74	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	583	432	142	571	80	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1015		1654	799
vC1, stage 1 conf vol					799	
vC2, stage 2 conf vol					855	
vCu, unblocked vol			1015		1654	799
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			79		70	88
cM capacity (veh/h)			683		270	386
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	1015	142	571	80	48	
Volume Left	0	142	0	80	0	
Volume Right	432	0	0	0	48	
cSH	1700	683	1700	270	386	
Volume to Capacity	0.60	0.21	0.34	0.30	0.12	
Queue Length 95th (ft)	0	19	0	30	11	
Control Delay (s)	0.0	11.6	0.0	23.8	15.7	
Lane LOS		B		C	C	
Approach Delay (s)	0.0	2.3		20.8		
Approach LOS				C		
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			73.8%	ICU Level of Service		D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2030 Projected AM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	397	692	22	453	55
Future Volume (Veh/h)	3	397	692	22	453	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	432	752	24	492	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	776				986	388
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	776				986	388
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	90
cM capacity (veh/h)	836				244	611
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	147	288	501	275	492	60
Volume Left	3	0	0	0	492	0
Volume Right	0	0	0	24	0	60
cSH	836	1700	1700	1700	244	611
Volume to Capacity	0.00	0.17	0.29	0.16	2.02	0.10
Queue Length 95th (ft)	0	0	0	0	903	8
Control Delay (s)	0.2	0.0	0.0	0.0	505.0	11.5
Lane LOS	A				F	B
Approach Delay (s)	0.1		0.0		451.4	
Approach LOS					F	
Intersection Summary						
Average Delay			141.4			
Intersection Capacity Utilization			51.6%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Projected AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	399	445	357	271	105	136	379	18	445
Future Volume (vph)	399	445	357	271	105	136	379	18	445
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	32.0	45.0	45.0	19.0	32.0	17.0	46.0	10.0	39.0
Total Split (%)	26.7%	37.5%	37.5%	15.8%	26.7%	14.2%	38.3%	8.3%	32.5%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	54.6	35.8	35.8	12.8	24.2	52.9	48.9	41.7	36.5
Actuated g/C Ratio	0.46	0.30	0.30	0.11	0.20	0.44	0.41	0.35	0.30
v/c Ratio	0.72	0.87	0.37	0.81	0.34	0.54	0.45	0.07	0.65
Control Delay	30.8	56.7	8.3	70.2	41.8	29.2	24.6	21.8	37.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	56.7	8.3	70.2	41.8	29.2	24.6	21.8	37.6
LOS	C	E	A	E	D	C	C	C	D
Approach Delay		33.7			61.7		25.5		37.1
Approach LOS		C			E		C		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 36.1

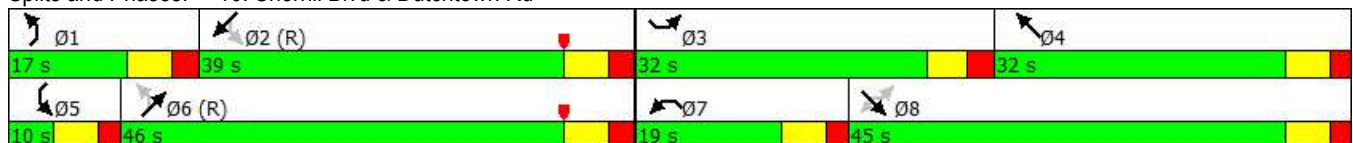
Intersection LOS: D

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Projected AM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	434	484	388	295	125	148	636	20	695
v/c Ratio	0.72	0.87	0.37	0.81	0.34	0.54	0.45	0.07	0.65
Control Delay	30.8	56.7	8.3	70.2	41.8	29.2	24.6	21.8	37.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	56.7	8.3	70.2	41.8	29.2	24.6	21.8	37.6
Queue Length 50th (ft)	225	342	26	116	79	72	155	9	238
Queue Length 95th (ft)	319	#487	66	#181	137	120	241	25	309
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	613	605	1109	371	401	284	1419	294	1067
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.80	0.35	0.80	0.31	0.52	0.45	0.07	0.65

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Projected AM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	399	445	357	271	105	10	136	379	206	18	445	194
Future Volume (vph)	399	445	357	271	105	10	136	379	206	18	445	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1838		1770	3352		1770	3378	
Flt Permitted	0.52	1.00	1.00	0.95	1.00		0.20	1.00		0.39	1.00	
Satd. Flow (perm)	962	1863	2787	3433	1838		364	3352		728	3378	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	434	484	388	295	114	11	148	412	224	20	484	211
RTOR Reduction (vph)	0	0	212	0	3	0	0	56	0	0	39	0
Lane Group Flow (vph)	434	484	176	295	122	0	148	580	0	20	656	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	54.6	35.8	35.8	12.8	24.2		52.9	45.3		38.1	36.5	
Effective Green, g (s)	54.6	35.8	35.8	12.8	24.2		52.9	45.3		38.1	36.5	
Actuated g/C Ratio	0.46	0.30	0.30	0.11	0.20		0.44	0.38		0.32	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	602	555	831	366	370		276	1265		245	1027	
v/s Ratio Prot	c0.15	c0.26		0.09	0.07		c0.04	0.17		0.00	c0.19	
v/s Ratio Perm	0.18		0.06				0.19			0.02		
v/c Ratio	0.72	0.87	0.21	0.81	0.33		0.54	0.46		0.08	0.64	
Uniform Delay, d1	23.9	39.9	31.5	52.4	41.0		22.8	28.1		28.3	36.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	14.1	0.1	12.2	0.5		2.0	1.2		0.1	3.0	
Delay (s)	28.2	54.0	31.7	64.6	41.5		24.9	29.3		28.4	39.1	
Level of Service	C	D	C	E	D		C	C		C	D	
Approach Delay (s)		38.8			57.7			28.5			38.8	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			38.7					HCM 2000 Level of Service			D	
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			120.0					Sum of lost time (s)		25.0		
Intersection Capacity Utilization			78.0%					ICU Level of Service		D		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2030 Projected AM Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	8	3	23	226	462	19
Future Volume (Veh/h)	8	3	23	226	462	19
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	3	25	246	502	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	686	262	523			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	686	262	523			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	98			
cM capacity (veh/h)	372	737	1040			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	12	25	123	123	335	188
Volume Left	9	25	0	0	0	0
Volume Right	3	0	0	0	0	21
cSH	497	1040	1700	1700	1700	1700
Volume to Capacity	0.02	0.02	0.07	0.07	0.20	0.11
Queue Length 95th (ft)	2	2	0	0	0	0
Control Delay (s)	13.7	8.5	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	13.7	0.8			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			29.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Sherrill Blvd & Medical Office Access RT

2030 Projected AM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	228	464	94	0	4
Future Volume (Veh/h)	0	228	464	94	0	4
Sign Control		Free	Free		Stop	
Grade		-9%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	248	504	102	0	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	606				679	303
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	606				679	303
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	968				385	693
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	
Volume Total	124	124	336	270	4	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	102	4	
cSH	1700	1700	1700	1700	693	
Volume to Capacity	0.07	0.07	0.20	0.16	0.01	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	10.2	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		10.2	
Approach LOS					B	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			25.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: Medical Office Access & Christian Academy Blvd

2030 Projected AM Peak
Medical Office Center

	→	↗	↖	←	↘	↙
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↗			↖	↗	↖
Traffic Volume (veh/h)	408	25	28	309	7	30
Future Volume (Veh/h)	408	25	28	309	7	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	443	27	30	336	8	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			470		852	456
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			470		852	456
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	95
cM capacity (veh/h)			1092		321	604
Direction, Lane #	EB 1	WB 1	NE 1	NE 2		
Volume Total	470	366	8	33		
Volume Left	0	30	8	0		
Volume Right	27	0	0	33		
cSH	1700	1092	321	604		
Volume to Capacity	0.28	0.03	0.02	0.05		
Queue Length 95th (ft)	0	2	2	4		
Control Delay (s)	0.0	1.0	16.5	11.3		
Lane LOS		A	C	B		
Approach Delay (s)	0.0	1.0	12.3			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			49.5%	ICU Level of Service		A
Analysis Period (min)			15			

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

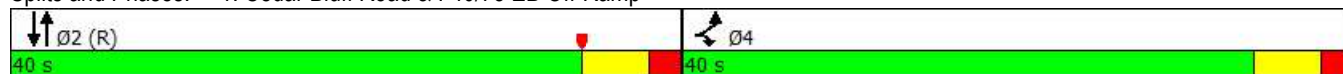
2030 Projected PM Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations	 		  	  
Traffic Volume (vph)	634	572	1584	1443
Future Volume (vph)	634	572	1584	1443
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	40.0	40.0	40.0	40.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	30.1	30.1	41.9	41.9
Actuated g/C Ratio	0.38	0.38	0.52	0.52
v/c Ratio	0.70	0.74	0.51	0.59
Control Delay	23.6	29.3	13.9	11.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.6	29.3	13.9	11.7
LOS	C	C	B	B
Approach Delay	25.4		13.9	11.7
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 51 (64%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 16.4
 Intersection Capacity Utilization 58.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Projected PM Peak

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	900	411	1722	1568
v/c Ratio	0.70	0.74	0.51	0.59
Control Delay	23.6	29.3	13.9	11.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.6	29.3	13.9	11.7
Queue Length 50th (ft)	188	185	154	189
Queue Length 95th (ft)	221	269	217	219
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1531	659	3352	2674
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.59	0.62	0.51	0.59
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Projected PM Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	634	572	0	1584	1443	0
Future Volume (vph)	634	572	0	1584	1443	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Frt	0.96	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3392	1455		6408	5111	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3392	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	689	622	0	1722	1568	0
RTOR Reduction (vph)	6	6	0	0	0	0
Lane Group Flow (vph)	894	405	0	1722	1568	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	28.1	28.1		39.9	39.9	
Effective Green, g (s)	30.1	30.1		41.9	41.9	
Actuated g/C Ratio	0.38	0.38		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1276	547		3356	2676	
v/s Ratio Prot	0.26	c0.28		0.27	c0.31	
v/s Ratio Perm						
v/c Ratio	0.70	0.74		0.51	0.59	
Uniform Delay, d1	21.1	21.6		12.4	13.1	
Progression Factor	1.00	1.00		1.00	0.78	
Incremental Delay, d2	1.4	4.7		0.6	0.8	
Delay (s)	22.6	26.3		13.0	11.0	
Level of Service	C	C		B	B	
Approach Delay (s)	23.7			13.0	11.0	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			15.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			58.6%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected PM Peak
Medical Office Center

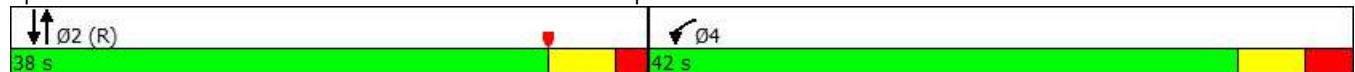
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	969	1605	924
Future Volume (vph)	969	1605	924
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	42.0	38.0	38.0
Total Split (%)	52.5%	47.5%	47.5%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	32.3	39.7	39.7
Actuated g/C Ratio	0.40	0.50	0.50
v/c Ratio	0.74	0.53	0.40
Control Delay	23.3	10.2	10.1
Queue Delay	0.0	0.0	0.0
Total Delay	23.3	10.2	10.1
LOS	C	B	B
Approach Delay	23.3	10.2	10.1
Approach LOS	C	B	B

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 55 (69%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 58.6%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service B

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected PM Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	1053	1745	1004
v/c Ratio	0.74	0.53	0.40
Control Delay	23.3	10.2	10.1
Queue Delay	0.0	0.0	0.0
Total Delay	23.3	10.2	10.1
Queue Length 50th (ft)	222	92	74
Queue Length 95th (ft)	256	105	128
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1676	3299	2495
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.63	0.53	0.40
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected PM Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	969	0	1605	0	0	924
Future Volume (vph)	969	0	1605	0	0	924
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1053	0	1745	0	0	1004
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1053	0	1745	0	0	1004
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	29.3		37.7			37.7
Effective Green, g (s)	32.3		39.7			39.7
Actuated g/C Ratio	0.40		0.50			0.50
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1425		3302			2498
v/s Ratio Prot	c0.30		c0.26			0.20
v/s Ratio Perm						
v/c Ratio	0.74		0.53			0.40
Uniform Delay, d1	20.3		13.8			12.7
Progression Factor	1.00		0.66			0.73
Incremental Delay, d2	1.8		0.5			0.3
Delay (s)	22.0		9.6			9.6
Level of Service	C		A			A
Approach Delay (s)	22.0		9.6			9.6
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			13.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			58.6%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

2030 Projected PM Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	83	38	437	318	93	220	694	55	1046	36
Future Volume (vph)	83	38	437	318	93	220	694	55	1046	36
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	38.0	38.0	27.0	32.0	32.0	27.0	73.0	17.0	63.0	63.0
Total Split (%)	23.8%	23.8%	16.9%	20.0%	20.0%	16.9%	45.6%	10.6%	39.4%	39.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	31.9	31.9	56.6	26.2	26.2	90.4	79.1	76.8	65.2	65.2
Actuated g/C Ratio	0.20	0.20	0.35	0.16	0.16	0.56	0.49	0.48	0.41	0.41
v/c Ratio	0.26	0.84	0.48	0.83	0.68	0.80	0.34	0.17	0.77	0.05
Control Delay	56.0	84.6	42.9	90.0	50.1	64.9	17.0	15.3	36.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	56.0	84.6	42.9	90.0	50.1	64.9	17.1	15.3	36.0	0.1
LOS	E	F	D	F	D	E	B	B	D	A
Approach Delay		62.7			63.7		27.7		33.8	
Approach LOS		E			E		C		C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 52 (33%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 42.3
 Intersection LOS: D
 Intersection Capacity Utilization 77.3%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
27 s	63 s	32 s	38 s
 Ø5	 Ø6 (R)		
17 s	73 s		

Queues

2030 Projected PM Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	90	260	256	221	428	239	837	60	1137	39
v/c Ratio	0.26	0.84	0.48	0.83	0.68	0.80	0.34	0.17	0.77	0.05
Control Delay	56.0	84.6	42.9	90.0	50.1	64.9	17.0	15.3	36.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	56.0	84.6	42.9	90.0	50.1	64.9	17.1	15.3	36.0	0.1
Queue Length 50th (ft)	79	271	209	246	166	232	183	23	591	0
Queue Length 95th (ft)	136	#410	298	#384	231	#351	212	41	471	m0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	370	335	552	283	665	315	2484	399	1470	746
Starvation Cap Reductn	0	0	0	0	0	0	625	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.78	0.46	0.78	0.64	0.76	0.45	0.15	0.77	0.05

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	38	437	318	93	186	220	694	76	55	1046	36
Future Volume (vph)	83	38	437	318	93	186	220	694	76	55	1046	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.87	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1554	1512	1618	3224		1770	5010		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.99		0.08	1.00		0.32	1.00	1.00
Satd. Flow (perm)	1719	1554	1512	1618	3224		146	5010		596	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	41	475	346	101	202	239	754	83	60	1137	39
RTOR Reduction (vph)	0	0	0	0	102	0	0	8	0	0	0	23
Lane Group Flow (vph)	90	260	256	221	326	0	239	829	0	60	1137	16
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	28.9	28.9	48.1	23.7	23.7		87.9	75.5		69.1	62.7	62.7
Effective Green, g (s)	31.9	31.9	52.1	26.2	26.2		89.9	78.0		75.1	65.2	65.2
Actuated g/C Ratio	0.20	0.20	0.33	0.16	0.16		0.56	0.49		0.47	0.41	0.41
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	342	309	492	264	527		297	2442		347	1471	658
v/s Ratio Prot	0.05	c0.17	0.07	c0.14	0.10		c0.11	0.17		0.01	0.31	
v/s Ratio Perm			0.10				c0.35			0.07		0.01
v/c Ratio	0.26	0.84	0.52	0.84	0.62		0.80	0.34		0.17	0.77	0.02
Uniform Delay, d1	54.1	61.6	43.8	64.8	62.3		43.6	25.2		23.3	41.0	28.4
Progression Factor	1.01	1.01	1.00	1.00	1.00		1.26	0.65		0.82	0.76	1.00
Incremental Delay, d2	0.3	18.1	0.8	19.7	1.9		12.4	0.3		0.2	3.5	0.1
Delay (s)	55.1	80.0	44.7	84.5	64.1		67.5	16.7		19.3	34.5	28.4
Level of Service	E	E	D	F	E		E	B		B	C	C
Approach Delay (s)		61.4			71.1			28.0			33.6	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			43.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			77.3%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

Timings
4: Cedar Bluff Road & Sherrill Blvd

2030 Projected PM Peak
Medical Office Center

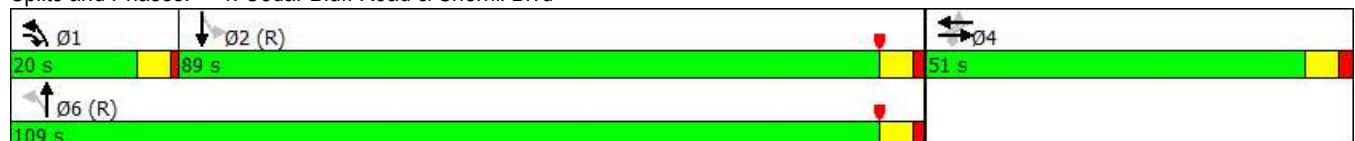
									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	202	3	171	83	0	125	905	7	1197
Future Volume (vph)	202	3	171	83	0	125	905	7	1197
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	51.0	51.0	20.0	51.0	51.0	20.0	109.0	89.0	89.0
Total Split (%)	31.9%	31.9%	12.5%	31.9%	31.9%	12.5%	68.1%	55.6%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	34.0	34.0	47.9		34.0	119.5	119.0	105.6	105.6
Actuated g/C Ratio	0.21	0.21	0.30		0.21	0.75	0.74	0.66	0.66
v/c Ratio	0.77	0.01	0.35		0.17	0.43	0.38	0.02	0.55
Control Delay	76.5	44.3	33.9		23.8	16.0	7.1	13.0	16.9
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	76.5	44.3	33.9		23.8	16.0	7.1	13.0	16.9
LOS	E	D	C		C	B	A	B	B
Approach Delay		56.9			23.8		8.2		16.9
Approach LOS		E			C		A		B

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 72 (45%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 19.3
 Intersection Capacity Utilization 70.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

4: Cedar Bluff Road & Sherrill Blvd

2030 Projected PM Peak

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	220	3	186	95	136	1001	8	1321
v/c Ratio	0.77	0.01	0.35	0.17	0.43	0.38	0.02	0.55
Control Delay	76.5	44.3	33.9	23.8	16.0	7.1	13.0	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.5	44.3	33.9	23.8	16.0	7.1	13.0	16.9
Queue Length 50th (ft)	219	3	119	19	26	138	3	365
Queue Length 95th (ft)	297	12	168	43	86	193	12	543
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	398	578	590	772	386	2651	349	2397
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.01	0.32	0.12	0.35	0.38	0.02	0.55
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2030 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	3	171	83	0	5	125	905	16	7	1197	18
Future Volume (vph)	202	3	171	83	0	5	125	905	16	7	1197	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3223		1906	3566		1761	3631	
Flt Permitted	0.69	1.00	1.00		0.74		0.14	1.00		0.29	1.00	
Satd. Flow (perm)	1344	1947	1655		2483		287	3566		530	3631	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	220	3	186	90	0	5	136	984	17	8	1301	20
RTOR Reduction (vph)	0	0	30	0	40	0	0	1	0	0	0	0
Lane Group Flow (vph)	220	3	156	0	55	0	136	1000	0	8	1321	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	31.5	31.5	39.9		31.5		117.0	117.0		103.6	103.6	
Effective Green, g (s)	34.0	34.0	43.9		34.0		119.0	119.0		105.6	105.6	
Actuated g/C Ratio	0.21	0.21	0.27		0.21		0.74	0.74		0.66	0.66	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	285	413	454		527		318	2652		349	2396	
v/s Ratio Prot		0.00	0.02				c0.03	0.28			c0.36	
v/s Ratio Perm	c0.16		0.07		0.02		0.29			0.02		
v/c Ratio	0.77	0.01	0.34		0.10		0.43	0.38		0.02	0.55	
Uniform Delay, d1	59.3	49.7	46.5		50.7		10.9	7.3		9.4	14.5	
Progression Factor	1.00	1.00	1.00		1.00		1.86	0.84		1.00	1.00	
Incremental Delay, d2	12.2	0.0	0.3		0.1		0.6	0.4		0.1	0.9	
Delay (s)	71.5	49.7	46.8		50.8		20.9	6.5		9.5	15.5	
Level of Service	E	D	D		D		C	A		A	B	
Approach Delay (s)		60.1			50.8			8.2			15.4	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			70.0%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected PM Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↑	↘	↗	
Traffic Volume (vph)	95	61	1060	69	1213	
Future Volume (vph)	95	61	1060	69	1213	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	24.0	14.0	77.0	14.0	91.0	24.0
Total Split (%)	20.9%	12.2%	67.0%	12.2%	79.1%	21%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	13.7	26.5	78.8	89.8	88.8	
Actuated g/C Ratio	0.12	0.23	0.69	0.78	0.77	
v/c Ratio	0.62	0.16	0.62	0.28	0.48	
Control Delay	63.1	8.5	9.6	6.1	5.9	
Queue Delay	0.0	0.0	0.1	0.0	0.1	
Total Delay	63.1	8.5	9.7	6.1	5.9	
LOS	E	A	A	A	A	
Approach Delay			9.7		6.0	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 52 (45%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 9.8
 Intersection Capacity Utilization 69.6%
 Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service C

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
14 s	77 s	24 s
↓ Ø6 (R)		↗ Ø8
91 s		24 s

Queues

5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected PM Peak

Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	103	66	1462	75	1318
v/c Ratio	0.62	0.16	0.62	0.28	0.48
Control Delay	63.1	8.5	9.6	6.1	5.9
Queue Delay	0.0	0.0	0.1	0.0	0.1
Total Delay	63.1	8.5	9.7	6.1	5.9
Queue Length 50th (ft)	74	0	176	10	155
Queue Length 95th (ft)	125	33	m481	26	244
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	223	437	2372	289	2728
Starvation Cap Reductn	0	0	120	0	0
Spillback Cap Reductn	0	0	0	0	269
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.46	0.15	0.65	0.26	0.54

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	95	0	61	0	1060	285	69	1213	0
Future Volume (vph)	0	0	0	95	0	61	0	1060	285	69	1213	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3427		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.12	1.00	
Satd. Flow (perm)				1410		1583		3427		226	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	103	0	66	0	1152	310	75	1318	0
RTOR Reduction (vph)	0	0	0	0	0	55	0	18	0	0	0	0
Lane Group Flow (vph)	0	0	0	103	0	11	0	1444	0	75	1318	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				13.7		19.3		77.7		88.8	88.8	
Effective Green, g (s)				13.7		19.3		77.7		88.8	88.8	
Actuated g/C Ratio				0.12		0.17		0.68		0.77	0.77	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				167		265		2315		249	2719	
v/s Ratio Prot						0.00		c0.42		0.01	c0.37	
v/s Ratio Perm				c0.07		0.00				0.22		
v/c Ratio				0.62		0.04		0.62		0.30	0.48	
Uniform Delay, d1				48.2		40.1		10.5		7.2	4.8	
Progression Factor				1.00		1.00		0.77		1.00	1.00	
Incremental Delay, d2				6.6		0.1		1.2		0.7	0.6	
Delay (s)				54.8		40.2		9.2		7.8	5.4	
Level of Service				D		D		A		A	A	
Approach Delay (s)		0.0			49.1			9.2			5.5	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8									
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			69.6%							C		
Analysis Period (min)			15									
c Critical Lane Group												

Timings 6: Cedar Bluff Road & Dutchtown Rd

2030 Projected PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	241	114	66	28	183	262	782	26	1108
Future Volume (vph)	241	114	66	28	183	262	782	26	1108
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	20.0	29.0	21.0	12.0	21.0	21.0	62.0	12.0	53.0
Total Split (%)	17.4%	25.2%	18.3%	10.4%	18.3%	18.3%	53.9%	10.4%	46.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	35.3	28.1	49.1	21.0	15.0	67.7	60.0	52.7	46.2
Actuated g/C Ratio	0.31	0.24	0.43	0.18	0.13	0.59	0.52	0.46	0.40
v/c Ratio	0.89	0.27	0.10	0.12	0.99	0.95	0.49	0.09	0.96
Control Delay	65.6	39.4	3.4	30.4	103.9	72.6	19.4	10.1	45.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.9
Total Delay	65.6	39.4	3.4	30.4	103.9	72.6	19.5	10.1	46.2
LOS	E	D	A	C	F	E	B	B	D
Approach Delay		48.7			95.7		32.3		45.5
Approach LOS		D			F		C		D

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 12 (10%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 45.3

Intersection LOS: D

Intersection Capacity Utilization 94.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues
6: Cedar Bluff Road & Dutchtown Rd

2030 Projected PM Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	262	124	72	30	239	285	893	28	1341
v/c Ratio	0.89	0.27	0.10	0.12	0.99	0.95	0.49	0.09	0.96
Control Delay	65.6	39.4	3.4	30.4	103.9	72.6	19.4	10.1	45.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.9
Total Delay	65.6	39.4	3.4	30.4	103.9	72.6	19.5	10.1	46.2
Queue Length 50th (ft)	158	79	0	16	174	156	232	5	502
Queue Length 95th (ft)	#287	136	21	39	#340	#328	291	m15	#653
Internal Link Dist (ft)	2065				1954		1139		493
Turn Bay Length (ft)	200		200		150		100		50
Base Capacity (vph)	294	454	727	256	242	299	1836	314	1410
Starvation Cap Reductn	0	0	0	0	0	0	0	0	14
Spillback Cap Reductn	0	0	0	0	0	0	101	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.27	0.10	0.12	0.99	0.95	0.51	0.09	0.96

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2030 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	114	66	28	183	37	262	782	40	26	1108	126
Future Volume (vph)	241	114	66	28	183	37	262	782	40	26	1108	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1816		1770	3514		1761	3468	
Flt Permitted	0.22	1.00	1.00	0.68	1.00		0.08	1.00		0.30	1.00	
Satd. Flow (perm)	411	1863	1583	1262	1816		150	3514		547	3468	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	262	124	72	30	199	40	285	850	43	28	1204	137
RTOR Reduction (vph)	0	0	45	0	6	0	0	3	0	0	8	0
Lane Group Flow (vph)	262	124	27	30	233	0	285	890	0	28	1333	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	37.7	28.1	43.1	21.0	17.4		64.8	55.2		47.4	43.8	
Effective Green, g (s)	37.7	28.1	43.1	21.0	17.4		64.8	55.2		47.4	43.8	
Actuated g/C Ratio	0.33	0.24	0.37	0.18	0.15		0.56	0.48		0.41	0.38	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	455	675	246	274		295	1686		263	1320	
v/s Ratio Prot	c0.11	0.07	0.01	0.00	0.13		c0.13	0.25		0.00	0.38	
v/s Ratio Perm	c0.18		0.01	0.02			c0.42			0.04		
v/c Ratio	0.86	0.27	0.04	0.12	0.85		0.97	0.53		0.11	1.01	
Uniform Delay, d1	31.8	35.2	22.8	39.1	47.5		36.1	20.8		20.2	35.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.88	0.91	
Incremental Delay, d2	21.7	0.3	0.0	0.2	21.5		42.8	1.2		0.2	25.8	
Delay (s)	53.5	35.5	22.8	39.3	69.1		78.9	22.0		18.0	58.3	
Level of Service	D	D	C	D	E		E	C		B	E	
Approach Delay (s)		43.8			65.7			35.8			57.4	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			48.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			94.8%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected PM Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	433	10	25	220	89	23	45	21	174	127	17
Future Volume (Veh/h)	40	433	10	25	220	89	23	45	21	174	127	17
Sign Control		Free			Free			Stop			Stop	
Grade		-9%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	471	11	27	239	97	25	49	23	189	138	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									40			
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1142							
pX, platoon unblocked												
vC, conflicting volume	336			482			823	952	241	688	910	168
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	336			482			823	952	241	688	910	168
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			97			83	80	97	27	46	98
cM capacity (veh/h)	1220			1077			144	242	760	261	257	847
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	43	314	168	146	216	97	189	156				
Volume Left	43	0	0	27	0	25	189	0				
Volume Right	0	0	11	0	97	23	0	18				
cSH	1220	1700	1700	1077	1700	274	261	279				
Volume to Capacity	0.04	0.18	0.10	0.03	0.13	0.35	0.73	0.56				
Queue Length 95th (ft)	3	0	0	2	0	38	126	79				
Control Delay (s)	8.1	0.0	0.0	1.7	0.0	26.3	48.3	33.0				
Lane LOS	A			A		D	E	D				
Approach Delay (s)	0.7			0.7		26.3	41.4					
Approach LOS						D	E					
Intersection Summary												
Average Delay			13.1									
Intersection Capacity Utilization			48.6%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Projected PM Peak
Medical Office Center

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1115	141	74	951	183	71
Future Volume (Veh/h)	1115	141	74	951	183	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1212	153	80	1034	199	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1365		2482	1288
vC1, stage 1 conf vol					1288	
vC2, stage 2 conf vol					1194	
vCu, unblocked vol			1365		2482	1288
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			84		0	62
cM capacity (veh/h)			503		171	200
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	1365	80	1034	199	77	
Volume Left	0	80	0	199	0	
Volume Right	153	0	0	0	77	
cSH	1700	503	1700	171	200	
Volume to Capacity	0.80	0.16	0.61	1.16	0.38	
Queue Length 95th (ft)	0	14	0	263	42	
Control Delay (s)	0.0	13.5	0.0	173.1	33.8	
Lane LOS		B		F	D	
Approach Delay (s)	0.0	1.0		134.2		
Approach LOS				F		
Intersection Summary						
Average Delay			13.8			
Intersection Capacity Utilization			84.0%	ICU Level of Service		E
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2030 Projected PM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	0	528	346	0	32	0
Future Volume (Veh/h)	0	528	346	0	32	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	574	376	0	35	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	376				663	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	376				663	188
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				91	100
cM capacity (veh/h)	1179				394	822
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	191	383	251	125	35	0
Volume Left	0	0	0	0	35	0
Volume Right	0	0	0	0	0	0
cSH	1179	1700	1700	1700	394	1700
Volume to Capacity	0.00	0.23	0.15	0.07	0.09	0.00
Queue Length 95th (ft)	0	0	0	0	7	0
Control Delay (s)	0.0	0.0	0.0	0.0	15.0	0.0
Lane LOS					C	A
Approach Delay (s)	0.0		0.0		15.0	
Approach LOS					C	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			24.6%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	401	218	134	521	304	327	744	15	540
Future Volume (vph)	401	218	134	521	304	327	744	15	540
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	31.0	31.0	31.0	29.0	29.0	28.0	49.5	10.5	32.0
Total Split (%)	25.8%	25.8%	25.8%	24.2%	24.2%	23.3%	41.3%	8.8%	26.7%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	50.6	25.6	25.6	22.4	23.0	53.5	49.3	30.9	25.9
Actuated g/C Ratio	0.42	0.21	0.21	0.19	0.19	0.45	0.41	0.26	0.22
v/c Ratio	1.01	0.60	0.19	0.89	0.99	0.95	0.67	0.09	0.86
Control Delay	81.2	49.9	2.2	64.3	92.9	67.7	31.8	21.9	57.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.2	49.9	2.2	64.3	92.9	67.7	31.8	21.9	57.4
LOS	F	D	A	E	F	E	C	C	E
Approach Delay		58.1			75.2		41.5		56.6
Approach LOS		E			E		D		E

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 56.2

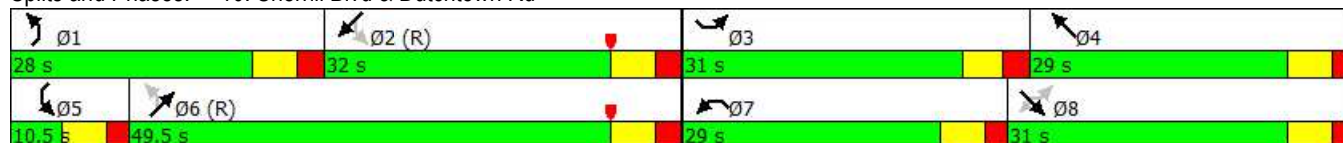
Intersection LOS: E

Intersection Capacity Utilization 95.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	436	237	146	566	350	355	957	16	653
v/c Ratio	1.01	0.60	0.19	0.89	0.99	0.95	0.67	0.09	0.86
Control Delay	81.2	49.9	2.2	64.3	92.9	67.7	31.8	21.9	57.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.2	49.9	2.2	64.3	92.9	67.7	31.8	21.9	57.4
Queue Length 50th (ft)	~298	168	0	220	271	219	286	7	255
Queue Length 95th (ft)	#513	255	10	#309	#468	#406	417	20	#354
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	431	398	752	657	355	380	1432	176	759
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.60	0.19	0.86	0.99	0.93	0.67	0.09	0.86

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	401	218	134	521	304	18	327	744	136	15	540	61
Future Volume (vph)	401	218	134	521	304	18	327	744	136	15	540	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1847		1770	3457		1770	3486	
Flt Permitted	0.16	1.00	1.00	0.95	1.00		0.13	1.00		0.27	1.00	
Satd. Flow (perm)	291	1863	2787	3433	1847		237	3457		502	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	436	237	146	566	330	20	355	809	148	16	587	66
RTOR Reduction (vph)	0	0	115	0	2	0	0	12	0	0	7	0
Lane Group Flow (vph)	436	237	31	566	348	0	355	945	0	16	646	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	50.6	25.6	25.6	22.4	23.0		53.5	45.7		27.7	25.9	
Effective Green, g (s)	50.6	25.6	25.6	22.4	23.0		53.5	45.7		27.7	25.9	
Actuated g/C Ratio	0.42	0.21	0.21	0.19	0.19		0.45	0.38		0.23	0.22	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	430	397	594	640	354		375	1316		134	752	
v/s Ratio Prot	c0.21	0.13		0.16	0.19		c0.17	0.27		0.00	0.19	
v/s Ratio Perm	c0.22		0.01				c0.26			0.03		
v/c Ratio	1.01	0.60	0.05	0.88	0.98		0.95	0.72		0.12	0.86	
Uniform Delay, d1	35.2	42.5	37.6	47.5	48.3		34.1	31.7		35.8	45.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	47.0	2.4	0.0	13.7	43.3		32.6	3.4		0.4	12.2	
Delay (s)	82.2	45.0	37.6	61.3	91.6		66.8	35.1		36.2	57.5	
Level of Service	F	D	D	E	F		E	D		D	E	
Approach Delay (s)		63.5			72.9			43.6			57.0	
Approach LOS		E			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			57.6			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			95.1%			ICU Level of Service				F		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2030 Projected PM Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	31	10	10	451	226	8
Future Volume (Veh/h)	31	10	10	451	226	8
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	11	11	490	246	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	518	128	255			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	128	255			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	99			
cM capacity (veh/h)	483	899	1307			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	45	11	245	245	164	91
Volume Left	34	11	0	0	0	0
Volume Right	11	0	0	0	0	9
cSH	640	1307	1700	1700	1700	1700
Volume to Capacity	0.07	0.01	0.14	0.14	0.10	0.05
Queue Length 95th (ft)	6	1	0	0	0	0
Control Delay (s)	12.0	7.8	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	12.0	0.2			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			22.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Sherrill Blvd & Medical Office Access RT

2030 Projected PM Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	468	213	41	0	15
Future Volume (Veh/h)	0	468	213	41	0	15
Sign Control		Free	Free		Stop	
Grade		-9%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	509	232	45	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	277				509	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	277				509	138
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	1283				494	884
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	
Volume Total	254	254	155	122	16	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	45	16	
cSH	1700	1700	1700	1700	884	
Volume to Capacity	0.15	0.15	0.09	0.07	0.02	
Queue Length 95th (ft)	0	0	0	0	1	
Control Delay (s)	0.0	0.0	0.0	0.0	9.1	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.1	
Approach LOS					A	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			17.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: Medical Office Access & Christian Academy Blvd

2030 Projected PM Peak
Medical Office Center

	→	↗	↖	←	↘	↙
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↰			↰	↰	↰
Traffic Volume (veh/h)	193	11	27	126	12	163
Future Volume (Veh/h)	193	11	27	126	12	163
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	210	12	29	137	13	177
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			222		411	216
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			222		411	216
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	79
cM capacity (veh/h)			1347		584	824
Direction, Lane #	EB 1	WB 1	NE 1	NE 2		
Volume Total	222	166	13	177		
Volume Left	0	29	13	0		
Volume Right	12	0	0	177		
cSH	1700	1347	584	824		
Volume to Capacity	0.13	0.02	0.02	0.21		
Queue Length 95th (ft)	0	2	2	20		
Control Delay (s)	0.0	1.5	11.3	10.6		
Lane LOS		A	B	B		
Approach Delay (s)	0.0	1.5	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			32.3%	ICU Level of Service		A
Analysis Period (min)			15			

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

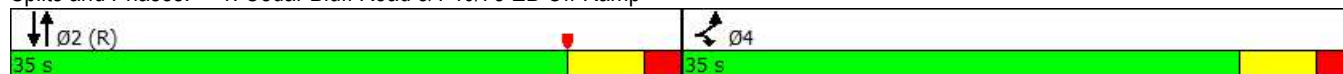
2030 Projected Midday Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	513	551	1601	1352
Future Volume (vph)	513	551	1601	1352
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effct Green (s)	24.8	24.8	37.2	37.2
Actuated g/C Ratio	0.35	0.35	0.53	0.53
v/c Ratio	0.66	0.70	0.51	0.54
Control Delay	21.0	25.7	12.1	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.0	25.7	12.1	11.0
LOS	C	C	B	B
Approach Delay	22.5		12.1	11.0
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 37 (53%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 14.5
 Intersection Capacity Utilization 65.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2030 Projected Midday Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	792	365	1740	1470
v/c Ratio	0.66	0.70	0.51	0.54
Control Delay	21.0	25.7	12.1	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.0	25.7	12.1	11.0
Queue Length 50th (ft)	141	138	131	171
Queue Length 95th (ft)	169	205	195	234
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1499	650	3407	2717
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.53	0.56	0.51	0.54
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Projected Midday Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	513	551	0	1601	1352	0
Future Volume (vph)	513	551	0	1601	1352	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Frt	0.96	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3369	1455		6408	5111	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3369	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	558	599	0	1740	1470	0
RTOR Reduction (vph)	7	7	0	0	0	0
Lane Group Flow (vph)	785	358	0	1740	1470	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	22.8	22.8		35.2	35.2	
Effective Green, g (s)	24.8	24.8		37.2	37.2	
Actuated g/C Ratio	0.35	0.35		0.53	0.53	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1193	515		3405	2716	
v/s Ratio Prot	0.23	c0.25		0.27	c0.29	
v/s Ratio Perm						
v/c Ratio	0.66	0.69		0.51	0.54	
Uniform Delay, d1	19.0	19.4		10.5	10.8	
Progression Factor	1.00	1.00		1.00	0.89	
Incremental Delay, d2	1.0	3.3		0.6	0.7	
Delay (s)	20.0	22.6		11.1	10.3	
Level of Service	C	C		B	B	
Approach Delay (s)	20.9			11.1	10.3	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			13.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			65.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected Midday Peak
Medical Office Center

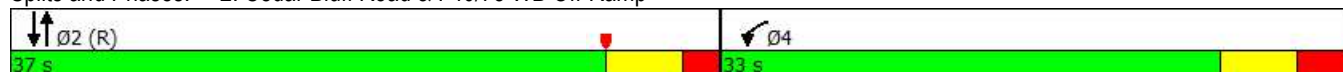
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	975	2113	688
Future Volume (vph)	975	2113	688
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	33.0	37.0	37.0
Total Split (%)	47.1%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	27.2	34.8	34.8
Actuated g/C Ratio	0.39	0.50	0.50
v/c Ratio	0.77	0.69	0.30
Control Delay	23.0	9.9	5.5
Queue Delay	0.0	0.0	0.0
Total Delay	23.0	9.9	5.5
LOS	C	A	A
Approach Delay	23.0	9.9	5.5
Approach LOS	C	A	A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 40 (57%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 12.5
 Intersection Capacity Utilization 65.1%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service C

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected Midday Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	1060	2297	748
v/c Ratio	0.77	0.69	0.30
Control Delay	23.0	9.9	5.5
Queue Delay	0.0	0.0	0.0
Total Delay	23.0	9.9	5.5
Queue Length 50th (ft)	191	99	38
Queue Length 95th (ft)	258	109	51
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1462	3310	2504
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	83	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.73	0.71	0.30
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected Midday Peak
Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	975	0	2113	0	0	688
Future Volume (vph)	975	0	2113	0	0	688
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1060	0	2297	0	0	748
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1060	0	2297	0	0	748
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	24.2		32.8			32.8
Effective Green, g (s)	27.2		34.8			34.8
Actuated g/C Ratio	0.39		0.50			0.50
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1371		3308			2502
v/s Ratio Prot	c0.30		c0.35			0.15
v/s Ratio Perm						
v/c Ratio	0.77		0.69			0.30
Uniform Delay, d1	18.7		13.5			10.4
Progression Factor	1.00		0.63			0.49
Incremental Delay, d2	2.5		1.1			0.3
Delay (s)	21.2		9.6			5.3
Level of Service	C		A			A
Approach Delay (s)	21.2		9.6			5.3
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			11.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			65.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings

3: Cedar Bluff Road & Park West Blvd

2030 Projected Midday Peak
Medical Office Center

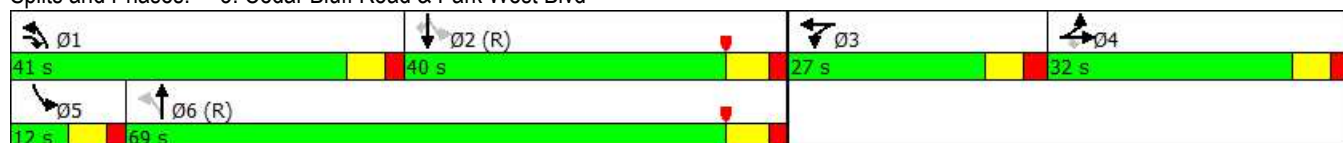
										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	101	54	362	143	278	415	902	56	616	61
Future Volume (vph)	101	54	362	143	278	415	902	56	616	61
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	32.0	32.0	41.0	27.0	27.0	41.0	69.0	12.0	40.0	40.0
Total Split (%)	22.9%	22.9%	29.3%	19.3%	19.3%	29.3%	49.3%	8.6%	28.6%	28.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	26.0	26.0	62.2	22.4	22.4	80.1	70.4	53.6	43.5	43.5
Actuated g/C Ratio	0.19	0.19	0.44	0.16	0.16	0.57	0.50	0.38	0.31	0.31
v/c Ratio	0.34	0.79	0.33	0.54	0.83	0.84	0.43	0.24	0.60	0.11
Control Delay	52.0	73.4	24.8	62.4	64.5	51.0	15.8	19.8	37.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	8.0	0.2	0.0	0.0	0.0
Total Delay	52.0	73.4	24.8	62.4	64.5	59.0	16.0	19.8	37.2	0.5
LOS	D	E	C	E	E	E	B	B	D	A
Approach Delay		50.1			64.0		28.6		32.8	
Approach LOS		D			E		C		C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 107 (76%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 39.2
 Intersection Capacity Utilization 74.6%
 Analysis Period (min) 15

Intersection LOS: D
ICU Level of Service D

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2030 Projected Midday Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	110	232	220	139	473	451	1091	61	670	66
v/c Ratio	0.34	0.79	0.33	0.54	0.83	0.84	0.43	0.24	0.60	0.11
Control Delay	52.0	73.4	24.8	62.4	64.5	51.0	15.8	19.8	37.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	8.0	0.2	0.0	0.0	0.0
Total Delay	52.0	73.4	24.8	62.4	64.5	59.0	16.0	19.8	37.2	0.5
Queue Length 50th (ft)	83	202	116	128	209	381	213	23	306	0
Queue Length 95th (ft)	m143	307	173	207	#280	492	265	m25	338	m1
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	349	321	718	265	586	581	2529	259	1121	619
Starvation Cap Reductn	0	0	0	0	0	97	578	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.72	0.31	0.52	0.81	0.93	0.56	0.24	0.60	0.11

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	54	362	143	278	143	415	902	102	56	616	61
Future Volume (vph)	101	54	362	143	278	143	415	902	102	56	616	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.89	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1580	1512	1618	3342		1770	5008		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.20	1.00		0.25	1.00	1.00
Satd. Flow (perm)	1719	1580	1512	1618	3342		370	5008		458	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	59	393	155	302	155	451	980	111	61	670	66
RTOR Reduction (vph)	0	0	0	0	38	0	0	9	0	0	0	45
Lane Group Flow (vph)	110	232	220	139	435	0	451	1082	0	61	670	21
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	23.0	23.0	53.6	19.9	19.9		77.6	66.7		45.9	41.0	41.0
Effective Green, g (s)	26.0	26.0	57.6	22.4	22.4		79.6	69.2		51.9	43.5	43.5
Actuated g/C Ratio	0.19	0.19	0.41	0.16	0.16		0.57	0.49		0.37	0.31	0.31
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	319	293	622	258	534		536	2475		242	1121	501
v/s Ratio Prot	0.06	c0.15	0.08	0.09	c0.13		c0.20	0.22		0.01	0.19	
v/s Ratio Perm			0.06				c0.28			0.08		0.01
v/c Ratio	0.34	0.79	0.35	0.54	0.81		0.84	0.44		0.25	0.60	0.04
Uniform Delay, d1	49.6	54.4	28.4	54.1	56.8		27.1	22.8		28.7	40.8	33.7
Progression Factor	1.00	0.99	0.97	1.00	1.00		1.62	0.67		1.00	0.82	1.00
Incremental Delay, d2	0.5	13.2	0.3	1.7	9.1		8.3	0.4		0.3	1.9	0.1
Delay (s)	50.0	67.3	27.7	55.7	65.9		52.4	15.8		28.9	35.3	33.8
Level of Service	D	E	C	E	E		D	B		C	D	C
Approach Delay (s)		48.4			63.6			26.5			34.7	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			74.6%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

Timings

4: Cedar Bluff Road & Sherrill Blvd

2030 Projected Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	179	18	305	105	9	322	1005	22	1116
Future Volume (vph)	179	18	305	105	9	322	1005	22	1116
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4	1		4	1	6		2
Permitted Phases	4		4	4		6		2	
Detector Phase	4	4	1	4	4	1	6	2	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	37.0	37.0	35.0	37.0	37.0	35.0	103.0	68.0	68.0
Total Split (%)	26.4%	26.4%	25.0%	26.4%	26.4%	25.0%	73.6%	48.6%	48.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	28.4	28.4	57.9		28.4	105.1	104.6	75.6	75.6
Actuated g/C Ratio	0.20	0.20	0.41		0.20	0.75	0.75	0.54	0.54
v/c Ratio	0.80	0.05	0.47		0.28	0.74	0.43	0.10	0.67
Control Delay	75.3	42.5	27.8		42.4	34.6	6.1	21.5	27.4
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	42.5	27.8		42.4	34.6	6.1	21.5	27.4
LOS	E	D	C		D	C	A	C	C
Approach Delay		45.3			42.4		12.8		27.3
Approach LOS		D			D		B		C

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 88 (63%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 24.6

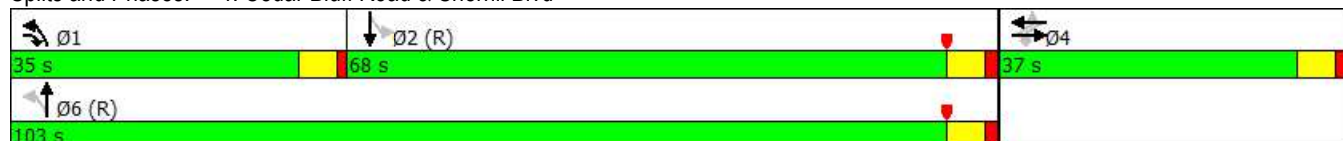
Intersection LOS: C

Intersection Capacity Utilization 78.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

2030 Projected Midday Peak

4: Cedar Bluff Road & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	195	20	332	148	350	1140	24	1313
v/c Ratio	0.80	0.05	0.47	0.28	0.74	0.43	0.10	0.67
Control Delay	75.3	42.5	27.8	42.4	34.6	6.1	21.5	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	42.5	27.8	42.4	34.6	6.1	21.5	27.4
Queue Length 50th (ft)	168	15	192	53	220	202	11	455
Queue Length 95th (ft)	254	37	247	84	m322	221	33	615
Internal Link Dist (ft)		1062		642		919		1139
Turn Bay Length (ft)	90				75		85	
Base Capacity (vph)	289	465	772	610	544	2655	249	1947
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.04	0.43	0.24	0.64	0.43	0.10	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2030 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	18	305	105	9	22	322	1005	44	22	1116	92
Future Volume (vph)	179	18	305	105	9	22	322	1005	44	22	1116	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5	3.5	3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849	1947	1655		3196		1906	3552		1761	3597	
Flt Permitted	0.62	1.00	1.00		0.75		0.10	1.00		0.25	1.00	
Satd. Flow (perm)	1211	1947	1655		2502		209	3552		462	3597	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	195	20	332	114	10	24	350	1092	48	24	1213	100
RTOR Reduction (vph)	0	0	19	0	12	0	0	2	0	0	4	0
Lane Group Flow (vph)	195	20	313	0	136	0	350	1138	0	24	1309	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	25.9	25.9	49.8		25.9		102.6	102.6		73.7	73.7	
Effective Green, g (s)	28.4	28.4	53.8		28.4		104.6	104.6		75.7	75.7	
Actuated g/C Ratio	0.20	0.20	0.38		0.20		0.75	0.75		0.54	0.54	
Clearance Time (s)	6.0	6.0	5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0	2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	245	394	635		507		470	2653		249	1944	
v/s Ratio Prot		0.01	0.09				c0.14	0.32			0.36	
v/s Ratio Perm	c0.16		0.10		0.05		c0.42			0.05		
v/c Ratio	0.80	0.05	0.49		0.27		0.74	0.43		0.10	0.67	
Uniform Delay, d1	53.0	44.9	32.7		47.0		31.7	6.6		15.6	23.2	
Progression Factor	1.00	1.00	1.00		1.00		1.02	0.79		1.00	1.00	
Incremental Delay, d2	16.2	0.1	0.4		0.3		5.6	0.5		0.8	1.9	
Delay (s)	69.3	45.0	33.2		47.3		37.9	5.7		16.3	25.1	
Level of Service	E	D	C		D		D	A		B	C	
Approach Delay (s)		46.5			47.3			13.2			25.0	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			24.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			78.2%				ICU Level of Service			D		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected Midday Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	98	47	811	102	1079	
Future Volume (vph)	98	47	811	102	1079	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	22.0	15.0	53.0	15.0	68.0	22.0
Total Split (%)	24.4%	16.7%	58.9%	16.7%	75.6%	24%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effect Green (s)	12.3	22.7	58.9	69.0	69.3	
Actuated g/C Ratio	0.14	0.25	0.65	0.77	0.77	
v/c Ratio	0.56	0.12	0.47	0.28	0.43	
Control Delay	46.7	6.8	6.7	5.6	5.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.7	6.8	6.7	5.6	5.7	
LOS	D	A	A	A	A	
Approach Delay			6.7		5.7	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 35 (39%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 7.9
 Intersection Capacity Utilization 66.1%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↑ Ø2 (R)	→ Ø4
15 s	53 s	22 s
↓ Ø6 (R)		↘ Ø8
68 s		22 s

Queues
5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected Midday Peak
Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	107	51	1056	111	1173
v/c Ratio	0.56	0.12	0.47	0.28	0.43
Control Delay	46.7	6.8	6.7	5.6	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	46.7	6.8	6.7	5.6	5.7
Queue Length 50th (ft)	58	0	92	14	120
Queue Length 95th (ft)	105	23	77	35	195
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	254	476	2275	438	2721
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.11	0.46	0.25	0.43
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	98	0	47	0	811	160	102	1079	0
Future Volume (vph)	0	0	0	98	0	47	0	811	160	102	1079	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.98		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3452		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.21	1.00	
Satd. Flow (perm)				1410		1583		3452		383	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	107	0	51	0	882	174	111	1173	0
RTOR Reduction (vph)	0	0	0	0	0	42	0	15	0	0	0	0
Lane Group Flow (vph)	0	0	0	107	0	9	0	1041	0	111	1173	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				10.7		16.7		55.3		66.8	66.8	
Effective Green, g (s)				10.7		16.7		55.3		66.8	66.8	
Actuated g/C Ratio				0.12		0.19		0.61		0.74	0.74	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				167		293		2121		376	2614	
v/s Ratio Prot						0.00		c0.30		0.02	c0.33	
v/s Ratio Perm				c0.08		0.00				0.20		
v/c Ratio				0.64		0.03		0.49		0.30	0.45	
Uniform Delay, d1				37.8		30.0		9.6		4.7	4.5	
Progression Factor				1.00		1.00		0.56		1.00	1.00	
Incremental Delay, d2				8.1		0.0		0.8		0.4	0.6	
Delay (s)				45.9		30.1		6.2		5.1	5.0	
Level of Service				D		C		A		A	A	
Approach Delay (s)		0.0			40.8			6.2			5.1	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.8									
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			90.0							18.0		
Intersection Capacity Utilization			66.1%							C		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

2030 Projected Midday Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	99	47	69	58	91	176	701	22	1069
Future Volume (vph)	99	47	69	58	91	176	701	22	1069
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	12.0	14.0	16.0	12.0	14.0	16.0	52.0	12.0	48.0
Total Split (%)	13.3%	15.6%	17.8%	13.3%	15.6%	17.8%	57.8%	13.3%	53.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	12.1	8.0	20.3	15.2	8.2	58.4	53.9	50.1	43.6
Actuated g/C Ratio	0.13	0.09	0.23	0.17	0.09	0.65	0.60	0.56	0.48
v/c Ratio	0.51	0.31	0.17	0.25	0.65	0.70	0.39	0.06	0.74
Control Delay	40.6	43.8	2.8	30.7	56.5	29.6	11.5	5.3	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	43.8	2.8	30.7	56.5	29.6	11.5	5.3	19.5
LOS	D	D	A	C	E	C	B	A	B
Approach Delay		29.2			47.1		14.9		19.2
Approach LOS		C			D		B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 16 (18%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 20.2

Intersection LOS: C

Intersection Capacity Utilization 69.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
12 s	52 s	12 s	14 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
16 s	48 s	12 s	14 s

Queues

2030 Projected Midday Peak

6: Cedar Bluff Road & Dutchtown Rd

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	108	51	75	63	111	191	822	24	1255
v/c Ratio	0.51	0.31	0.17	0.25	0.65	0.70	0.39	0.06	0.74
Control Delay	40.6	43.8	2.8	30.7	56.5	29.6	11.5	5.3	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	43.8	2.8	30.7	56.5	29.6	11.5	5.3	19.5
Queue Length 50th (ft)	50	28	0	28	59	49	108	2	325
Queue Length 95th (ft)	97	63	14	63	#136	#138	196	m7	133
Internal Link Dist (ft)	2065				1954		1139		493
Turn Bay Length (ft)	200		200		150		100		50
Base Capacity (vph)	210	165	460	248	172	288	2101	427	1731
Starvation Cap Reductn	0	0	0	0	0	0	0	0	3
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.31	0.16	0.25	0.65	0.66	0.39	0.06	0.73

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2030 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	47	69	58	91	11	176	701	55	22	1069	86
Future Volume (vph)	99	47	69	58	91	11	176	701	55	22	1069	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1833		1770	3500		1761	3482	
Flt Permitted	0.69	1.00	1.00	0.49	1.00		0.09	1.00		0.34	1.00	
Satd. Flow (perm)	1277	1863	1583	908	1833		170	3500		632	3482	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	51	75	63	99	12	191	762	60	24	1162	93
RTOR Reduction (vph)	0	0	62	0	4	0	0	6	0	0	7	0
Lane Group Flow (vph)	108	51	13	63	107	0	191	816	0	24	1248	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	12.1	6.4	15.5	18.3	9.5		56.3	47.9		43.6	41.2	
Effective Green, g (s)	12.1	6.4	15.5	18.3	9.5		56.3	47.9		43.6	41.2	
Actuated g/C Ratio	0.13	0.07	0.17	0.20	0.11		0.63	0.53		0.48	0.46	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	132	378	268	193		268	1862		336	1593	
v/s Ratio Prot	c0.03	0.03	0.00	0.02	c0.06		c0.07	0.23		0.00	c0.36	
v/s Ratio Perm	0.04		0.00	0.02			0.37			0.03		
v/c Ratio	0.53	0.39	0.03	0.24	0.55		0.71	0.44		0.07	0.78	
Uniform Delay, d1	35.9	39.9	31.0	29.7	38.2		17.1	12.8		12.1	20.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.76	0.84	
Incremental Delay, d2	2.7	1.9	0.0	0.5	3.4		8.7	0.8		0.1	3.6	
Delay (s)	38.6	41.8	31.1	30.1	41.6		25.7	13.6		9.3	21.0	
Level of Service	D	D	C	C	D		C	B		A	C	
Approach Delay (s)		36.9			37.5			15.9			20.8	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			21.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			24.5		
Intersection Capacity Utilization			69.6%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected Midday Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	348	23	40	351	64	10	28	32	131	84	23
Future Volume (Veh/h)	35	348	23	40	351	64	10	28	32	131	84	23
Sign Control		Free			Free			Stop			Stop	
Grade		-9%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	378	25	43	382	70	11	30	35	142	91	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									40			
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1142							
pX, platoon unblocked												
vC, conflicting volume	452			403			814	1004	202	783	982	226
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	452			403			814	1004	202	783	982	226
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			96			94	87	96	38	60	97
cM capacity (veh/h)	1105			1152			172	223	806	231	230	777
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	38	252	151	234	261	76	142	116				
Volume Left	38	0	0	43	0	11	142	0				
Volume Right	0	0	25	0	70	35	0	25				
cSH	1105	1700	1700	1152	1700	388	231	271				
Volume to Capacity	0.03	0.15	0.09	0.04	0.15	0.20	0.62	0.43				
Queue Length 95th (ft)	3	0	0	3	0	18	90	51				
Control Delay (s)	8.4	0.0	0.0	1.8	0.0	18.7	42.7	27.8				
Lane LOS	A			A		C	E	D				
Approach Delay (s)	0.7			0.9		18.7	36.0					
Approach LOS						C	E					
Intersection Summary												
Average Delay			9.0									
Intersection Capacity Utilization			47.2%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Projected Midday Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	560	94	35	466	88	35
Future Volume (Veh/h)	560	94	35	466	88	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	609	102	38	507	96	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			711		1243	660
vC1, stage 1 conf vol					660	
vC2, stage 2 conf vol					583	
vCu, unblocked vol			711		1243	660
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		76	92
cM capacity (veh/h)			888		401	463
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	711	38	507	96	38	
Volume Left	0	38	0	96	0	
Volume Right	102	0	0	0	38	
cSH	1700	888	1700	401	463	
Volume to Capacity	0.42	0.04	0.30	0.24	0.08	
Queue Length 95th (ft)	0	3	0	23	7	
Control Delay (s)	0.0	9.2	0.0	16.8	13.5	
Lane LOS		A		C	B	
Approach Delay (s)	0.0	0.6		15.8		
Approach LOS				C		
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			46.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2030 Projected Midday Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (veh/h)	0	563	436	0	224	4
Future Volume (Veh/h)	0	563	436	0	224	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	612	474	0	243	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	474				780	237
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	474				780	237
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				27	99
cM capacity (veh/h)	1084				332	764
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	204	408	316	158	243	4
Volume Left	0	0	0	0	243	0
Volume Right	0	0	0	0	0	4
cSH	1084	1700	1700	1700	332	764
Volume to Capacity	0.00	0.24	0.19	0.09	0.73	0.01
Queue Length 95th (ft)	0	0	0	0	137	0
Control Delay (s)	0.0	0.0	0.0	0.0	40.4	9.7
Lane LOS					E	A
Approach Delay (s)	0.0		0.0		39.9	
Approach LOS					E	
Intersection Summary						
Average Delay			7.4			
Intersection Capacity Utilization			34.6%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Projected Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	94	259	196	156	303	170	208	39	82
Future Volume (vph)	94	259	196	156	303	170	208	39	82
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	12.0	29.0	29.0	14.0	31.0	17.0	27.0	10.0	20.0
Total Split (%)	15.0%	36.3%	36.3%	17.5%	38.8%	21.3%	33.8%	12.5%	25.0%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	23.7	17.7	17.7	7.8	21.9	35.7	29.1	25.7	19.6
Actuated g/C Ratio	0.30	0.22	0.22	0.10	0.27	0.45	0.36	0.32	0.24
v/c Ratio	0.34	0.68	0.25	0.51	0.69	0.38	0.31	0.12	0.25
Control Delay	17.9	36.8	1.5	40.0	33.6	17.5	12.6	16.0	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	36.8	1.5	40.0	33.6	17.5	12.6	16.0	12.8
LOS	B	D	A	D	C	B	B	B	B
Approach Delay		20.9			35.7		14.1		13.3
Approach LOS		C			D		B		B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 21.7

Intersection LOS: C

Intersection Capacity Utilization 60.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
17 s	20 s	12 s	31 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
10 s	27 s	14 s	29 s

Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Projected Midday Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	102	282	213	170	350	185	411	42	222
v/c Ratio	0.34	0.68	0.25	0.51	0.69	0.38	0.31	0.12	0.25
Control Delay	17.9	36.8	1.5	40.0	33.6	17.5	12.6	16.0	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	36.8	1.5	40.0	33.6	17.5	12.6	16.0	12.8
Queue Length 50th (ft)	32	129	0	42	160	55	45	11	18
Queue Length 95th (ft)	55	192	7	72	231	110	86	33	50
Internal Link Dist (ft)	1094				6715		2069		1876
Turn Bay Length (ft)	200		225		175		475		100
Base Capacity (vph)	299	535	1015	343	579	503	1317	362	888
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.53	0.21	0.50	0.60	0.37	0.31	0.12	0.25
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Projected Midday Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	94	259	196	156	303	19	170	208	170	39	82	122
Future Volume (vph)	94	259	196	156	303	19	170	208	170	39	82	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1846		1770	3300		1770	3221	
Flt Permitted	0.40	1.00	1.00	0.95	1.00		0.45	1.00		0.51	1.00	
Satd. Flow (perm)	754	1863	2787	3433	1846		844	3300		952	3221	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	282	213	170	329	21	185	226	185	42	89	133
RTOR Reduction (vph)	0	0	163	0	3	0	0	126	0	0	102	0
Lane Group Flow (vph)	102	282	50	170	347	0	185	285	0	42	120	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	23.7	18.9	18.9	7.8	21.9		34.8	25.5		21.7	18.4	
Effective Green, g (s)	23.7	18.9	18.9	7.8	21.9		34.8	25.5		21.7	18.4	
Actuated g/C Ratio	0.30	0.24	0.24	0.10	0.27		0.43	0.32		0.27	0.23	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	284	440	658	334	505		481	1051		291	740	
v/s Ratio Prot	0.02	0.15		c0.05	c0.19		c0.05	0.09		0.01	0.04	
v/s Ratio Perm	0.08		0.02				c0.12			0.03		
v/c Ratio	0.36	0.64	0.08	0.51	0.69		0.38	0.27		0.14	0.16	
Uniform Delay, d1	21.2	27.5	23.8	34.3	26.0		14.6	20.3		21.8	24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	3.2	0.0	1.2	3.9		0.5	0.6		0.2	0.5	
Delay (s)	22.0	30.7	23.8	35.5	29.9		15.1	21.0		22.0	25.1	
Level of Service	C	C	C	D	C		B	C		C	C	
Approach Delay (s)		26.7			31.7			19.1			24.6	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			25.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			60.9%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2030 Projected Midday Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	33	11	17	374	312	15
Future Volume (Veh/h)	33	11	17	374	312	15
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	12	18	407	339	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	586	178	355			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	586	178	355			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	99	99			
cM capacity (veh/h)	434	835	1200			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	48	18	204	204	226	129
Volume Left	36	18	0	0	0	0
Volume Right	12	0	0	0	0	16
cSH	579	1200	1700	1700	1700	1700
Volume to Capacity	0.08	0.01	0.12	0.12	0.13	0.08
Queue Length 95th (ft)	7	1	0	0	0	0
Control Delay (s)	12.9	8.0	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	12.9	0.3			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			24.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Sherrill Blvd & Medical Office Access RT

2030 Projected Midday Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	406	312	73	0	15
Future Volume (Veh/h)	0	406	312	73	0	15
Sign Control		Free	Free		Stop	
Grade		-9%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	441	339	79	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	418				599	209
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	418				599	209
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	1138				433	797
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	
Volume Total	220	220	226	192	16	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	79	16	
cSH	1700	1700	1700	1700	797	
Volume to Capacity	0.13	0.13	0.13	0.11	0.02	
Queue Length 95th (ft)	0	0	0	0	2	
Control Delay (s)	0.0	0.0	0.0	0.0	9.6	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.6	
Approach LOS					A	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			21.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: Medical Office Access & Christian Academy Blvd

2030 Projected Midday Peak
Medical Office Center

	→	↘	↙	←	↗	↖
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↰			↰	↰	↰
Traffic Volume (veh/h)	108	19	22	105	28	131
Future Volume (Veh/h)	108	19	22	105	28	131
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	117	21	24	114	30	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			138		290	128
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			138		290	128
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	85
cM capacity (veh/h)			1446		689	923
Direction, Lane #	EB 1	WB 1	NE 1	NE 2		
Volume Total	138	138	30	142		
Volume Left	0	24	30	0		
Volume Right	21	0	0	142		
cSH	1700	1446	689	923		
Volume to Capacity	0.08	0.02	0.04	0.15		
Queue Length 95th (ft)	0	1	3	14		
Control Delay (s)	0.0	1.4	10.5	9.6		
Lane LOS		A	B	A		
Approach Delay (s)	0.0	1.4	9.8			
Approach LOS						
A						
Intersection Summary						
Average Delay						
			4.2			
Intersection Capacity Utilization			26.9%	ICU Level of Service		A
Analysis Period (min)			15			

Timings
1: Cedar Bluff Road & I-40/75 EB Off-Ramp

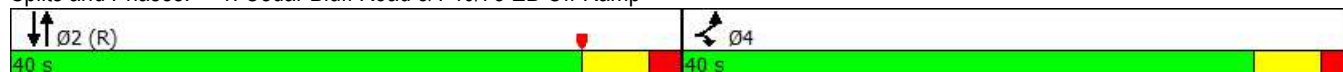
2030 Projected PM School Peak
Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	602	438	1395	1255
Future Volume (vph)	602	438	1395	1255
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	4	2	2
Permitted Phases				
Detector Phase	4	4	2	2
Switch Phase				
Minimum Initial (s)	6.0	6.0	15.0	15.0
Minimum Split (s)	15.0	15.0	24.0	24.0
Total Split (s)	40.0	40.0	40.0	40.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	C-Max
Act Effect Green (s)	27.1	27.1	44.9	44.9
Actuated g/C Ratio	0.34	0.34	0.56	0.56
v/c Ratio	0.67	0.70	0.42	0.48
Control Delay	24.3	28.7	11.5	10.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	24.3	28.7	11.5	10.3
LOS	C	C	B	B
Approach Delay	25.7		11.5	10.3
Approach LOS	C		B	B

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 48 (60%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 15.1
 Intersection Capacity Utilization 59.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 1: Cedar Bluff Road & I-40/75 EB Off-Ramp



Queues

2030 Projected PM School Peak

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

Medical Office Center

				
Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	778	352	1516	1364
v/c Ratio	0.67	0.70	0.42	0.48
Control Delay	24.3	28.7	11.5	10.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	24.3	28.7	11.5	10.3
Queue Length 50th (ft)	164	157	116	134
Queue Length 95th (ft)	184	217	182	188
Internal Link Dist (ft)	2155		702	442
Turn Bay Length (ft)	435			
Base Capacity (vph)	1548	664	3596	2868
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	0.53	0.42	0.48
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: Cedar Bluff Road & I-40/75 EB Off-Ramp

2030 Projected PM School Peak
Medical Office Center

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	602	438	0	1395	1255	0
Future Volume (vph)	602	438	0	1395	1255	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-2%			0%	-1%	
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.86	0.91	
Flt	0.98	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3419	1455		6408	5111	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3419	1455		6408	5111	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	654	476	0	1516	1364	0
RTOR Reduction (vph)	11	11	0	0	0	0
Lane Group Flow (vph)	767	341	0	1516	1364	0
Turn Type	Prot	Prot		NA	NA	
Protected Phases	4	4		2	2	
Permitted Phases						
Actuated Green, G (s)	25.1	25.1		42.9	42.9	
Effective Green, g (s)	27.1	27.1		44.9	44.9	
Actuated g/C Ratio	0.34	0.34		0.56	0.56	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1158	492		3596	2868	
v/s Ratio Prot	0.22	c0.23		0.24	c0.27	
v/s Ratio Perm						
v/c Ratio	0.66	0.69		0.42	0.48	
Uniform Delay, d1	22.5	22.9		10.1	10.5	
Progression Factor	1.00	1.00		1.00	0.86	
Incremental Delay, d2	1.1	3.4		0.4	0.5	
Delay (s)	23.7	26.2		10.5	9.5	
Level of Service	C	C		B	A	
Approach Delay (s)	24.5			10.5	9.5	
Approach LOS	C			B	A	
Intersection Summary						
HCM 2000 Control Delay			14.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			59.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected PM School Peak
Medical Office Center

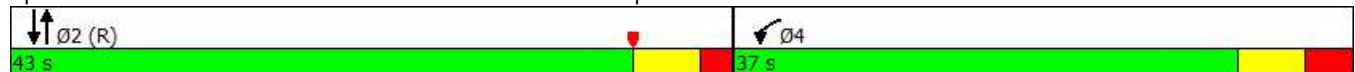
	↙	↑	↓
Lane Group	WBL	NBT	SBT
Lane Configurations	↙↙	↑↑↑	↑↑↑
Traffic Volume (vph)	851	1997	954
Future Volume (vph)	851	1997	954
Turn Type	Prot	NA	NA
Protected Phases	4	2	2
Permitted Phases			
Detector Phase	4	2	2
Switch Phase			
Minimum Initial (s)	6.0	15.0	15.0
Minimum Split (s)	15.0	24.0	24.0
Total Split (s)	37.0	43.0	43.0
Total Split (%)	46.3%	53.8%	53.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Max	C-Max
Act Effct Green (s)	28.6	43.4	43.4
Actuated g/C Ratio	0.36	0.54	0.54
v/c Ratio	0.73	0.60	0.38
Control Delay	25.8	10.4	8.0
Queue Delay	0.0	0.0	0.0
Total Delay	25.8	10.4	8.0
LOS	C	B	A
Approach Delay	25.8	10.4	8.0
Approach LOS	C	B	A

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 49 (61%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 13.3
 Intersection Capacity Utilization 59.9%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service B

Splits and Phases: 2: Cedar Bluff Road & I-40/75 WB Off-Ramp



Queues
2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected PM School Peak
Medical Office Center

			
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	925	2171	1037
v/c Ratio	0.73	0.60	0.38
Control Delay	25.8	10.4	8.0
Queue Delay	0.0	0.0	0.0
Total Delay	25.8	10.4	8.0
Queue Length 50th (ft)	201	129	85
Queue Length 95th (ft)	245	141	88
Internal Link Dist (ft)	2153	442	52
Turn Bay Length (ft)			
Base Capacity (vph)	1456	3608	2729
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.64	0.60	0.38
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

2: Cedar Bluff Road & I-40/75 WB Off-Ramp

2030 Projected PM School Peak

Medical Office Center

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	851	0	1997	0	0	954
Future Volume (vph)	851	0	1997	0	0	954
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	12	12	12
Grade (%)	1%		-1%			2%
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.86			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3530		6655			5034
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3530		6655			5034
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	925	0	2171	0	0	1037
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	925	0	2171	0	0	1037
Turn Type	Prot		NA			NA
Protected Phases	4		2			2
Permitted Phases						
Actuated Green, G (s)	25.6		41.4			41.4
Effective Green, g (s)	28.6		43.4			43.4
Actuated g/C Ratio	0.36		0.54			0.54
Clearance Time (s)	7.0		6.0			6.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	1261		3610			2730
v/s Ratio Prot	c0.26		c0.33			0.21
v/s Ratio Perm						
v/c Ratio	0.73		0.60			0.38
Uniform Delay, d1	22.4		12.4			10.5
Progression Factor	1.00		0.74			0.69
Incremental Delay, d2	1.9		0.7			0.3
Delay (s)	24.3		9.9			7.6
Level of Service	C		A			A
Approach Delay (s)	24.3		9.9			7.6
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			12.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			59.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Timings 3: Cedar Bluff Road & Park West Blvd

2030 Projected PM School Peak
Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	134	24	384	214	214	241	817	43	887	37
Future Volume (vph)	134	24	384	214	214	241	817	43	887	37
Turn Type	Split	NA	pm+ov	Split	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	1	3	3	1	6	5	2	
Permitted Phases			4			6		2		2
Detector Phase	4	4	1	3	3	1	6	5	2	2
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.0	12.5	12.5	12.0	21.5	12.0	21.5	21.5
Total Split (s)	37.0	37.0	32.0	34.0	34.0	32.0	72.0	17.0	57.0	57.0
Total Split (%)	23.1%	23.1%	20.0%	21.3%	21.3%	20.0%	45.0%	10.6%	35.6%	35.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5	2.5	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-2.0	-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	29.2	29.2	56.4	26.4	26.4	92.9	82.2	76.3	65.2	65.2
Actuated g/C Ratio	0.18	0.18	0.35	0.16	0.16	0.58	0.51	0.48	0.41	0.41
v/c Ratio	0.47	0.79	0.41	0.79	0.75	0.71	0.39	0.15	0.66	0.05
Control Delay	62.4	81.5	40.2	84.6	54.7	47.3	16.8	15.5	34.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.1	0.2	0.0	0.0	0.0
Total Delay	62.4	81.5	40.2	84.6	54.7	48.3	17.0	15.5	34.1	0.1
LOS	E	F	D	F	D	D	B	B	C	A
Approach Delay		61.3			63.8		23.5		32.0	
Approach LOS		E			E		C		C	

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 46 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 39.9

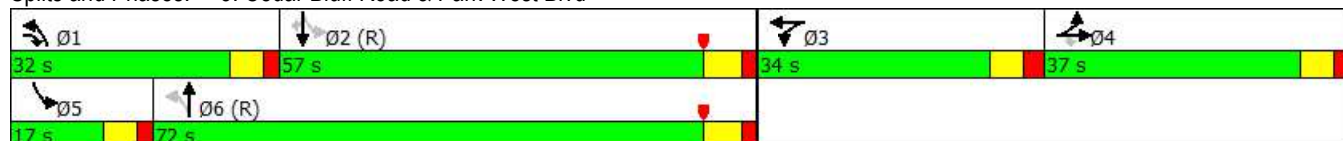
Intersection LOS: D

Intersection Capacity Utilization 72.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2030 Projected PM School Peak

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	146	222	221	210	479	262	1008	47	964	40
v/c Ratio	0.47	0.79	0.41	0.79	0.75	0.71	0.39	0.15	0.66	0.05
Control Delay	62.4	81.5	40.2	84.6	54.7	47.3	16.8	15.5	34.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.1	0.2	0.0	0.0	0.0
Total Delay	62.4	81.5	40.2	84.6	54.7	48.3	17.0	15.5	34.1	0.1
Queue Length 50th (ft)	136	230	177	231	198	224	220	18	465	0
Queue Length 95th (ft)	204	328	241	336	263	338	247	m34	448	m0
Internal Link Dist (ft)		888			1639		269		273	
Turn Bay Length (ft)	110			230		245		95		145
Base Capacity (vph)	359	323	573	303	711	412	2574	358	1471	747
Starvation Cap Reductn	0	0	0	0	0	39	651	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.69	0.39	0.69	0.67	0.70	0.52	0.13	0.66	0.05

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Projected PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	24	384	214	214	205	241	817	110	43	887	37
Future Volume (vph)	134	24	384	214	214	205	241	817	110	43	887	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.87	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1543	1512	1618	3267		1770	4994		1745	3610	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.14	1.00		0.27	1.00	1.00
Satd. Flow (perm)	1719	1543	1512	1618	3267		254	4994		495	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	26	417	233	233	223	262	888	120	47	964	40
RTOR Reduction (vph)	0	0	0	0	101	0	0	9	0	0	0	24
Lane Group Flow (vph)	146	222	221	210	378	0	262	999	0	47	964	16
Turn Type	Split	NA	pm+ov	Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4	1	3	3		1	6		5	2	
Permitted Phases			4				6			2		2
Actuated Green, G (s)	26.2	26.2	47.9	23.9	23.9		90.4	78.5		68.6	62.7	62.7
Effective Green, g (s)	29.2	29.2	51.9	26.4	26.4		92.4	81.0		74.6	65.2	65.2
Actuated g/C Ratio	0.18	0.18	0.32	0.16	0.16		0.58	0.51		0.47	0.41	0.41
Clearance Time (s)	6.5	6.5	6.0	6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	313	281	490	266	539		371	2528		300	1471	658
v/s Ratio Prot	0.08	c0.14	0.07	c0.13	0.12		c0.10	0.20		0.01	0.27	
v/s Ratio Perm			0.08				c0.30			0.06		0.01
v/c Ratio	0.47	0.79	0.45	0.79	0.70		0.71	0.40		0.16	0.66	0.02
Uniform Delay, d1	58.4	62.5	42.8	64.1	63.1		26.1	24.4		23.4	38.3	28.4
Progression Factor	1.00	1.00	0.99	1.00	1.00		1.63	0.65		0.82	0.78	1.00
Incremental Delay, d2	0.8	13.6	0.5	13.9	3.8		4.5	0.4		0.2	2.0	0.1
Delay (s)	59.0	75.8	43.0	78.0	66.9		46.9	16.3		19.3	31.9	28.4
Level of Service	E	E	D	E	E		D	B		B	C	C
Approach Delay (s)		59.3			70.3			22.6			31.2	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			40.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				15.5		
Intersection Capacity Utilization			72.8%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

Timings

4: Cedar Bluff Road & Sherrill Blvd

2030 Projected PM School Peak
Medical Office Center

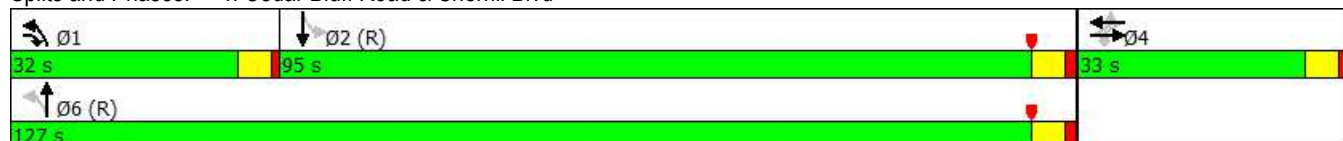
								
Lane Group	EBL	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	119	191	69	0	223	809	15	1257
Future Volume (vph)	119	191	69	0	223	809	15	1257
Turn Type	Perm	pm+ov	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		1		4	1	6		2
Permitted Phases	4	4	4		6		2	
Detector Phase	4	1	4	4	1	6	2	2
Switch Phase								
Minimum Initial (s)	8.0	6.0	8.0	8.0	6.0	20.0	20.0	20.0
Minimum Split (s)	14.0	11.0	14.0	14.0	11.0	25.5	25.5	25.5
Total Split (s)	33.0	32.0	33.0	33.0	32.0	127.0	95.0	95.0
Total Split (%)	20.6%	20.0%	20.6%	20.6%	20.0%	79.4%	59.4%	59.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	-2.5	-2.0		-2.5	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.5	3.0		3.5	3.0	3.5	3.5	3.5
Lead/Lag		Lead			Lead		Lag	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	22.6	41.5		22.6	130.9	130.4	112.0	112.0
Actuated g/C Ratio	0.14	0.26		0.14	0.82	0.82	0.70	0.70
v/c Ratio	0.67	0.45		0.19	0.63	0.32	0.04	0.55
Control Delay	81.3	39.9		24.2	29.8	3.1	10.9	14.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	81.3	39.9		24.2	29.8	3.1	10.9	14.2
LOS	F	D		C	C	A	B	B
Approach Delay				24.2		8.7		14.2
Approach LOS				C		A		B

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 68 (43%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 17.0
 Intersection Capacity Utilization 71.3%
 Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service C

Splits and Phases: 4: Cedar Bluff Road & Sherrill Blvd



Queues

2030 Projected PM School Peak

4: Cedar Bluff Road & Sherrill Blvd

Medical Office Center

							
Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	129	208	77	242	919	16	1398
v/c Ratio	0.67	0.45	0.19	0.63	0.32	0.04	0.55
Control Delay	81.3	39.9	24.2	29.8	3.1	10.9	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.3	39.9	24.2	29.8	3.1	10.9	14.2
Queue Length 50th (ft)	130	145	12	85	76	5	343
Queue Length 95th (ft)	198	198	37	195	100	18	551
Internal Link Dist (ft)			642		919		1139
Turn Bay Length (ft)	90			75		85	
Base Capacity (vph)	252	598	502	521	2895	403	2540
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.35	0.15	0.46	0.32	0.04	0.55
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

4: Cedar Bluff Road & Sherrill Blvd

2030 Projected PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	0	191	69	0	2	223	809	37	15	1257	29
Future Volume (vph)	119	0	191	69	0	2	223	809	37	15	1257	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	12	14	12	12	12	13	12
Grade (%)		-9%			-6%			-2%			1%	
Total Lost time (s)	3.5		3.0		3.5		3.0	3.5		3.5	3.5	
Lane Util. Factor	1.00		1.00		0.95		1.00	0.95		1.00	0.95	
Frt	1.00		0.85		1.00		1.00	0.99		1.00	1.00	
Flt Protected	0.95		1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1849		1655		3232		1906	3551		1761	3626	
Flt Permitted	0.70		1.00		0.74		0.14	1.00		0.31	1.00	
Satd. Flow (perm)	1371		1655		2501		276	3551		576	3626	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	129	0	208	75	0	2	242	879	40	16	1366	32
RTOR Reduction (vph)	0	0	34	0	44	0	0	2	0	0	1	0
Lane Group Flow (vph)	129	0	174	0	33	0	242	917	0	16	1397	0
Turn Type	Perm		pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	1		4		1	6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)	20.1		33.5		20.1		128.4	128.4		110.0	110.0	
Effective Green, g (s)	22.6		37.5		22.6		130.4	130.4		112.0	112.0	
Actuated g/C Ratio	0.14		0.23		0.14		0.82	0.82		0.70	0.70	
Clearance Time (s)	6.0		5.0		6.0		5.0	5.5		5.5	5.5	
Vehicle Extension (s)	3.0		2.5		3.0		2.5	5.0		5.0	5.0	
Lane Grp Cap (vph)	193		387		353		381	2894		403	2538	
v/s Ratio Prot			0.04				c0.06	0.26			0.39	
v/s Ratio Perm	c0.09		0.06		0.01		c0.46			0.03		
v/c Ratio	0.67		0.45		0.09		0.64	0.32		0.04	0.55	
Uniform Delay, d1	65.1		52.4		59.8		12.1	3.7		7.4	11.7	
Progression Factor	1.00		1.00		1.00		3.43	0.72		1.00	1.00	
Incremental Delay, d2	8.5		0.6		0.1		2.8	0.3		0.2	0.9	
Delay (s)	73.6		53.0		59.9		44.3	2.9		7.6	12.6	
Level of Service	E		D		E		D	A		A	B	
Approach Delay (s)		60.9			59.9			11.5			12.5	
Approach LOS		E			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			71.3%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected PM School Peak
Medical Office Center

	↖	↗	↑	↘	↓	
Lane Group	WBL	WBR	NBT	SBL	SBT	Ø4
Lane Configurations	↖	↗	↑↓	↘	↑↓	
Traffic Volume (vph)	99	28	914	130	771	
Future Volume (vph)	99	28	914	130	771	
Turn Type	Perm	pm+ov	NA	pm+pt	NA	
Protected Phases		1	2	1	6	4
Permitted Phases	8	8		6		
Detector Phase	8	1	2	1	6	
Switch Phase						
Minimum Initial (s)	8.0	6.0	20.0	6.0	20.0	8.0
Minimum Split (s)	22.0	11.5	26.5	11.5	26.5	22.0
Total Split (s)	25.0	20.0	70.0	20.0	90.0	25.0
Total Split (%)	21.7%	17.4%	60.9%	17.4%	78.3%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	1.5	2.5	1.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.5	6.5	5.5	6.5	
Lead/Lag		Lead	Lag	Lead		
Lead-Lag Optimize?		Yes	Yes	Yes		
Recall Mode	None	None	C-Min	None	C-Min	None
Act Effct Green (s)	14.1	28.0	75.0	89.4	88.4	
Actuated g/C Ratio	0.12	0.24	0.65	0.78	0.77	
v/c Ratio	0.63	0.07	0.53	0.40	0.31	
Control Delay	63.1	9.1	7.1	7.1	4.7	
Queue Delay	0.0	0.0	0.2	0.0	0.0	
Total Delay	63.1	9.1	7.3	7.1	4.7	
LOS	E	A	A	A	A	
Approach Delay			7.3		5.1	
Approach LOS			A		A	

Intersection Summary

Cycle Length: 115
 Actuated Cycle Length: 115
 Offset: 62 (54%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 9.0
 Intersection Capacity Utilization 57.6%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 5: Cedar Bluff Road & Fox Lonas Rd

↖ Ø1	↗ Ø2 (R)	↘ Ø4
20 s	70 s	25 s
↓ Ø6 (R)		↖ Ø8
90 s		25 s

Queues

2030 Projected PM School Peak

5: Cedar Bluff Road & Fox Lonas Rd

Medical Office Center

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	108	30	1204	141	838
v/c Ratio	0.63	0.07	0.53	0.40	0.31
Control Delay	63.1	9.1	7.1	7.1	4.7
Queue Delay	0.0	0.0	0.2	0.0	0.0
Total Delay	63.1	9.1	7.3	7.1	4.7
Queue Length 50th (ft)	77	0	49	21	83
Queue Length 95th (ft)	131	20	417	46	134
Internal Link Dist (ft)			493		1729
Turn Bay Length (ft)	200			100	
Base Capacity (vph)	235	498	2260	431	2714
Starvation Cap Reductn	0	0	315	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.46	0.06	0.62	0.33	0.31
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Cedar Bluff Road & Fox Lonas Rd

2030 Projected PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	99	0	28	0	914	194	130	771	0
Future Volume (vph)	0	0	0	99	0	28	0	914	194	130	771	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)				6.0		5.5		6.5		5.5	6.5	
Lane Util. Factor				1.00		1.00		0.95		1.00	0.95	
Frt				1.00		0.85		0.97		1.00	1.00	
Flt Protected				0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1770		1583		3446		1761	3522	
Flt Permitted				0.76		1.00		1.00		0.17	1.00	
Satd. Flow (perm)				1410		1583		3446		322	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	108	0	30	0	993	211	141	838	0
RTOR Reduction (vph)	0	0	0	0	0	24	0	12	0	0	0	0
Lane Group Flow (vph)	0	0	0	108	0	6	0	1192	0	141	838	0
Turn Type	Perm			Perm		pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)				14.1		22.0		75.0		88.4	88.4	
Effective Green, g (s)				14.1		22.0		75.0		88.4	88.4	
Actuated g/C Ratio				0.12		0.19		0.65		0.77	0.77	
Clearance Time (s)				6.0		5.5		6.5		5.5	6.5	
Vehicle Extension (s)				3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)				172		302		2247		346	2707	
v/s Ratio Prot						0.00		c0.35		c0.03	0.24	
v/s Ratio Perm				c0.08		0.00				0.29		
v/c Ratio				0.63		0.02		0.53		0.41	0.31	
Uniform Delay, d1				48.0		37.7		10.6		6.1	4.0	
Progression Factor				1.00		1.00		0.55		1.00	1.00	
Incremental Delay, d2				7.0		0.0		0.8		0.8	0.3	
Delay (s)				54.9		37.8		6.7		6.9	4.3	
Level of Service				D		D		A		A	A	
Approach Delay (s)		0.0			51.2			6.7			4.7	
Approach LOS		A			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.5									
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			115.0							18.0		
Intersection Capacity Utilization			57.6%							B		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
6: Cedar Bluff Road & Dutchtown Rd

2030 Projected PM School Peak
Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	118	81	103	26	172	234	774	21	694
Future Volume (vph)	118	81	103	26	172	234	774	21	694
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	8.0	6.0	6.0	8.0	6.0	20.0	6.0	20.0
Minimum Split (s)	12.0	14.0	12.0	12.0	14.0	12.0	32.5	12.0	29.5
Total Split (s)	15.0	29.0	25.0	12.0	26.0	25.0	62.0	12.0	49.0
Total Split (%)	13.0%	25.2%	21.7%	10.4%	22.6%	21.7%	53.9%	10.4%	42.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Act Effct Green (s)	33.2	26.3	46.3	23.5	17.1	69.1	61.4	55.1	48.6
Actuated g/C Ratio	0.29	0.23	0.40	0.20	0.15	0.60	0.53	0.48	0.42
v/c Ratio	0.46	0.21	0.16	0.10	0.77	0.71	0.47	0.07	0.63
Control Delay	35.8	38.4	4.4	28.9	63.9	24.5	19.2	11.0	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	35.8	38.4	4.4	28.9	63.9	24.5	19.2	11.0	26.3
LOS	D	D	A	C	E	C	B	B	C
Approach Delay		25.8			59.8		20.4		26.0
Approach LOS		C			E		C		C

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 16 (14%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 26.6

Intersection LOS: C

Intersection Capacity Utilization 74.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: Cedar Bluff Road & Dutchtown Rd



Queues

2030 Projected PM School Peak

6: Cedar Bluff Road & Dutchtown Rd

Medical Office Center

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	128	88	112	28	211	254	878	23	922
v/c Ratio	0.46	0.21	0.16	0.10	0.77	0.71	0.47	0.07	0.63
Control Delay	35.8	38.4	4.4	28.9	63.9	24.5	19.2	11.0	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	35.8	38.4	4.4	28.9	63.9	24.5	19.2	11.0	26.3
Queue Length 50th (ft)	69	55	0	14	147	88	234	6	135
Queue Length 95th (ft)	122	102	34	37	228	154	285	m13	344
Internal Link Dist (ft)	2065				1954		1139		493
Turn Bay Length (ft)	200		200		150		100		50
Base Capacity (vph)	281	425	767	292	322	424	1913	330	1474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	59
Spillback Cap Reductn	0	0	0	0	0	0	4	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.21	0.15	0.10	0.66	0.60	0.46	0.07	0.65

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

6: Cedar Bluff Road & Dutchtown Rd

2030 Projected PM School Peak

Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	81	103	26	172	22	234	774	34	21	694	155
Future Volume (vph)	118	81	103	26	172	22	234	774	34	21	694	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1831		1770	3517		1761	3425	
Flt Permitted	0.31	1.00	1.00	0.70	1.00		0.16	1.00		0.30	1.00	
Satd. Flow (perm)	583	1863	1583	1304	1831		302	3517		557	3425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	88	112	28	187	24	254	841	37	23	754	168
RTOR Reduction (vph)	0	0	73	0	4	0	0	3	0	0	16	0
Lane Group Flow (vph)	128	88	39	28	207	0	254	875	0	23	906	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.3	26.3	40.3	23.4	19.4		66.2	56.6		49.8	46.2	
Effective Green, g (s)	36.3	26.3	40.3	23.4	19.4		66.2	56.6		49.8	46.2	
Actuated g/C Ratio	0.32	0.23	0.35	0.20	0.17		0.58	0.49		0.43	0.40	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	296	426	637	281	308		352	1730		278	1375	
v/s Ratio Prot	c0.04	0.05	0.01	0.00	c0.11		c0.09	0.25		0.00	0.26	
v/s Ratio Perm	0.10		0.02	0.02			c0.33			0.03		
v/c Ratio	0.43	0.21	0.06	0.10	0.67		0.72	0.51		0.08	0.66	
Uniform Delay, d1	29.8	35.9	24.8	37.1	44.8		16.9	19.7		18.8	28.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.90	0.89	
Incremental Delay, d2	1.0	0.2	0.0	0.2	5.7		7.1	1.1		0.1	2.4	
Delay (s)	30.8	36.1	24.8	37.2	50.5		24.0	20.8		17.0	27.5	
Level of Service	C	D	C	D	D		C	C		B	C	
Approach Delay (s)		30.2			48.9			21.5			27.2	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)				24.5		
Intersection Capacity Utilization			74.4%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected PM School Peak
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (veh/h)	39	260	11	23	275	97	7	41	25	161	113	22
Future Volume (Veh/h)	39	260	11	23	275	97	7	41	25	161	113	22
Sign Control		Free			Free			Stop			Stop	
Grade		-9%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	283	12	25	299	105	8	45	27	175	123	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									40			
Median type		None			None							
Median storage veh												
Upstream signal (ft)					1142							
pX, platoon unblocked												
vC, conflicting volume	404			295			658	827	148	650	780	202
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	404			295			658	827	148	650	780	202
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			98			96	84	97	40	60	97
cM capacity (veh/h)	1151			1263			224	288	873	290	307	805
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1	SB 2				
Volume Total	42	189	106	174	254	80	175	147				
Volume Left	42	0	0	25	0	8	175	0				
Volume Right	0	0	12	0	105	27	0	24				
cSH	1151	1700	1700	1263	1700	421	290	341				
Volume to Capacity	0.04	0.11	0.06	0.02	0.15	0.19	0.60	0.43				
Queue Length 95th (ft)	3	0	0	2	0	17	91	52				
Control Delay (s)	8.2	0.0	0.0	1.3	0.0	17.0	34.7	23.3				
Lane LOS	A			A		C	D	C				
Approach Delay (s)	1.0			0.5		17.0	29.5					
Approach LOS						C	D					
Intersection Summary												
Average Delay			9.8									
Intersection Capacity Utilization			44.5%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Projected PM School Peak
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (veh/h)	396	150	86	556	152	63
Future Volume (Veh/h)	396	150	86	556	152	63
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	430	163	93	604	165	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT		TWLT			
Median storage (veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			593		1302	512
vC1, stage 1 conf vol					512	
vC2, stage 2 conf vol					790	
vCu, unblocked vol			593		1302	512
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			91		54	88
cM capacity (veh/h)			983		356	562
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	593	93	604	165	68	
Volume Left	0	93	0	165	0	
Volume Right	163	0	0	0	68	
cSH	1700	983	1700	356	562	
Volume to Capacity	0.35	0.09	0.36	0.46	0.12	
Queue Length 95th (ft)	0	8	0	59	10	
Control Delay (s)	0.0	9.0	0.0	23.6	12.3	
Lane LOS		A		C	B	
Approach Delay (s)	0.0	1.2		20.3		
Approach LOS				C		
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			53.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

9: Park West Blvd & Park 40 Blvd

2030 Projected PM School Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	602	395	0	123	3
Future Volume (Veh/h)	4	602	395	0	123	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	654	429	0	134	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			968			
pX, platoon unblocked						
vC, conflicting volume	429				764	214
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	429				764	214
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				60	100
cM capacity (veh/h)	1127				339	790
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	222	436	286	143	134	3
Volume Left	4	0	0	0	134	0
Volume Right	0	0	0	0	0	3
cSH	1127	1700	1700	1700	339	790
Volume to Capacity	0.00	0.26	0.17	0.08	0.40	0.00
Queue Length 95th (ft)	0	0	0	0	46	0
Control Delay (s)	0.2	0.0	0.0	0.0	22.4	9.6
Lane LOS	A				C	A
Approach Delay (s)	0.1		0.0		22.1	
Approach LOS					C	
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			32.9%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	198	286	109	356	182	139	205	48	248
Future Volume (vph)	198	286	109	356	182	139	205	48	248
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA	pm+pt	NA
Protected Phases	3	8		7	4	1	6	5	2
Permitted Phases	8		8			6		2	
Detector Phase	3	8	8	7	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	12.0	14.0	14.0	12.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	19.0	41.0	41.0	28.0	50.0	21.0	41.0	10.0	30.0
Total Split (%)	15.8%	34.2%	34.2%	23.3%	41.7%	17.5%	34.2%	8.3%	25.0%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	38.2	25.6	25.6	18.4	31.4	56.3	47.2	46.6	39.5
Actuated g/C Ratio	0.32	0.21	0.21	0.15	0.26	0.47	0.39	0.39	0.33
v/c Ratio	0.49	0.78	0.15	0.74	0.43	0.33	0.27	0.12	0.32
Control Delay	26.7	58.1	0.4	57.0	37.6	22.3	18.7	21.5	30.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	58.1	0.4	57.0	37.6	22.3	18.7	21.5	30.6
LOS	C	E	A	E	D	C	B	C	C
Approach Delay		37.1			50.2		19.8		29.5
Approach LOS		D			D		B		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 35.1

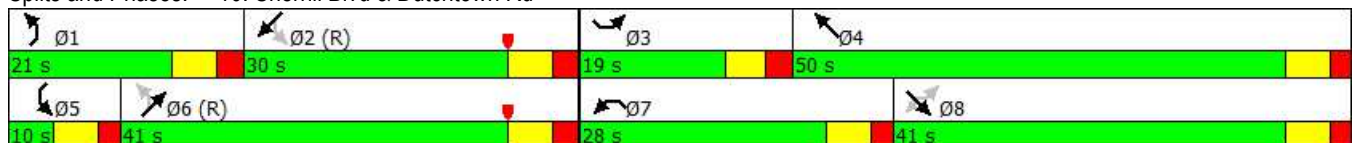
Intersection LOS: D

Intersection Capacity Utilization 63.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM School Peak
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	215	311	118	387	210	151	369	52	371
v/c Ratio	0.49	0.78	0.15	0.74	0.43	0.33	0.27	0.12	0.32
Control Delay	26.7	58.1	0.4	57.0	37.6	22.3	18.7	21.5	30.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	58.1	0.4	57.0	37.6	22.3	18.7	21.5	30.6
Queue Length 50th (ft)	109	230	0	148	134	65	66	21	100
Queue Length 95th (ft)	137	305	0	196	180	129	119	53	173
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	440	543	993	629	678	495	1387	427	1143
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.57	0.12	0.62	0.31	0.31	0.27	0.12	0.32
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM School Peak
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			 	 				 			 	
Traffic Volume (vph)	198	286	109	356	182	11	139	205	134	48	248	93
Future Volume (vph)	198	286	109	356	182	11	139	205	134	48	248	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	2787	3433	1847		1770	3329		1770	3395	
Flt Permitted	0.63	1.00	1.00	0.95	1.00		0.42	1.00		0.53	1.00	
Satd. Flow (perm)	1167	1863	2787	3433	1847		779	3329		991	3395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	215	311	118	387	198	12	151	223	146	52	270	101
RTOR Reduction (vph)	0	0	93	0	2	0	0	79	0	0	27	0
Lane Group Flow (vph)	215	311	25	387	208	0	151	290	0	52	344	0
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8				6			2		
Actuated Green, G (s)	38.2	25.6	25.6	18.4	31.4		57.5	46.0		45.0	39.5	
Effective Green, g (s)	38.2	25.6	25.6	18.4	31.4		57.5	46.0		45.0	39.5	
Actuated g/C Ratio	0.32	0.21	0.21	0.15	0.26		0.48	0.38		0.38	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	434	397	594	526	483		468	1276		407	1117	
v/s Ratio Prot	0.05	c0.17		c0.11	c0.11		c0.03	0.09		0.01	0.10	
v/s Ratio Perm	0.11		0.01				c0.12			0.04		
v/c Ratio	0.50	0.78	0.04	0.74	0.43		0.32	0.23		0.13	0.31	
Uniform Delay, d1	31.7	44.6	37.5	48.5	36.9		18.3	25.0		24.1	30.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	9.7	0.0	5.3	0.6		0.4	0.4		0.1	0.7	
Delay (s)	32.6	54.3	37.5	53.8	37.5		18.7	25.4		24.3	30.8	
Level of Service	C	D	D	D	D		B	C		C	C	
Approach Delay (s)		44.0			48.0			23.5			30.0	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			37.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			63.6%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2030 Projected PM School Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	25	8	22	285	206	18
Future Volume (Veh/h)	25	8	22	285	206	18
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	9	24	310	224	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	437	122	244			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	437	122	244			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	98			
cM capacity (veh/h)	538	906	1319			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	36	24	155	155	149	95
Volume Left	27	24	0	0	0	0
Volume Right	9	0	0	0	0	20
cSH	717	1319	1700	1700	1700	1700
Volume to Capacity	0.05	0.02	0.09	0.09	0.09	0.06
Queue Length 95th (ft)	4	1	0	0	0	0
Control Delay (s)	11.3	7.8	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	11.3	0.6			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			22.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Sherrill Blvd & Medical Office Access RT

2030 Projected PM School Peak
Medical Office Center

						
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	310	213	91	0	12
Future Volume (Veh/h)	0	310	213	91	0	12
Sign Control		Free	Free		Stop	
Grade		-9%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	337	232	99	0	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	331				450	166
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	331				450	166
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	1225				538	850
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	
Volume Total	168	168	155	176	13	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	99	13	
cSH	1700	1700	1700	1700	850	
Volume to Capacity	0.10	0.10	0.09	0.10	0.02	
Queue Length 95th (ft)	0	0	0	0	1	
Control Delay (s)	0.0	0.0	0.0	0.0	9.3	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.3	
Approach LOS					A	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			18.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: Medical Office Access & Christian Academy Blvd

2030 Projected PM School Peak
Medical Office Center

	→	↗	↖	←	↘	↙
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	196	24	27	150	22	101
Future Volume (Veh/h)	196	24	27	150	22	101
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	213	26	29	163	24	110
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			239		447	226
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			239		447	226
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	86
cM capacity (veh/h)			1328		557	813
Direction, Lane #	EB 1	WB 1	NE 1	NE 2		
Volume Total	239	192	24	110		
Volume Left	0	29	24	0		
Volume Right	26	0	0	110		
cSH	1700	1328	557	813		
Volume to Capacity	0.14	0.02	0.04	0.14		
Queue Length 95th (ft)	0	2	3	12		
Control Delay (s)	0.0	1.3	11.8	10.1		
Lane LOS		A	B	B		
Approach Delay (s)	0.0	1.3	10.4			
Approach LOS			B			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			34.5%	ICU Level of Service		A
Analysis Period (min)			15			

Timings 3: Cedar Bluff Road & Park West Blvd

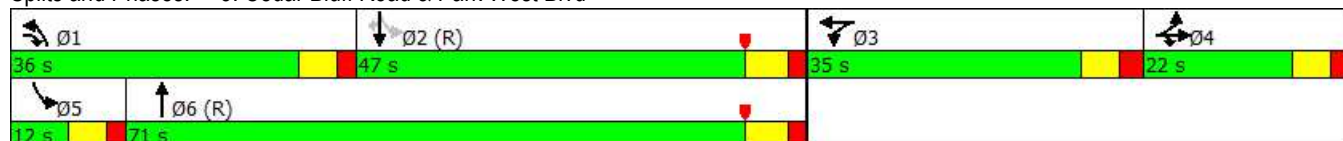
2019 Projected AM Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↑	↗	↓	↘
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↙	↖↖	↖↖	↖↖↖	↙	↖↖	↖
Traffic Volume (vph)	65	203	143	341	307	655	36	575	65
Future Volume (vph)	65	203	143	341	307	655	36	575	65
Turn Type	NA	pt+ov	Split	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	4	4 1	3	3	1	6	5	2	
Permitted Phases							2		2
Detector Phase	4	4 1	3	3	1	6	5	2	2
Switch Phase									
Minimum Initial (s)	6.0		6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5		12.5	12.5	35.0	21.5	12.0	21.5	21.5
Total Split (s)	22.0		35.0	35.0	36.0	71.0	12.0	47.0	47.0
Total Split (%)	15.7%		25.0%	25.0%	25.7%	50.7%	8.6%	33.6%	33.6%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5		2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0		-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5		4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag		Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None		None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	16.4	40.0	28.6	28.6	20.6	73.8	68.9	58.9	58.9
Actuated g/C Ratio	0.12	0.29	0.20	0.20	0.15	0.53	0.49	0.42	0.42
v/c Ratio	0.54	0.28	0.42	0.81	0.66	0.35	0.11	0.41	0.09
Control Delay	66.8	39.0	52.1	57.5	54.9	11.8	11.1	24.5	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.8	39.0	52.1	57.5	54.9	11.8	11.1	24.5	1.1
LOS	E	D	D	E	D	B	B	C	A
Approach Delay	48.6			56.5		23.4		21.5	
Approach LOS	D			E		C		C	

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 29 (21%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 33.6
Intersection Capacity Utilization 56.6%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service B

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2019 Projected AM Peak MIT

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

									
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	117	221	139	584	334	907	39	625	71
v/c Ratio	0.54	0.28	0.42	0.81	0.66	0.35	0.11	0.41	0.09
Control Delay	66.8	39.0	52.1	57.5	54.9	11.8	11.1	24.5	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.8	39.0	52.1	57.5	54.9	11.8	11.1	24.5	1.1
Queue Length 50th (ft)	102	90	119	252	156	156	7	226	1
Queue Length 95th (ft)	165	120	193	325	216	186	m19	294	11
Internal Link Dist (ft)	888			1639		269		273	
Turn Bay Length (ft)			230		245		95		145
Base Capacity (vph)	242	1012	358	779	784	2627	350	1517	777
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.22	0.39	0.75	0.43	0.35	0.11	0.41	0.09

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Projected AM Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	65	203	143	341	181	307	655	179	36	575	65
Future Volume (vph)	42	65	203	143	341	181	307	655	179	36	575	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)		3.5	4.5	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor		1.00	0.88	0.91	0.91		0.97	0.91		1.00	0.95	1.00
Flt		1.00	0.85	1.00	0.95		1.00	0.97		1.00	1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1836	2801	1618	3338		3433	4921		1745	3610	1615
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00		0.30	1.00	1.00
Satd. Flow (perm)		1836	2801	1618	3338		3433	4921		555	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	71	221	155	371	197	334	712	195	39	625	71
RTOR Reduction (vph)	0	0	0	0	41	0	0	33	0	0	0	41
Lane Group Flow (vph)	0	117	221	139	543	0	334	874	0	39	625	30
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	4	4	4 1	3	3		1	6		5	2	
Permitted Phases										2		2
Actuated Green, G (s)		13.4	38.5	26.1	26.1		18.6	70.1		61.3	56.4	56.4
Effective Green, g (s)		16.4	40.5	28.6	28.6		20.6	72.6		67.3	58.9	58.9
Actuated g/C Ratio		0.12	0.29	0.20	0.20		0.15	0.52		0.48	0.42	0.42
Clearance Time (s)		6.5		6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)		2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		215	810	330	681		505	2551		333	1518	679
v/s Ratio Prot		c0.06	0.08	0.09	c0.16		c0.10	0.18		0.01	c0.17	
v/s Ratio Perm										0.05		0.02
v/c Ratio		0.54	0.27	0.42	0.80		0.66	0.34		0.12	0.41	0.04
Uniform Delay, d1		58.3	38.4	48.5	52.9		56.4	19.7		19.3	28.4	23.9
Progression Factor		0.98	1.01	1.00	1.00		0.87	0.61		0.74	0.79	1.00
Incremental Delay, d2		2.2	0.1	0.6	6.2		2.6	0.3		0.1	0.7	0.1
Delay (s)		59.6	38.9	49.1	59.2		51.9	12.4		14.4	23.1	24.0
Level of Service		E	D	D	E		D	B		B	C	C
Approach Delay (s)		46.0			57.3			23.0			22.7	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				16.5		
Intersection Capacity Utilization			56.6%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected AM Peak MIT
Medical Office Center

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	51	120	41	437	4	25	4	92	233
Future Volume (vph)	51	120	41	437	4	25	4	92	233
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	15.0	10.0	15.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	19.0	14.0	19.0	14.0	14.0	14.0	14.0	14.0
Total Split (s)	14.0	30.0	14.0	30.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	20.0%	42.9%	20.0%	42.9%	37.1%	37.1%	37.1%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Min	Min	Min	Min	Min
Act Effct Green (s)	43.5	37.5	43.5	37.5		16.1	16.1	16.1	16.1
Actuated g/C Ratio	0.62	0.54	0.62	0.54		0.23	0.23	0.23	0.23
v/c Ratio	0.09	0.07	0.05	0.37		0.08	0.01	0.32	0.67
Control Delay	6.1	10.3	5.5	9.1		13.2	0.0	15.0	21.5
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	6.1	10.3	5.5	9.1		13.2	0.0	15.0	21.5
LOS	A	B	A	A		B	A	B	C
Approach Delay		9.2		8.8		11.7			19.8
Approach LOS		A		A		B			B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 24 (34%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 12.1

Intersection LOS: B

Intersection Capacity Utilization 50.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

 Ø2	 Ø3	 Ø4 (R)
26 s	14 s	30 s
 Ø6	 Ø7	 Ø8 (R)
26 s	14 s	30 s

Queues

2019 Projected AM Peak MIT

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	55	146	45	691	31	4	100	287
v/c Ratio	0.09	0.07	0.05	0.37	0.08	0.01	0.32	0.67
Control Delay	6.1	10.3	5.5	9.1	13.2	0.0	15.0	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	10.3	5.5	9.1	13.2	0.0	15.0	21.5
Queue Length 50th (ft)	7	15	8	90	14	0	27	89
Queue Length 95th (ft)	23	36	m16	141	m12	m0	m34	m106
Internal Link Dist (ft)		317		1062	1566			181
Turn Bay Length (ft)	100		150			1000	100	
Base Capacity (vph)	580	1957	840	1863	561	551	431	581
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.07	0.05	0.37	0.06	0.01	0.23	0.49

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected AM Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	120	15	41	437	199	4	25	4	92	233	31
Future Volume (vph)	51	120	15	41	437	199	4	25	4	92	233	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-9%			0%			0%			0%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Flt	1.00	0.98		1.00	0.95			1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1849	3638		1770	3373			1851	1583	1770	1830	
Flt Permitted	0.34	1.00		0.66	1.00			0.96	1.00	0.74	1.00	
Satd. Flow (perm)	659	3638		1228	3373			1787	1583	1373	1830	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	130	16	45	475	216	4	27	4	100	253	34
RTOR Reduction (vph)	0	8	0	0	58	0	0	0	3	0	8	0
Lane Group Flow (vph)	55	138	0	45	633	0	0	31	1	100	279	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	41.9	35.9		41.9	35.9			16.1	16.1	16.1	16.1	
Effective Green, g (s)	41.9	35.9		41.9	35.9			16.1	16.1	16.1	16.1	
Actuated g/C Ratio	0.60	0.51		0.60	0.51			0.23	0.23	0.23	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	496	1865		781	1729			411	364	315	420	
v/s Ratio Prot	c0.01	0.04		0.00	c0.19						c0.15	
v/s Ratio Perm	0.06			0.03				0.02	0.00	0.07		
v/c Ratio	0.11	0.07		0.06	0.37			0.08	0.00	0.32	0.67	
Uniform Delay, d1	6.0	8.6		5.8	10.2			21.1	20.8	22.4	24.5	
Progression Factor	1.00	1.00		0.97	0.89			0.67	1.00	0.61	0.65	
Incremental Delay, d2	0.1	0.1		0.0	0.6			0.1	0.0	0.5	3.2	
Delay (s)	6.1	8.7		5.6	9.7			14.3	20.8	14.2	19.1	
Level of Service	A	A		A	A			B	C	B	B	
Approach Delay (s)		8.0			9.4			15.0			17.8	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			11.8			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			50.9%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
8: Christian Academy Blvd & Dutchtown Rd

2019 Projected AM Peak MIT
Medical Office Center

	→	↖	←	↙	↗
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↖	↖	↖	↖	↖
Traffic Volume (vph)	429	108	420	60	36
Future Volume (vph)	429	108	420	60	36
Turn Type	NA	pm+pt	NA	Prot	Perm
Protected Phases	4	3	8	2	
Permitted Phases		8			2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	15.0	10.0	15.0	10.0	10.0
Minimum Split (s)	19.0	14.0	19.0	14.0	14.0
Total Split (s)	42.0	14.0	56.0	14.0	14.0
Total Split (%)	60.0%	20.0%	80.0%	20.0%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	C-Max	None	C-Max	Max	Max
Act Effct Green (s)	40.8	52.0	52.0	10.0	10.0
Actuated g/C Ratio	0.58	0.74	0.74	0.14	0.14
v/c Ratio	0.77	0.27	0.33	0.26	0.15
Control Delay	17.7	4.1	3.8	23.9	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	4.1	3.8	23.9	9.6
LOS	B	A	A	C	A
Approach Delay	17.7		3.9	18.5	
Approach LOS	B		A	B	

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 12.4
 Intersection LOS: B
 Intersection Capacity Utilization 68.7%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 8: Christian Academy Blvd & Dutchtown Rd

↖ Ø2	↖ Ø3	→ Ø4 (R)
14 s	14 s	42 s
	↖ Ø8 (R)	
	56 s	

Queues
8: Christian Academy Blvd & Dutchtown Rd

2019 Projected AM Peak MIT
Medical Office Center

	→	↖	←	↙	↗
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	813	117	457	65	39
v/c Ratio	0.77	0.27	0.33	0.26	0.15
Control Delay	17.7	4.1	3.8	23.9	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	4.1	3.8	23.9	9.6
Queue Length 50th (ft)	239	10	51	27	4
Queue Length 95th (ft)	#476	21	81	51	23
Internal Link Dist (ft)	5197		2065	558	
Turn Bay Length (ft)		250		200	
Base Capacity (vph)	1058	428	1383	252	259
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.77	0.27	0.33	0.26	0.15

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Projected AM Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (vph)	429	319	108	420	60	36
Future Volume (vph)	429	319	108	420	60	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1755		1770	1863	1770	1583
Flt Permitted	1.00		0.16	1.00	0.95	1.00
Satd. Flow (perm)	1755		293	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	466	347	117	457	65	39
RTOR Reduction (vph)	36	0	0	0	0	33
Lane Group Flow (vph)	777	0	117	457	65	6
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	40.0		52.0	52.0	10.0	10.0
Effective Green, g (s)	40.0		52.0	52.0	10.0	10.0
Actuated g/C Ratio	0.57		0.74	0.74	0.14	0.14
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1002		386	1383	252	226
v/s Ratio Prot	c0.44		0.03	c0.25	c0.04	
v/s Ratio Perm			0.19			0.00
v/c Ratio	0.78		0.30	0.33	0.26	0.02
Uniform Delay, d1	11.5		7.8	3.1	26.7	25.8
Progression Factor	1.00		1.00	1.00	0.80	1.09
Incremental Delay, d2	5.9		0.4	0.6	2.4	0.2
Delay (s)	17.4		8.2	3.7	23.7	28.3
Level of Service	B		A	A	C	C
Approach Delay (s)	17.4			4.6	25.4	
Approach LOS	B			A	C	
Intersection Summary						
HCM 2000 Control Delay			13.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			68.7%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings
10: Sherrill Blvd & Dutchtown Rd

2019 Projected AM Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	320	349	286	212	82	109	304	14	357
Future Volume (vph)	320	349	286	212	82	109	304	14	357
Turn Type	Split	NA	Perm	Split	NA	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		4	4	1	6	5	2
Permitted Phases			8			6		2	
Detector Phase	8	8	8	4	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	36.0	36.0	36.0	20.0	20.0	18.0	44.0	10.0	36.0
Total Split (%)	32.7%	32.7%	32.7%	18.2%	18.2%	16.4%	40.0%	9.1%	32.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	25.1	25.1	25.1	12.2	12.2	54.2	50.2	43.9	38.4
Actuated g/C Ratio	0.23	0.23	0.23	0.11	0.11	0.49	0.46	0.40	0.35
v/c Ratio	0.65	0.64	0.56	0.61	0.47	0.31	0.32	0.04	0.46
Control Delay	46.4	41.9	12.2	53.4	51.4	19.3	18.1	18.1	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	41.9	12.2	53.4	51.4	19.3	18.1	18.1	27.8
LOS	D	D	B	D	D	B	B	B	C
Approach Delay		34.0			52.8		18.3		27.6
Approach LOS		C			D		B		C

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 31.2
 Intersection Capacity Utilization 61.0%
 Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service B

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø4	 Ø8
18 s	36 s	20 s	36 s
 Ø5	 Ø6 (R)		
10 s	44 s		

Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Projected AM Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	237	490	311	230	98	118	500	15	556
v/c Ratio	0.65	0.64	0.56	0.61	0.47	0.31	0.32	0.04	0.46
Control Delay	46.4	41.9	12.2	53.4	51.4	19.3	18.1	18.1	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	41.9	12.2	53.4	51.4	19.3	18.1	18.1	27.8
Queue Length 50th (ft)	165	171	35	80	63	45	86	5	143
Queue Length 95th (ft)	247	218	113	120	116	88	162	18	217
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	439	914	612	436	237	406	1583	389	1218
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.54	0.51	0.53	0.41	0.29	0.32	0.04	0.46
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Projected AM Peak MIT
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	320	349	286	212	82	8	109	304	156	14	357	155
Future Volume (vph)	320	349	286	212	82	8	109	304	156	14	357	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	0.91	0.91	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.95	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	3352	1583	3433	1837		1770	3359		1770	3379	
Flt Permitted	0.95	0.99	1.00	0.95	1.00		0.31	1.00		0.47	1.00	
Satd. Flow (perm)	1610	3352	1583	3433	1837		570	3359		873	3379	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	379	311	230	89	9	118	330	170	15	388	168
RTOR Reduction (vph)	0	0	192	0	4	0	0	52	0	0	39	0
Lane Group Flow (vph)	237	490	119	230	94	0	118	448	0	15	517	0
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	25.1	25.1	25.1	12.2	12.2		54.2	46.6		39.9	38.3	
Effective Green, g (s)	25.1	25.1	25.1	12.2	12.2		54.2	46.6		39.9	38.3	
Actuated g/C Ratio	0.23	0.23	0.23	0.11	0.11		0.49	0.42		0.36	0.35	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	367	764	361	380	203		383	1422		329	1176	
v/s Ratio Prot	c0.15	0.15		c0.07	0.05		c0.03	c0.13		0.00	c0.15	
v/s Ratio Perm			0.08				0.13			0.02		
v/c Ratio	0.65	0.64	0.33	0.61	0.47		0.31	0.31		0.05	0.44	
Uniform Delay, d1	38.4	38.4	35.4	46.6	45.8		16.2	21.1		22.5	27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	1.8	0.5	2.7	1.7		0.5	0.6		0.1	1.2	
Delay (s)	42.3	40.2	36.0	49.3	47.5		16.7	21.7		22.6	28.8	
Level of Service	D	D	D	D	D		B	C		C	C	
Approach Delay (s)		39.4			48.8			20.7			28.6	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			61.0%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗	↑	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR	
Lane Configurations	↗	↗↗	↙	↗↗	↗↗	↗↗↗	↙	↗↗	↗	
Traffic Volume (vph)	21	300	255	65	154	506	49	855	26	
Future Volume (vph)	21	300	255	65	154	506	49	855	26	
Turn Type	NA	pt+ov	Split	NA	Prot	NA	pm+pt	NA	Perm	
Protected Phases	4	4 1	3	3	1	6	5	2		
Permitted Phases							2		2	
Detector Phase	4	4 1	3	3	1	6	5	2	2	
Switch Phase										
Minimum Initial (s)	6.0		6.0	6.0	6.0	15.0	6.0	15.0	15.0	
Minimum Split (s)	12.5		12.5	12.5	30.0	21.5	12.0	21.5	21.5	
Total Split (s)	22.0		38.0	38.0	32.0	88.0	12.0	68.0	68.0	
Total Split (%)	13.8%		23.8%	23.8%	20.0%	55.0%	7.5%	42.5%	42.5%	
Yellow Time (s)	4.0		4.0	4.0	4.0	4.5	4.0	4.5	4.5	
All-Red Time (s)	2.5		2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-3.0		-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5	
Total Lost Time (s)	3.5		4.0	4.0	4.0	4.0	3.0	4.0	4.0	
Lead/Lag	Lag		Lead	Lead	Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?										
Recall Mode	None		None	None	None	C-Max	None	C-Max	C-Max	
Act Effct Green (s)	21.7	39.3	24.9	24.9	14.6	92.1	93.5	83.3	83.3	
Actuated g/C Ratio	0.14	0.25	0.16	0.16	0.09	0.58	0.58	0.52	0.52	
v/c Ratio	0.37	0.47	0.70	0.54	0.53	0.21	0.11	0.49	0.03	
Control Delay	67.6	54.5	78.3	38.4	64.9	12.7	11.2	22.3	0.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	67.6	54.5	78.3	38.4	64.9	12.7	11.2	22.3	0.1	
LOS	E	D	E	D	E	B	B	C	A	
Approach Delay	57.4			52.2		23.8		21.1		
Approach LOS	E			D		C		C		

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 60 (38%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 33.3
 Intersection LOS: C
 Intersection Capacity Utilization 56.4%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd

↙ Ø1	↓ Ø2 (R)	↗ Ø3	↘ Ø4
32 s	68 s	38 s	22 s
↘ Ø5	↑ Ø6 (R)		
12 s	88 s		

Queues

2019 Projected PM Peak MIT

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

									
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	90	326	177	336	167	616	53	929	28
v/c Ratio	0.37	0.47	0.70	0.54	0.53	0.21	0.11	0.49	0.03
Control Delay	67.6	54.5	78.3	38.4	64.9	12.7	11.2	22.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	54.5	78.3	38.4	64.9	12.7	11.2	22.3	0.1
Queue Length 50th (ft)	85	166	195	104	89	117	18	244	0
Queue Length 95th (ft)	152	225	275	151	129	146	35	292	0
Internal Link Dist (ft)	888			1639		269		273	
Turn Bay Length (ft)			230		245		95		145
Base Capacity (vph)	244	906	343	791	600	2889	494	1879	912
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.36	0.52	0.42	0.28	0.21	0.11	0.49	0.03
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	21	300	255	65	152	154	506	61	49	855	26
Future Volume (vph)	62	21	300	255	65	152	154	506	61	49	855	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)		3.5	4.5	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor		1.00	0.88	0.91	0.91		0.97	0.91		1.00	0.95	1.00
Frt		1.00	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.96	1.00	0.95	0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	2801	1618	3214		3433	5004		1745	3610	1615
Flt Permitted		0.96	1.00	0.95	0.99		0.95	1.00		0.41	1.00	1.00
Satd. Flow (perm)		1805	2801	1618	3214		3433	5004		749	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	23	326	277	71	165	167	550	66	53	929	28
RTOR Reduction (vph)	0	0	0	0	117	0	0	9	0	0	0	13
Lane Group Flow (vph)	0	90	326	177	219	0	167	607	0	53	929	15
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	4	4	4 1	3	3		1	6		5	2	
Permitted Phases										2		2
Actuated Green, G (s)		18.7	37.8	22.4	22.4		12.6	88.4		85.8	80.8	80.8
Effective Green, g (s)		21.7	39.8	24.9	24.9		14.6	90.9		91.8	83.3	83.3
Actuated g/C Ratio		0.14	0.25	0.16	0.16		0.09	0.57		0.57	0.52	0.52
Clearance Time (s)		6.5		6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)		2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		244	696	251	500		313	2842		479	1879	840
v/s Ratio Prot		0.05	c0.12	c0.11	0.07		c0.05	0.12		0.01	c0.26	
v/s Ratio Perm										0.06		0.01
v/c Ratio		0.37	0.47	0.71	0.44		0.53	0.21		0.11	0.49	0.02
Uniform Delay, d1		62.9	51.1	64.1	61.2		69.4	17.0		15.0	24.8	18.6
Progression Factor		1.00	1.02	1.00	1.00		0.85	0.73		0.87	0.81	1.00
Incremental Delay, d2		0.7	0.4	8.1	0.4		1.3	0.2		0.1	0.9	0.0
Delay (s)		63.5	52.3	72.2	61.6		60.5	12.6		13.1	21.0	18.6
Level of Service		E	D	E	E		E	B		B	C	B
Approach Delay (s)		54.8			65.3			22.8			20.6	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			34.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				16.5		
Intersection Capacity Utilization			56.4%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected PM Peak MIT
Medical Office Center

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	33	344	20	182	19	36	17	158	106
Future Volume (vph)	33	344	20	182	19	36	17	158	106
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	15.0	10.0	15.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	19.0	14.0	19.0	14.0	14.0	14.0	14.0	14.0
Total Split (s)	16.0	29.0	16.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	20.0%	36.3%	20.0%	36.3%	43.8%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	35.8	27.8	35.0	25.0		38.6	38.6	38.6	38.6
Actuated g/C Ratio	0.45	0.35	0.44	0.31		0.48	0.48	0.48	0.48
v/c Ratio	0.06	0.30	0.05	0.25		0.07	0.02	0.27	0.15
Control Delay	11.5	19.9	10.6	12.7		14.0	0.1	19.4	16.7
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	11.5	19.9	10.6	12.7		14.0	0.1	19.4	16.7
LOS	B	B	B	B		B	A	B	B
Approach Delay		19.2		12.6		10.8			18.2
Approach LOS		B		B		B			B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 45 (56%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 16.5

Intersection LOS: B

Intersection Capacity Utilization 49.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

 Ø2	 Ø4 (R)	 Ø3
35 s	29 s	16 s
 Ø6	 Ø8 (R)	 Ø7
35 s	29 s	16 s

Queues

2019 Projected PM Peak MIT

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	36	383	22	277	60	18	172	132
v/c Ratio	0.06	0.30	0.05	0.25	0.07	0.02	0.27	0.15
Control Delay	11.5	19.9	10.6	12.7	14.0	0.1	19.4	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	19.9	10.6	12.7	14.0	0.1	19.4	16.7
Queue Length 50th (ft)	9	54	6	38	18	0	64	44
Queue Length 95th (ft)	24	112	15	68	40	0	m92	m68
Internal Link Dist (ft)		317		1062	1566			181
Turn Bay Length (ft)	100		150			1000	100	
Base Capacity (vph)	627	1282	532	1111	820	798	645	887
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.30	0.04	0.25	0.07	0.02	0.27	0.15

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected PM Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	344	8	20	182	73	19	36	17	158	106	16
Future Volume (vph)	33	344	8	20	182	73	19	36	17	158	106	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-9%			0%			0%			0%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Flt	1.00	1.00		1.00	0.96			1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1849	3685		1770	3388			1831	1583	1770	1827	
Flt Permitted	0.56	1.00		0.46	1.00			0.91	1.00	0.72	1.00	
Satd. Flow (perm)	1085	3685		853	3388			1700	1583	1337	1827	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	374	9	22	198	79	21	39	18	172	115	17
RTOR Reduction (vph)	0	2	0	0	55	0	0	0	9	0	6	0
Lane Group Flow (vph)	36	381	0	22	222	0	0	60	9	172	126	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.2	25.4		26.6	22.6			38.6	38.6	38.6	38.6	
Effective Green, g (s)	32.2	25.4		26.6	22.6			38.6	38.6	38.6	38.6	
Actuated g/C Ratio	0.40	0.32		0.33	0.28			0.48	0.48	0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	501	1169		329	957			820	763	645	881	
v/s Ratio Prot	c0.01	c0.10		0.00	0.07						0.07	
v/s Ratio Perm	0.02			0.02				0.04	0.01	c0.13		
v/c Ratio	0.07	0.33		0.07	0.23			0.07	0.01	0.27	0.14	
Uniform Delay, d1	15.4	20.8		20.3	22.0			11.1	10.8	12.3	11.5	
Progression Factor	1.00	1.00		0.94	0.83			1.00	1.00	1.25	1.29	
Incremental Delay, d2	0.1	0.7		0.1	0.6			0.2	0.0	0.9	0.3	
Delay (s)	15.5	21.5		19.1	18.9			11.3	10.8	16.3	15.1	
Level of Service	B	C		B	B			B	B	B	B	
Approach Delay (s)		21.0			18.9			11.2			15.8	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.27									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			49.6%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
8: Christian Academy Blvd & Dutchtown Rd

2019 Projected PM Peak MIT
Medical Office Center

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↖	↖	↖	↖	↖
Traffic Volume (vph)	892	61	761	148	60
Future Volume (vph)	892	61	761	148	60
Turn Type	NA	pm+pt	NA	Prot	Perm
Protected Phases	4	3	8	2	
Permitted Phases		8			2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	15.0	10.0	15.0	10.0	10.0
Minimum Split (s)	19.0	14.0	19.0	19.0	19.0
Total Split (s)	47.0	14.0	61.0	19.0	19.0
Total Split (%)	58.8%	17.5%	76.3%	23.8%	23.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	C-Max	None	C-Max	Max	Max
Act Effct Green (s)	45.8	57.0	57.0	15.0	15.0
Actuated g/C Ratio	0.57	0.71	0.71	0.19	0.19
v/c Ratio	1.04	0.21	0.62	0.49	0.19
Control Delay	58.5	5.0	8.5	30.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	58.5	5.0	8.5	30.7	5.7
LOS	E	A	A	C	A
Approach Delay	58.5		8.3	23.5	
Approach LOS	E		A	C	

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 34.6
 Intersection LOS: C
 Intersection Capacity Utilization 68.8%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 8: Christian Academy Blvd & Dutchtown Rd

↖ Ø2	↖ Ø3	→ Ø4 (R)
19 s	14 s	47 s
	↖ Ø8 (R)	
	61 s	

Queues
8: Christian Academy Blvd & Dutchtown Rd

2019 Projected PM Peak MIT
Medical Office Center

	→	↖	←	↙	↗
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1093	66	827	161	65
v/c Ratio	1.04	0.21	0.62	0.49	0.19
Control Delay	58.5	5.0	8.5	30.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	58.5	5.0	8.5	30.7	5.7
Queue Length 50th (ft)	~630	8	176	75	0
Queue Length 95th (ft)	#868	18	273	120	26
Internal Link Dist (ft)	5197		2065	558	
Turn Bay Length (ft)		250		200	
Base Capacity (vph)	1055	311	1327	331	349
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.04	0.21	0.62	0.49	0.19

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Projected PM Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰		↰	↰	↰	↰
Traffic Volume (vph)	892	113	61	761	148	60
Future Volume (vph)	892	113	61	761	148	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1834		1770	1863	1770	1583
Flt Permitted	1.00		0.08	1.00	0.95	1.00
Satd. Flow (perm)	1834		152	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	970	123	66	827	161	65
RTOR Reduction (vph)	5	0	0	0	0	53
Lane Group Flow (vph)	1088	0	66	827	161	12
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	45.0		57.0	57.0	15.0	15.0
Effective Green, g (s)	45.0		57.0	57.0	15.0	15.0
Actuated g/C Ratio	0.56		0.71	0.71	0.19	0.19
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1031		270	1327	331	296
v/s Ratio Prot	c0.59		0.02	c0.44	c0.09	
v/s Ratio Perm			0.15			0.01
v/c Ratio	1.06		0.24	0.62	0.49	0.04
Uniform Delay, d1	17.5		16.6	5.9	29.1	26.6
Progression Factor	1.00		1.00	1.00	0.87	0.78
Incremental Delay, d2	43.7		0.5	2.2	5.0	0.3
Delay (s)	61.2		17.0	8.2	30.4	21.1
Level of Service	E		B	A	C	C
Approach Delay (s)	61.2			8.8	27.7	
Approach LOS	E			A	C	
Intersection Summary						
HCM 2000 Control Delay			36.6		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			68.8%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Timings
10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	321	171	107	407	238	261	596	12	433
Future Volume (vph)	321	171	107	407	238	261	596	12	433
Turn Type	Split	NA	Perm	Split	NA	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		4	4	1	6	5	2
Permitted Phases			8			6		2	
Detector Phase	8	8	8	4	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	26.0	26.0	26.0	32.0	32.0	29.0	52.0	10.0	33.0
Total Split (%)	21.7%	21.7%	21.7%	26.7%	26.7%	24.2%	43.3%	8.3%	27.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	18.2	18.2	18.2	22.5	22.5	60.8	56.8	42.7	37.3
Actuated g/C Ratio	0.15	0.15	0.15	0.19	0.19	0.51	0.47	0.36	0.31
v/c Ratio	0.72	0.72	0.28	0.69	0.79	0.63	0.46	0.05	0.48
Control Delay	65.0	57.1	1.7	50.8	62.2	25.4	23.9	19.7	37.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	57.1	1.7	50.8	62.2	25.4	23.9	19.7	37.2
LOS	E	E	A	D	E	C	C	B	D
Approach Delay		49.3			55.2		24.3		36.7
Approach LOS		D			E		C		D

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 39.6
 Intersection LOS: D
 Intersection Capacity Utilization 71.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø4	 Ø8
29 s	33 s	32 s	26 s
 Ø5	 Ø6 (R)		
10 s	52 s		

Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	174	361	116	442	274	284	762	13	524
v/c Ratio	0.72	0.72	0.28	0.69	0.79	0.63	0.46	0.05	0.48
Control Delay	65.0	57.1	1.7	50.8	62.2	25.4	23.9	19.7	37.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	57.1	1.7	50.8	62.2	25.4	23.9	19.7	37.2
Queue Length 50th (ft)	139	145	0	162	199	134	197	5	179
Queue Length 95th (ft)	226	201	0	214	292	205	302	17	255
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	268	551	430	743	401	511	1648	285	1090
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.66	0.27	0.59	0.68	0.56	0.46	0.05	0.48
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM Peak MIT
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	321	171	107	407	238	14	261	596	105	12	433	49
Future Volume (vph)	321	171	107	407	238	14	261	596	105	12	433	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	0.91	0.91	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	3310	1583	3433	1847		1770	3460		1770	3486	
Flt Permitted	0.95	0.98	1.00	0.95	1.00		0.30	1.00		0.36	1.00	
Satd. Flow (perm)	1610	3310	1583	3433	1847		561	3460		676	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	349	186	116	442	259	15	284	648	114	13	471	53
RTOR Reduction (vph)	0	0	98	0	2	0	0	11	0	0	6	0
Lane Group Flow (vph)	174	361	18	442	272	0	284	751	0	13	518	0
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	18.2	18.2	18.2	22.5	22.5		60.8	53.2		38.9	37.3	
Effective Green, g (s)	18.2	18.2	18.2	22.5	22.5		60.8	53.2		38.9	37.3	
Actuated g/C Ratio	0.15	0.15	0.15	0.19	0.19		0.51	0.44		0.32	0.31	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	244	502	240	643	346		455	1533		233	1083	
v/s Ratio Prot	0.11	c0.11		0.13	c0.15		c0.09	0.22		0.00	0.15	
v/s Ratio Perm			0.01				c0.23			0.02		
v/c Ratio	0.71	0.72	0.07	0.69	0.79		0.62	0.49		0.06	0.48	
Uniform Delay, d1	48.4	48.5	43.7	45.5	46.5		18.8	23.8		27.6	33.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.5	4.9	0.1	3.1	11.2		2.7	1.1		0.1	1.5	
Delay (s)	57.9	53.4	43.8	48.5	57.7		21.5	24.9		27.7	35.0	
Level of Service	E	D	D	D	E		C	C		C	C	
Approach Delay (s)		52.9			52.0			23.9			34.8	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			39.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			71.6%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

Timings 3: Cedar Bluff Road & Park West Blvd

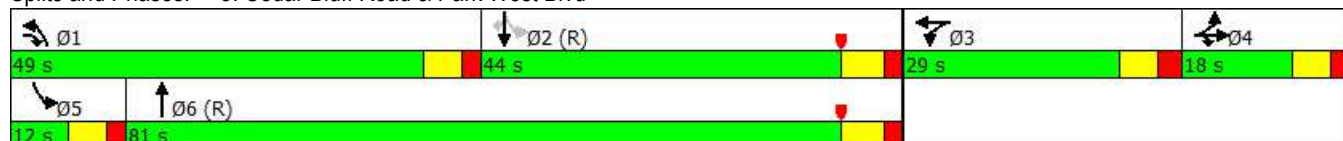
2019 Projected Midday Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↙	↖↖	↖↖	↖↖↖	↙	↖↖	↖
Traffic Volume (vph)	38	268	115	197	290	733	49	513	44
Future Volume (vph)	38	268	115	197	290	733	49	513	44
Turn Type	NA	pt+ov	Split	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	4	4 1	3	3	1	6	5	2	
Permitted Phases							2		2
Detector Phase	4	4 1	3	3	1	6	5	2	2
Switch Phase									
Minimum Initial (s)	6.0		6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5		12.5	12.5	40.0	21.5	12.0	21.5	21.5
Total Split (s)	18.0		29.0	29.0	49.0	81.0	12.0	44.0	44.0
Total Split (%)	12.9%		20.7%	20.7%	35.0%	57.9%	8.6%	31.4%	31.4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5		2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0		-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5		4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag		Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None		None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	17.0	40.2	20.0	20.0	20.2	82.0	77.4	67.4	67.4
Actuated g/C Ratio	0.12	0.29	0.14	0.14	0.14	0.59	0.55	0.48	0.48
v/c Ratio	0.58	0.36	0.49	0.70	0.64	0.30	0.14	0.32	0.06
Control Delay	68.2	40.0	61.8	50.7	50.0	9.6	8.1	20.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	40.0	61.8	50.7	50.0	9.6	8.1	20.9	0.5
LOS	E	D	E	D	D	A	A	C	A
Approach Delay	48.5			53.2		20.2		18.4	
Approach LOS	D			D		C		B	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 107 (76%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 29.9
 Intersection LOS: C
 Intersection Capacity Utilization 51.0%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

3: Cedar Bluff Road & Park West Blvd

2019 Projected Midday Peak MIT

Medical Office Center

									
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	126	291	112	380	315	886	53	558	48
v/c Ratio	0.58	0.36	0.49	0.70	0.64	0.30	0.14	0.32	0.06
Control Delay	68.2	40.0	61.8	50.7	50.0	9.6	8.1	20.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	40.0	61.8	50.7	50.0	9.6	8.1	20.9	0.5
Queue Length 50th (ft)	108	118	104	142	139	152	15	167	0
Queue Length 95th (ft)	#197	165	168	194	177	180	25	237	5
Internal Link Dist (ft)	888			1639		269		273	
Turn Bay Length (ft)			230		245		95		145
Base Capacity (vph)	219	1300	288	660	1103	2941	389	1737	865
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.22	0.39	0.58	0.29	0.30	0.14	0.32	0.06

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Projected Midday Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	38	268	115	197	141	290	733	82	49	513	44
Future Volume (vph)	78	38	268	115	197	141	290	733	82	49	513	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)		3.5	4.5	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor		1.00	0.88	0.91	0.91		0.97	0.91		1.00	0.95	1.00
Flt		1.00	0.85	1.00	0.94		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1811	2801	1618	3302		3433	5009		1745	3610	1615
Flt Permitted		0.97	1.00	0.95	1.00		0.95	1.00		0.31	1.00	1.00
Satd. Flow (perm)		1811	2801	1618	3302		3433	5009		567	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	41	291	125	214	153	315	797	89	53	558	48
RTOR Reduction (vph)	0	0	0	0	74	0	0	9	0	0	0	25
Lane Group Flow (vph)	0	126	291	112	306	0	315	877	0	53	558	23
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	4	4	4 1	3	3		1	6		5	2	
Permitted Phases										2		2
Actuated Green, G (s)		14.0	38.7	17.5	17.5		18.2	78.2		69.6	64.8	64.8
Effective Green, g (s)		17.0	40.7	20.0	20.0		20.2	80.7		75.6	67.3	67.3
Actuated g/C Ratio		0.12	0.29	0.14	0.14		0.14	0.58		0.54	0.48	0.48
Clearance Time (s)		6.5		6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)		2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		219	814	231	471		495	2887		371	1735	776
v/s Ratio Prot		c0.07	0.10	0.07	c0.09		c0.09	0.18		0.01	c0.15	
v/s Ratio Perm										0.07		0.01
v/c Ratio		0.58	0.36	0.48	0.65		0.64	0.30		0.14	0.32	0.03
Uniform Delay, d1		58.1	39.3	55.3	56.7		56.4	15.2		15.3	22.3	19.1
Progression Factor		0.98	0.98	1.00	1.00		0.80	0.62		0.71	0.87	1.00
Incremental Delay, d2		3.0	0.2	1.2	2.9		2.1	0.2		0.1	0.5	0.1
Delay (s)		59.9	38.9	56.4	59.6		47.0	9.7		11.0	19.9	19.2
Level of Service		E	D	E	E		D	A		B	B	B
Approach Delay (s)		45.2			58.8			19.5			19.1	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			30.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				16.5		
Intersection Capacity Utilization			51.0%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

Timings
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected Midday Peak MIT
Medical Office Center

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	29	281	32	290	8	22	25	124	71
Future Volume (vph)	29	281	32	290	8	22	25	124	71
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	10.0	30.0	10.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	14.3%	42.9%	14.3%	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	34.4	32.0	34.4	32.0		26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.49	0.46	0.49	0.46		0.37	0.37	0.37	0.37
v/c Ratio	0.06	0.19	0.06	0.23		0.05	0.04	0.27	0.15
Control Delay	8.8	12.4	5.0	6.4		14.5	0.1	15.1	10.1
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	8.8	12.4	5.0	6.4		14.5	0.1	15.1	10.1
LOS	A	B	A	A		B	A	B	B
Approach Delay		12.1		6.3		8.0			13.0
Approach LOS		B		A		A			B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 29 (41%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 9.8

Intersection LOS: A

Intersection Capacity Utilization 36.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

 Ø2	 Ø3	 Ø4 (R)
30 s	10 s	30 s
 Ø6	 Ø7	 Ø8 (R)
30 s	10 s	30 s

Queues

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected Midday Peak MIT

Medical Office Center

								
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	32	326	35	374	33	27	135	100
v/c Ratio	0.06	0.19	0.06	0.23	0.05	0.04	0.27	0.15
Control Delay	8.8	12.4	5.0	6.4	14.5	0.1	15.1	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	12.4	5.0	6.4	14.5	0.1	15.1	10.1
Queue Length 50th (ft)	6	35	5	23	9	0	41	22
Queue Length 95th (ft)	18	75	m14	58	25	0	78	47
Internal Link Dist (ft)		317		1062	1566			181
Turn Bay Length (ft)	100		150			1000	100	
Base Capacity (vph)	562	1679	567	1597	656	637	509	682
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.19	0.06	0.23	0.05	0.04	0.27	0.15

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected Midday Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	281	19	32	290	54	8	22	25	124	71	21
Future Volume (vph)	29	281	19	32	290	54	8	22	25	124	71	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-9%			0%			0%			0%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Flt	1.00	0.99		1.00	0.98			1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1849	3663		1770	3455			1838	1583	1770	1798	
Flt Permitted	0.51	1.00		0.55	1.00			0.95	1.00	0.74	1.00	
Satd. Flow (perm)	997	3663		1024	3455			1768	1583	1370	1798	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	305	21	35	315	59	9	24	27	135	77	23
RTOR Reduction (vph)	0	6	0	0	20	0	0	0	17	0	14	0
Lane Group Flow (vph)	32	320	0	35	354	0	0	33	10	135	86	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.0	29.6		32.0	29.6			26.0	26.0	26.0	26.0	
Effective Green, g (s)	32.0	29.6		32.0	29.6			26.0	26.0	26.0	26.0	
Actuated g/C Ratio	0.46	0.42		0.46	0.42			0.37	0.37	0.37	0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	484	1548		493	1460			656	587	508	667	
v/s Ratio Prot	0.00	0.09		c0.00	c0.10						0.05	
v/s Ratio Perm	0.03			0.03				0.02	0.01	c0.10		
v/c Ratio	0.07	0.21		0.07	0.24			0.05	0.02	0.27	0.13	
Uniform Delay, d1	10.5	12.8		10.5	13.0			14.1	13.9	15.3	14.5	
Progression Factor	1.00	1.00		0.56	0.54			1.00	1.00	0.87	0.82	
Incremental Delay, d2	0.1	0.3		0.1	0.4			0.1	0.1	1.3	0.4	
Delay (s)	10.6	13.1		6.0	7.3			14.2	14.0	14.7	12.2	
Level of Service	B	B		A	A			B	B	B	B	
Approach Delay (s)		12.9			7.2			14.1			13.6	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			10.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			36.6%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
8: Christian Academy Blvd & Dutchtown Rd

2019 Projected Midday Peak MIT
Medical Office Center

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↖	↖	↖	↖	↖
Traffic Volume (vph)	448	30	373	73	32
Future Volume (vph)	448	30	373	73	32
Turn Type	NA	pm+pt	NA	Prot	Perm
Protected Phases	4	3	8	2	
Permitted Phases		8			2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	8.0	20.0	20.0	20.0
Total Split (s)	42.0	8.0	50.0	20.0	20.0
Total Split (%)	60.0%	11.4%	71.4%	28.6%	28.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	C-Max	None	C-Max	Max	Max
Act Effect Green (s)	42.8	46.0	46.0	16.0	16.0
Actuated g/C Ratio	0.61	0.66	0.66	0.23	0.23
v/c Ratio	0.51	0.07	0.33	0.20	0.09
Control Delay	10.3	4.6	6.2	19.9	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	4.6	6.2	19.9	6.9
LOS	B	A	A	B	A
Approach Delay	10.3		6.0	15.9	
Approach LOS	B		A	B	

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 2 (3%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 39.0%
 Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service A

Splits and Phases: 8: Christian Academy Blvd & Dutchtown Rd

↖ Ø2	↖ Ø3	→ Ø4 (R)
20 s	8 s	42 s
	↖ Ø8 (R)	
	50 s	

Queues
8: Christian Academy Blvd & Dutchtown Rd

2019 Projected Midday Peak MIT
Medical Office Center

	→	↙	←	↘	↗
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	571	33	405	79	35
v/c Ratio	0.51	0.07	0.33	0.20	0.09
Control Delay	10.3	4.6	6.2	19.9	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	4.6	6.2	19.9	6.9
Queue Length 50th (ft)	99	4	65	31	5
Queue Length 95th (ft)	232	12	105	57	19
Internal Link Dist (ft)	5197		2065	558	
Turn Bay Length (ft)		250		200	
Base Capacity (vph)	1123	447	1224	404	388
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.51	0.07	0.33	0.20	0.09
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Projected Midday Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰		↰	↰	↰	↰
Traffic Volume (vph)	448	77	30	373	73	32
Future Volume (vph)	448	77	30	373	73	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1826		1770	1863	1770	1583
Flt Permitted	1.00		0.31	1.00	0.95	1.00
Satd. Flow (perm)	1826		578	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	487	84	33	405	79	35
RTOR Reduction (vph)	8	0	0	0	0	27
Lane Group Flow (vph)	563	0	33	405	79	8
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	40.4		46.0	46.0	16.0	16.0
Effective Green, g (s)	40.4		46.0	46.0	16.0	16.0
Actuated g/C Ratio	0.58		0.66	0.66	0.23	0.23
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1053		407	1224	404	361
v/s Ratio Prot	c0.31		0.00	c0.22	c0.04	
v/s Ratio Perm			0.05			0.01
v/c Ratio	0.53		0.08	0.33	0.20	0.02
Uniform Delay, d1	9.1		5.6	5.3	21.8	20.9
Progression Factor	1.00		1.00	1.00	0.85	1.00
Incremental Delay, d2	1.9		0.1	0.7	1.1	0.1
Delay (s)	11.0		5.7	6.0	19.7	21.1
Level of Service	B		A	A	B	C
Approach Delay (s)	11.0			6.0	20.1	
Approach LOS	B			A	C	
Intersection Summary						
HCM 2000 Control Delay			10.0		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			39.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
10: Sherrill Blvd & Dutchtown Rd

2019 Projected Midday Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	76	199	157	123	242	136	168	31	67
Future Volume (vph)	76	199	157	123	242	136	168	31	67
Turn Type	Split	NA	Perm	Split	NA	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		4	4	1	6	5	2
Permitted Phases			8			6		2	
Detector Phase	8	8	8	4	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	18.0	18.0	18.0	29.0	29.0	17.0	28.0	10.0	21.0
Total Split (%)	21.2%	21.2%	21.2%	34.1%	34.1%	20.0%	32.9%	11.8%	24.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	10.9	10.9	10.9	17.8	17.8	37.3	31.2	27.8	22.0
Actuated g/C Ratio	0.13	0.13	0.13	0.21	0.21	0.44	0.37	0.33	0.26
v/c Ratio	0.36	0.52	0.38	0.19	0.72	0.30	0.25	0.09	0.20
Control Delay	38.6	38.7	2.5	26.9	40.9	18.1	13.5	17.3	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	38.7	2.5	26.9	40.9	18.1	13.5	17.3	13.5
LOS	D	D	A	C	D	B	B	B	B
Approach Delay		25.5			36.4		15.0		14.1
Approach LOS		C			D		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 85

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 23.7

Intersection LOS: C

Intersection Capacity Utilization 57.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø4	 Ø8
17 s	21 s	29 s	18 s
 Ø5	 Ø6 (R)		
10 s	28 s		

Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Projected Midday Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	75	224	171	134	279	148	320	34	180
v/c Ratio	0.36	0.52	0.38	0.19	0.72	0.30	0.25	0.09	0.20
Control Delay	38.6	38.7	2.5	26.9	40.9	18.1	13.5	17.3	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	38.7	2.5	26.9	40.9	18.1	13.5	17.3	13.5
Queue Length 50th (ft)	40	61	0	30	137	47	38	10	15
Queue Length 95th (ft)	85	98	0	50	204	96	75	30	46
Internal Link Dist (ft)	1094				6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	231	485	468	928	502	511	1301	385	915
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.46	0.37	0.14	0.56	0.29	0.25	0.09	0.20
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Projected Midday Peak MIT
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	76	199	157	123	242	15	136	168	126	31	67	98
Future Volume (vph)	76	199	157	123	242	15	136	168	126	31	67	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	0.91	0.91	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	3384	1583	3433	1847		1770	3312		1770	3224	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.49	1.00		0.56	1.00	
Satd. Flow (perm)	1610	3384	1583	3433	1847		918	3312		1039	3224	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	216	171	134	263	16	148	183	137	34	73	107
RTOR Reduction (vph)	0	0	149	0	3	0	0	91	0	0	79	0
Lane Group Flow (vph)	75	224	22	134	276	0	148	229	0	34	101	0
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	10.9	10.9	10.9	17.8	17.8		37.8	28.8		25.0	22.0	
Effective Green, g (s)	10.9	10.9	10.9	17.8	17.8		37.8	28.8		25.0	22.0	
Actuated g/C Ratio	0.13	0.13	0.13	0.21	0.21		0.44	0.34		0.29	0.26	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	206	433	202	718	386		501	1122		331	834	
v/s Ratio Prot	0.05	c0.07		0.04	c0.15		c0.03	0.07		0.00	0.03	
v/s Ratio Perm			0.01				c0.10			0.03		
v/c Ratio	0.36	0.52	0.11	0.19	0.71		0.30	0.20		0.10	0.12	
Uniform Delay, d1	33.9	34.6	32.8	27.6	31.2		14.6	20.0		21.6	24.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	1.0	0.2	0.1	6.2		0.3	0.4		0.1	0.3	
Delay (s)	35.0	35.6	33.0	27.8	37.4		14.9	20.4		21.7	24.4	
Level of Service	C	D	C	C	D		B	C		C	C	
Approach Delay (s)		34.6			34.3			18.6			24.0	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			28.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			57.0%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM School Peak MIT
Medical Office Center

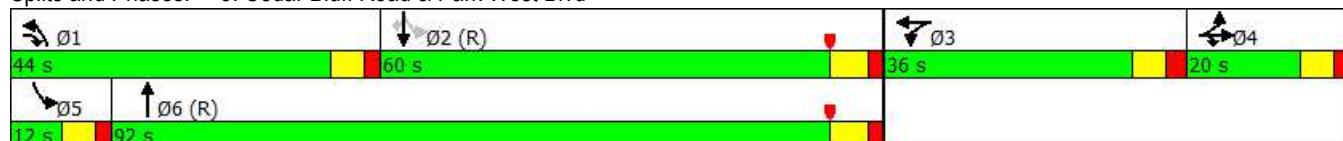
	→	↘	↙	←	↖	↗	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↗	↗↗	↙	↗↗	↗↗	↗↗↗	↙	↗↗	↗
Traffic Volume (vph)	11	267	171	161	177	668	38	725	27
Future Volume (vph)	11	267	171	161	177	668	38	725	27
Turn Type	NA	pt+ov	Split	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	4	4 1	3	3	1	6	5	2	
Permitted Phases							2		2
Detector Phase	4	4 1	3	3	1	6	5	2	2
Switch Phase									
Minimum Initial (s)	6.0		6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5		12.5	12.5	35.0	21.5	12.0	21.5	21.5
Total Split (s)	20.0		36.0	36.0	44.0	92.0	12.0	60.0	60.0
Total Split (%)	12.5%		22.5%	22.5%	27.5%	57.5%	7.5%	37.5%	37.5%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5		2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0		-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5		4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag		Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None		None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	19.6	38.4	23.9	23.9	15.8	95.4	95.3	85.2	85.2
Actuated g/C Ratio	0.12	0.24	0.15	0.15	0.10	0.60	0.60	0.53	0.53
v/c Ratio	0.57	0.43	0.69	0.63	0.57	0.28	0.10	0.41	0.03
Control Delay	76.7	54.0	78.8	44.2	64.0	12.1	10.6	20.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.7	54.0	78.8	44.2	64.0	12.1	10.6	20.8	0.1
LOS	E	D	E	D	E	B	B	C	A
Approach Delay	60.8			54.7		22.0		19.6	
Approach LOS	E			D		C		B	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 58 (36%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 33.3
 Intersection Capacity Utilization 54.7%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service A

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2019 Projected PM School Peak MIT

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

									
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	124	290	167	382	192	822	41	788	29
v/c Ratio	0.50	0.41	0.69	0.63	0.57	0.28	0.10	0.42	0.03
Control Delay	70.6	51.1	78.4	43.1	66.4	14.2	12.1	22.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.6	51.1	78.4	43.1	66.4	14.2	12.1	22.3	0.1
Queue Length 50th (ft)	123	146	184	130	103	158	14	210	0
Queue Length 95th (ft)	190	186	262	180	149	193	33	255	0
Internal Link Dist (ft)	888			1639		269		273	
Turn Bay Length (ft)			230		245		95		145
Base Capacity (vph)	296	763	364	843	429	2885	430	1867	907
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.38	0.46	0.45	0.45	0.28	0.10	0.42	0.03
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2019 Projected PM School Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			 		 		 	 			 	
Traffic Volume (vph)	103	11	267	171	161	173	177	668	88	38	725	27
Future Volume (vph)	103	11	267	171	161	173	177	668	88	38	725	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)		3.5	4.5	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor		1.00	0.88	0.91	0.91		0.97	0.91		1.00	0.95	1.00
Frt		1.00	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1791	2801	1618	3253		3433	4996		1745	3610	1615
Flt Permitted		0.96	1.00	0.95	1.00		0.95	1.00		0.32	1.00	1.00
Satd. Flow (perm)		1791	2801	1618	3253		3433	4996		594	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	12	290	186	175	188	192	726	96	41	788	29
RTOR Reduction (vph)	0	0	0	0	122	0	0	8	0	0	0	14
Lane Group Flow (vph)	0	124	290	167	260	0	192	814	0	41	788	15
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	4	4	4 1	3	3		1	6		5	2	
Permitted Phases										2		2
Actuated Green, G (s)		19.0	39.2	21.5	21.5		13.7	88.5		85.8	80.3	80.3
Effective Green, g (s)		22.0	41.2	24.0	24.0		15.7	91.0		91.8	82.8	82.8
Actuated g/C Ratio		0.14	0.26	0.15	0.15		0.10	0.57		0.57	0.52	0.52
Clearance Time (s)		6.5		6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)		2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		246	721	242	487		336	2841		401	1868	835
v/s Ratio Prot		c0.07	0.10	c0.10	0.08		c0.06	0.16		0.01	c0.22	
v/s Ratio Perm										0.05		0.01
v/c Ratio		0.50	0.40	0.69	0.53		0.57	0.29		0.10	0.42	0.02
Uniform Delay, d1		63.9	49.2	64.5	62.8		68.9	17.8		14.9	23.8	18.8
Progression Factor		1.00	1.01	1.00	1.00		0.88	0.75		0.89	0.84	1.00
Incremental Delay, d2		1.2	0.3	7.6	0.9		1.8	0.2		0.1	0.7	0.0
Delay (s)		65.0	50.1	72.0	63.7		62.3	13.6		13.3	20.6	18.8
Level of Service		E	D	E	E		E	B		B	C	B
Approach Delay (s)		54.6			66.2			22.8			20.2	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			35.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				16.5		
Intersection Capacity Utilization			54.7%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

Timings
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected PM School Peak MIT
Medical Office Center

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	33	206	19	238	6	33	20	144	94
Future Volume (vph)	33	206	19	238	6	33	20	144	94
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	33.0	12.0	33.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	15.0%	41.3%	15.0%	41.3%	43.8%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	39.6	36.8	38.3	34.5		31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.50	0.46	0.48	0.43		0.39	0.39	0.39	0.39
v/c Ratio	0.07	0.14	0.04	0.23		0.06	0.03	0.30	0.17
Control Delay	10.1	13.7	8.4	11.1		15.8	0.1	14.6	11.2
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	10.1	13.7	8.4	11.1		15.8	0.1	14.6	11.2
LOS	B	B	A	B		B	A	B	B
Approach Delay		13.2		10.9		10.5			13.1
Approach LOS		B		B		B			B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 47 (59%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 12.1

Intersection LOS: B

Intersection Capacity Utilization 37.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

 Ø2	 Ø3	 Ø4 (R)
35 s	12 s	33 s
 Ø6	 Ø7	 Ø8 (R)
35 s	12 s	33 s

Queues

2019 Projected PM School Peak MIT

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	36	234	21	347	43	22	157	123
v/c Ratio	0.07	0.14	0.04	0.23	0.06	0.03	0.30	0.17
Control Delay	10.1	13.7	8.4	11.1	15.8	0.1	14.6	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	13.7	8.4	11.1	15.8	0.1	14.6	11.2
Queue Length 50th (ft)	8	29	5	55	13	0	34	22
Queue Length 95th (ft)	22	63	15	92	33	0	60	43
Internal Link Dist (ft)		317		1062	1566			181
Turn Bay Length (ft)	100		150			1000	100	
Base Capacity (vph)	573	1693	619	1506	699	655	526	712
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.14	0.03	0.23	0.06	0.03	0.30	0.17
Intersection Summary								

HCM Signalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2019 Projected PM School Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	206	9	19	238	81	6	33	20	144	94	19
Future Volume (vph)	33	206	9	19	238	81	6	33	20	144	94	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-9%			0%			0%			0%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Flt	1.00	0.99		1.00	0.96			1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1849	3675		1770	3405			1848	1583	1770	1815	
Flt Permitted	0.50	1.00		0.61	1.00			0.97	1.00	0.73	1.00	
Satd. Flow (perm)	971	3675		1129	3405			1806	1583	1358	1815	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	224	10	21	259	88	7	36	22	157	102	21
RTOR Reduction (vph)	0	3	0	0	38	0	0	0	13	0	9	0
Lane Group Flow (vph)	36	231	0	21	309	0	0	43	9	157	114	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	38.5	34.4		35.5	32.9			31.0	31.0	31.0	31.0	
Effective Green, g (s)	38.5	34.4		35.5	32.9			31.0	31.0	31.0	31.0	
Actuated g/C Ratio	0.48	0.43		0.44	0.41			0.39	0.39	0.39	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	512	1580		521	1400			699	613	526	703	
v/s Ratio Prot	c0.00	0.06		0.00	c0.09						0.06	
v/s Ratio Perm	0.03			0.02				0.02	0.01	c0.12		
v/c Ratio	0.07	0.15		0.04	0.22			0.06	0.01	0.30	0.16	
Uniform Delay, d1	11.0	13.9		12.5	15.2			15.4	15.1	17.0	16.0	
Progression Factor	1.00	1.00		0.84	0.86			1.00	1.00	0.75	0.75	
Incremental Delay, d2	0.1	0.2		0.0	0.4			0.2	0.0	1.4	0.5	
Delay (s)	11.1	14.1		10.6	13.5			15.5	15.1	14.2	12.4	
Level of Service	B	B		B	B			B	B	B	B	
Approach Delay (s)		13.7			13.4			15.4			13.4	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			37.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
8: Christian Academy Blvd & Dutchtown Rd

2019 Projected PM School Peak MIT
Medical Office Center

	→	↖	←	↙	↗
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↗	↖	↗	↖	↗
Traffic Volume (vph)	316	72	444	123	53
Future Volume (vph)	316	72	444	123	53
Turn Type	NA	pm+pt	NA	Prot	Perm
Protected Phases	4	3	8	2	
Permitted Phases		8			2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	8.0	20.0	20.0	20.0
Total Split (s)	45.0	11.0	56.0	24.0	24.0
Total Split (%)	56.3%	13.8%	70.0%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	C-Max	None	C-Max	Max	Max
Act Effct Green (s)	43.2	52.0	52.0	20.0	20.0
Actuated g/C Ratio	0.54	0.65	0.65	0.25	0.25
v/c Ratio	0.48	0.14	0.40	0.30	0.13
Control Delay	13.3	6.3	7.8	23.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	6.3	7.8	23.4	4.4
LOS	B	A	A	C	A
Approach Delay	13.3		7.6	17.7	
Approach LOS	B		A	B	

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 45 (56%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.48
 Intersection Signal Delay: 11.4
 Intersection LOS: B
 Intersection Capacity Utilization 44.9%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 8: Christian Academy Blvd & Dutchtown Rd

↖ Ø2	→ Ø4 (R)	↙ Ø3
24 s	45 s	11 s
	↖ Ø8 (R)	
	56 s	

Queues
8: Christian Academy Blvd & Dutchtown Rd

2019 Projected PM School Peak MIT
Medical Office Center

	→	↖	←	↗	
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	476	78	483	134	58
v/c Ratio	0.48	0.14	0.40	0.30	0.13
Control Delay	13.3	6.3	7.8	23.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	6.3	7.8	23.4	4.4
Queue Length 50th (ft)	136	12	100	46	1
Queue Length 95th (ft)	216	27	154	68	5
Internal Link Dist (ft)	5197		2065	558	
Turn Bay Length (ft)		250		200	
Base Capacity (vph)	983	563	1210	442	439
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.14	0.40	0.30	0.13
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2019 Projected PM School Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (vph)	316	122	72	444	123	53
Future Volume (vph)	316	122	72	444	123	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1792		1770	1863	1770	1583
Flt Permitted	1.00		0.39	1.00	0.95	1.00
Satd. Flow (perm)	1792		727	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	343	133	78	483	134	58
RTOR Reduction (vph)	17	0	0	0	0	44
Lane Group Flow (vph)	459	0	78	483	134	15
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	42.4		52.0	52.0	20.0	20.0
Effective Green, g (s)	42.4		52.0	52.0	20.0	20.0
Actuated g/C Ratio	0.53		0.65	0.65	0.25	0.25
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	949		545	1210	442	395
v/s Ratio Prot	c0.26		0.01	c0.26	c0.08	
v/s Ratio Perm			0.08			0.01
v/c Ratio	0.48		0.14	0.40	0.30	0.04
Uniform Delay, d1	11.9		9.6	6.6	24.3	22.7
Progression Factor	1.00		1.00	1.00	0.88	0.73
Incremental Delay, d2	1.8		0.1	1.0	1.8	0.2
Delay (s)	13.6		9.7	7.6	23.2	16.7
Level of Service	B		A	A	C	B
Approach Delay (s)	13.6			7.9	21.3	
Approach LOS	B			A	C	
Intersection Summary						
HCM 2000 Control Delay			12.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			44.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM School Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	159	228	87	277	142	111	165	39	199
Future Volume (vph)	159	228	87	277	142	111	165	39	199
Turn Type	Split	NA	Perm	Split	NA	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		4	4	1	6	5	2
Permitted Phases			8			6		2	
Detector Phase	8	8	8	4	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	33.0	33.0	33.0	32.0	32.0	22.0	42.0	13.0	33.0
Total Split (%)	27.5%	27.5%	27.5%	26.7%	26.7%	18.3%	35.0%	10.8%	27.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	16.9	16.9	16.9	16.8	16.8	65.6	57.3	59.2	51.8
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.55	0.48	0.49	0.43
v/c Ratio	0.61	0.60	0.24	0.63	0.63	0.20	0.18	0.07	0.20
Control Delay	59.1	53.2	1.4	54.1	58.6	15.3	13.5	15.3	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.1	53.2	1.4	54.1	58.6	15.3	13.5	15.3	21.0
LOS	E	D	A	D	E	B	B	B	C
Approach Delay		45.2			55.7		14.0		20.3
Approach LOS		D			E		B		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 35.7

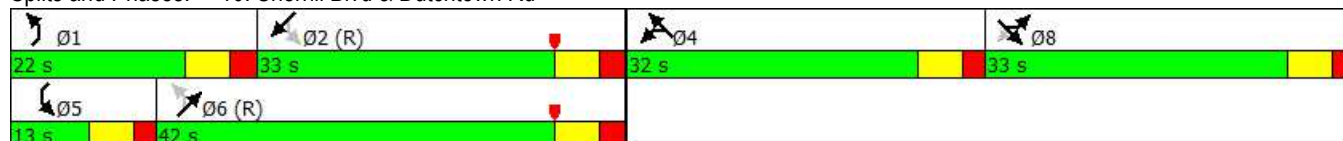
Intersection LOS: D

Intersection Capacity Utilization 50.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd



Queues
10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM School Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	137	284	95	301	164	121	294	42	298
v/c Ratio	0.61	0.60	0.24	0.63	0.63	0.20	0.18	0.07	0.20
Control Delay	59.1	53.2	1.4	54.1	58.6	15.3	13.5	15.3	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.1	53.2	1.4	54.1	58.6	15.3	13.5	15.3	21.0
Queue Length 50th (ft)	112	115	0	115	121	40	39	13	61
Queue Length 95th (ft)	173	152	0	151	182	93	86	39	121
Internal Link Dist (ft)	1094			6715			2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	362	758	511	743	401	656	1649	573	1487
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.37	0.19	0.41	0.41	0.18	0.18	0.07	0.20
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2019 Projected PM School Peak MIT
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	159	228	87	277	142	9	111	165	106	39	199	75
Future Volume (vph)	159	228	87	277	142	9	111	165	106	39	199	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	0.91	0.91	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	3369	1583	3433	1846		1770	3332		1770	3393	
Flt Permitted	0.95	0.99	1.00	0.95	1.00		0.53	1.00		0.57	1.00	
Satd. Flow (perm)	1610	3369	1583	3433	1846		980	3332		1066	3393	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	248	95	301	154	10	121	179	115	42	216	82
RTOR Reduction (vph)	0	0	82	0	2	0	0	61	0	0	24	0
Lane Group Flow (vph)	137	284	13	301	162	0	121	233	0	42	274	0
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	16.9	16.9	16.9	16.8	16.8		65.6	56.0		57.5	51.7	
Effective Green, g (s)	16.9	16.9	16.9	16.8	16.8		65.6	56.0		57.5	51.7	
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14		0.55	0.47		0.48	0.43	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	226	474	222	480	258		598	1554		544	1461	
v/s Ratio Prot	c0.09	0.08		0.09	c0.09		c0.02	c0.07		0.00	0.08	
v/s Ratio Perm			0.01				c0.09			0.03		
v/c Ratio	0.61	0.60	0.06	0.63	0.63		0.20	0.15		0.08	0.19	
Uniform Delay, d1	48.4	48.4	44.7	48.6	48.7		13.3	18.3		16.7	21.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	2.0	0.1	2.6	4.7		0.2	0.2		0.1	0.3	
Delay (s)	53.0	50.4	44.8	51.2	53.4		13.5	18.6		16.7	21.4	
Level of Service	D	D	D	D	D		B	B		B	C	
Approach Delay (s)		50.1			52.0			17.1			20.9	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			37.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			50.6%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

Timings 3: Cedar Bluff Road & Park West Blvd

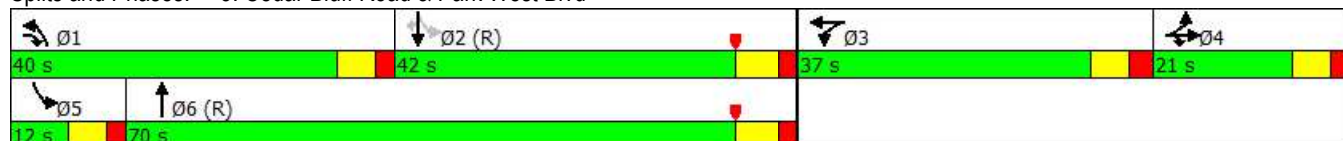
2030 Projected AM Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↑	↗	↓	↘
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↙	↖↖	↖↖	↖↖↖	↙	↖↖	↖
Traffic Volume (vph)	87	279	179	463	427	802	44	713	87
Future Volume (vph)	87	279	179	463	427	802	44	713	87
Turn Type	NA	pt+ov	Split	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	4	4 1	3	3	1	6	5	2	
Permitted Phases							2		2
Detector Phase	4	4 1	3	3	1	6	5	2	2
Switch Phase									
Minimum Initial (s)	6.0		6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5		12.5	12.5	35.0	21.5	12.0	21.5	21.5
Total Split (s)	21.0		37.0	37.0	40.0	70.0	12.0	42.0	42.0
Total Split (%)	15.0%		26.4%	26.4%	28.6%	50.0%	8.6%	30.0%	30.0%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5		2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0		-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5		4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag		Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None		None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	17.1	46.5	32.6	32.6	26.4	69.1	58.3	48.3	48.3
Actuated g/C Ratio	0.12	0.33	0.23	0.23	0.19	0.49	0.42	0.34	0.34
v/c Ratio	0.69	0.33	0.46	0.93	0.72	0.45	0.18	0.62	0.14
Control Delay	76.5	34.7	50.8	67.4	54.0	13.6	13.4	33.3	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	76.5	34.7	50.8	67.4	54.0	13.8	13.4	33.3	2.5
LOS	E	C	D	E	D	B	B	C	A
Approach Delay	48.8			64.3		25.6		29.1	
Approach LOS	D			E		C		C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 32 (23%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 38.4
 Intersection LOS: D
 Intersection Capacity Utilization 69.3%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2030 Projected AM Peak MIT

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

									
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	154	303	175	753	464	1114	48	775	95
v/c Ratio	0.69	0.33	0.46	0.93	0.72	0.45	0.18	0.62	0.14
Control Delay	76.5	34.7	50.8	67.4	54.0	13.6	13.4	33.3	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	76.5	34.7	50.8	67.4	54.0	13.8	13.4	33.3	2.5
Queue Length 50th (ft)	137	114	151	352	229	198	11	324	3
Queue Length 95th (ft)	#218	146	235	#474	290	241	m21	419	m19
Internal Link Dist (ft)	888			1639		269		273	
Turn Bay Length (ft)			230		245		95		145
Base Capacity (vph)	229	1112	381	822	882	2462	269	1246	669
Starvation Cap Reductn	0	0	0	0	0	476	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.27	0.46	0.92	0.53	0.56	0.18	0.62	0.14

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Projected AM Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	87	279	179	463	212	427	802	223	44	713	87
Future Volume (vph)	54	87	279	179	463	212	427	802	223	44	713	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)		3.5	4.5	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor		1.00	0.88	0.91	0.91		0.97	0.91		1.00	0.95	1.00
Frt		1.00	0.85	1.00	0.95		1.00	0.97		1.00	1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1837	2801	1618	3355		3433	4920		1745	3610	1615
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00		0.24	1.00	1.00
Satd. Flow (perm)		1837	2801	1618	3355		3433	4920		447	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	95	303	195	503	230	464	872	242	48	775	95
RTOR Reduction (vph)	0	0	0	0	32	0	0	35	0	0	0	62
Lane Group Flow (vph)	0	154	303	175	721	0	464	1079	0	48	775	33
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	4	4	4 1	3	3		1	6		5	2	
Permitted Phases										2		2
Actuated Green, G (s)		14.1	45.0	30.1	30.1		24.4	65.5		50.7	45.9	45.9
Effective Green, g (s)		17.1	47.0	32.6	32.6		26.4	68.0		56.7	48.4	48.4
Actuated g/C Ratio		0.12	0.34	0.23	0.23		0.19	0.49		0.41	0.35	0.35
Clearance Time (s)		6.5		6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)		2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		224	940	376	781		647	2389		253	1248	558
v/s Ratio Prot		c0.08	0.11	0.11	c0.21		c0.14	0.22		0.01	c0.21	
v/s Ratio Perm										0.07		0.02
v/c Ratio		0.69	0.32	0.47	0.92		0.72	0.45		0.19	0.62	0.06
Uniform Delay, d1		58.9	34.6	46.2	52.5		53.3	23.7		25.5	38.2	30.6
Progression Factor		1.02	0.98	1.00	1.00		0.93	0.59		0.75	0.80	1.00
Incremental Delay, d2		7.8	0.1	0.7	16.4		2.7	0.5		0.2	1.8	0.2
Delay (s)		68.0	34.2	46.9	68.8		52.1	14.5		19.4	32.2	30.7
Level of Service		E	C	D	E		D	B		B	C	C
Approach Delay (s)		45.6			64.7			25.6			31.3	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.6				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			69.3%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected AM Peak MIT
Medical Office Center

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	62	152	51	528	6	32	6	109	290
Future Volume (vph)	62	152	51	528	6	32	6	109	290
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	9.0	34.0	8.0	33.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	12.9%	48.6%	11.4%	47.1%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	36.2	33.2	35.0	32.6		24.0	24.0	24.0	24.0
Actuated g/C Ratio	0.52	0.47	0.50	0.47		0.34	0.34	0.34	0.34
v/c Ratio	0.20	0.11	0.09	0.51		0.07	0.01	0.25	0.56
Control Delay	9.1	10.2	10.1	14.8		21.5	0.0	17.6	20.1
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	9.1	10.2	10.1	14.8		21.5	0.0	17.6	20.1
LOS	A	B	B	B		C	A	B	C
Approach Delay		9.9		14.5		18.5			19.4
Approach LOS		A		B		B			B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 15.3

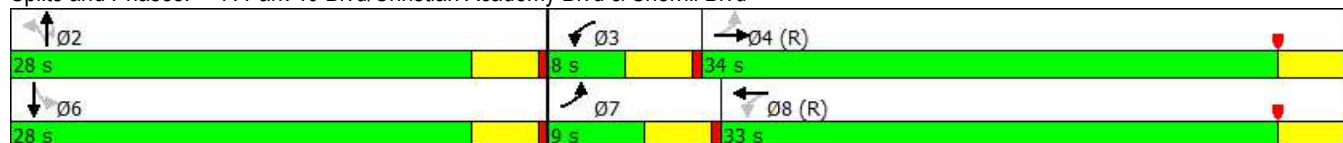
Intersection LOS: B

Intersection Capacity Utilization 53.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd



Queues

2030 Projected AM Peak MIT

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	67	186	55	839	42	7	118	356
v/c Ratio	0.20	0.11	0.09	0.51	0.07	0.01	0.25	0.56
Control Delay	9.1	10.2	10.1	14.8	21.5	0.0	17.6	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	10.2	10.1	14.8	21.5	0.0	17.6	20.1
Queue Length 50th (ft)	13	21	16	177	15	0	28	84
Queue Length 95th (ft)	29	39	m26	234	m26	m0	m47	m150
Internal Link Dist (ft)		317		1062	1566			181
Turn Bay Length (ft)	100		150			1000	100	
Base Capacity (vph)	337	1735	625	1640	604	594	466	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.11	0.09	0.51	0.07	0.01	0.25	0.56

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected AM Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	152	19	51	528	244	6	32	6	109	290	38
Future Volume (vph)	62	152	19	51	528	244	6	32	6	109	290	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-9%			0%			0%			0%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.95			1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1849	3636		1770	3372			1847	1583	1770	1831	
Flt Permitted	0.24	1.00		0.63	1.00			0.95	1.00	0.73	1.00	
Satd. Flow (perm)	462	3636		1182	3372			1761	1583	1359	1831	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	165	21	55	574	265	7	35	7	118	315	41
RTOR Reduction (vph)	0	12	0	0	73	0	0	0	5	0	7	0
Lane Group Flow (vph)	67	174	0	55	766	0	0	42	2	118	349	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	34.6	31.6		33.4	31.0			24.0	24.0	24.0	24.0	
Effective Green, g (s)	34.6	31.6		33.4	31.0			24.0	24.0	24.0	24.0	
Actuated g/C Ratio	0.49	0.45		0.48	0.44			0.34	0.34	0.34	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	287	1641		584	1493			603	542	465	627	
v/s Ratio Prot	c0.01	0.05		0.00	c0.23						c0.19	
v/s Ratio Perm	0.11			0.04				0.02	0.00	0.09		
v/c Ratio	0.23	0.11		0.09	0.51			0.07	0.00	0.25	0.56	
Uniform Delay, d1	10.0	11.1		9.9	14.1			15.5	15.1	16.6	18.7	
Progression Factor	1.00	1.00		1.27	1.20			1.36	1.00	0.97	0.93	
Incremental Delay, d2	0.4	0.1		0.1	1.0			0.2	0.0	1.0	2.6	
Delay (s)	10.4	11.2		12.6	17.9			21.3	15.2	17.0	20.0	
Level of Service	B	B		B	B			C	B	B	B	
Approach Delay (s)		11.0			17.6			20.4			19.3	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			17.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Timings 8: Christian Academy Blvd & Dutchtown Rd

2030 Projected AM Peak MIT
Medical Office Center

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↖	↖	↖	↖	↖
Traffic Volume (vph)	536	131	525	74	44
Future Volume (vph)	536	131	525	74	44
Turn Type	NA	pm+pt	NA	Prot	Perm
Protected Phases	4	3	8	2	
Permitted Phases		8			2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0
Total Split (s)	52.0	8.0	60.0	10.0	10.0
Total Split (%)	74.3%	11.4%	85.7%	14.3%	14.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	C-Max	None	C-Max	Max	Max
Act Effect Green (s)	49.6	56.0	56.0	6.0	6.0
Actuated g/C Ratio	0.71	0.80	0.80	0.09	0.09
v/c Ratio	0.79	0.48	0.38	0.53	0.27
Control Delay	12.7	6.9	2.9	51.5	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	6.9	2.9	51.5	20.5
LOS	B	A	A	D	C
Approach Delay	12.7		3.7	39.9	
Approach LOS	B		A	D	

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 11.1
 Intersection LOS: B
 Intersection Capacity Utilization 73.8%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 8: Christian Academy Blvd & Dutchtown Rd

↖ Ø2	↖ Ø3	→ Ø4 (R)
10 s	8 s	52 s
	↖ Ø8 (R)	
	60 s	

Queues
8: Christian Academy Blvd & Dutchtown Rd

2030 Projected AM Peak MIT
Medical Office Center

	→	↖	←	↙	↗
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1015	142	571	80	48
v/c Ratio	0.79	0.48	0.38	0.53	0.27
Control Delay	12.7	6.9	2.9	51.5	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	6.9	2.9	51.5	20.5
Queue Length 50th (ft)	224	9	46	44	8
Queue Length 95th (ft)	#438	17	73	77	m33
Internal Link Dist (ft)	5197		2065	558	
Turn Bay Length (ft)		250		200	
Base Capacity (vph)	1279	298	1490	151	179
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.79	0.48	0.38	0.53	0.27

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Projected AM Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰		↰	↰	↰	↰
Traffic Volume (vph)	536	397	131	525	74	44
Future Volume (vph)	536	397	131	525	74	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1756		1770	1863	1770	1583
Flt Permitted	1.00		0.14	1.00	0.95	1.00
Satd. Flow (perm)	1756		266	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	583	432	142	571	80	48
RTOR Reduction (vph)	37	0	0	0	0	44
Lane Group Flow (vph)	978	0	142	571	80	4
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	48.8		56.0	56.0	6.0	6.0
Effective Green, g (s)	48.8		56.0	56.0	6.0	6.0
Actuated g/C Ratio	0.70		0.80	0.80	0.09	0.09
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1224		281	1490	151	135
v/s Ratio Prot	c0.56		0.02	c0.31	c0.05	
v/s Ratio Perm			0.38			0.00
v/c Ratio	0.80		0.51	0.38	0.53	0.03
Uniform Delay, d1	7.3		8.7	2.0	30.6	29.3
Progression Factor	1.00		1.00	1.00	1.28	2.17
Incremental Delay, d2	5.5		1.4	0.7	11.9	0.4
Delay (s)	12.8		10.2	2.8	51.1	64.0
Level of Service	B		B	A	D	E
Approach Delay (s)	12.8			4.2	55.9	
Approach LOS	B			A	E	
Intersection Summary						
HCM 2000 Control Delay			12.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			73.8%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Projected AM Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	399	445	357	271	105	136	379	18	445
Future Volume (vph)	399	445	357	271	105	136	379	18	445
Turn Type	Split	NA	Perm	Split	NA	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		4	4	1	6	5	2
Permitted Phases			8			6		2	
Detector Phase	8	8	8	4	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	40.0	40.0	40.0	21.0	21.0	19.3	49.0	10.0	39.7
Total Split (%)	33.3%	33.3%	33.3%	17.5%	17.5%	16.1%	40.8%	8.3%	33.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	31.0	31.0	31.0	14.0	14.0	56.4	52.4	44.3	39.1
Actuated g/C Ratio	0.26	0.26	0.26	0.12	0.12	0.47	0.44	0.37	0.33
v/c Ratio	0.72	0.71	0.69	0.74	0.58	0.48	0.42	0.06	0.61
Control Delay	50.6	45.2	23.8	62.6	59.7	25.1	22.2	20.2	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	45.2	23.8	62.6	59.7	25.1	22.2	20.2	35.3
LOS	D	D	C	E	E	C	C	C	D
Approach Delay		40.1			61.7		22.8		34.9
Approach LOS		D			E		C		C

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 37.5
 Intersection Capacity Utilization 70.5%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø4	 Ø8
19.3 s	39.7 s	21 s	40 s
 Ø5	 Ø6 (R)		
10 s	49 s		

Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Projected AM Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	299	619	388	295	125	148	636	20	695
v/c Ratio	0.72	0.71	0.69	0.74	0.58	0.48	0.42	0.06	0.61
Control Delay	50.6	45.2	23.8	62.6	59.7	25.1	22.2	20.2	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	45.2	23.8	62.6	59.7	25.1	22.2	20.2	35.3
Queue Length 50th (ft)	225	232	119	114	90	69	147	9	232
Queue Length 95th (ft)	336	299	230	162	155	114	229	24	306
Internal Link Dist (ft)	1094		6715			2069		1876	
Turn Bay Length (ft)	200	225		175	475		100		
Base Capacity (vph)	456	950	600	429	232	332	1517	321	1136
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.65	0.65	0.69	0.54	0.45	0.42	0.06	0.61
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Projected AM Peak MIT
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	399	445	357	271	105	10	136	379	206	18	445	194
Future Volume (vph)	399	445	357	271	105	10	136	379	206	18	445	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	0.91	0.91	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.95	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	3354	1583	3433	1838		1770	3352		1770	3378	
Flt Permitted	0.95	0.99	1.00	0.95	1.00		0.21	1.00		0.41	1.00	
Satd. Flow (perm)	1610	3354	1583	3433	1838		395	3352		764	3378	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	434	484	388	295	114	11	148	412	224	20	484	211
RTOR Reduction (vph)	0	0	157	0	3	0	0	56	0	0	38	0
Lane Group Flow (vph)	299	619	231	295	122	0	148	580	0	20	657	0
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	31.0	31.0	31.0	14.0	14.0		56.5	48.9		40.7	39.1	
Effective Green, g (s)	31.0	31.0	31.0	14.0	14.0		56.5	48.9		40.7	39.1	
Actuated g/C Ratio	0.26	0.26	0.26	0.12	0.12		0.47	0.41		0.34	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	415	866	408	400	214		310	1365		272	1100	
v/s Ratio Prot	c0.19	0.18		c0.09	0.07		c0.04	0.17		0.00	c0.19	
v/s Ratio Perm			0.15				0.18			0.02		
v/c Ratio	0.72	0.71	0.57	0.74	0.57		0.48	0.43		0.07	0.60	
Uniform Delay, d1	40.6	40.5	38.7	51.2	50.2		20.6	25.5		26.5	33.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	2.8	1.8	6.9	3.7		1.2	1.0		0.1	2.4	
Delay (s)	46.6	43.3	40.5	58.2	53.8		21.7	26.4		26.6	36.3	
Level of Service	D	D	D	E	D		C	C		C	D	
Approach Delay (s)		43.2			56.9			25.6			36.0	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			39.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			70.5%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

Timings 3: Cedar Bluff Road & Park West Blvd

2030 Projected PM Peak MIT
Medical Office Center

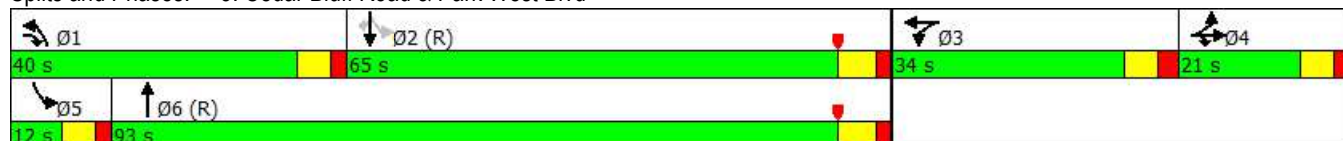
	→	↘	↙	←	↖	↑	↗	↓	↘
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↙	↖↖	↖↖	↖↖↖	↙	↖↖	↖
Traffic Volume (vph)	38	437	318	93	220	694	55	1046	36
Future Volume (vph)	38	437	318	93	220	694	55	1046	36
Turn Type	NA	pt+ov	Split	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	4	4 1	3	3	1	6	5	2	
Permitted Phases							2		2
Detector Phase	4	4 1	3	3	1	6	5	2	2
Switch Phase									
Minimum Initial (s)	6.0		6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5		12.5	12.5	40.0	21.5	12.0	21.5	21.5
Total Split (s)	21.0		34.0	34.0	40.0	93.0	12.0	65.0	65.0
Total Split (%)	13.1%		21.3%	21.3%	25.0%	58.1%	7.5%	40.6%	40.6%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5		2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0		-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5		4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag		Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None		None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.1	42.4	27.1	27.1	19.3	91.7	88.1	78.1	78.1
Actuated g/C Ratio	0.13	0.26	0.17	0.17	0.12	0.57	0.55	0.49	0.49
v/c Ratio	0.58	0.64	0.81	0.66	0.58	0.29	0.15	0.65	0.05
Control Delay	78.4	55.6	85.9	48.5	53.7	9.5	10.6	23.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	78.4	55.6	85.9	48.5	53.7	9.7	10.6	23.4	0.1
LOS	E	E	F	D	D	A	B	C	A
Approach Delay	60.5			61.2		19.5		22.0	
Approach LOS	E			E		B		C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 53 (33%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 34.9
 Intersection Capacity Utilization 67.0%
 Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service C

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2030 Projected PM Peak MIT

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

									
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	131	475	221	428	239	837	60	1137	39
v/c Ratio	0.58	0.64	0.81	0.66	0.58	0.29	0.15	0.65	0.05
Control Delay	78.4	55.6	85.9	48.5	53.7	9.5	10.6	23.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	78.4	55.6	85.9	48.5	53.7	9.7	10.6	23.4	0.1
Queue Length 50th (ft)	131	252	243	163	115	163	21	244	0
Queue Length 95th (ft)	#210	306	352	226	123	191	36	278	m0
Internal Link Dist (ft)	888			1639		269		273	
Turn Bay Length (ft)			230		245		95		145
Base Capacity (vph)	227	1034	303	705	772	2879	393	1761	864
Starvation Cap Reductn	0	0	0	0	0	1145	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.46	0.73	0.61	0.31	0.48	0.15	0.65	0.05

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Projected PM Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	38	437	318	93	186	220	694	76	55	1046	36
Future Volume (vph)	83	38	437	318	93	186	220	694	76	55	1046	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)		3.5	4.5	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor		1.00	0.88	0.91	0.91		0.97	0.91		1.00	0.95	1.00
Flt		1.00	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.97	1.00	0.95	0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1810	2801	1618	3224		3433	5010		1745	3610	1615
Flt Permitted		0.97	1.00	0.95	0.99		0.95	1.00		0.32	1.00	1.00
Satd. Flow (perm)		1810	2801	1618	3224		3433	5010		597	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	41	475	346	101	202	239	754	83	60	1137	39
RTOR Reduction (vph)	0	0	0	0	103	0	0	8	0	0	0	20
Lane Group Flow (vph)	0	131	475	221	325	0	239	829	0	60	1137	19
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	4	4	4 1	3	3		1	6		5	2	
Permitted Phases										2		2
Actuated Green, G (s)		17.1	40.9	24.6	24.6		17.3	88.0		80.3	75.5	75.5
Effective Green, g (s)		20.1	42.9	27.1	27.1		19.3	90.5		86.3	78.0	78.0
Actuated g/C Ratio		0.13	0.27	0.17	0.17		0.12	0.57		0.54	0.49	0.49
Clearance Time (s)		6.5		6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)		2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		227	751	274	546		414	2833		377	1759	787
v/s Ratio Prot		0.07	c0.17	c0.14	0.10		0.07	0.17		0.01	c0.31	
v/s Ratio Perm										0.08		0.01
v/c Ratio		0.58	0.63	0.81	0.60		0.58	0.29		0.16	0.65	0.02
Uniform Delay, d1		65.9	51.6	63.9	61.4		66.5	18.1		17.6	30.7	21.3
Progression Factor		1.01	0.98	1.00	1.00		0.74	0.53		0.82	0.69	1.00
Incremental Delay, d2		2.9	1.5	15.4	1.5		1.4	0.2		0.1	1.6	0.0
Delay (s)		69.4	52.3	79.3	62.8		50.6	9.8		14.5	22.7	21.3
Level of Service		E	D	E	E		D	A		B	C	C
Approach Delay (s)		56.0			68.4			18.9			22.2	
Approach LOS		E			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			35.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				16.5		
Intersection Capacity Utilization			67.0%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected PM Peak MIT
Medical Office Center

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	40	433	25	220	23	45	21	174	127
Future Volume (vph)	40	433	25	220	23	45	21	174	127
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	10.0	33.0	10.0	33.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	12.5%	41.3%	12.5%	41.3%	46.3%	46.3%	46.3%	46.3%	46.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	37.4	35.0	36.6	33.0		33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.47	0.44	0.46	0.41		0.41	0.41	0.41	0.41
v/c Ratio	0.08	0.30	0.06	0.23		0.11	0.03	0.35	0.20
Control Delay	11.3	16.1	10.8	11.9		15.1	0.1	18.4	15.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	11.3	16.1	10.8	11.9		15.1	0.1	18.4	15.0
LOS	B	B	B	B		B	A	B	B
Approach Delay		15.7		11.8		11.5			16.9
Approach LOS		B		B		B			B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 14.6

Intersection LOS: B

Intersection Capacity Utilization 42.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

 Ø2	 Ø3	 Ø4 (R)
37 s	10 s	33 s
 Ø6	 Ø7	 Ø8 (R)
37 s	10 s	33 s

Queues

2030 Projected PM Peak MIT

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	43	482	27	336	74	23	189	156
v/c Ratio	0.08	0.30	0.06	0.23	0.11	0.03	0.35	0.20
Control Delay	11.3	16.1	10.8	11.9	15.1	0.1	18.4	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	16.1	10.8	11.9	15.1	0.1	18.4	15.0
Queue Length 50th (ft)	11	70	7	50	22	0	63	45
Queue Length 95th (ft)	27	129	m14	61	48	0	114	84
Internal Link Dist (ft)		317		1062	1566			181
Turn Bay Length (ft)	100		150			1000	100	
Base Capacity (vph)	525	1614	444	1447	692	692	544	761
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.30	0.06	0.23	0.11	0.03	0.35	0.20

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected PM Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	433	10	25	220	89	23	45	21	174	127	17
Future Volume (vph)	40	433	10	25	220	89	23	45	21	174	127	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-9%			0%			0%			0%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Flt	1.00	1.00		1.00	0.96			1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1849	3686		1770	3386			1832	1583	1770	1831	
Flt Permitted	0.51	1.00		0.44	1.00			0.90	1.00	0.71	1.00	
Satd. Flow (perm)	988	3686		815	3386			1679	1583	1320	1831	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	471	11	27	239	97	25	49	23	189	138	18
RTOR Reduction (vph)	0	2	0	0	52	0	0	0	14	0	6	0
Lane Group Flow (vph)	43	480	0	27	284	0	0	74	9	189	150	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	36.2	32.6		33.8	31.4			33.0	33.0	33.0	33.0	
Effective Green, g (s)	36.2	32.6		33.8	31.4			33.0	33.0	33.0	33.0	
Actuated g/C Ratio	0.45	0.41		0.42	0.39			0.41	0.41	0.41	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	485	1502		372	1329			692	652	544	755	
v/s Ratio Prot	c0.00	c0.13		0.00	0.08						0.08	
v/s Ratio Perm	0.04			0.03				0.04	0.01	c0.14		
v/c Ratio	0.09	0.32		0.07	0.21			0.11	0.01	0.35	0.20	
Uniform Delay, d1	12.3	16.1		13.6	16.1			14.4	13.9	16.1	15.0	
Progression Factor	1.00	1.00		0.97	0.96			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.1	0.4			0.3	0.0	1.8	0.6	
Delay (s)	12.4	16.7		13.2	15.9			14.8	13.9	17.9	15.6	
Level of Service	B	B		B	B			B	B	B	B	
Approach Delay (s)		16.4			15.7			14.6			16.9	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			42.2%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
8: Christian Academy Blvd & Dutchtown Rd

2030 Projected PM Peak MIT
Medical Office Center

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↖	↖	↖	↖	↖
Traffic Volume (vph)	1115	74	951	183	71
Future Volume (vph)	1115	74	951	183	71
Turn Type	NA	pm+pt	NA	Prot	Perm
Protected Phases	4	3	8	2	
Permitted Phases		8			2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	10.0	8.0	10.0	10.0	10.0
Minimum Split (s)	14.0	12.0	14.0	14.0	14.0
Total Split (s)	91.0	12.0	103.0	17.0	17.0
Total Split (%)	75.8%	10.0%	85.8%	14.2%	14.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	C-Max	None	C-Max	Max	Max
Act Effct Green (s)	89.4	99.0	99.0	13.0	13.0
Actuated g/C Ratio	0.74	0.82	0.82	0.11	0.11
v/c Ratio	1.00	0.45	0.67	1.04	0.32
Control Delay	46.8	21.7	6.8	128.5	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	21.7	6.8	128.5	14.7
LOS	D	C	A	F	B
Approach Delay	46.8		7.8	96.7	
Approach LOS	D		A	F	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 36.0
 Intersection LOS: D
 Intersection Capacity Utilization 84.0%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 8: Christian Academy Blvd & Dutchtown Rd

↖ Ø2	↖ Ø3	→ Ø4 (R)
17 s	12 s	91 s
	↖ Ø8 (R)	
	103 s	

Queues
8: Christian Academy Blvd & Dutchtown Rd

2030 Projected PM Peak MIT
Medical Office Center

	→	↖	←	↙	↗
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1365	80	1034	199	77
v/c Ratio	1.00	0.45	0.67	1.04	0.32
Control Delay	46.8	21.7	6.8	128.5	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	21.7	6.8	128.5	14.7
Queue Length 50th (ft)	~1155	9	242	~166	0
Queue Length 95th (ft)	m#1425	61	346	#318	46
Internal Link Dist (ft)	5197		2065	558	
Turn Bay Length (ft)		250		200	
Base Capacity (vph)	1370	178	1536	191	240
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.00	0.45	0.67	1.04	0.32

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Projected PM Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↘	↗	↘	↗
Traffic Volume (vph)	1115	141	74	951	183	71
Future Volume (vph)	1115	141	74	951	183	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1835		1770	1863	1770	1583
Flt Permitted	1.00		0.04	1.00	0.95	1.00
Satd. Flow (perm)	1835		80	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1212	153	80	1034	199	77
RTOR Reduction (vph)	4	0	0	0	0	69
Lane Group Flow (vph)	1361	0	80	1034	199	8
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	88.6		99.0	99.0	13.0	13.0
Effective Green, g (s)	88.6		99.0	99.0	13.0	13.0
Actuated g/C Ratio	0.74		0.82	0.82	0.11	0.11
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1354		156	1536	191	171
v/s Ratio Prot	c0.74		0.03	c0.56	c0.11	
v/s Ratio Perm			0.39			0.01
v/c Ratio	1.01		0.51	0.67	1.04	0.05
Uniform Delay, d1	15.7		36.1	4.1	53.5	48.0
Progression Factor	1.74		1.00	1.00	1.00	1.00
Incremental Delay, d2	22.6		2.8	2.4	76.6	0.5
Delay (s)	49.9		38.9	6.5	130.1	48.5
Level of Service	D		D	A	F	D
Approach Delay (s)	49.9			8.8	107.3	
Approach LOS	D			A	F	
Intersection Summary						
HCM 2000 Control Delay			39.1		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.00			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			84.0%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	401	218	134	521	304	327	744	15	540
Future Volume (vph)	401	218	134	521	304	327	744	15	540
Turn Type	Split	NA	Perm	Split	NA	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		4	4	1	6	5	2
Permitted Phases			8			6		2	
Detector Phase	8	8	8	4	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	25.0	25.0	25.0	31.0	31.0	30.0	54.0	10.0	34.0
Total Split (%)	20.8%	20.8%	20.8%	25.8%	25.8%	25.0%	45.0%	8.3%	28.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	18.8	18.8	18.8	24.5	24.5	58.2	54.2	35.2	30.4
Actuated g/C Ratio	0.16	0.16	0.16	0.20	0.20	0.48	0.45	0.29	0.25
v/c Ratio	0.88	0.87	0.35	0.81	0.92	0.86	0.61	0.08	0.73
Control Delay	83.7	67.7	4.2	55.4	77.5	45.7	27.3	23.2	49.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.7	67.7	4.2	55.4	77.5	45.7	27.3	23.2	49.6
LOS	F	E	A	E	E	D	C	C	D
Approach Delay		60.7			63.8		32.3		48.9
Approach LOS		E			E		C		D

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 49.3
 Intersection Capacity Utilization 84.7%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service E

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø4	 Ø8
30 s	34 s	31 s	25 s
 Ø5	 Ø6 (R)		
10 s	54 s		

Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	222	451	146	566	350	355	957	16	653
v/c Ratio	0.88	0.87	0.35	0.81	0.92	0.86	0.61	0.08	0.73
Control Delay	83.7	67.7	4.2	55.4	77.5	45.7	27.3	23.2	49.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.7	67.7	4.2	55.4	77.5	45.7	27.3	23.2	49.6
Queue Length 50th (ft)	186	189	0	215	265	185	266	7	247
Queue Length 95th (ft)	#340	#279	20	281	#442	#335	390	m10	m317
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	254	524	418	715	386	439	1573	205	890
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.86	0.35	0.79	0.91	0.81	0.61	0.08	0.73

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM Peak MIT
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	401	218	134	521	304	18	327	744	136	15	540	61
Future Volume (vph)	401	218	134	521	304	18	327	744	136	15	540	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	0.91	0.91	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	3312	1583	3433	1847		1770	3457		1770	3486	
Flt Permitted	0.95	0.98	1.00	0.95	1.00		0.17	1.00		0.30	1.00	
Satd. Flow (perm)	1610	3312	1583	3433	1847		321	3457		552	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	436	237	146	566	330	20	355	809	148	16	587	66
RTOR Reduction (vph)	0	0	123	0	2	0	0	12	0	0	7	0
Lane Group Flow (vph)	222	451	23	566	348	0	355	945	0	16	646	0
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	18.8	18.8	18.8	24.5	24.5		58.2	50.6		32.0	30.4	
Effective Green, g (s)	18.8	18.8	18.8	24.5	24.5		58.2	50.6		32.0	30.4	
Actuated g/C Ratio	0.16	0.16	0.16	0.20	0.20		0.49	0.42		0.27	0.25	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	252	518	248	700	377		412	1457		163	883	
v/s Ratio Prot	c0.14	0.14		0.16	c0.19		c0.15	0.27		0.00	0.19	
v/s Ratio Perm			0.01				c0.26			0.02		
v/c Ratio	0.88	0.87	0.09	0.81	0.92		0.86	0.65		0.10	0.73	
Uniform Delay, d1	49.5	49.4	43.3	45.5	46.8		25.7	27.6		32.6	41.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.18	1.10	
Incremental Delay, d2	28.0	14.8	0.2	6.8	27.9		16.7	2.2		0.2	3.6	
Delay (s)	77.5	64.2	43.5	52.4	74.7		42.3	29.9		38.6	48.9	
Level of Service	E	E	D	D	E		D	C		D	D	
Approach Delay (s)		64.1			60.9			33.2			48.6	
Approach LOS		E			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			49.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			84.7%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

Timings

3: Cedar Bluff Road & Park West Blvd

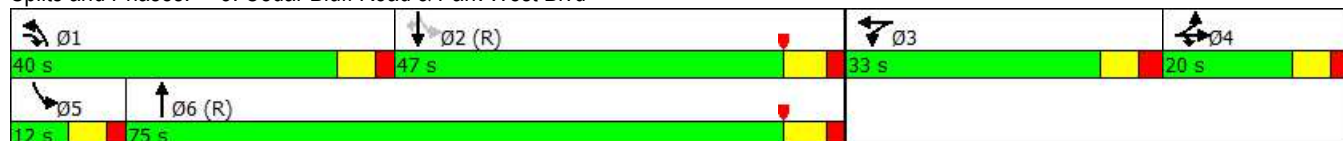
2030 Projected Midday Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↗	↗↗	↙	↗↗	↗↗	↗↗↗	↙	↗↗	↗
Traffic Volume (vph)	54	362	143	278	415	902	56	616	61
Future Volume (vph)	54	362	143	278	415	902	56	616	61
Turn Type	NA	pt+ov	Split	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	4	4 1	3	3	1	6	5	2	
Permitted Phases							2		2
Detector Phase	4	4 1	3	3	1	6	5	2	2
Switch Phase									
Minimum Initial (s)	6.0		6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	20.0		12.5	12.5	25.0	21.5	12.0	21.5	21.5
Total Split (s)	20.0		33.0	33.0	40.0	75.0	12.0	47.0	47.0
Total Split (%)	14.3%		23.6%	23.6%	28.6%	53.6%	8.6%	33.6%	33.6%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5		2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0		-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5		4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag		Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None		None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	18.8	47.8	25.0	25.0	26.1	75.1	64.7	54.6	54.6
Actuated g/C Ratio	0.13	0.34	0.18	0.18	0.19	0.54	0.46	0.39	0.39
v/c Ratio	0.70	0.41	0.48	0.74	0.71	0.40	0.21	0.48	0.09
Control Delay	76.3	34.9	56.8	56.1	48.5	12.4	13.1	26.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	76.3	34.9	56.8	56.1	48.5	12.6	13.1	26.3	0.3
LOS	E	C	E	E	D	B	B	C	A
Approach Delay	47.4			56.2		23.1		23.1	
Approach LOS	D			E		C		C	

Intersection Summary

Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 109 (78%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 32.8
 Intersection LOS: C
 Intersection Capacity Utilization 61.6%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

3: Cedar Bluff Road & Park West Blvd

2030 Projected Midday Peak MIT

Medical Office Center

									
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	169	393	139	473	451	1091	61	670	66
v/c Ratio	0.70	0.41	0.48	0.74	0.71	0.40	0.21	0.48	0.09
Control Delay	76.3	34.9	56.8	56.1	48.5	12.4	13.1	26.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	76.3	34.9	56.8	56.1	48.5	12.6	13.1	26.3	0.3
Queue Length 50th (ft)	149	145	126	203	213	209	13	250	0
Queue Length 95th (ft)	#270	187	196	262	274	250	m20	262	m1
Internal Link Dist (ft)	888			1639		269		273	
Turn Bay Length (ft)			230		245		95		145
Base Capacity (vph)	242	1155	335	730	882	2695	295	1408	734
Starvation Cap Reductn	0	0	0	0	0	747	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.34	0.41	0.65	0.51	0.56	0.21	0.48	0.09

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Projected Midday Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			 		 		 	  			 	
Traffic Volume (vph)	101	54	362	143	278	143	415	902	102	56	616	61
Future Volume (vph)	101	54	362	143	278	143	415	902	102	56	616	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)		3.5	4.5	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor		1.00	0.88	0.91	0.91		0.97	0.91		1.00	0.95	1.00
Frt		1.00	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1813	2801	1618	3342		3433	5008		1745	3610	1615
Flt Permitted		0.97	1.00	0.95	1.00		0.95	1.00		0.25	1.00	1.00
Satd. Flow (perm)		1813	2801	1618	3342		3433	5008		458	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	59	393	155	302	155	451	980	111	61	670	66
RTOR Reduction (vph)	0	0	0	0	39	0	0	9	0	0	0	40
Lane Group Flow (vph)	0	169	393	139	434	0	451	1082	0	61	670	26
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	4	4	4 1	3	3		1	6		5	2	
Permitted Phases										2		2
Actuated Green, G (s)		15.8	46.4	22.5	22.5		24.1	71.4		56.9	52.1	52.1
Effective Green, g (s)		18.8	48.4	25.0	25.0		26.1	73.9		62.9	54.6	54.6
Actuated g/C Ratio		0.13	0.35	0.18	0.18		0.19	0.53		0.45	0.39	0.39
Clearance Time (s)		6.5		6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)		2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		243	968	288	596		640	2643		277	1407	629
v/s Ratio Prot		c0.09	0.14	0.09	c0.13		c0.13	0.22		0.01	c0.19	
v/s Ratio Perm										0.09		0.02
v/c Ratio		0.70	0.41	0.48	0.73		0.70	0.41		0.22	0.48	0.04
Uniform Delay, d1		57.9	34.9	51.7	54.3		53.3	19.9		22.0	32.0	26.5
Progression Factor		1.04	0.96	1.00	1.00		0.83	0.61		0.84	0.76	1.00
Incremental Delay, d2		7.7	0.2	0.9	4.1		2.3	0.3		0.2	0.9	0.1
Delay (s)		68.1	33.6	52.6	58.4		46.6	12.5		18.6	25.2	26.6
Level of Service		E	C	D	E		D	B		B	C	C
Approach Delay (s)		44.0			57.1			22.5			24.8	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			61.6%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Timings
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected Midday Peak MIT
Medical Office Center

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	35	348	40	351	10	28	32	131	84
Future Volume (vph)	35	348	40	351	10	28	32	131	84
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	10.0	31.0	10.0	31.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	14.3%	44.3%	14.3%	44.3%	41.4%	41.4%	41.4%	41.4%	41.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	34.6	31.0	35.4	33.0		25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.49	0.44	0.51	0.47		0.36	0.36	0.36	0.36
v/c Ratio	0.07	0.25	0.08	0.27		0.07	0.06	0.29	0.18
Control Delay	8.4	13.4	8.5	14.8		15.3	1.0	13.9	9.3
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	8.4	13.4	8.5	14.8		15.3	1.0	13.9	9.3
LOS	A	B	A	B		B	A	B	A
Approach Delay		13.0		14.3		8.7			11.9
Approach LOS		B		B		A			B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.29

Intersection Signal Delay: 13.0

Intersection LOS: B

Intersection Capacity Utilization 39.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

 Ø2	 Ø3	 Ø4 (R)
29 s	10 s	31 s
 Ø6	 Ø7	 Ø8 (R)
29 s	10 s	31 s

Queues

2030 Projected Midday Peak MIT

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	38	403	43	452	41	35	142	116
v/c Ratio	0.07	0.25	0.08	0.27	0.07	0.06	0.29	0.18
Control Delay	8.4	13.4	8.5	14.8	15.3	1.0	13.9	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	13.4	8.5	14.8	15.3	1.0	13.9	9.3
Queue Length 50th (ft)	7	59	19	118	11	0	38	22
Queue Length 95th (ft)	20	90	m17	166	30	5	m67	m44
Internal Link Dist (ft)		317		1062	1566			181
Turn Bay Length (ft)	100		150			1000	100	
Base Capacity (vph)	538	1629	520	1648	627	615	485	658
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.25	0.08	0.27	0.07	0.06	0.29	0.18

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected Midday Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	348	23	40	351	64	10	28	32	131	84	23
Future Volume (vph)	35	348	23	40	351	64	10	28	32	131	84	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-9%			0%			0%				0%
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98			1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1849	3664		1770	3457			1838	1583	1770	1803	
Flt Permitted	0.48	1.00		0.47	1.00			0.94	1.00	0.73	1.00	
Satd. Flow (perm)	930	3664		877	3457			1757	1583	1360	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	378	25	43	382	70	11	30	35	142	91	25
RTOR Reduction (vph)	0	6	0	0	20	0	0	0	23	0	14	0
Lane Group Flow (vph)	38	397	0	43	432	0	0	41	13	142	102	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	31.8	29.4		34.2	30.6			25.0	25.0	25.0	25.0	
Effective Green, g (s)	31.8	29.4		34.2	30.6			25.0	25.0	25.0	25.0	
Actuated g/C Ratio	0.45	0.42		0.49	0.44			0.36	0.36	0.36	0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	453	1538		474	1511			627	565	485	643	
v/s Ratio Prot	0.00	0.11		c0.00	c0.13							0.06
v/s Ratio Perm	0.04			0.04				0.02	0.01	c0.10		
v/c Ratio	0.08	0.26		0.09	0.29			0.07	0.02	0.29	0.16	
Uniform Delay, d1	10.6	13.2		9.4	12.7			14.8	14.6	16.2	15.3	
Progression Factor	1.00	1.00		1.01	1.30			1.00	1.00	0.74	0.68	
Incremental Delay, d2	0.1	0.4		0.1	0.4			0.2	0.1	1.5	0.5	
Delay (s)	10.7	13.6		9.6	16.9			15.0	14.7	13.5	10.9	
Level of Service	B	B		A	B			B	B	B	B	
Approach Delay (s)		13.4			16.2			14.8			12.3	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			39.0%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
8: Christian Academy Blvd & Dutchtown Rd

2030 Projected Midday Peak MIT
Medical Office Center

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↖	↖	↖	↖	↖
Traffic Volume (vph)	560	35	466	88	35
Future Volume (vph)	560	35	466	88	35
Turn Type	NA	pm+pt	NA	Prot	Perm
Protected Phases	4	3	8	2	
Permitted Phases		8			2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	8.0	20.0	20.0	20.0
Total Split (s)	42.0	8.0	50.0	20.0	20.0
Total Split (%)	60.0%	11.4%	71.4%	28.6%	28.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	Max	Max
Act Effct Green (s)	41.2	46.0	46.0	16.0	16.0
Actuated g/C Ratio	0.59	0.66	0.66	0.23	0.23
v/c Ratio	0.66	0.11	0.41	0.24	0.10
Control Delay	14.0	4.9	6.9	22.7	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	4.9	6.9	22.7	8.8
LOS	B	A	A	C	A
Approach Delay	14.0		6.8	18.8	
Approach LOS	B		A	B	

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 46 (66%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.6
 Intersection LOS: B
 Intersection Capacity Utilization 46.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 8: Christian Academy Blvd & Dutchtown Rd

↖ Ø2	↖ Ø3	→ Ø4 (R)
20 s	8 s	42 s
	↖ Ø8 (R)	
	50 s	

Queues
8: Christian Academy Blvd & Dutchtown Rd

2030 Projected Midday Peak MIT
Medical Office Center

	→	↖	←	↗	
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	711	38	507	96	38
v/c Ratio	0.66	0.11	0.41	0.24	0.10
Control Delay	14.0	4.9	6.9	22.7	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	4.9	6.9	22.7	8.8
Queue Length 50th (ft)	203	5	87	45	5
Queue Length 95th (ft)	329	13	139	74	24
Internal Link Dist (ft)	5197		2065	558	
Turn Bay Length (ft)		250		200	
Base Capacity (vph)	1083	341	1224	404	391
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.11	0.41	0.24	0.10
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Projected Midday Peak MIT
Medical Office Center

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	560	94	35	466	88	35
Future Volume (vph)	560	94	35	466	88	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1827		1770	1863	1770	1583
Flt Permitted	1.00		0.22	1.00	0.95	1.00
Satd. Flow (perm)	1827		401	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	609	102	38	507	96	38
RTOR Reduction (vph)	8	0	0	0	0	29
Lane Group Flow (vph)	703	0	38	507	96	9
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	39.6		46.0	46.0	16.0	16.0
Effective Green, g (s)	39.6		46.0	46.0	16.0	16.0
Actuated g/C Ratio	0.57		0.66	0.66	0.23	0.23
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1033		310	1224	404	361
v/s Ratio Prot	c0.38		0.00	c0.27	c0.05	
v/s Ratio Perm			0.08			0.01
v/c Ratio	0.68		0.12	0.41	0.24	0.02
Uniform Delay, d1	10.7		7.2	5.7	22.0	20.9
Progression Factor	1.00		1.00	1.00	0.96	1.34
Incremental Delay, d2	3.6		0.2	1.0	1.4	0.1
Delay (s)	14.3		7.4	6.7	22.4	28.2
Level of Service	B		A	A	C	C
Approach Delay (s)	14.3			6.7	24.1	
Approach LOS	B			A	C	
Intersection Summary						
HCM 2000 Control Delay			12.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			46.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Projected Midday Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	94	259	196	156	303	170	208	39	82
Future Volume (vph)	94	259	196	156	303	170	208	39	82
Turn Type	Split	NA	Perm	Split	NA	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		4	4	1	6	5	2
Permitted Phases			8			6		2	
Detector Phase	8	8	8	4	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	19.0	19.0	19.0	30.0	30.0	18.4	26.0	10.0	17.6
Total Split (%)	22.4%	22.4%	22.4%	35.3%	35.3%	21.6%	30.6%	11.8%	20.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	11.9	11.9	11.9	20.4	20.4	34.2	27.8	22.8	17.2
Actuated g/C Ratio	0.14	0.14	0.14	0.24	0.24	0.40	0.33	0.27	0.20
v/c Ratio	0.41	0.62	0.46	0.21	0.78	0.41	0.34	0.14	0.29
Control Delay	38.7	40.2	4.8	25.4	42.5	21.8	14.7	20.0	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	40.2	4.8	25.4	42.5	21.8	14.7	20.0	15.2
LOS	D	D	A	C	D	C	B	B	B
Approach Delay		27.3			36.9		16.9		15.9
Approach LOS		C			D		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 85

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 25.2

Intersection LOS: C

Intersection Capacity Utilization 62.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø4	 Ø8
18.4 s	17.6 s	30 s	19 s
 Ø5	 Ø6 (R)		
10 s	26 s		

Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Projected Midday Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	92	292	213	170	350	185	411	42	222
v/c Ratio	0.41	0.62	0.46	0.21	0.78	0.41	0.34	0.14	0.29
Control Delay	38.7	40.2	4.8	25.4	42.5	21.8	14.7	20.0	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	40.2	4.8	25.4	42.5	21.8	14.7	20.0	15.2
Queue Length 50th (ft)	48	80	0	36	169	68	52	14	22
Queue Length 95th (ft)	100	123	24	59	256	123	95	36	56
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	247	520	481	969	524	465	1204	304	759
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.56	0.44	0.18	0.67	0.40	0.34	0.14	0.29
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Projected Midday Peak MIT
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	94	259	196	156	303	19	170	208	170	39	82	122
Future Volume (vph)	94	259	196	156	303	19	170	208	170	39	82	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	0.91	0.91	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	3384	1583	3433	1846		1770	3300		1770	3221	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.45	1.00		0.51	1.00	
Satd. Flow (perm)	1610	3384	1583	3433	1846		830	3300		952	3221	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	282	213	170	329	21	185	226	185	42	89	133
RTOR Reduction (vph)	0	0	183	0	3	0	0	130	0	0	106	0
Lane Group Flow (vph)	92	292	30	170	347	0	185	281	0	42	116	0
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	11.9	11.9	11.9	20.4	20.4		34.2	25.4		20.1	17.3	
Effective Green, g (s)	11.9	11.9	11.9	20.4	20.4		34.2	25.4		20.1	17.3	
Actuated g/C Ratio	0.14	0.14	0.14	0.24	0.24		0.40	0.30		0.24	0.20	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	225	473	221	823	443		448	986		252	655	
v/s Ratio Prot	0.06	c0.09		0.05	c0.19		c0.05	0.09		0.01	0.04	
v/s Ratio Perm			0.02				c0.12			0.03		
v/c Ratio	0.41	0.62	0.13	0.21	0.78		0.41	0.29		0.17	0.18	
Uniform Delay, d1	33.3	34.4	32.0	25.8	30.2		17.2	22.8		25.4	28.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	2.4	0.3	0.1	8.8		0.6	0.7		0.3	0.6	
Delay (s)	34.6	36.8	32.3	26.0	39.0		17.9	23.6		25.7	28.6	
Level of Service	C	D	C	C	D		B	C		C	C	
Approach Delay (s)		34.9			34.7			21.8			28.1	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			62.8%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Timings

3: Cedar Bluff Road & Park West Blvd

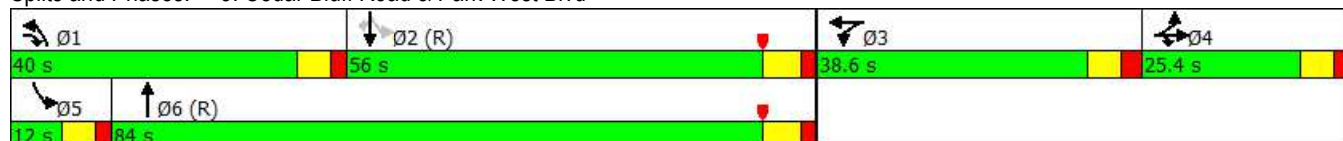
2030 Projected PM School Peak MIT
Medical Office Center

	→	↘	↙	←	↖	↗	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↗	↗↗	↙	↗↗	↗↗	↗↗↗	↙	↗↗	↗
Traffic Volume (vph)	24	384	214	214	241	817	43	887	37
Future Volume (vph)	24	384	214	214	241	817	43	887	37
Turn Type	NA	pt+ov	Split	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	4	4 1	3	3	1	6	5	2	
Permitted Phases							2		2
Detector Phase	4	4 1	3	3	1	6	5	2	2
Switch Phase									
Minimum Initial (s)	6.0		6.0	6.0	6.0	15.0	6.0	15.0	15.0
Minimum Split (s)	25.0		12.5	12.5	35.0	21.5	12.0	21.5	21.5
Total Split (s)	25.4		38.6	38.6	40.0	84.0	12.0	56.0	56.0
Total Split (%)	15.9%		24.1%	24.1%	25.0%	52.5%	7.5%	35.0%	35.0%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.5	4.0	4.5	4.5
All-Red Time (s)	2.5		2.5	2.5	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0		-2.5	-2.5	-2.0	-2.5	-3.0	-2.5	-2.5
Total Lost Time (s)	3.5		4.0	4.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag	Lag		Lead	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None		None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	24.6	47.0	27.8	27.8	19.4	86.5	82.8	72.7	72.7
Actuated g/C Ratio	0.15	0.29	0.17	0.17	0.12	0.54	0.52	0.45	0.45
v/c Ratio	0.63	0.51	0.75	0.71	0.63	0.37	0.15	0.59	0.05
Control Delay	74.0	48.1	78.8	51.2	60.8	14.5	13.3	27.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	74.0	48.1	78.8	51.2	60.8	14.7	13.3	27.1	0.1
LOS	E	D	E	D	E	B	B	C	A
Approach Delay	55.7			59.6		24.2		25.5	
Approach LOS	E			E		C		C	

Intersection Summary

Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 50 (31%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 36.5
 Intersection LOS: D
 Intersection Capacity Utilization 65.9%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Cedar Bluff Road & Park West Blvd



Queues

2030 Projected PM School Peak MIT

3: Cedar Bluff Road & Park West Blvd

Medical Office Center

									
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	172	417	210	479	262	1008	47	964	40
v/c Ratio	0.63	0.51	0.75	0.71	0.63	0.37	0.15	0.59	0.05
Control Delay	74.0	48.1	78.8	51.2	60.8	14.5	13.3	27.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	74.0	48.1	78.8	51.2	60.8	14.7	13.3	27.1	0.1
Queue Length 50th (ft)	163	195	231	195	141	212	17	432	0
Queue Length 95th (ft)	#262	257	323	251	191	239	m32	305	m0
Internal Link Dist (ft)	888			1639		269		273	
Turn Bay Length (ft)			230		245		95		145
Base Capacity (vph)	275	1113	349	805	772	2710	320	1640	815
Starvation Cap Reductn	0	0	0	0	0	738	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.37	0.60	0.60	0.34	0.51	0.15	0.59	0.05

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: Cedar Bluff Road & Park West Blvd

2030 Projected PM School Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	24	384	214	214	205	241	817	110	43	887	37
Future Volume (vph)	134	24	384	214	214	205	241	817	110	43	887	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	13	12	12	12	12	11	12	12
Grade (%)		-1%			-1%			0%			-4%	
Total Lost time (s)		3.5	4.5	4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor		1.00	0.88	0.91	0.91		0.97	0.91		1.00	0.95	1.00
Flt		1.00	0.85	1.00	0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1796	2801	1618	3267		3433	4994		1745	3610	1615
Flt Permitted		0.96	1.00	0.95	1.00		0.95	1.00		0.26	1.00	1.00
Satd. Flow (perm)		1796	2801	1618	3267		3433	4994		481	3610	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	26	417	233	233	223	262	888	120	47	964	40
RTOR Reduction (vph)	0	0	0	0	104	0	0	10	0	0	0	22
Lane Group Flow (vph)	0	172	417	210	375	0	262	998	0	47	964	18
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	4	4	4 1	3	3		1	6		5	2	
Permitted Phases										2		2
Actuated Green, G (s)		21.6	45.5	25.3	25.3		17.4	82.8		75.0	70.2	70.2
Effective Green, g (s)		24.6	47.5	27.8	27.8		19.4	85.3		81.0	72.7	72.7
Actuated g/C Ratio		0.15	0.30	0.17	0.17		0.12	0.53		0.51	0.45	0.45
Clearance Time (s)		6.5		6.5	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)		2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		276	831	281	567		416	2662		305	1640	733
v/s Ratio Prot		c0.10	c0.15	c0.13	0.11		c0.08	0.20		0.01	c0.27	
v/s Ratio Perm										0.07		0.01
v/c Ratio		0.62	0.50	0.75	0.66		0.63	0.37		0.15	0.59	0.02
Uniform Delay, d1		63.4	46.5	62.8	61.7		66.9	21.8		20.1	32.5	24.1
Progression Factor		0.99	0.98	1.00	1.00		0.83	0.65		0.82	0.75	1.00
Incremental Delay, d2		3.8	0.3	9.8	2.6		2.1	0.3		0.2	1.4	0.1
Delay (s)		66.8	46.0	72.6	64.3		57.6	14.5		16.6	25.8	24.1
Level of Service		E	D	E	E		E	B		B	C	C
Approach Delay (s)		52.1			66.8			23.4			25.4	
Approach LOS		D			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			37.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				16.5		
Intersection Capacity Utilization			65.9%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

Timings
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected PM School Peak MIT
Medical Office Center

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	39	260	23	275	7	41	25	161	113
Future Volume (vph)	39	260	23	275	7	41	25	161	113
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	11.0	32.0	11.0	32.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	13.8%	40.0%	13.8%	40.0%	46.3%	46.3%	46.3%	46.3%	46.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	37.5	34.7	36.4	32.5		33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.47	0.43	0.46	0.41		0.41	0.41	0.41	0.41
v/c Ratio	0.09	0.18	0.05	0.28		0.07	0.04	0.32	0.19
Control Delay	11.3	15.3	8.4	10.8		14.7	0.5	13.9	10.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	11.3	15.3	8.4	10.8		14.7	0.5	13.9	10.9
LOS	B	B	A	B		B	A	B	B
Approach Delay		14.8		10.7		9.9			12.5
Approach LOS		B		B		A			B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 12.3

Intersection LOS: B

Intersection Capacity Utilization 39.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

 Ø2	 Ø3	 Ø4 (R)
37 s	11 s	32 s
 Ø6	 Ø7	 Ø8 (R)
37 s	11 s	32 s

Queues

2030 Projected PM School Peak MIT

7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

Medical Office Center

								
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	42	295	25	404	53	27	175	147
v/c Ratio	0.09	0.18	0.05	0.28	0.07	0.04	0.32	0.19
Control Delay	11.3	15.3	8.4	10.8	14.7	0.5	13.9	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	15.3	8.4	10.8	14.7	0.5	13.9	10.9
Queue Length 50th (ft)	10	40	5	62	16	0	35	24
Queue Length 95th (ft)	27	82	m10	64	37	2	75	46
Internal Link Dist (ft)		317		1062	1566			181
Turn Bay Length (ft)	100		150			1000	100	
Base Capacity (vph)	496	1598	550	1423	744	692	554	758
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.18	0.05	0.28	0.07	0.04	0.32	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
7: Park 40 Blvd/Christian Academy Blvd & Sherrill Blvd

2030 Projected PM School Peak MIT
Medical Office Center

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	260	11	23	275	97	7	41	25	161	113	22
Future Volume (vph)	39	260	11	23	275	97	7	41	25	161	113	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-9%			0%			0%			0%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Flt	1.00	0.99		1.00	0.96			1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1849	3676		1770	3401			1849	1583	1770	1817	
Flt Permitted	0.45	1.00		0.57	1.00			0.97	1.00	0.72	1.00	
Satd. Flow (perm)	878	3676		1065	3401			1804	1583	1346	1817	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	283	12	25	299	105	8	45	27	175	123	24
RTOR Reduction (vph)	0	4	0	0	41	0	0	0	16	0	9	0
Lane Group Flow (vph)	42	291	0	25	363	0	0	53	11	175	138	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	36.4	32.3		33.6	30.9			33.0	33.0	33.0	33.0	
Effective Green, g (s)	36.4	32.3		33.6	30.9			33.0	33.0	33.0	33.0	
Actuated g/C Ratio	0.45	0.40		0.42	0.39			0.41	0.41	0.41	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	449	1484		471	1313			744	652	555	749	
v/s Ratio Prot	c0.00	0.08		0.00	c0.11						0.08	
v/s Ratio Perm	0.04			0.02				0.03	0.01	c0.13		
v/c Ratio	0.09	0.20		0.05	0.28			0.07	0.02	0.32	0.18	
Uniform Delay, d1	12.3	15.4		13.6	16.9			14.2	13.9	15.9	14.9	
Progression Factor	1.00	1.00		0.76	0.74			1.00	1.00	0.76	0.75	
Incremental Delay, d2	0.1	0.3		0.0	0.5			0.2	0.0	1.4	0.5	
Delay (s)	12.4	15.7		10.4	13.0			14.4	14.0	13.5	11.8	
Level of Service	B	B		B	B			B	B	B	B	
Approach Delay (s)		15.3			12.8			14.3			12.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			39.6%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
8: Christian Academy Blvd & Dutchtown Rd

2030 Projected PM School Peak MIT
Medical Office Center

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↖	↖	↖	↖	↖
Traffic Volume (vph)	396	86	556	152	63
Future Volume (vph)	396	86	556	152	63
Turn Type	NA	pm+pt	NA	Prot	Perm
Protected Phases	4	3	8	2	
Permitted Phases		8			2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	8.0	20.0	20.0	20.0
Total Split (s)	49.0	9.0	58.0	22.0	22.0
Total Split (%)	61.3%	11.3%	72.5%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	Max	Max
Act Effct Green (s)	46.8	54.0	54.0	18.0	18.0
Actuated g/C Ratio	0.58	0.68	0.68	0.22	0.22
v/c Ratio	0.56	0.21	0.48	0.41	0.17
Control Delay	12.5	5.6	7.8	35.7	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	5.6	7.8	35.7	13.2
LOS	B	A	A	D	B
Approach Delay	12.5		7.5	29.1	
Approach LOS	B		A	C	

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 3 (4%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 12.8
 Intersection LOS: B
 Intersection Capacity Utilization 53.2%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 8: Christian Academy Blvd & Dutchtown Rd

↖ Ø2 22 s	↖ Ø3 9 s	→ Ø4 (R) 49 s
	↖ Ø8 (R) 58 s	

Queues
8: Christian Academy Blvd & Dutchtown Rd

2030 Projected PM School Peak MIT
Medical Office Center

	→	↙	←	↘	
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	593	93	604	165	68
v/c Ratio	0.56	0.21	0.48	0.41	0.17
Control Delay	12.5	5.6	7.8	35.7	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	5.6	7.8	35.7	13.2
Queue Length 50th (ft)	165	14	124	75	0
Queue Length 95th (ft)	259	28	190	121	25
Internal Link Dist (ft)	5197		2065	558	
Turn Bay Length (ft)		250		200	
Base Capacity (vph)	1065	445	1257	398	408
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.56	0.21	0.48	0.41	0.17
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

8: Christian Academy Blvd & Dutchtown Rd

2030 Projected PM School Peak MIT
Medical Office Center

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	396	150	86	556	152	63
Future Volume (vph)	396	150	86	556	152	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1794		1770	1863	1770	1583
Flt Permitted	1.00		0.29	1.00	0.95	1.00
Satd. Flow (perm)	1794		547	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	430	163	93	604	165	68
RTOR Reduction (vph)	17	0	0	0	0	53
Lane Group Flow (vph)	576	0	93	604	165	15
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	46.0		54.0	54.0	18.0	18.0
Effective Green, g (s)	46.0		54.0	54.0	18.0	18.0
Actuated g/C Ratio	0.58		0.68	0.68	0.22	0.22
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1031		430	1257	398	356
v/s Ratio Prot	c0.32		0.01	c0.32	c0.09	
v/s Ratio Perm			0.14			0.01
v/c Ratio	0.56		0.22	0.48	0.41	0.04
Uniform Delay, d1	10.6		6.4	6.3	26.5	24.3
Progression Factor	1.00		1.00	1.00	1.21	2.40
Incremental Delay, d2	2.2		0.3	1.3	3.2	0.2
Delay (s)	12.8		6.7	7.6	35.3	58.4
Level of Service	B		A	A	D	E
Approach Delay (s)	12.8			7.5	42.0	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			14.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			53.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Timings
10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM School Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	198	286	109	356	182	139	205	48	248
Future Volume (vph)	198	286	109	356	182	139	205	48	248
Turn Type	Split	NA	Perm	Split	NA	pm+pt	NA	pm+pt	NA
Protected Phases	8	8		4	4	1	6	5	2
Permitted Phases			8			6		2	
Detector Phase	8	8	8	4	4	1	6	5	2
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	4.0	10.0	4.0	10.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	10.5	16.5	10.0	16.5
Total Split (s)	32.0	32.0	32.0	32.0	32.0	22.0	43.0	13.0	34.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%	18.3%	35.8%	10.8%	28.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.0	6.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	19.6	19.6	19.6	20.1	20.1	60.4	51.2	51.5	44.1
Actuated g/C Ratio	0.16	0.16	0.16	0.17	0.17	0.50	0.43	0.43	0.37
v/c Ratio	0.65	0.65	0.28	0.67	0.68	0.30	0.25	0.11	0.29
Control Delay	57.8	52.0	1.6	52.5	57.1	19.5	16.8	18.9	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	52.0	1.6	52.5	57.1	19.5	16.8	18.9	27.1
LOS	E	D	A	D	E	B	B	B	C
Approach Delay		44.3			54.1		17.6		26.1
Approach LOS		D			D		B		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 37.1

Intersection LOS: D

Intersection Capacity Utilization 57.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Sherrill Blvd & Dutchtown Rd

 Ø1	 Ø2 (R)	 Ø4	 Ø8
22 s	34 s	32 s	32 s
 Ø5	 Ø6 (R)		
13 s	43 s		

Queues
10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM School Peak MIT
Medical Office Center

									
Lane Group	SEL	SET	SER	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	170	356	118	387	210	151	369	52	371
v/c Ratio	0.65	0.65	0.28	0.67	0.68	0.30	0.25	0.11	0.29
Control Delay	57.8	52.0	1.6	52.5	57.1	19.5	16.8	18.9	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	52.0	1.6	52.5	57.1	19.5	16.8	18.9	27.1
Queue Length 50th (ft)	136	143	0	147	154	59	61	19	92
Queue Length 95th (ft)	206	184	0	188	224	122	115	50	164
Internal Link Dist (ft)		1094			6715		2069		1876
Turn Bay Length (ft)	200		225	175		475		100	
Base Capacity (vph)	348	730	499	743	401	545	1496	476	1275
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.49	0.24	0.52	0.52	0.28	0.25	0.11	0.29
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: Sherrill Blvd & Dutchtown Rd

2030 Projected PM School Peak MIT
Medical Office Center

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	198	286	109	356	182	11	139	205	134	48	248	93
Future Volume (vph)	198	286	109	356	182	11	139	205	134	48	248	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Lane Util. Factor	0.91	0.91	1.00	0.97	1.00		1.00	0.95		1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1610	3369	1583	3433	1847		1770	3329		1770	3395	
Flt Permitted	0.95	0.99	1.00	0.95	1.00		0.44	1.00		0.53	1.00	
Satd. Flow (perm)	1610	3369	1583	3433	1847		821	3329		991	3395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	215	311	118	387	198	12	151	223	146	52	270	101
RTOR Reduction (vph)	0	0	99	0	2	0	0	76	0	0	27	0
Lane Group Flow (vph)	170	356	19	387	208	0	151	293	0	52	344	0
Turn Type	Split	NA	Perm	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases			8				6			2		
Actuated Green, G (s)	19.6	19.6	19.6	20.1	20.1		61.1	50.0		50.0	44.2	
Effective Green, g (s)	19.6	19.6	19.6	20.1	20.1		61.1	50.0		50.0	44.2	
Actuated g/C Ratio	0.16	0.16	0.16	0.17	0.17		0.51	0.42		0.42	0.37	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.5	6.5		6.0	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	262	550	258	575	309		505	1387		450	1250	
v/s Ratio Prot	0.11	c0.11		0.11	c0.11		c0.03	0.09		0.01	0.10	
v/s Ratio Perm			0.01				c0.12			0.04		
v/c Ratio	0.65	0.65	0.07	0.67	0.67		0.30	0.21		0.12	0.28	
Uniform Delay, d1	47.0	47.0	42.5	46.9	46.9		16.2	22.4		21.0	26.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.4	2.6	0.1	3.1	5.7		0.3	0.3		0.1	0.5	
Delay (s)	52.4	49.6	42.6	50.0	52.6		16.5	22.7		21.1	27.2	
Level of Service	D	D	D	D	D		B	C		C	C	
Approach Delay (s)		49.1			50.9			20.9			26.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				25.0		
Intersection Capacity Utilization			57.7%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

2019 Phase 1 Projected AM Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	12	3	12	170	357	44
Future Volume (Veh/h)	12	3	12	170	357	44
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	3	13	185	388	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	530	218	436			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530	218	436			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	99			
cM capacity (veh/h)	473	786	1120			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	16	13	92	92	259	177
Volume Left	13	13	0	0	0	0
Volume Right	3	0	0	0	0	48
cSH	582	1120	1700	1700	1700	1700
Volume to Capacity	0.03	0.01	0.05	0.05	0.15	0.10
Queue Length 95th (ft)	2	1	0	0	0	0
Control Delay (s)	12.2	8.3	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	12.2	0.5			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			21.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

11: Sherrill Blvd & Medical Office Access

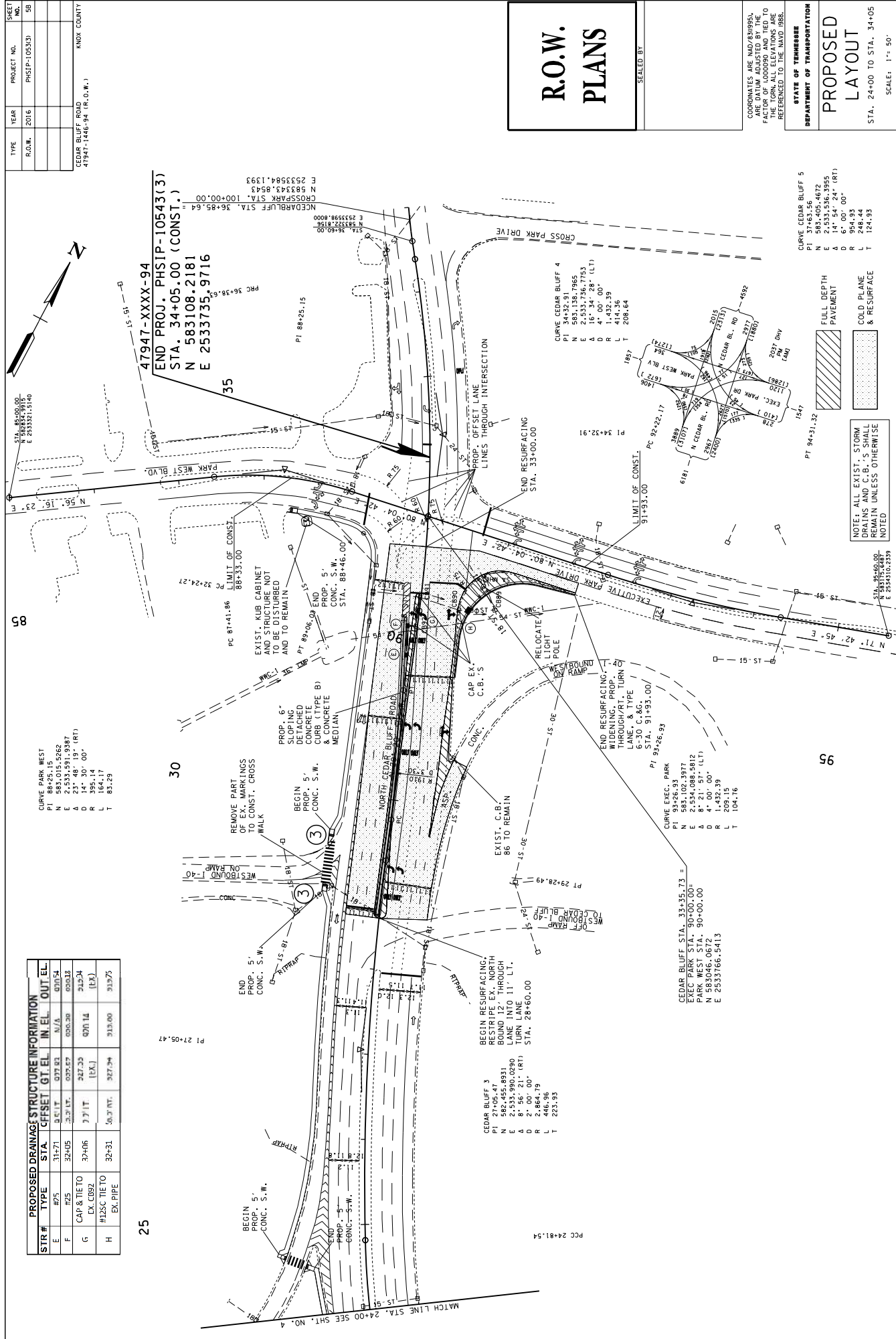
2019 Phase 1 Projected PM Peak
Medical Office Center

						
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	55	16	6	349	157	22
Future Volume (Veh/h)	55	16	6	349	157	22
Sign Control	Stop			Free	Free	
Grade	0%			-9%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	17	7	379	171	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	386	98	195			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	386	98	195			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	98	99			
cM capacity (veh/h)	586	940	1375			
Direction, Lane #	SE 1	NE 1	NE 2	NE 3	SW 1	SW 2
Volume Total	77	7	190	190	114	81
Volume Left	60	7	0	0	0	0
Volume Right	17	0	0	0	0	24
cSH	752	1375	1700	1700	1700	1700
Volume to Capacity	0.10	0.01	0.11	0.11	0.07	0.05
Queue Length 95th (ft)	9	0	0	0	0	0
Control Delay (s)	11.2	7.6	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	11.2	0.1			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			19.6%		ICU Level of Service	A
Analysis Period (min)			15			

TDOT Plans

PROPOSED DRAINAGE STRUCTURE INFORMATION						
STR #	TYPE	STA.	CFSEET	GT. EL.	IN. EL.	OUT. EL.
E	#75	31+71	9.6' IT.	977.01	N/A	970.54
F	#25	32+05	2.3' IT.	937.67	936.39	930.18
G	CAP & TIE TO EX. CB992	32+06	7' IT.	927.35	970.14	919.34
H	#125C TIE TO EX. PIPE	32+31	56.3' IT.	927.94	913.66	913.75

25



R.O.W. PLANS

SEAL BY

COORDINATES ARE NAD/83(1995).
ARE DATUM ADJUSTED BY THE
FACTOR OF 1,00090 AND TIED TO
THE TGRN, ALL ELEVATIONS ARE
REFERENCED TO THE NAVD 1988.

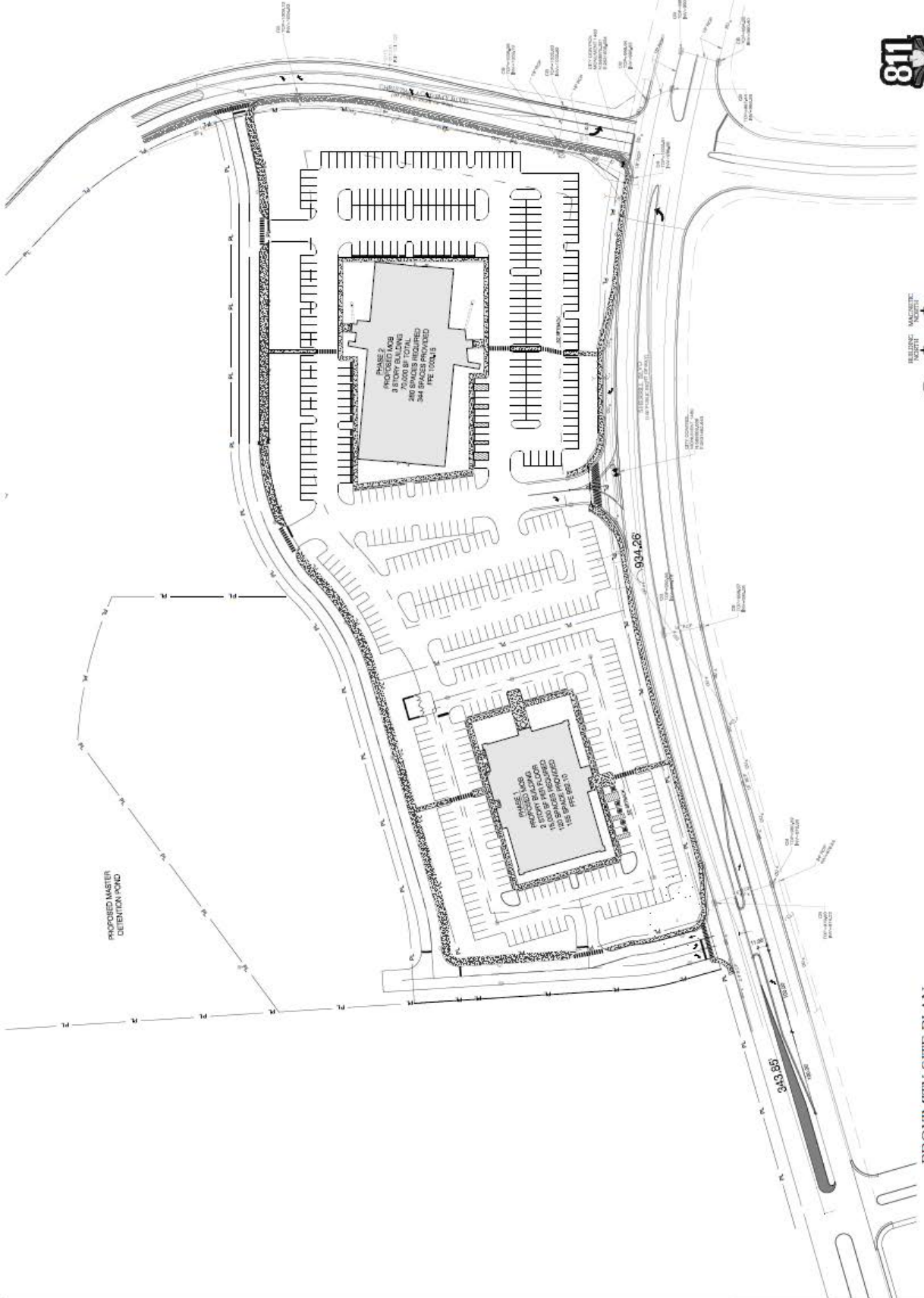
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT

STA. 24+00 TO STA. 34+05
SCALE: 1" = 50'

SCALE: 1"= 50'

Site Concept Plans



Know what's below.
Call before you dig.
In Tennessee call 811 or 424-83-1111



PROXIMITY SITE PLAN
SCALE: 1" = 100'

MBI
MICHAEL BAKER CORPORATION
200 N. WATSON CO. BLVD. SUITE 100
KNOXVILLE, TN 37923
TEL: 615.522.8800
FAX: 615.522.8801
WWW.MBI-CORP.COM

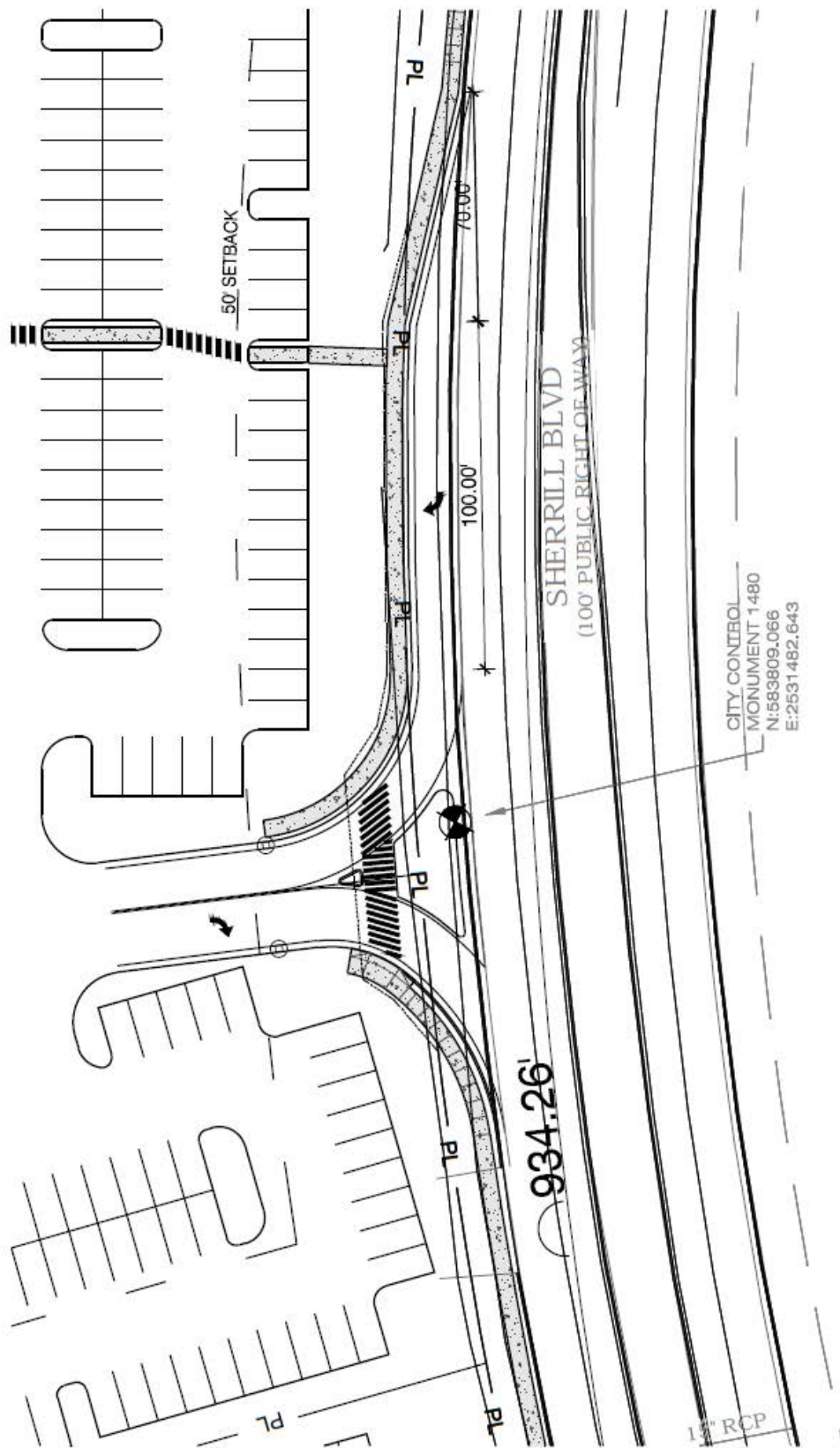
A NEW DEVELOPMENT FOR
SHERILL BLVD, MEDICAL
OFFICE COMPLEX
KNOXVILLE, TN 37923

DATE: 09/22/2017
DESIGNED BY: MBI
DRAWN BY: MBI
CHECKED BY: MBI
PROJECT NO: 170628.01
SHEET NO: 1001
SHEET TOTAL: 1001

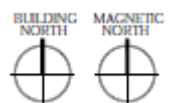
SHEET: 1001
OF: 1001
PROJECT: 170628.01



WESTERN SHERRILL BLVD ACCESS



SHERRILL BLVD RIGHT-TURN ACCESS



Trip Generation

Hospital (610)

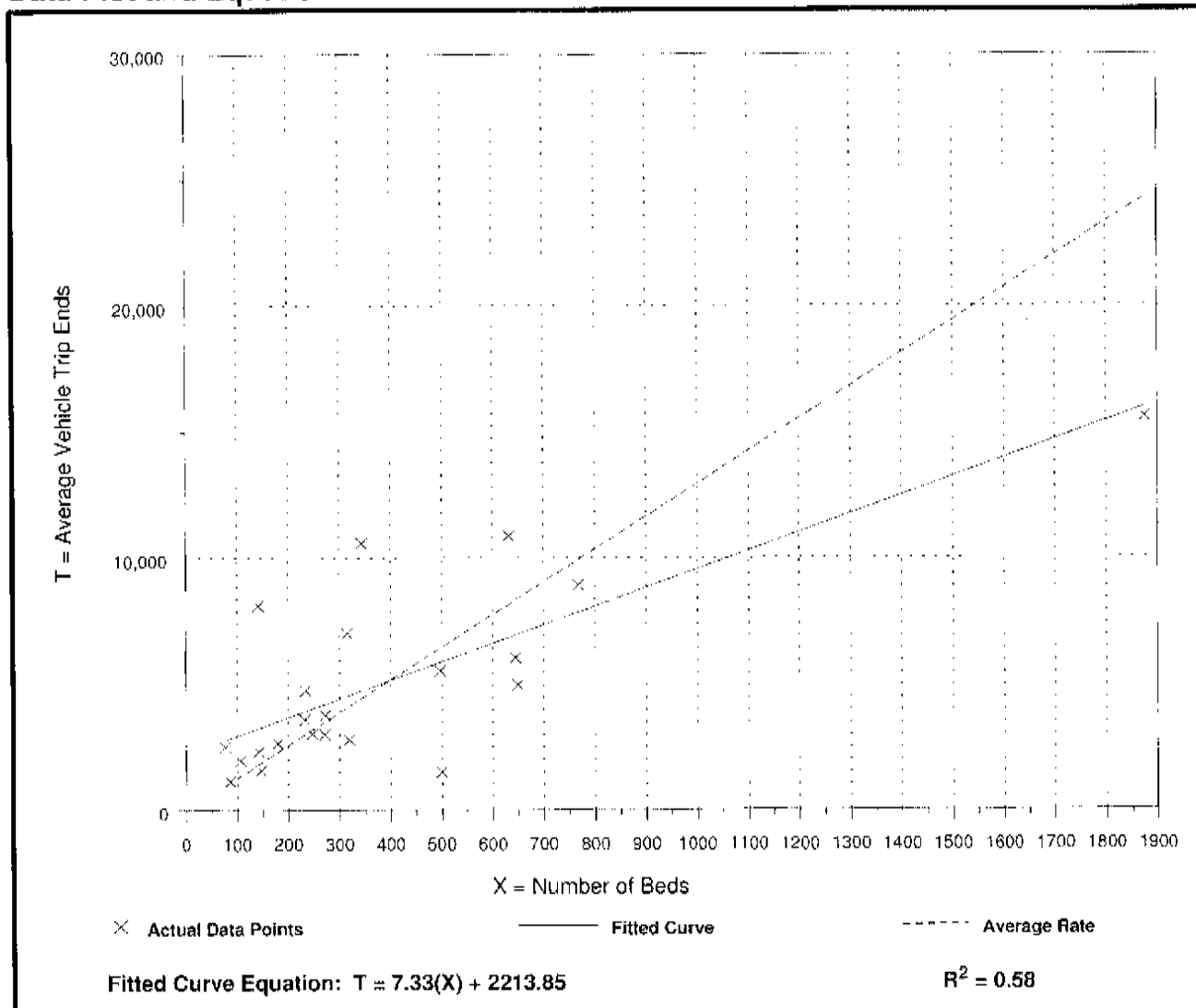
Average Vehicle Trip Ends vs: Beds
On a: Weekday

Number of Studies: 22
Average Number of Beds: 395
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
12.94	3.00 - 57.13	9.07

Data Plot and Equation



Hospital (610)

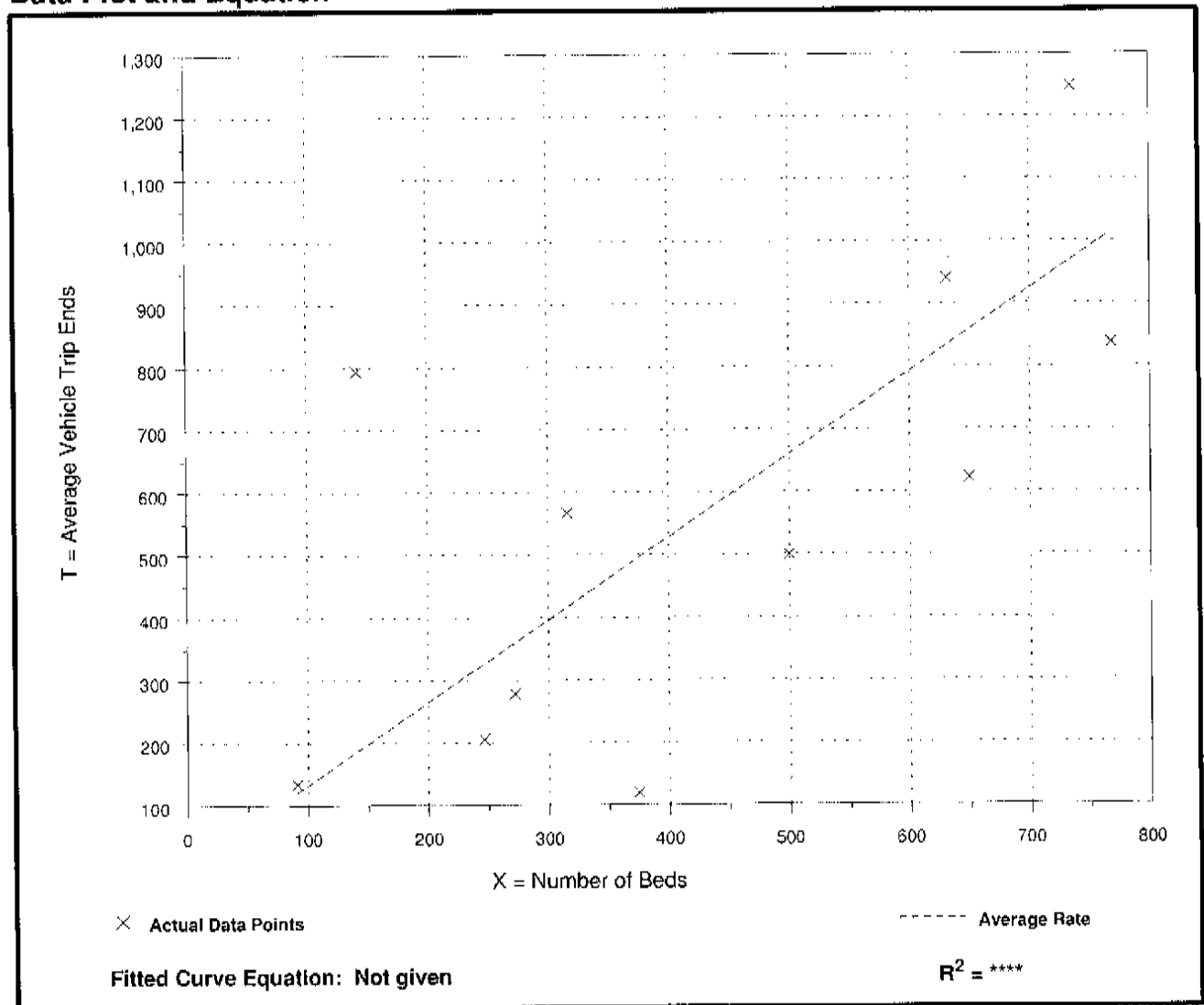
Average Vehicle Trip Ends vs: Beds
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 11
 Average Number of Beds: 430
 Directional Distribution: 72% entering, 28% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
1.32	0.32 - 5.59	1.43

Data Plot and Equation



Hospital (610)

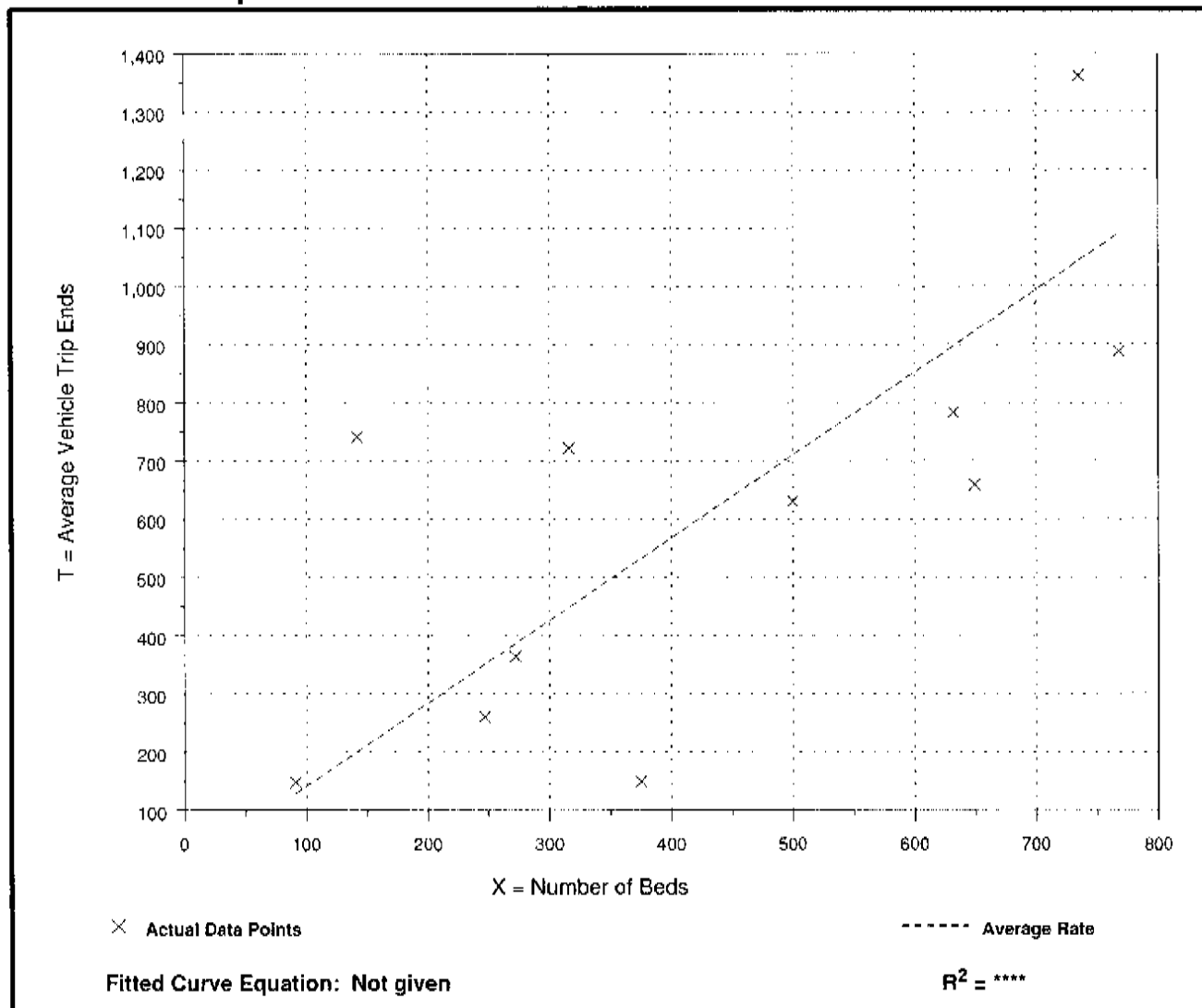
Average Vehicle Trip Ends vs: Beds
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 11
 Average Number of Beds: 430
 Directional Distribution: 33% entering, 67% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
1.42	0.40 - 5.22	1.44

Data Plot and Equation



Hospital (610)

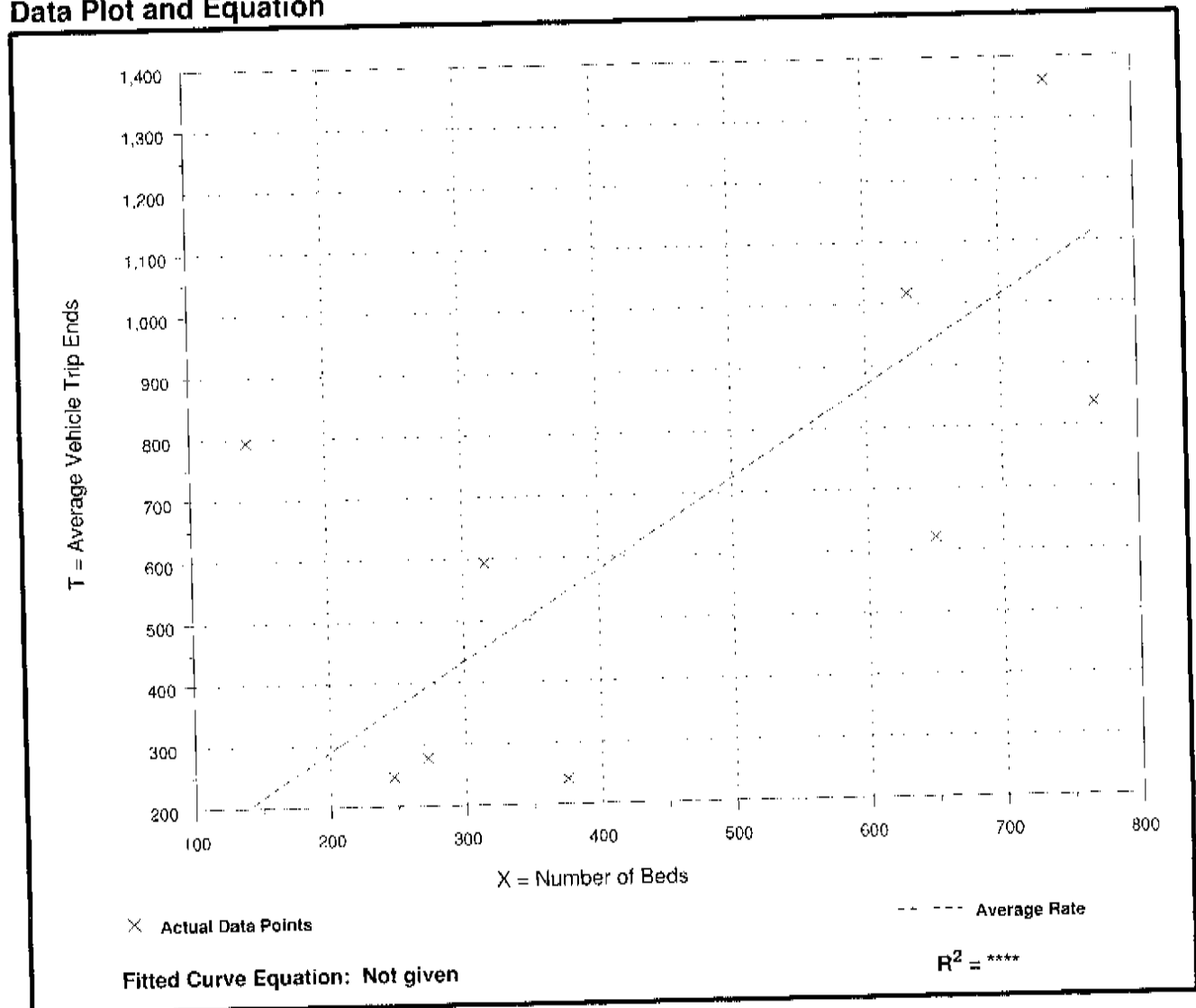
Average Vehicle Trip Ends vs: Beds
On a: Weekday,
A.M. Peak Hour of Generator

Number of Studies: 9
Average Number of Beds: 460
Directional Distribution: 69% entering, 31% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
1.45	0.64 - 5.59	1.49

Data Plot and Equation



Hospital (610)

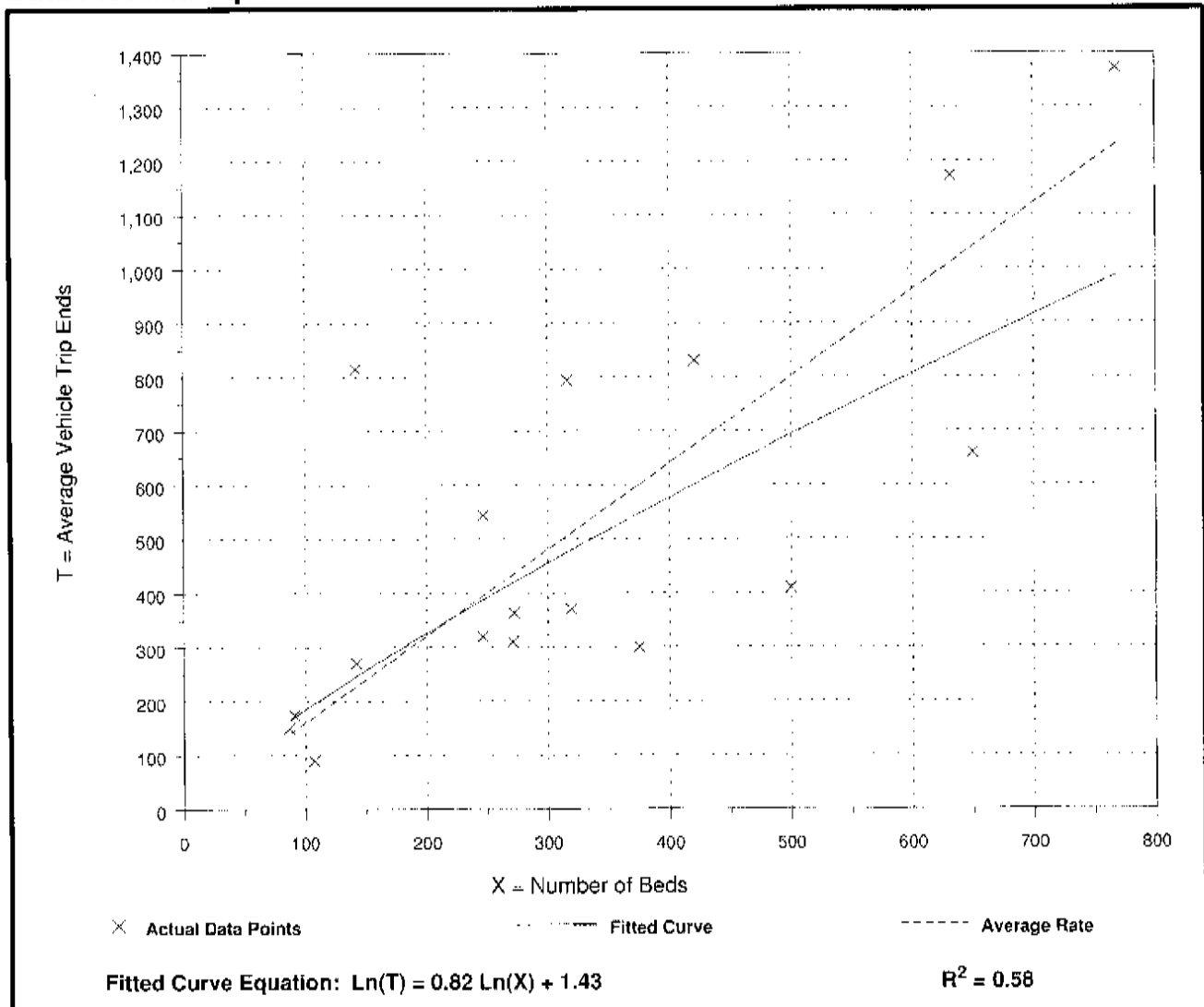
Average Vehicle Trip Ends vs: Beds
On a: Weekday,
P.M. Peak Hour of Generator

Number of Studies: 17
 Average Number of Beds: 329
 Directional Distribution: 34% entering, 66% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
1.60	0.80 - 5.74	1.52

Data Plot and Equation



Hospital (610)

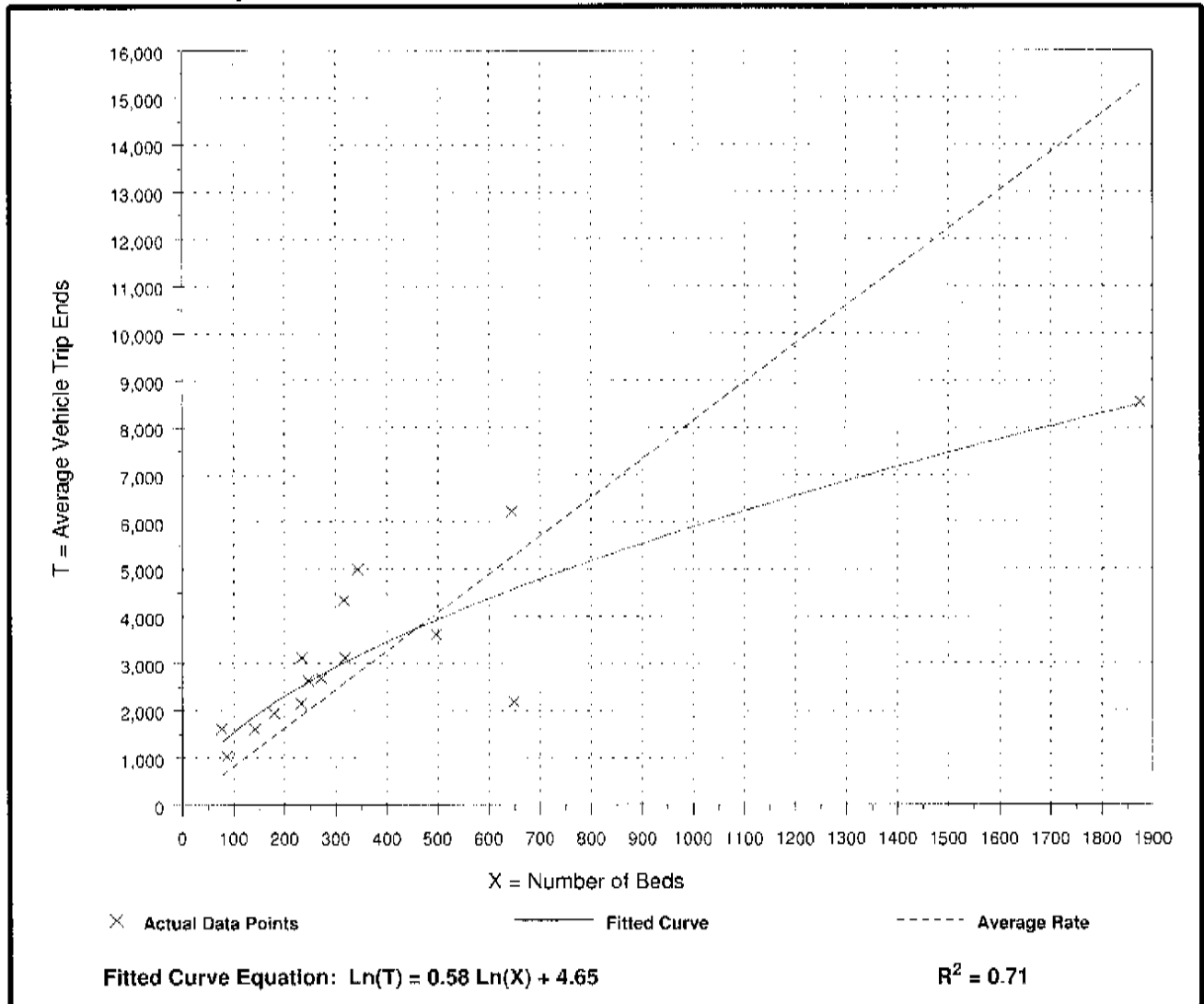
Average Vehicle Trip Ends vs: Beds
On a: Saturday

Number of Studies: 15
Average Number of Beds: 408
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
8.14	3.35 - 21.04	4.80

Data Plot and Equation



Hospital (610)

Average Vehicle Trip Ends vs: Beds
On a: Saturday,
Peak Hour of Generator

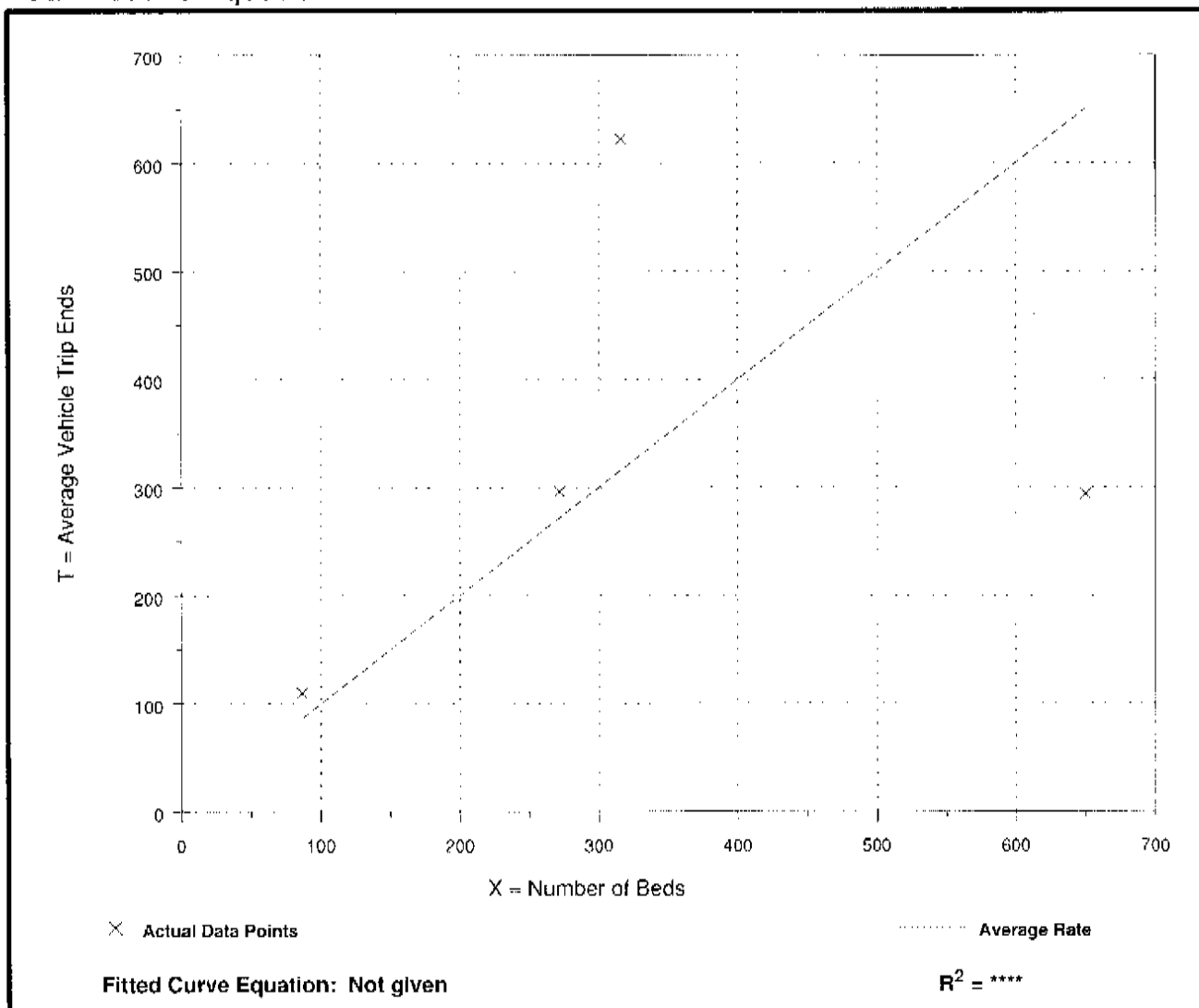
Number of Studies: 4
 Average Number of Beds: 331
 Directional Distribution: 47% entering, 53% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
1.00	0.45 - 1.97	1.17

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Hospital (610)

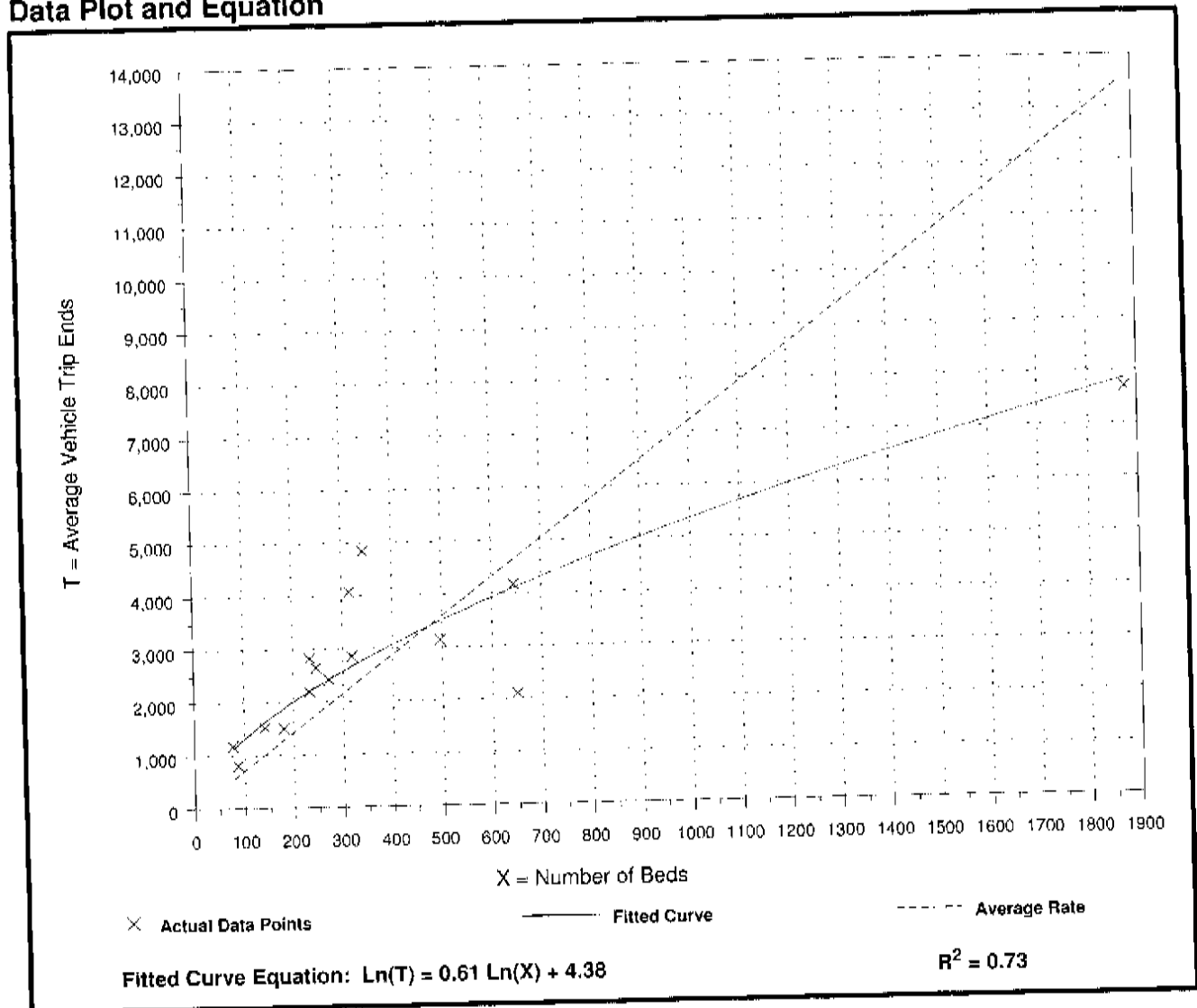
Average Vehicle Trip Ends vs: Beds
On a: Sunday

Number of Studies: 15
Average Number of Beds: 408
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
7.19	3.22 - 15.32	4.40

Data Plot and Equation



Hospital (610)

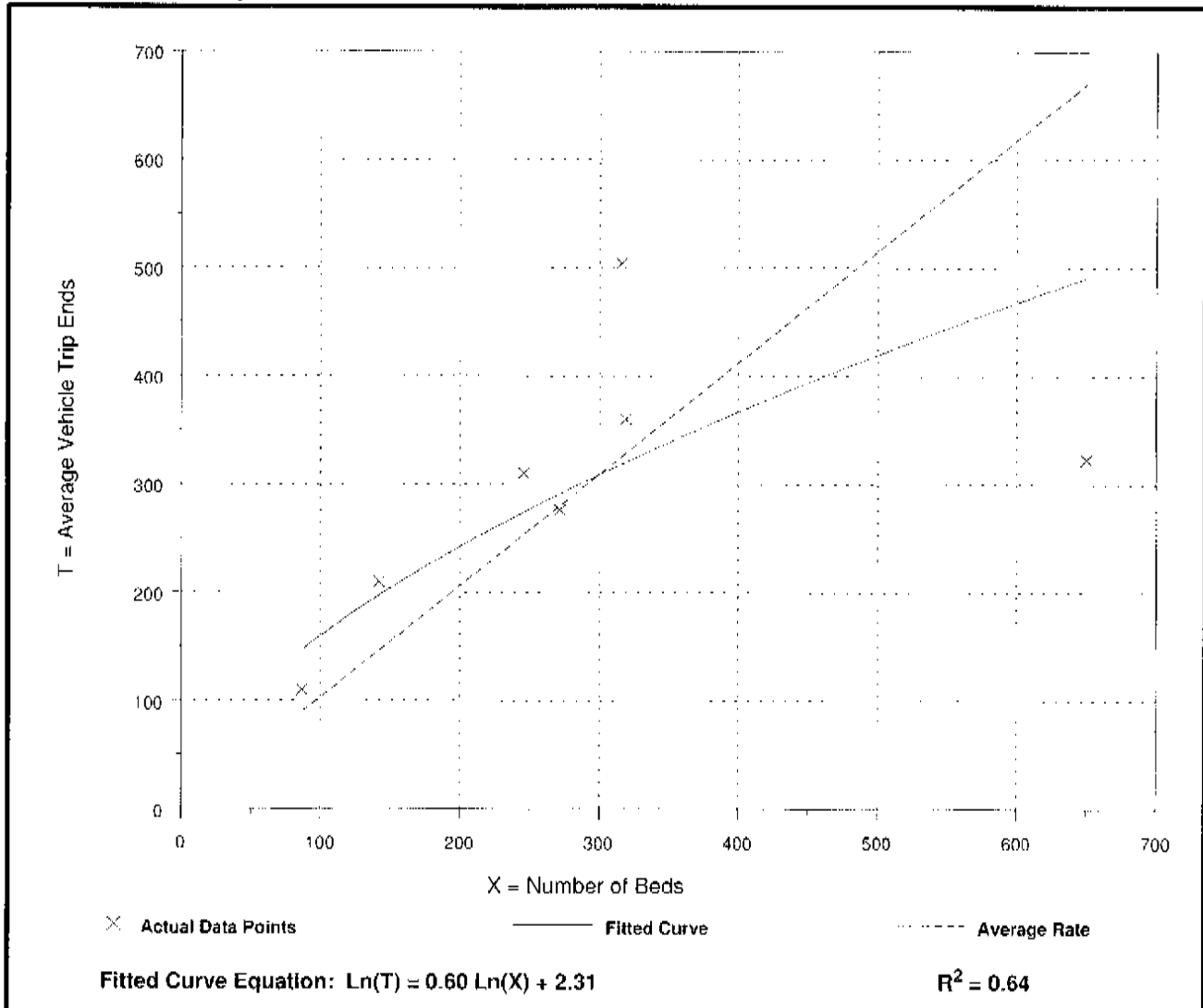
Average Vehicle Trip Ends vs: Beds
On a: Sunday,
Peak Hour of Generator

Number of Studies: 7
Average Number of Beds: 290
Directional Distribution: 45% entering, 55% exiting

Trip Generation per Bed

Average Rate	Range of Rates	Standard Deviation
1.03	0.50 - 1.59	1.09

Data Plot and Equation



Land Use: 720

Medical-Dental Office Building

Description

A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility. Clinic (Land Use 630) is a related use.

Additional Data

The average vehicle occupancy for the six studies for which information was submitted was approximately 1.37 persons per automobile. The vehicle occupancy rates ranged from 1.32 to 1.44 persons per automobile.

The sites were surveyed between the 1980s and the 2000s throughout the United States.

Source Numbers

8, 19, 98, 104, 109, 120, 157, 184, 209, 211, 253, 287, 294, 295, 304, 357, 384, 404, 407, 423, 444, 509, 601, 715

Medical-Dental Office Building (720)

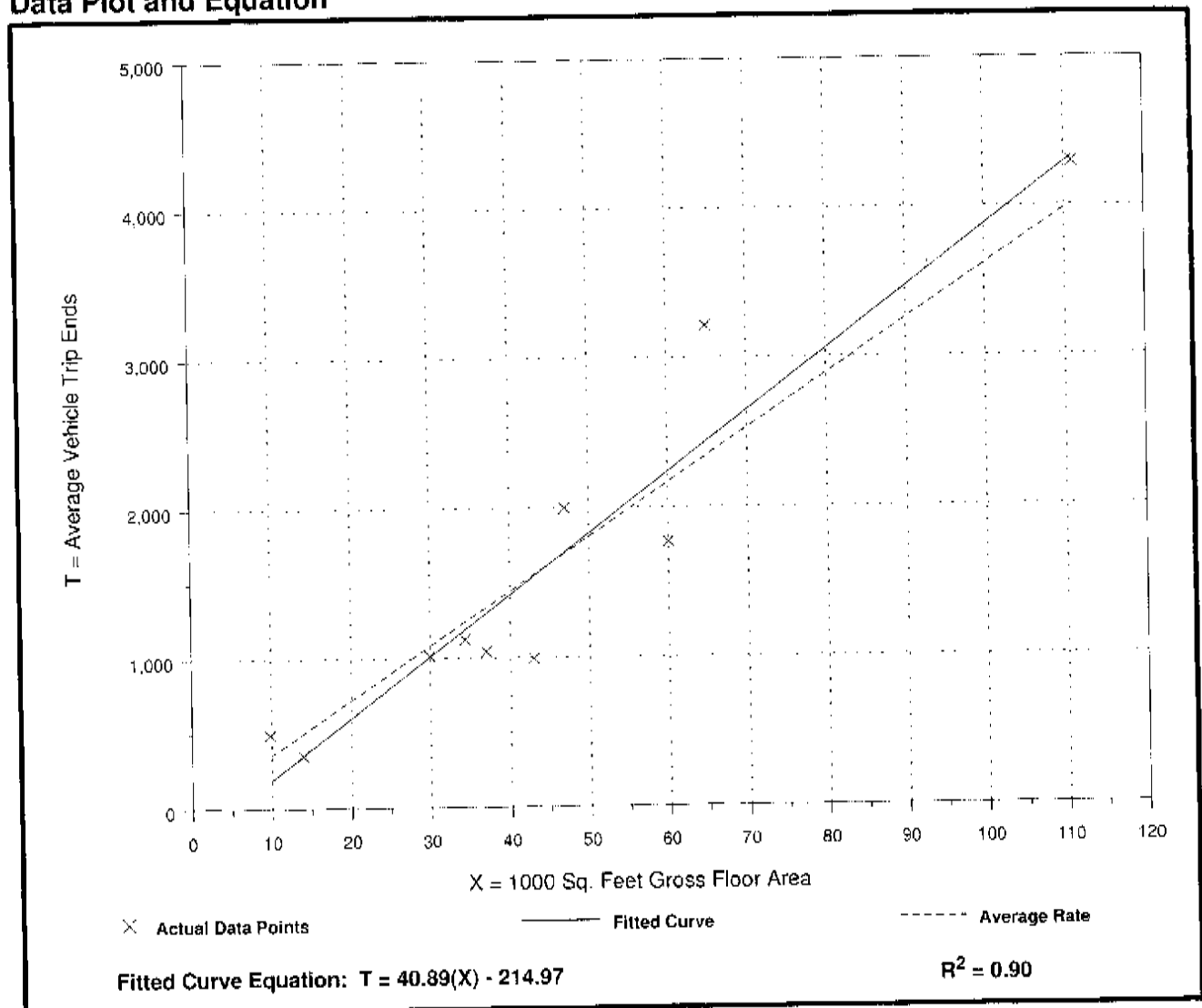
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday

Number of Studies: 10
Average 1000 Sq. Feet GFA: 45
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
36.13	23.16 - 50.51	10.18

Data Plot and Equation



Medical-Dental Office Building (720)

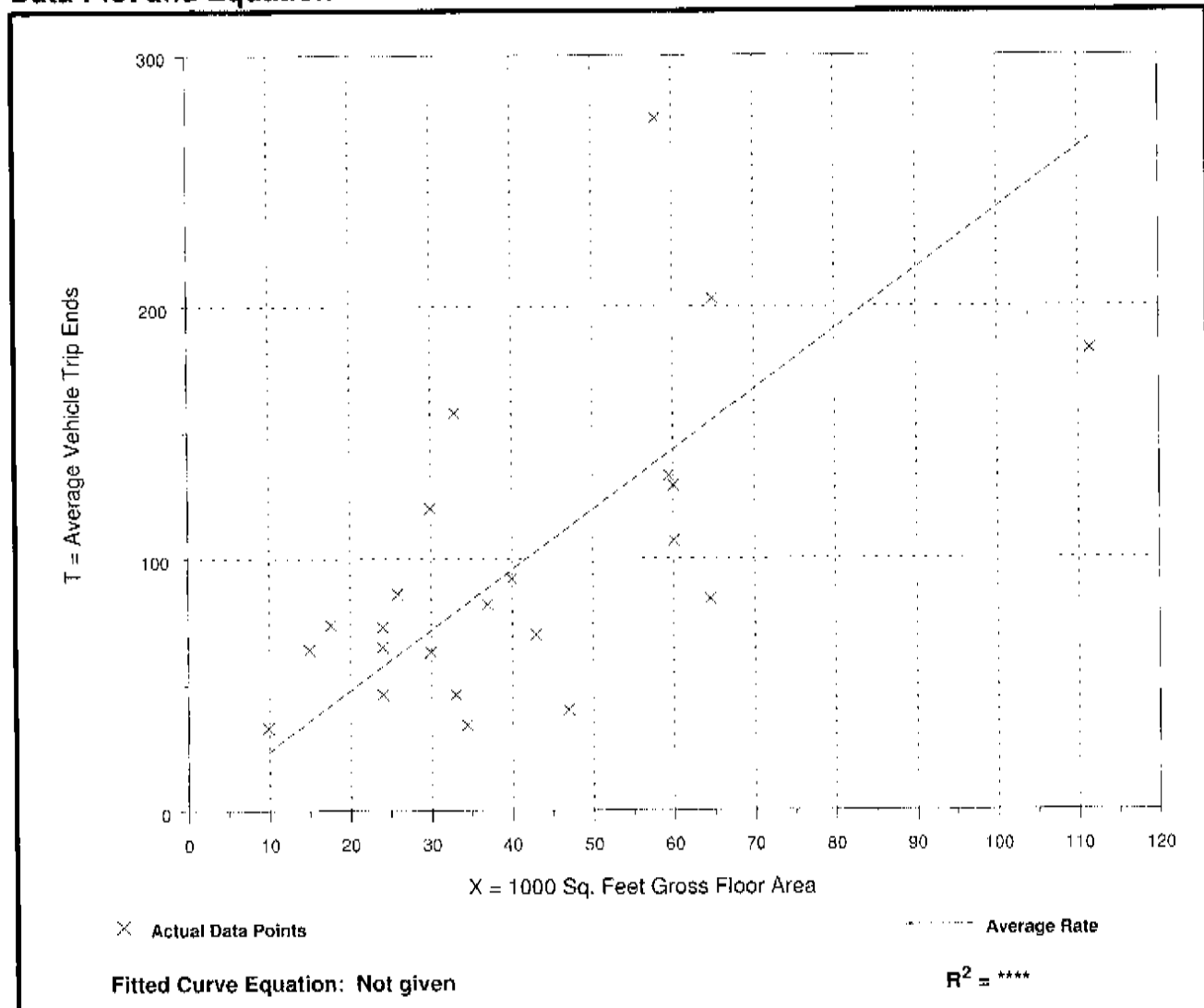
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 23
Average 1000 Sq. Feet GFA: 41
Directional Distribution: 79% entering, 21% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
2.39	0.85 - 4.79	1.89

Data Plot and Equation



Medical-Dental Office Building (720)

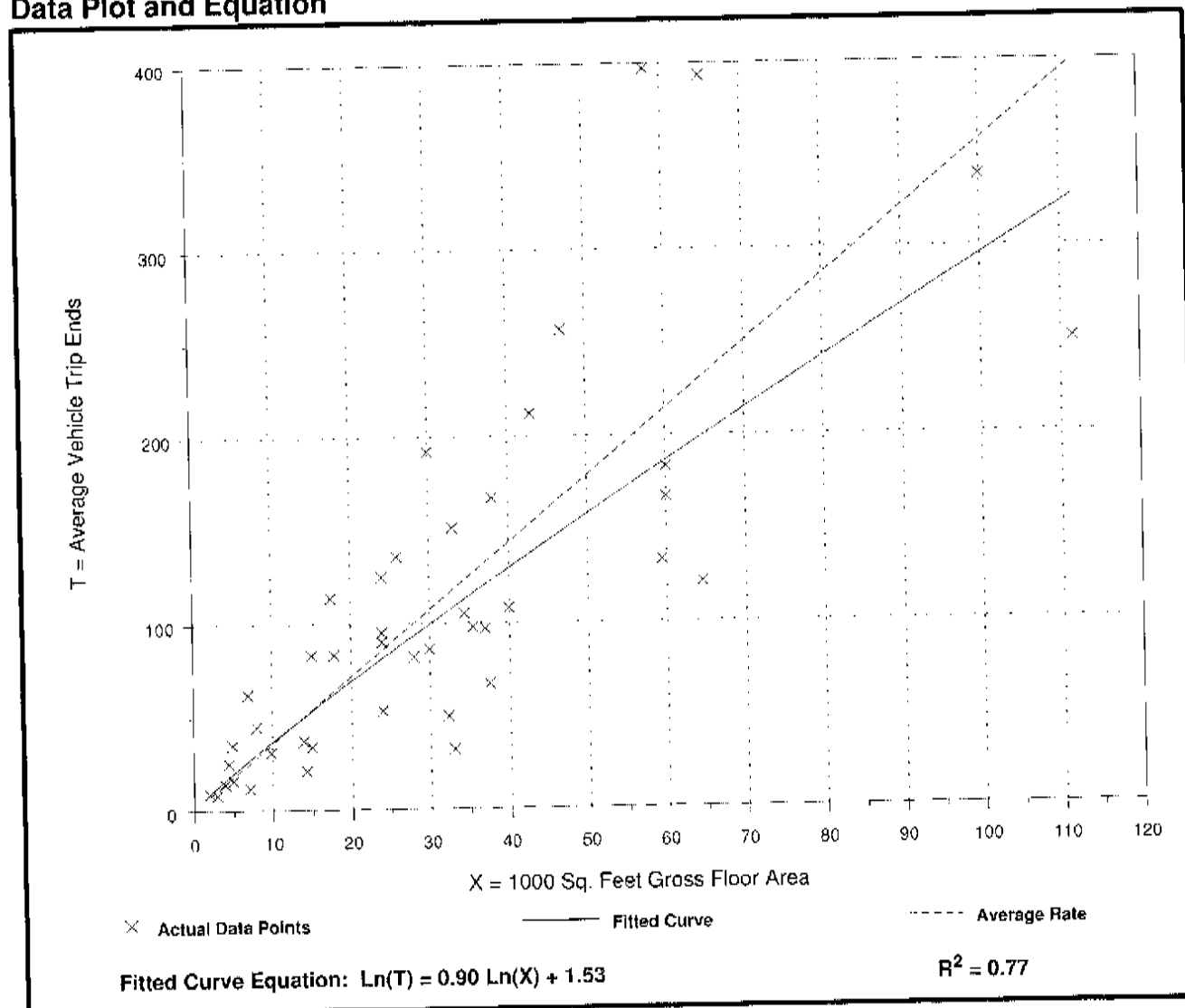
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 43
Average 1000 Sq. Feet GFA: 31
Directional Distribution: 28% entering, 72% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
3.57	0.97 - 8.86	2.47

Data Plot and Equation



MEDICAL OFFICE
MIDDAY & SCHOOL PEAK HOURS

Average Daily Trips 3,613

Hour	Entering Trip Distribution	Exiting Trip Distribution	Entering Trips	Existing Trips	Total Trip Generation
8	12.6%	1.1%	228	20	247
9	15.3%	4.9%	276	89	365
10	10.5%	10.2%	190	184	374
11	9.9%	9.6%	179	173	352
12	8.1%	12.1%	145	218	363
13	8.5%	11.0%	154	199	352
14	10.0%	9.3%	181	168	349
15	7.2%	9.0%	130	163	293
16	5.4%	10.0%	98	181	278
17	3.3%	13.3%	60	240	300
18	0.5%	7.5%	9	135	145

Medical Office hourly distribution



**CDM
Smith**

