TRAFFIC IMPACT STUDY
FOR
PROPOSED RESIDENTIAL DEVELOPMENT ON LOWER UNION HILL RD,
CHEROKEE COUNTY, GEORGIA

Prepared for:

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January 13, 2021
A & R Project # 21-225

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1.0 INTRODUCTION

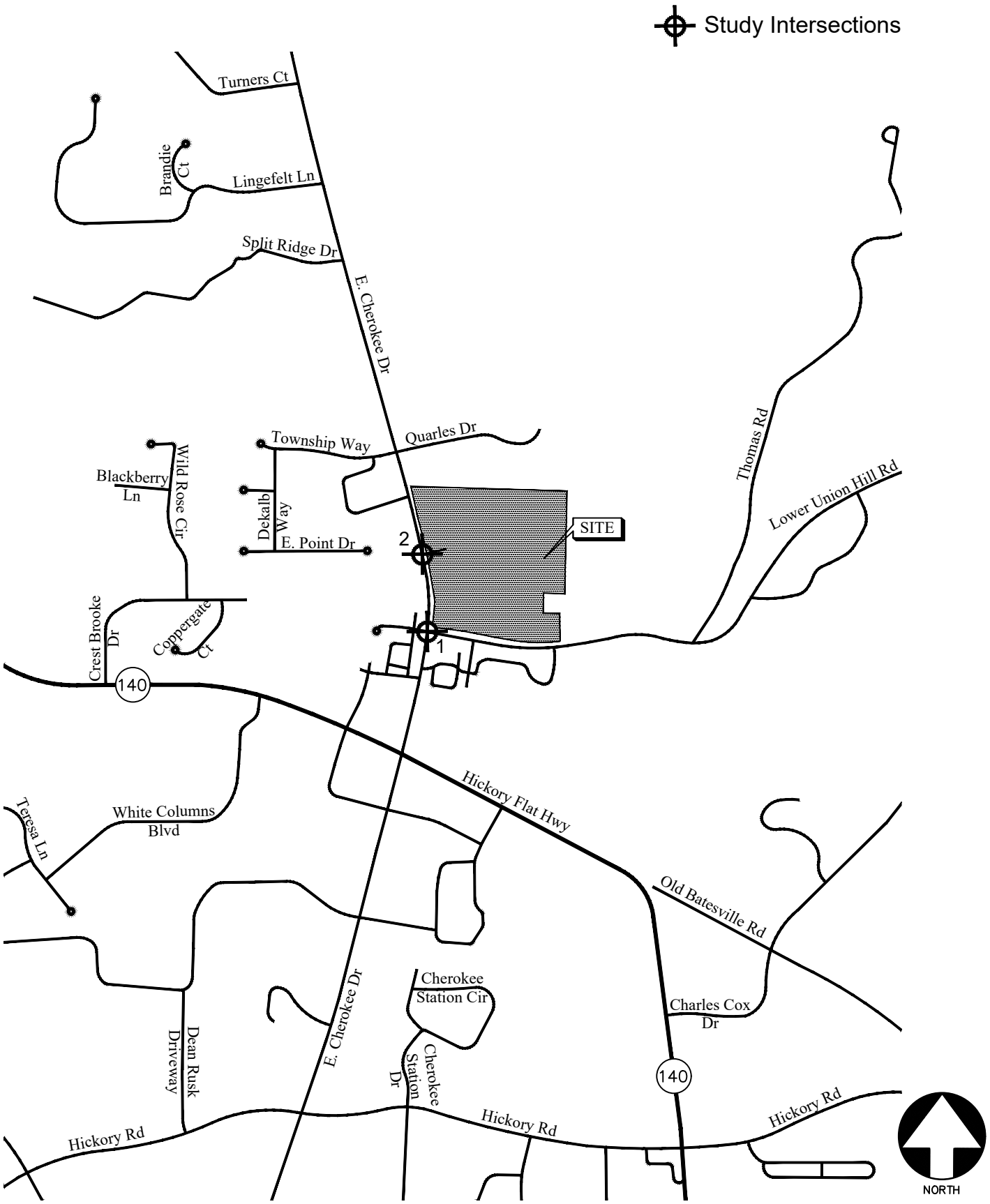
The purpose of this study is to determine the traffic impact that will result from the residential development that will be located in the northeast corner of Lower Union Hill Road and East Cherokee Drive in Cherokee County, Georgia. The traffic analysis evaluates the current operations compared to the future conditions with the traffic generated by the development. The proposed residential development will consist of 125 units of Single-family attached housing.

The development proposes a full access driveway on East Cherokee Drive.

The AM and PM peak hours have been analyzed in this study. In addition to the site access points, this study includes the evaluation of traffic operations at the intersection of:

- Lower Union Rd at East Cherokee Drive

Recommendations to improve traffic operations have been identified as appropriate and are discussed in detail in the following sections of the report. The location of the development and the surrounding roadway network is shown in Figure 1.



LOCATION MAP FIGURE 1

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2.0 EXISTING FACILITIES / CONDITIONS

2.1 Roadway Facilities

The following is a brief description of each of the roadway facilities located in proximity to the site:

2.1.1 East Cherokee Drive

East Cherokee Drive is a north-south, two-lane, un-divided roadway with a posted speed limit of 35 mph in the vicinity of the site. Georgia Department of Transportation (GDOT) traffic counts (Station ID's 057-0169) indicate that the daily traffic volume on East Cherokee Drive in 2019 was 8,150 vehicles per day, North of Lower Union Hill Road. GDOT classifies East Cherokee Drive as an Urban Minor Arterial roadway.

2.1.2 Lower Union Hill Road

Lower Union Hill Road is an east-west, two-lane, un-divided roadway with a posted speed limit of 45 mph in the vicinity of the site. Georgia Department of Transportation (GDOT) traffic counts (Station ID's 057-8151) indicate that the daily traffic volume on Lower Union Hill Road in 2019 was 4,650 vehicles per day, West of Cherokee Hill. GDOT classifies Lower Union Hill Road as an Urban Local roadway.

3.0 STUDY METHODOLOGY

In this study, the methodology used for evaluating traffic operations at each of the subject intersections is based on the criteria set forth in the Transportation Research Board's Highway Capacity Manual, 6th edition (HCM 6). Synchro software, which utilizes the HCM methodology, was used for the analysis. The following is a description of the methodology employed for the analysis of unsignalized and signalized intersections.

3.1 Unsignalized Intersections

For unsignalized intersections at which the side street or minor street is controlled by a stop sign, the criteria for evaluating traffic operations are the level-of-service (LOS) for the turning movements at the intersection and the level-of-service for the overall intersection. Level-of-service is based on control delay incurred at the intersection. Control delay for unsignalized intersections includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Several factors affect the control delay for unsignalized intersections, such as the availability and distribution of gaps in the conflicting traffic stream, critical gaps, and follow-up time for a vehicle in the queue.

Level-of-service is assigned a letter designation from "A" through "F". Level-of-service "A" indicates excellent operations with little delay to motorists, while level-of-service "F" exists when there are insufficient gaps of acceptable size to allow vehicles on the side street to cross safely, resulting in extremely long total delays and long queues. The level-of-service criteria for two-way stop-controlled and all-way stop-controlled (unsignalized) intersections are given in Table 1.

TABLE 1 – LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level-of-service	Control Delay (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: Highway Capacity Manual

3.2 Signalized Intersections

For signalized intersections, it is necessary to evaluate both capacity and level-of-service in order to evaluate the overall operation of the intersection. The capacity analysis of an intersection is performed by comparing the volume of traffic using the various lane groups at the intersection to the capacity of those lane groups. This results in a volume/capacity (v/c) ratio for each lane group. A v/c ratio greater than 1.0 indicates that the volume of traffic has exceeded the capacity available, resulting in a temporary excess of demand. Although the capacity of the entire intersection is not defined, a composite v/c ratio for the sum of the critical lane groups within the intersection is computed. This composite v/c ratio is an indication of the overall intersection sufficiency.

Level-of-service for a signalized intersection is defined in terms of control delay per vehicle, which is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The level-of-service criteria for signalized intersections, based on control delay, are shown in Table 2. Level-of-service "A" indicates operations with very low control delay, while level-of-service "F" describes operations with extremely high control delay. Level-of-service "E" is typically considered to be the limit of acceptable delay, and level-of-service "F" is considered unacceptable by most drivers.

TABLE 2 – LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS	
Level-of-service	Control Delay (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Source: Highway Capacity Manual

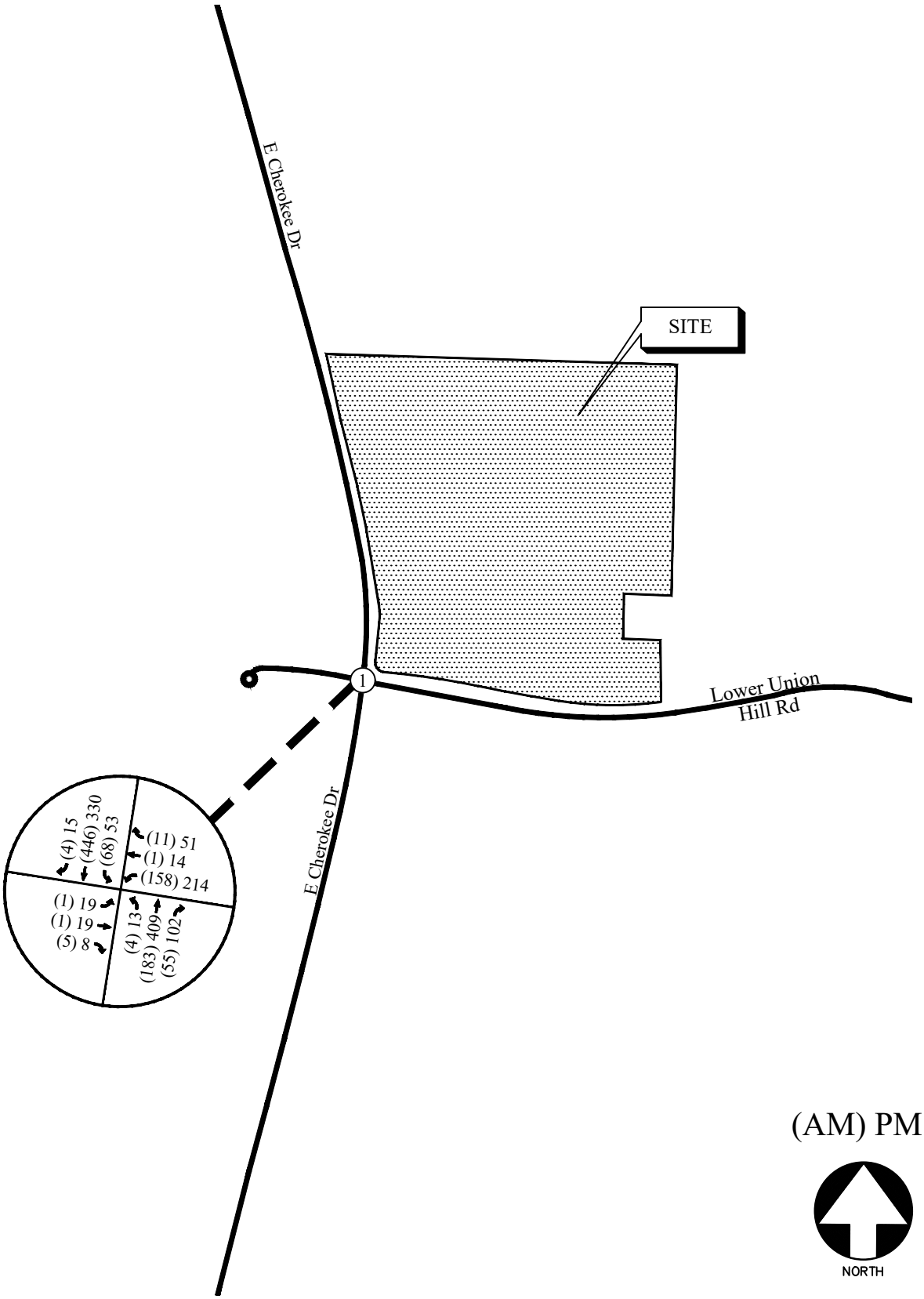
4.0 EXISTING 2021 TRAFFIC ANALYSIS

4.1 Existing Traffic Volumes

Existing traffic counts were obtained at the following study intersection:

- Lower Union Rd at East Cherokee Drive

Turning movement counts were collected on Tuesday, December 14, 2021. All turning movement counts were recorded during the AM and PM peak hours between 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM, respectively. The four consecutive 15-minute interval volumes that summed to produce the highest volume at the intersections were then determined. These volumes make up the peak hour traffic volumes for the intersections counted and are shown in Figure 2.



EXISTING WEEKDAY PEAK-HOUR VOLUMES FIGURE 2

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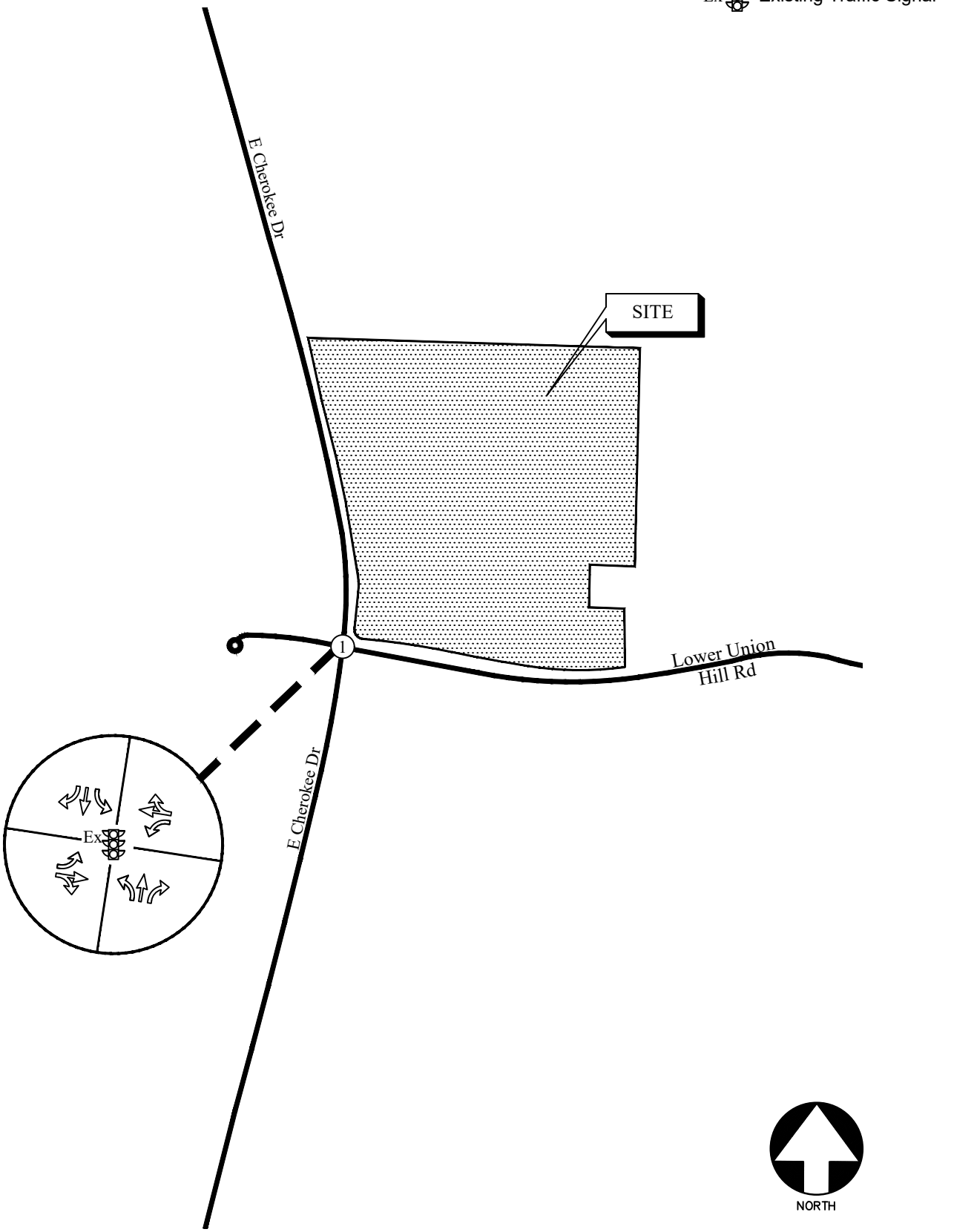
4.2 Existing Traffic Operations

Existing 2021 traffic operations were analyzed at the study intersections in accordance with the HCM methodology. The results of the analysis are shown in Table 3.

TABLE 3 – EXISTING INTERSECTION OPERATIONS

Intersection		Traffic Control	LOS (Delay)	
			AM Peak Hour	PM Peak Hour
1	**Lower Union Rd at East Cherokee Drive**	Signalized	**B (16.8)**	**C (21.8)**
	-Eastbound Approach		E (59.0)	E (56.7)
	-Westbound Approach		D (50.0)	D (51.2)
	-Northbound Left		A (8.7)	B (11.9)
	-Southbound Left		A (9.1)	B (10.1)

The results of existing traffic operations analysis indicates that the study intersection is operating at a level of service "C" or better in both the AM and PM peak hours. The existing traffic control and lane geometry for the intersections are shown in Figure 3.



EXISTING TRAFFIC CONTROL AND LANE GEOMETRY FIGURE 3

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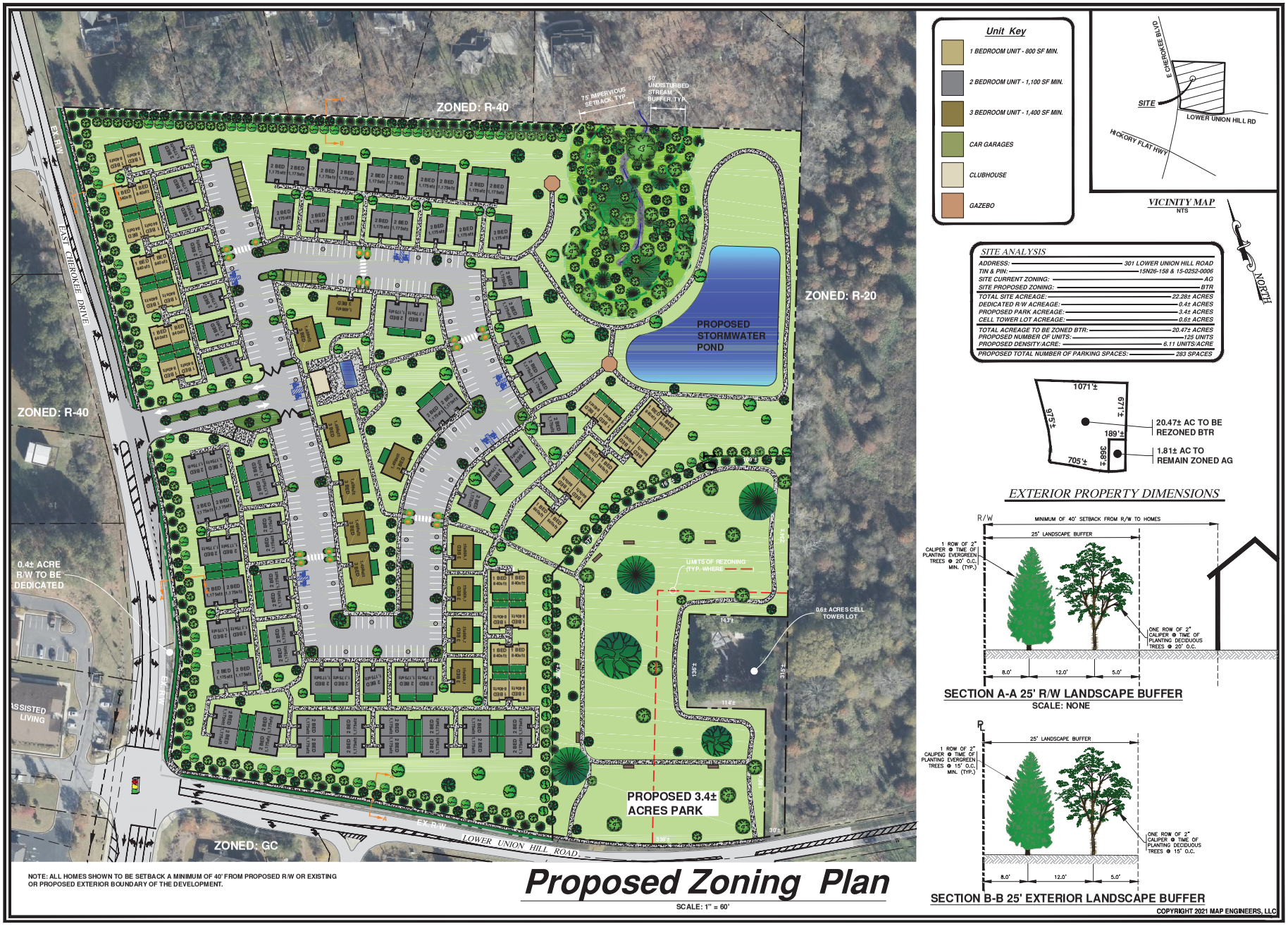
5.0 PROPOSED DEVELOPMENT

The proposed residential development that will be located along on Lower Union Hill Road, Cherokee County, Georgia. The proposed residential development will consist of 125 units of Single-family attached housing. The development proposes a full access driveway on East Cherokee Drive.

A site plan is shown in Figure 4.



PRELIMINARY NOT FOR CONSTRUCTION

MAP ENGINEERS L.L.C.
CELEBRATING 25 YEARS
7588 Applegate Lane
Chattanooga, TN 37421
TN (423) 855-0554
Fax (423) 468-6110

GRAPHIC SCALE
60' 30' 0 60' 120' 180'

301 LOWER UNION HILL ROAD

FOR:
LYONS GROUP ACQUISITIONS, LLC
1401 MARKET STREET
CHATTANOOGA, TN 37402

PROPOSED ZONING PLAN

REVISIONS		
1	MISCELLANEOUS	11/05/21
2	MISCELLANEOUS	11/16/21
3		
4		

FILE: 21191_gisxref.DWG

DATE: 10/15/21
DRAWN BY: GTF
CHECKED BY: MAP
PROJ. NUMBER: 21-191
SHEET NUMBER: PS-1

FIGURE 4 SITE PLAN

5.1 Trip Generation

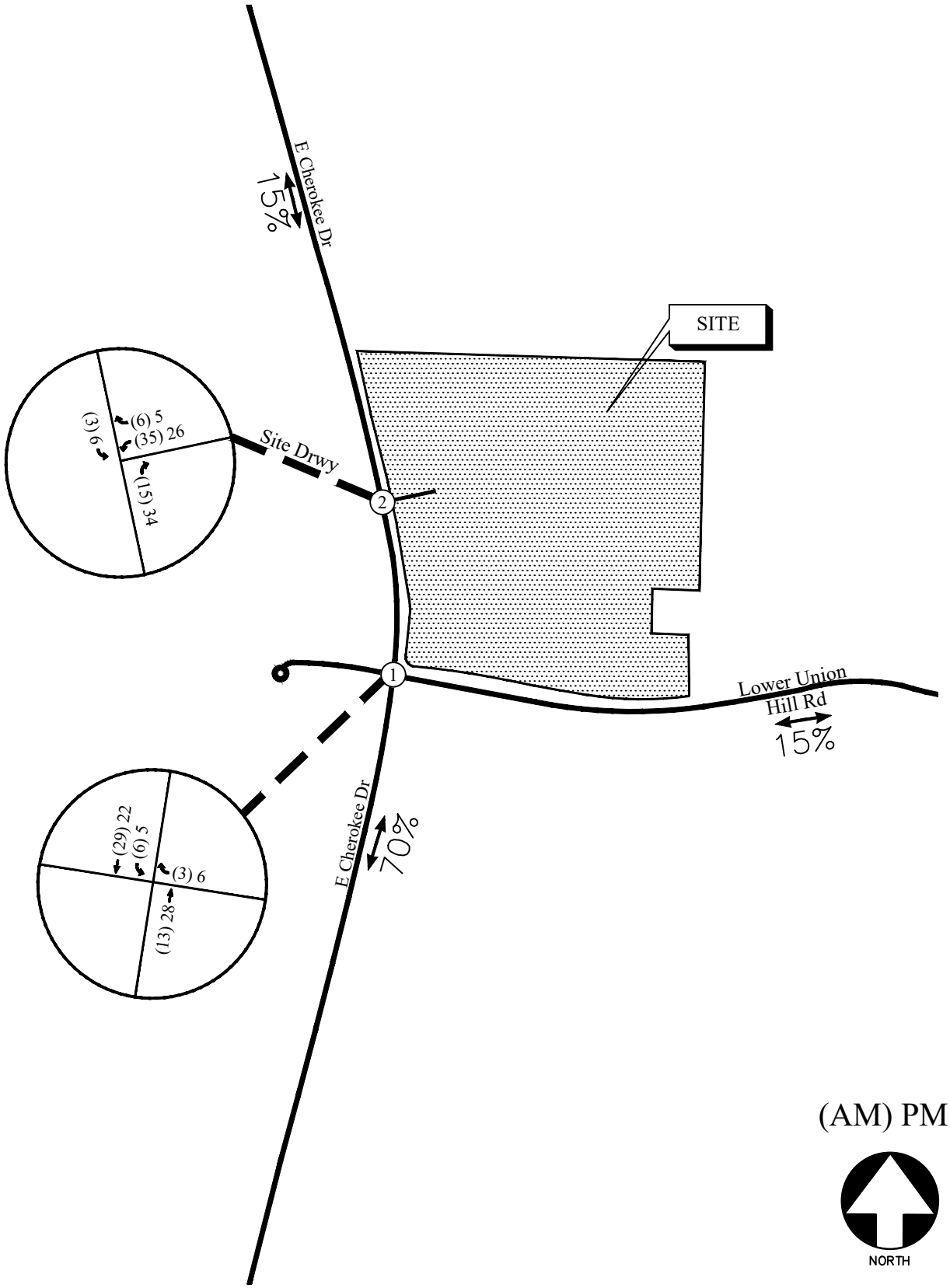
Trip generation estimates for the project were based on the rates and equations published in the 11th edition of the Institute of Transportation Engineers (ITE) Trip Generation report. This reference contains traffic volume count data collected at similar facilities nationwide. The trip generation was based on the following ITE Land Uses: *215 – Single-Family Attached Housing.* The calculated total trip generation for the proposed development is shown in Table 4.

TABLE 4 – TRIP GENERATION

Land Use	Size	AM Peak Hour			PM Peak Hour			24 Hour
		Enter	Exit	Total	Enter	Exit	Total	Two-way
ITE 215 – Single-Family Attached Housing	125 units	18	41	59	40	31	71	902

5.2 Trip Distribution

The trip distribution describes how traffic arrives and departs from the site. An overall trip distribution was developed for the site based on a review of the existing travel patterns in the area and the locations of major roadways and highways that will serve the development. The site-generated peak hour traffic volumes, shown in Table 4, were assigned to the study area intersections based on this distribution. The outer-leg distribution and AM and PM peak hour new traffic generated by the site are shown in Figure 5.



TRIP DISTRIBUTION AND SITE-GENERATED WEEKDAY PEAK HOUR VOLUMES

FIGURE 5

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6.0 FUTURE 2024 TRAFFIC ANALYSIS

The future 2024 traffic operations are analyzed for the "Build" and "No-Build" conditions. This provides a basis of reference for determining both the contribution of the site to overall traffic conditions and the additional improvements needed to provide sufficient site access and capacity for passing traffic.

6.1 Future "No-Build" Conditions

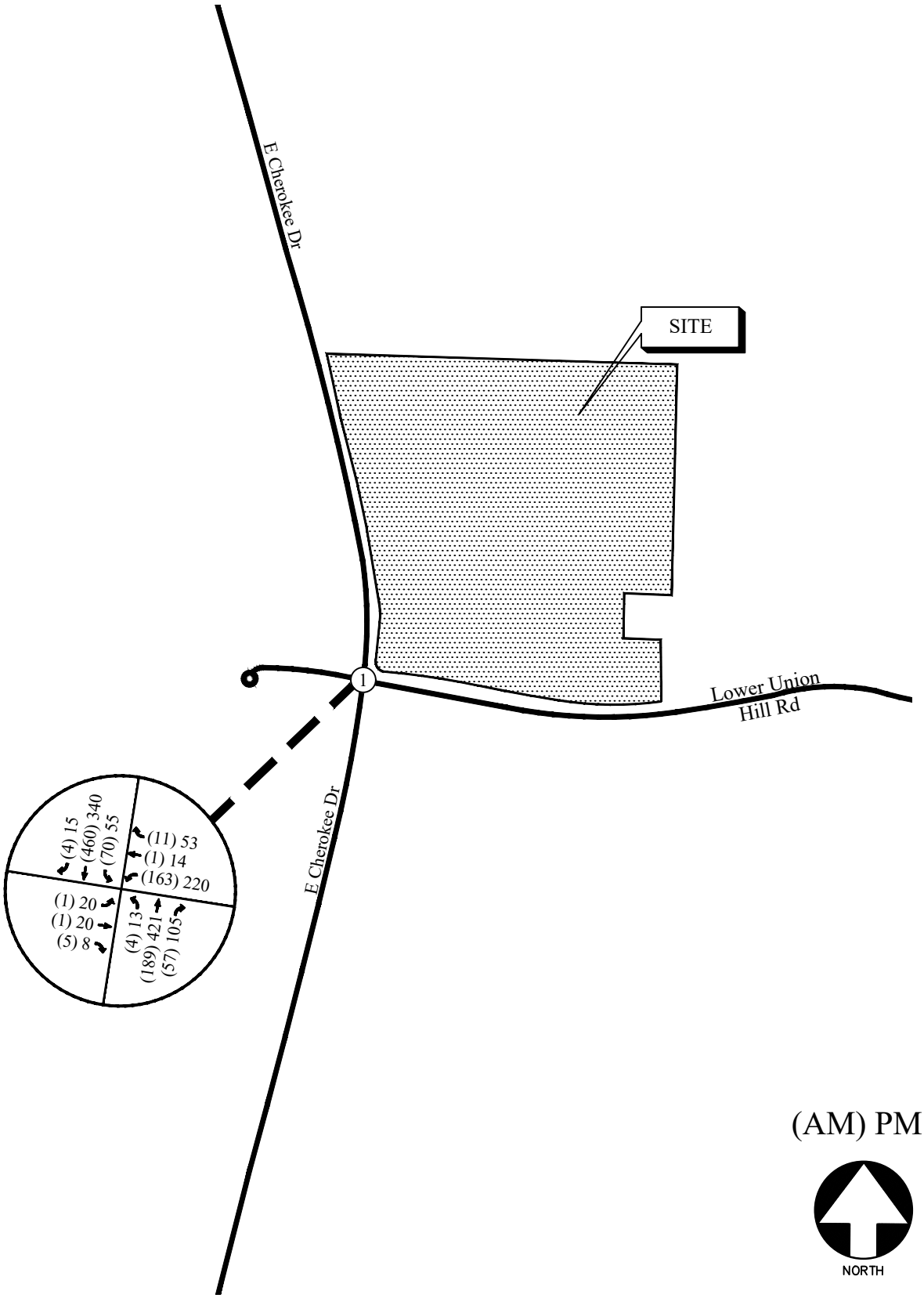
The "No-Build" (or background) conditions provide an assessment of how traffic will operate in the study horizon year without the study site being developed as proposed, with projected increases in through traffic volumes due to normal annual growth. The Future "No-Build" volumes consist of the existing traffic volumes (Figure 2) plus increases for annual growth of through traffic.

6.1.1 Annual Traffic Growth

To evaluate future traffic operations in this area, a projection of normal traffic growth was applied to the existing volumes. The Georgia Department of Transportation recorded average daily traffic volumes at several locations in the vicinity of the site. Reviewing the growth over the last three years revealed growth of approximately 1% in the area was used in the analysis. This growth factor was applied to the existing traffic volumes between collector and arterial roadways in order to estimate the future year traffic volumes prior to the addition of site-generated traffic. The resulting Future "No-Build" volumes on the roadway are shown in Figure 6.

6.2 Future "Build" Conditions

The "Build" or development conditions include the estimated background traffic from the "No-Build" conditions plus the added traffic from the proposed development. In order to evaluate future traffic operations in this area, the additional traffic volumes from the site (Figure 5) were added to base traffic volumes (Figure 6) to calculate the future traffic volumes after the construction of the development. These total future "Build" traffic volumes are shown in Figure 7.



FUTURE (NO-BUILD) WEEKDAY PEAK HOUR VOLUMES FIGURE 6

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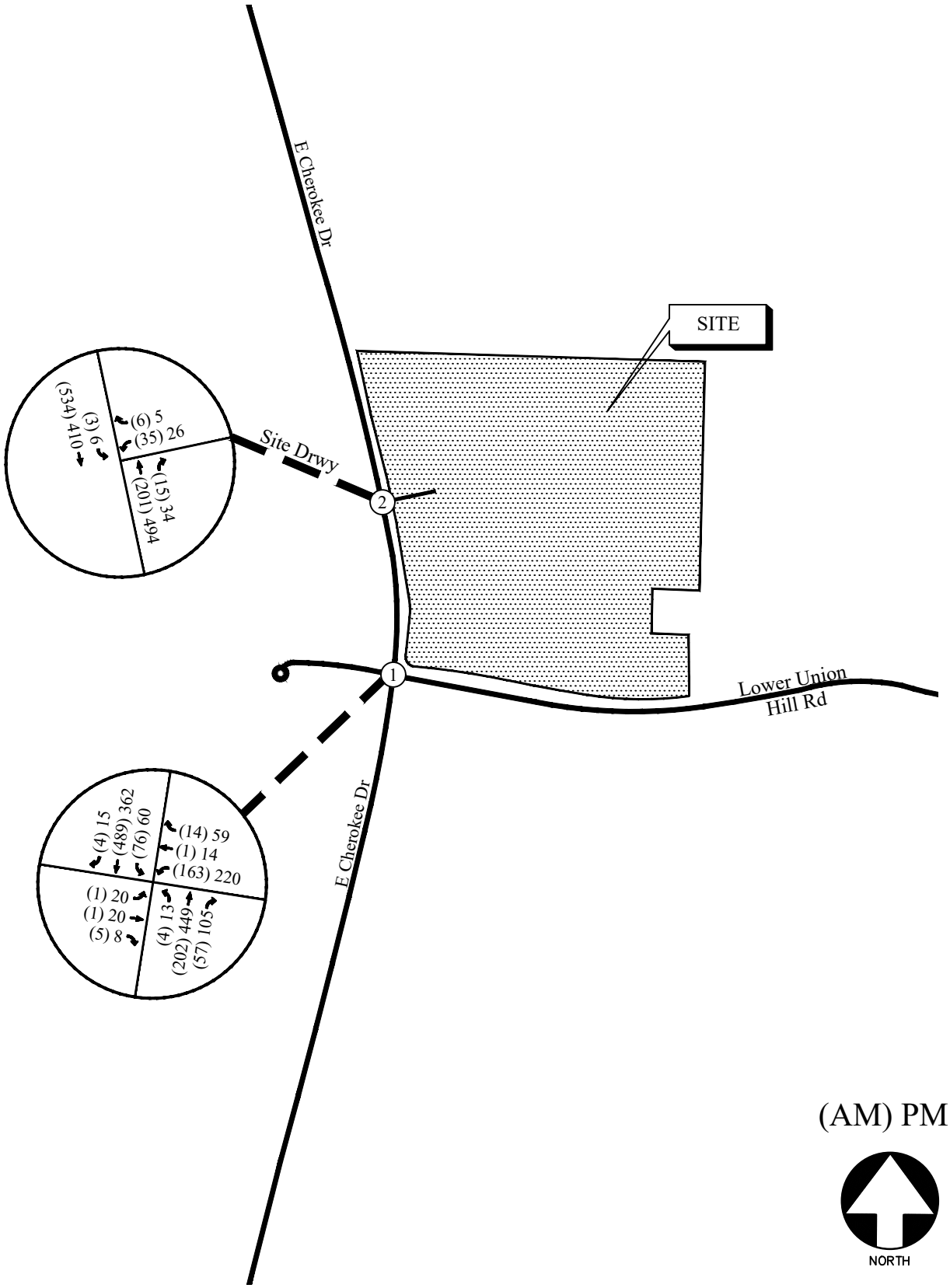

FUTURE (BUILD) WEEKDAY PEAK HOUR VOLUMES FIGURE 7

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6.3 Auxiliary Lane Analysis

Included below are analyses for left-turn lanes and deceleration lanes for all site driveways per GDOT standards. The analyses below are based off the trip distribution included in Section 5.2. According to the trip distribution, the 24-hour two-way volume entering and exiting of the site is 902 vehicles.

6.3.1 Left Turn Lane Analysis

According to GDOT standards, for a two-lane roadway with AADT's greater than 6,000 vehicles, the threshold of daily site generated left-turn volume to warrant a left-turn lane is 200 vehicles for speed limit 35 mph. The projected left-turn volume per day for the proposed driveways is shown in Table 5.

TABLE 5 - GDOT REQUIREMENTS FOR LEFT TURN LANES

Intersection	Left turn traffic (% total entering)	Left turn / Roadway Direction	Left-turn Volume (vehicle/day)	Roadway Speed/ # lanes / ADT	GDOT Threshold (vehicle/day)	Warrant met?
E. Cherokee Dr @ Site Drwy	15%	E. Cherokee Dr (Southbound)	**68** (total trips) ÷ 2 × 0.15 = (902) ÷ 2 x 0.15 = 68	35 mph / 2-Lane/ >6000	200	No

Although a left turn lane is not warranted on East Cherokee Drive at the Site Driveway per GDOT standards, it is highly recommended that a left turn lane be provided to accommodate Cherokee County turn lane requirements for projects of this size on major roadways.

6.3.2 Deceleration Turn Lane Analysis

For two lane roadways with AADT's greater than 6,000 vehicles and a posted speed limit of 35 mph, the threshold of daily site generated right-turn volume to warrant a right-turn lane is 100 vehicles. The projected right-turn volume per day for the proposed driveway is shown in Table 6.

TABLE 6 - GDOT REQUIREMENTS FOR DECELERATION LANES

Intersection	Right-turn traffic (% total entering)	Right turn / Roadway Direction	Right-turn Volume (vehicle/day)	Roadway Speed/ # lanes /ADT	GDOT Threshold (vehicle/day)	Warrant met?
E. Cherokee Dr @ Site Drwy	85%	E. Cherokee Dr (Northbound)	**383** (total trips) ÷ 2 × 0.85 = (902) ÷ 2 x 0.85 = 383	35 mph / 2-Lane/>6000	100	Yes

Per GDOT standards, a deceleration lane is warranted on East Cherokee Drive at the Site Driveway.

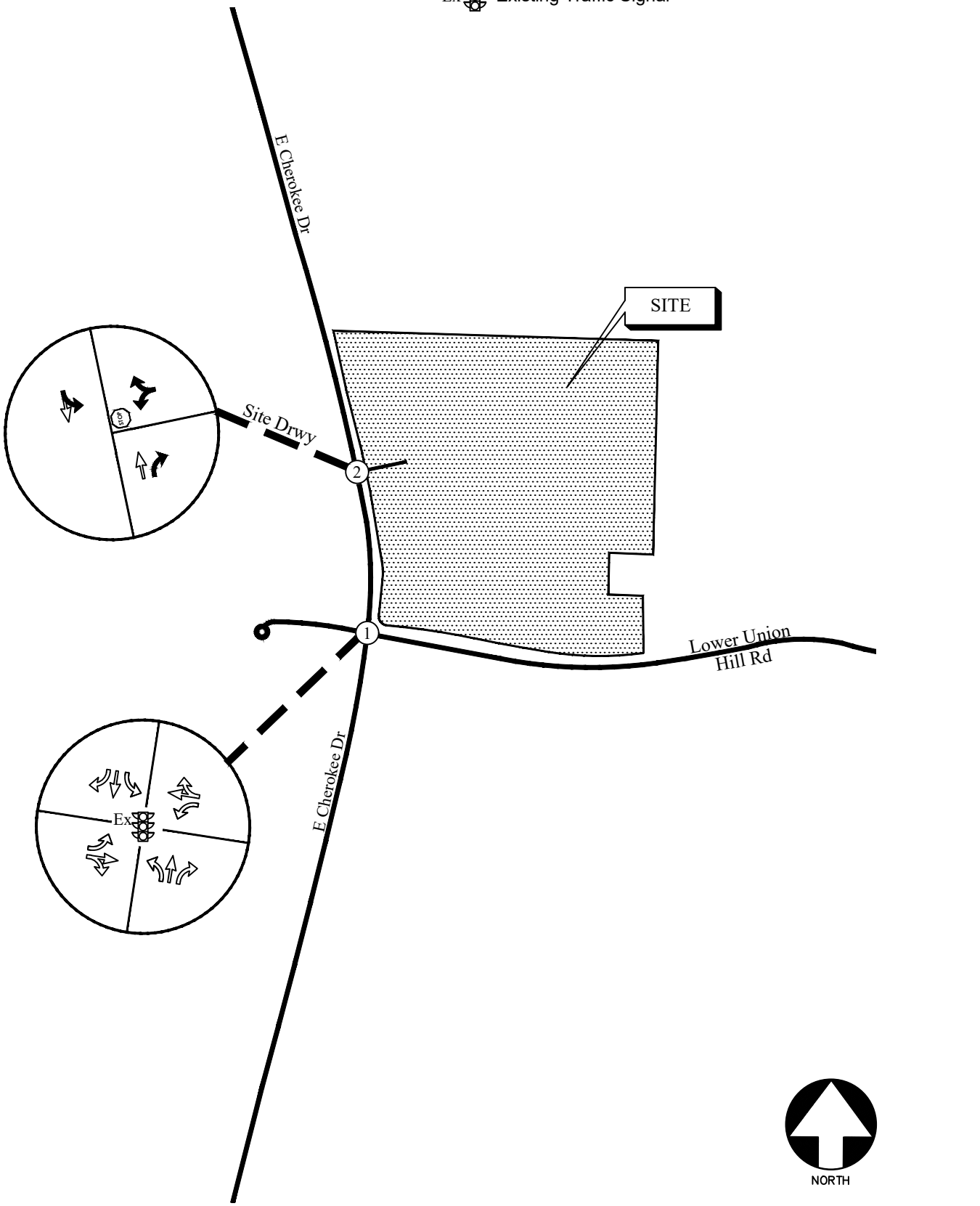
6.4 Future Traffic Operations

The future "No-Build" and "Build" traffic operations were analyzed using the volumes in Figure 6 and Figure 7, respectively. The results of the future traffic operations analysis are shown below in Table 7. Recommendations for future traffic control and lane geometry is shown in Figure 8.

TABLE 7 – FUTURE INTERSECTION OPERATIONS

	Intersection	Future Condition: LOS (Delay)			
		NO BUILD		BUILD	
		AM Peak	PM Peak	AM Peak	PM Peak
	Lower Union Rd at East Cherokee Drive	**B (17.6)**	**C (22.3)**	**B (18.6)**	**C (24.0)**
	-Eastbound Approach	E (59.0)	E (56.9)	E (58.2)	E (56.8)
1	-Westbound Approach	E (58.5)	D (52.8)	E (64.3)	E (65.1)
	-Northbound Left	A (7.9)	B (12.1)	A (7.5)	B (11.2)
	-Southbound Left	A (8.2)	B (10.2)	A (7.9)	A (9.3)
	East Cherokee Drive at Site Driveway				
2	-Westbound Approach	-	-	C (15.6)	C (18.9)
	-Southbound Left			A (7.7)	A (8.6)

After addition of site generated traffic volumes to the No-Build Volumes, the signalized intersection of Lower Union Road at East Cherokee Drive will continue to operate at a level-of-service "B" in the AM peak hours and "C" in the PM peak hour. Based on the analysis shown in Table 7, there are insignificant differences in level-of-services between the" No-Build" and "Build" scenarios. Therefore, the impact of the proposed development on traffic operations at the study intersection is minimal. A deceleration lane at the site driveway on East Cherokee Drive was included in the Synchro model for the Build condition analysis.



FUTURE TRAFFIC CONTROL AND LANE GEOMETRY FIGURE 8

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7.0 CONCLUSIONS AND RECOMMENDATIONS

Traffic impacts were evaluated for the added traffic from the proposed residential development that will be located in the northeast corner of Lower Union Hill Road and East Cherokee Drive in Cherokee County, Georgia. The proposed residential development will consist of 125 units of Single-family attached housing. The development proposes one full access driveway on East Cherokee Drive.

Existing and future operations after completion of the project were analyzed at the intersections of:

- Lower Union Rd at East Cherokee Drive
- East Cherokee Drive at Site Driveway

The analysis included the evaluation of Future operations for "No-Build" and "Build" conditions. The results of "No-Build" and "Build" traffic operations analysis indicates that the signalized study intersection and the approaches for the stop sign controlled intersection will operate at level of service "C" or better in both the AM and PM peak hours. Based on the analysis, the proposed development will have minimal impact on traffic operations in the study network.

7.1 Recommendation for Site Access Configuration

It is recommended that the following improvements be provided at the site driveway:

- Northbound deceleration lane on East Cherokee Drive (See section 6.3 for details)
- One entering and one exiting lane at the driveway approach
- Stop sign control for the site driveway with East Cherokee Drive remaining free flow
- Verify adequate sight distance per AASHTO guidelines at the site driveway in both directions

Appendix

EXISTING INTERSECTION TRAFFIC COUNTS

A & R Engineering, Inc.

2160 Kingston Court, Suite 'O'
Marietta, GA 30067

TMC DATA
Lower Union Hill Rd @ E Cherokee Dr
7-9 am | 4-6 pm

File Name : 20210426
Site Code : 20210426
Start Date : 12/14/2021
Page No : 1

Groups Printed- Cars,Buses & Trucks

	E Cherokee Dr Northbound				E Cherokee Dr Southbound				Lower Union Hill Rd Eastbound				Lower Union Hill Rd Westbound				
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	32	10	43	4	75	0	79	0	1	0	1	24	2	1	27	150
07:15 AM	1	45	13	59	12	99	1	112	0	2	1	3	25	0	1	26	200
07:30 AM	1	34	18	53	9	114	0	123	0	0	1	1	30	0	3	33	210
07:45 AM	2	53	17	72	20	119	1	140	0	1	2	3	41	0	3	44	259
Total	5	164	58	227	45	407	2	454	0	4	4	8	120	2	8	130	819
08:00 AM	0	27	13	40	15	120	1	136	0	0	1	1	45	0	4	49	226
08:15 AM	1	50	11	62	18	107	1	126	0	0	1	1	42	1	2	45	234
08:30 AM	1	53	14	68	15	100	1	116	1	0	1	2	30	0	2	32	218
08:45 AM	1	54	13	68	8	97	1	106	1	0	0	1	33	1	4	38	213
Total	3	184	51	238	56	424	4	484	2	0	3	5	150	2	12	164	891
*** BREAK ***																	
04:00 PM	2	73	34	109	13	79	2	94	3	2	1	6	49	1	4	54	263
04:15 PM	0	93	31	124	14	72	1	87	2	1	1	4	36	2	6	44	259
04:30 PM	3	90	31	124	17	96	3	116	3	5	4	12	49	1	6	56	308
04:45 PM	7	98	24	129	13	66	2	81	6	6	2	14	50	3	5	58	282
Total	12	354	120	486	57	313	8	378	14	14	8	36	184	7	21	212	1112
05:00 PM	2	102	28	132	20	74	3	97	2	3	3	8	52	4	17	73	310
05:15 PM	1	109	25	135	8	89	2	99	5	5	1	11	59	2	12	73	318
05:30 PM	3	100	25	128	12	101	8	121	6	5	2	13	53	5	17	75	337
05:45 PM	3	92	20	115	9	78	1	88	1	4	3	8	60	2	5	67	278
Total	9	403	98	510	49	342	14	405	14	17	9	40	224	13	51	288	1243
Grand Total	29	1105	327	1461	207	1486	28	1721	30	35	24	89	678	24	92	794	4065
Apprch %	2	75.6	22.4		12	86.3	1.6		33.7	39.3	27		85.4	3	11.6		
Total %	0.7	27.2	8	35.9	5.1	36.6	0.7	42.3	0.7	0.9	0.6	2.2	16.7	0.6	2.3	19.5	

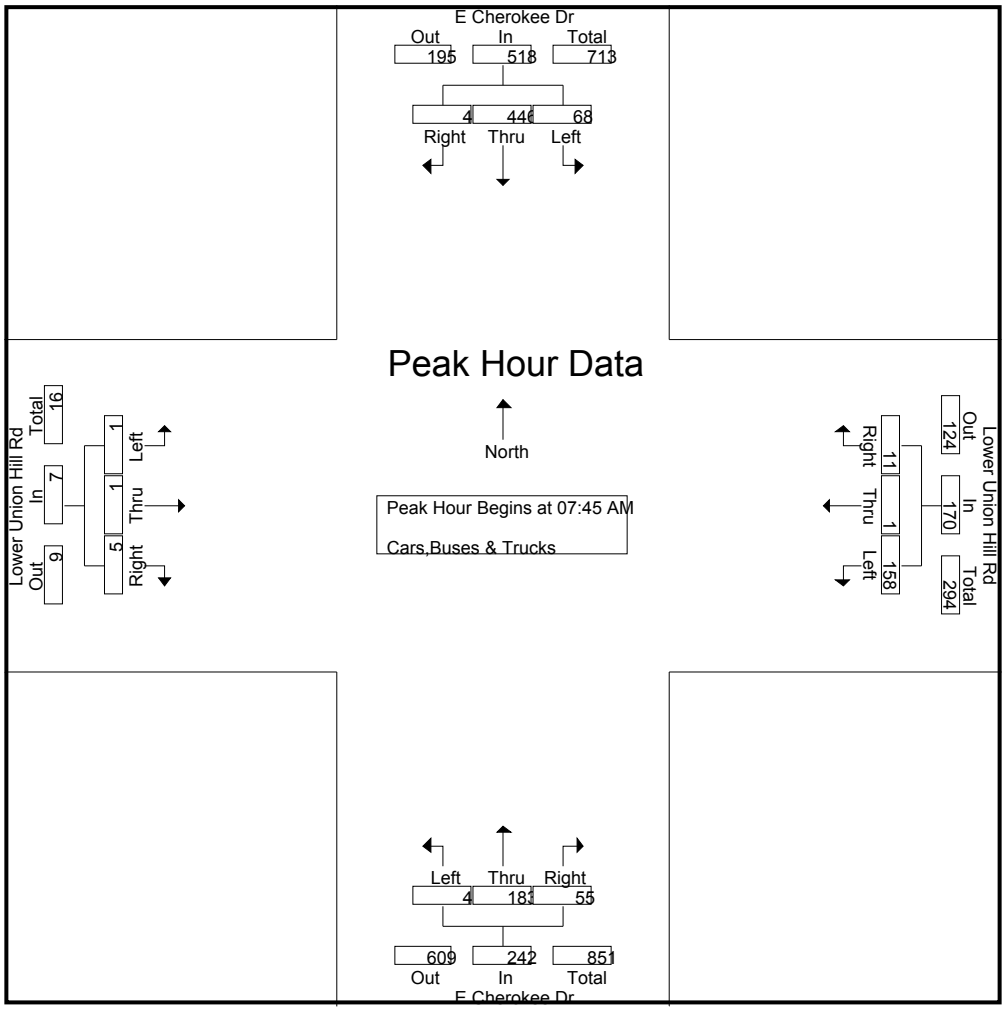
A & R Engineering, Inc.

2160 Kingston Court, Suite 'O'
Marietta, GA 30067

TMC DATA
Lower Union Hill Rd @ E Cherokee Dr
7-9 am | 4-6 pm

File Name : 20210426
Site Code : 20210426
Start Date : 12/14/2021
Page No : 2

	E Cherokee Dr Northbound				E Cherokee Dr Southbound				Lower Union Hill Rd Eastbound				Lower Union Hill Rd Westbound				
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 07:45 AM																	
07:45 AM	**2**	**53**	**17**	**72**	**20**	119	**1**	**140**	0	**1**	**2**	**3**	41	0	3	44	**259**
08:00 AM	0	27	13	40	15	**120**	1	136	0	0	1	1	**45**	0	**4**	**49**	226
08:15 AM	1	50	11	62	18	107	1	126	0	0	1	1	42	**1**	2	45	234
08:30 AM	1	53	14	68	15	100	1	116	**1**	0	1	2	30	0	2	32	218
Total Volume	4	183	55	242	68	446	4	518	1	1	5	7	158	1	11	170	937
% App. Total	1.7	75.6	22.7		13.1	86.1	0.8		14.3	14.3	71.4		92.9	0.6	6.5		
PHF	.500	.863	.809	.840	.850	.929	1.00	.925	.250	.250	.625	.583	.878	.250	.688	.867	.904



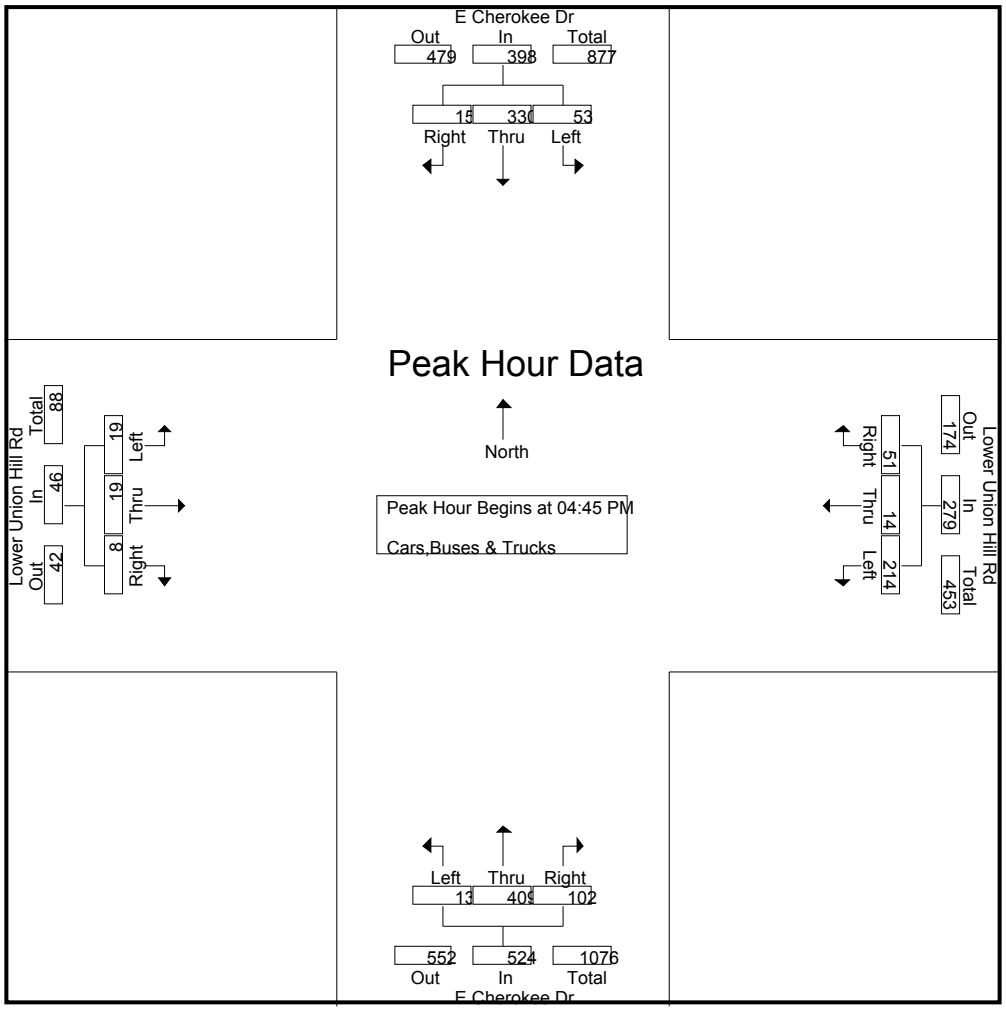
A & R Engineering, Inc.

2160 Kingston Court, Suite 'O'
Marietta, GA 30067

TMC DATA
Lower Union Hill Rd @ E Cherokee Dr
7-9 am | 4-6 pm

File Name : 20210426
Site Code : 20210426
Start Date : 12/14/2021
Page No : 3

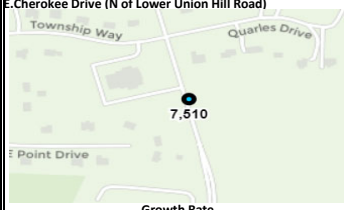
	E Cherokee Dr Northbound				E Cherokee Dr Southbound				Lower Union Hill Rd Eastbound				Lower Union Hill Rd Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**7**	98	24	129	13	66	2	81	**6**	**6**	2	**14**	50	3	5	58	282
05:00 PM	2	102	**28**	132	**20**	74	3	97	2	3	**3**	8	52	4	**17**	73	310
05:15 PM	1	**109**	25	**135**	8	89	2	99	5	5	1	11	**59**	2	12	73	318
05:30 PM	3	100	25	128	12	**101**	**8**	**121**	6	5	2	13	53	**5**	17	**75**	**337**
Total Volume	13	409	102	524	53	330	15	398	19	19	8	46	214	14	51	279	1247
% App. Total	2.5	78.1	19.5		13.3	82.9	3.8		41.3	41.3	17.4		76.7	5	18.3		
PHF	.464	.938	.911	.970	.663	.817	.469	.822	.792	.792	.667	.821	.907	.700	.750	.930	.925

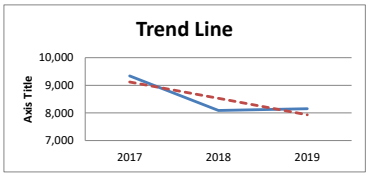


LINEAR REGRESSION OF DAILY TRAFFIC

Location	Growth Rate	R Squared	Station ID	Route	2017	2018	2019
E.Cherokee Drive (N of Lower U	-6.8%	0.71	057-0169	00076500	9,340	8,090	8,150
Lower Union Hill Road (E of E.Ch	13.2%	0.80	057-8151	00029500	3,660	3,720	4,650
SR 140 Hickory Flat Highway (E	-2.5%	0.67	057-0110	00014000	18,200	17,200	17,300
E.Cherokee Drive (N of Hickory I	9.9%	0.75	057-0167	00076500	10,900	10,900	13,100
Weighted Average	**1.3%**	0.11	Sum of Count Stations =		42,100	39,910	43,200

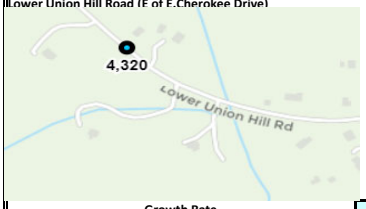
Location	Traffic Counter	RCLINK	2017	2018	2019
E.Cherokee Drive (N of Lower Union Hill Road)	057-0169	00076500	9,340	8,090	8,150

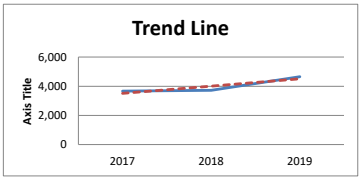




Growth Rate	-6.8%	Intercept	1,209,237	Slope	-595.00
Trend Line			9,122	8,527	7,932

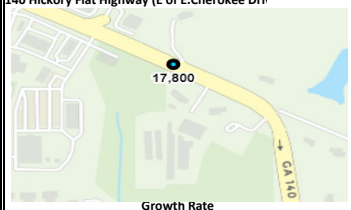
Location	Traffic Counter	RCLINK	2017	2018	2019
Lower Union Hill Road (E of E.Cherokee Drive)	057-8151	00029500	3,660	3,720	4,650

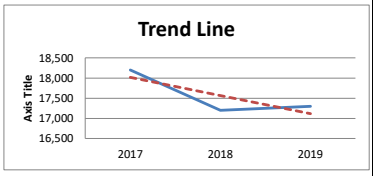




Growth Rate	13.2%	Intercept	-994,900	Slope	495.00
Trend Line			3,515	4,010	4,505

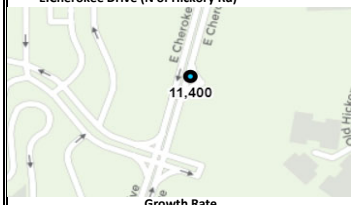
Location	Traffic Counter	RCLINK	2017	2018	2019
140 Hickory Flat Highway (E of E.Cherokee Dri	057-0110	00014000	18,200	17,200	17,300

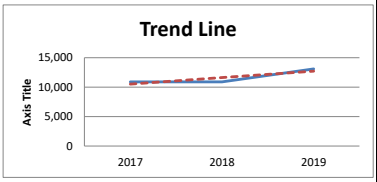




Growth Rate	-2.5%	Intercept	925,667	Slope	-450.00
Trend Line			18,017	17,567	17,117

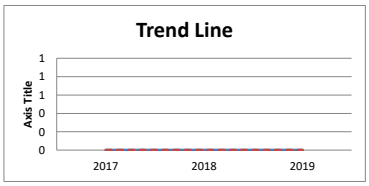
Location	Traffic Counter	RCLINK	2017	2018	2019
E.Cherokee Drive (N of Hickory Rd)	057-0167	00076500	10,900	10,900	13,100





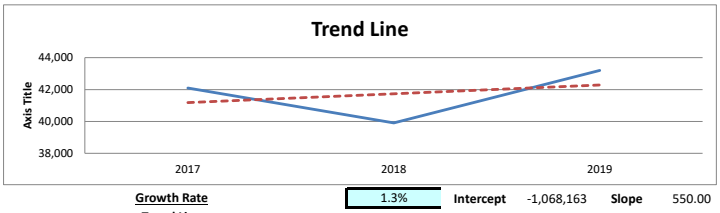
Growth Rate	9.9%	Intercept	-2,208,167	Slope	1,100.00
Trend Line			10,533	11,633	12,733

Location	Traffic Counter	RCLINK	2017	2018	2019
0	0	0	0	0	0



Growth Rate	#DIV/0!	Intercept	0	Slope	0.00
Trend Line			0	0	0

Weighted Average	2017	2018	2019
Sum of Count Stations	42,100	39,910	43,200



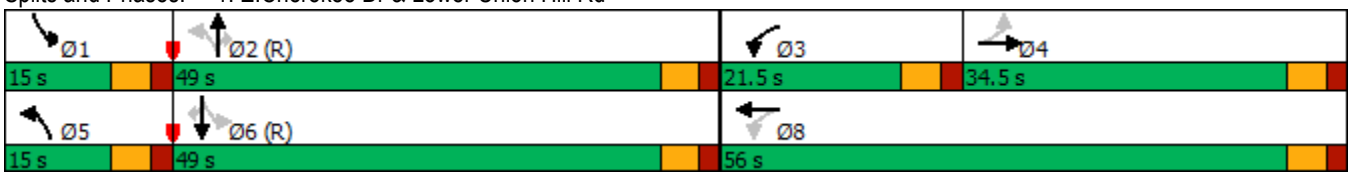
Growth Rate	1.3%	Intercept	-1,068,163	Slope	550.00
Trend Line			41,187	41,737	42,287

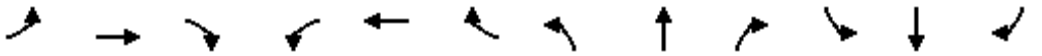
EXISTING INTERSECTION ANALYSIS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1	1	158	1	4	183	55	68	446	4
Future Volume (vph)	1	1	158	1	4	183	55	68	446	4
Lane Group Flow (vph)	1	7	176	13	4	203	61	76	496	4
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	6.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	34.5	34.5	15.0	30.5	15.0	31.5	31.5	15.0	29.5	29.5
Total Split (s)	34.5	34.5	21.5	56.0	15.0	49.0	49.0	15.0	49.0	49.0
Total Split (%)	28.8%	28.8%	17.9%	46.7%	12.5%	40.8%	40.8%	12.5%	40.8%	40.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	6.2	6.2	17.2	17.2	85.3	80.8	80.8	91.5	89.5	89.5
Actuated g/C Ratio	0.05	0.05	0.14	0.14	0.71	0.67	0.67	0.76	0.75	0.75
v/c Ratio	0.01	0.08	0.74	0.05	0.01	0.16	0.06	0.09	0.36	0.00
Control Delay	54.0	35.5	66.1	19.5	5.2	9.4	0.1	4.7	7.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	35.5	66.1	19.5	5.2	9.4	0.1	4.7	7.8	0.0
LOS	D	D	E	B	A	A	A	A	A	A
Approach Delay		37.8		62.9		7.2			7.4	
Approach LOS		D		E		A			A	
Queue Length 50th (ft)	1	1	138	1	1	57	0	12	103	0
Queue Length 95th (ft)	7	17	194	18	5	124	0	37	306	0
Internal Link Dist (ft)		258		596		424			425	
Turn Bay Length (ft)	230		235		180		90	245		240
Base Capacity (vph)	450	396	258	682	698	1253	1105	886	1390	1212
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	0.00	0.02	0.68	0.02	0.01	0.16	0.06	0.09	0.36	0.00

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 56.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: E.Cherokee Dr & Lower Union Hill Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	5	158	1	11	4	183	55	68	446	4
Future Volume (veh/h)	1	1	5	158	1	11	4	183	55	68	446	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1	6	176	1	12	4	203	61	76	496	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	95	6	35	286	22	268	571	1203	1019	797	1265	1072
Arrive On Green	0.03	0.03	0.03	0.11	0.18	0.18	0.01	0.64	0.64	0.04	0.68	0.68
Sat Flow, veh/h	1401	231	1389	1781	123	1480	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	1	0	7	176	0	13	4	203	61	76	496	4
Grp Sat Flow(s),veh/h/ln	1401	0	1620	1781	0	1604	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.1	0.0	0.5	11.2	0.0	0.8	0.1	5.2	1.7	1.7	14.0	0.1
Cycle Q Clear(g_c), s	0.1	0.0	0.5	11.2	0.0	0.8	0.1	5.2	1.7	1.7	14.0	0.1
Prop In Lane	1.00		0.86	1.00		0.92	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	95	0	41	286	0	291	571	1203	1019	797	1265	1072
V/C Ratio(X)	0.01	0.00	0.17	0.62	0.00	0.04	0.01	0.17	0.06	0.10	0.39	0.00
Avail Cap(c_a), veh/h	399	0	392	327	0	675	703	1203	1019	870	1265	1072
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.1	0.0	57.3	47.9	0.0	40.6	7.9	8.6	8.0	6.4	8.6	6.3
Incr Delay (d2), s/veh	0.0	0.0	2.0	2.7	0.0	0.1	0.0	0.3	0.1	0.1	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.2	5.0	0.0	0.3	0.0	2.1	0.6	0.6	5.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	59.2	50.6	0.0	40.6	7.9	8.9	8.1	6.4	9.5	6.3
LnGrp LOS	E	A	E	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		8			189			268			576	
Approach Delay, s/veh		59.0			50.0			8.7			9.1	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.1	82.7	18.7	8.5	6.1	86.6		27.2				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	43.5	16.0	29.0	9.5	43.5		50.5				
Max Q Clear Time (g_c+I1), s	3.7	7.2	13.2	2.5	2.1	16.0		2.8				
Green Ext Time (p_c), s	0.1	0.8	0.1	0.0	0.0	1.8		0.0				

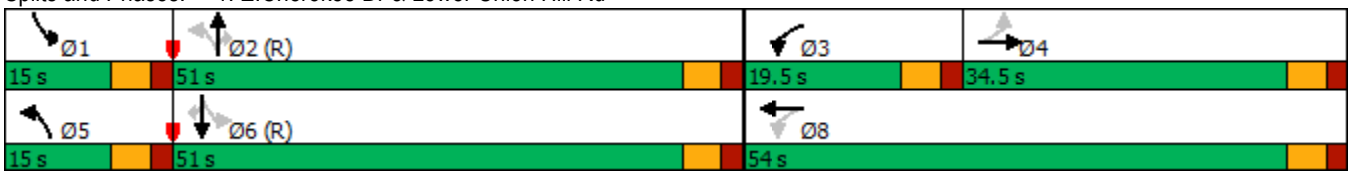
Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B

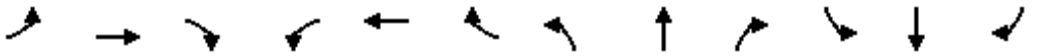
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	19	19	214	14	13	409	102	53	330	15
Future Volume (vph)	19	19	214	14	13	409	102	53	330	15
Lane Group Flow (vph)	20	29	230	70	14	440	110	57	355	16
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	6.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	34.5	34.5	15.0	30.5	15.0	31.5	31.5	15.0	29.5	29.5
Total Split (s)	34.5	34.5	19.5	54.0	15.0	51.0	51.0	15.0	51.0	51.0
Total Split (%)	28.8%	28.8%	16.3%	45.0%	12.5%	42.5%	42.5%	12.5%	42.5%	42.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	7.5	7.5	22.4	22.4	80.7	76.0	76.0	85.4	82.0	82.0
Actuated g/C Ratio	0.06	0.06	0.19	0.19	0.67	0.63	0.63	0.71	0.68	0.68
v/c Ratio	0.22	0.24	0.91	0.20	0.02	0.37	0.11	0.09	0.28	0.01
Control Delay	58.3	45.1	81.5	14.4	6.8	13.8	2.0	6.5	10.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.3	45.1	81.5	14.4	6.8	13.8	2.0	6.5	10.3	0.0
LOS	E	D	F	B	A	B	A	A	B	A
Approach Delay		50.5		65.8		11.4			9.4	
Approach LOS		D		E		B			A	
Queue Length 50th (ft)	16	16	167	10	3	186	0	13	100	0
Queue Length 95th (ft)	42	47	#280	49	11	288	22	30	213	0
Internal Link Dist (ft)		258		596		424			425	
Turn Bay Length (ft)	230		235		180		90	245		240
Base Capacity (vph)	352	435	255	696	758	1179	1047	633	1272	1120
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	0.06	0.07	0.90	0.10	0.02	0.37	0.11	0.09	0.28	0.01

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 58.0%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 1: E.Cherokee Dr & Lower Union Hill Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	19	8	214	14	51	13	409	102	53	330	15
Future Volume (veh/h)	19	19	8	214	14	51	13	409	102	53	330	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	20	9	230	15	55	14	440	110	57	355	16
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	125	60	27	314	74	272	644	1151	976	550	1188	1007
Arrive On Green	0.05	0.05	0.05	0.12	0.21	0.21	0.02	0.62	0.62	0.04	0.64	0.64
Sat Flow, veh/h	1331	1222	550	1781	351	1287	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	20	0	29	230	0	70	14	440	110	57	355	16
Grp Sat Flow(s),veh/h/ln	1331	0	1771	1781	0	1639	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.7	0.0	1.9	14.0	0.0	4.2	0.4	14.2	3.4	1.4	10.2	0.4
Cycle Q Clear(g_c), s	1.7	0.0	1.9	14.0	0.0	4.2	0.4	14.2	3.4	1.4	10.2	0.4
Prop In Lane	1.00		0.31	1.00		0.79	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	125	0	87	314	0	347	644	1151	976	550	1188	1007
V/C Ratio(X)	0.16	0.00	0.33	0.73	0.00	0.20	0.02	0.38	0.11	0.10	0.30	0.02
Avail Cap(c_a), veh/h	382	0	428	314	0	662	757	1151	976	627	1188	1007
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.1	0.0	55.2	46.3	0.0	39.0	8.5	11.6	9.5	8.5	9.8	8.1
Incr Delay (d2), s/veh	0.6	0.0	2.2	8.6	0.0	0.3	0.0	1.0	0.2	0.1	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.9	7.0	0.0	1.7	0.1	5.9	1.2	0.5	4.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	0.0	57.4	54.8	0.0	39.2	8.5	12.6	9.8	8.5	10.5	8.1
LnGrp LOS	E	A	E	D	A	D	A	B	A	A	B	A
Approach Vol, veh/h		49			300			564			428	
Approach Delay, s/veh		56.7			51.2			11.9			10.1	
Approach LOS		E			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	79.4	19.5	11.4	7.4	81.7		30.9				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	45.5	14.0	29.0	9.5	45.5		48.5				
Max Q Clear Time (g_c+I1), s	3.4	16.2	16.0	3.9	2.4	12.2		6.2				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.1	0.0	1.2		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		21.8	
HCM 6th LOS		C	

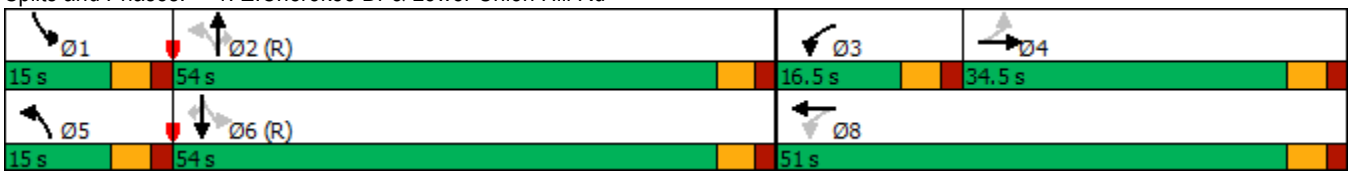
FUTURE "NO-BUILD" INTERSECTION ANALYSIS

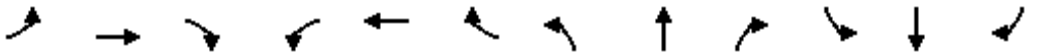
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1	1	163	1	4	189	57	70	460	4
Future Volume (vph)	1	1	163	1	4	189	57	70	460	4
Lane Group Flow (vph)	1	7	181	13	4	210	63	78	511	4
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	6.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	34.5	34.5	15.0	30.5	15.0	31.5	31.5	15.0	29.5	29.5
Total Split (s)	34.5	34.5	16.5	51.0	15.0	54.0	54.0	15.0	54.0	54.0
Total Split (%)	28.8%	28.8%	13.8%	42.5%	12.5%	45.0%	45.0%	12.5%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	6.2	6.2	13.5	13.5	88.8	84.4	84.4	95.2	93.3	93.3
Actuated g/C Ratio	0.05	0.05	0.11	0.11	0.74	0.70	0.70	0.79	0.78	0.78
v/c Ratio	0.01	0.08	0.98	0.07	0.01	0.16	0.05	0.09	0.35	0.00
Control Delay	54.0	35.5	114.2	21.8	4.0	7.7	0.1	3.5	6.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	35.5	114.2	21.8	4.0	7.7	0.1	3.5	6.3	0.0
LOS	D	D	F	C	A	A	A	A	A	A
Approach Delay		37.8		108.1		5.9			5.8	
Approach LOS		D		F		A			A	
Queue Length 50th (ft)	1	1	~167	1	1	51	0	9	81	0
Queue Length 95th (ft)	7	17	210	19	4	116	0	32	283	0
Internal Link Dist (ft)		258		596		424			425	
Turn Bay Length (ft)	230		235		180		90	245		240
Base Capacity (vph)	450	396	184	616	724	1309	1149	920	1447	1257
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	0.00	0.02	0.98	0.02	0.01	0.16	0.05	0.08	0.35	0.00

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 24.6	Intersection LOS: C
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 1: E.Cherokee Dr & Lower Union Hill Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	5	163	1	11	4	189	57	70	460	4
Future Volume (veh/h)	1	1	5	163	1	11	4	189	57	70	460	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1	6	181	1	12	4	210	63	78	511	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	95	6	35	253	20	241	583	1237	1048	813	1299	1101
Arrive On Green	0.03	0.03	0.03	0.09	0.16	0.16	0.01	0.66	0.66	0.04	0.69	0.69
Sat Flow, veh/h	1401	231	1389	1781	123	1480	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	1	0	7	181	0	13	4	210	63	78	511	4
Grp Sat Flow(s),veh/h/ln	1401	0	1620	1781	0	1604	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.1	0.0	0.5	11.0	0.0	0.8	0.1	5.1	1.7	1.6	13.8	0.1
Cycle Q Clear(g_c), s	0.1	0.0	0.5	11.0	0.0	0.8	0.1	5.1	1.7	1.6	13.8	0.1
Prop In Lane	1.00		0.86	1.00		0.92	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	95	0	41	253	0	261	583	1237	1048	813	1299	1101
V/C Ratio(X)	0.01	0.00	0.17	0.72	0.00	0.05	0.01	0.17	0.06	0.10	0.39	0.00
Avail Cap(c_a), veh/h	399	0	392	253	0	608	715	1237	1048	885	1299	1101
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.1	0.0	57.3	50.3	0.0	42.4	7.1	7.8	7.2	5.6	7.7	5.6
Incr Delay (d2), s/veh	0.0	0.0	2.0	9.3	0.0	0.1	0.0	0.3	0.1	0.1	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.2	5.7	0.0	0.3	0.0	2.0	0.5	0.6	5.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	59.2	59.6	0.0	42.5	7.1	8.1	7.3	5.7	8.6	5.6
LnGrp LOS	E	A	E	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		8			194			277			593	
Approach Delay, s/veh		59.0			58.5			7.9			8.2	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	84.9	16.5	8.5	6.1	88.9		25.0
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5		5.5
Max Green Setting (Gmax), s	9.5	48.5	11.0	29.0	9.5	48.5		45.5
Max Q Clear Time (g_c+I1), s	3.6	7.1	13.0	2.5	2.1	15.8		2.8
Green Ext Time (p_c), s	0.1	0.9	0.0	0.0	0.0	1.9		0.0

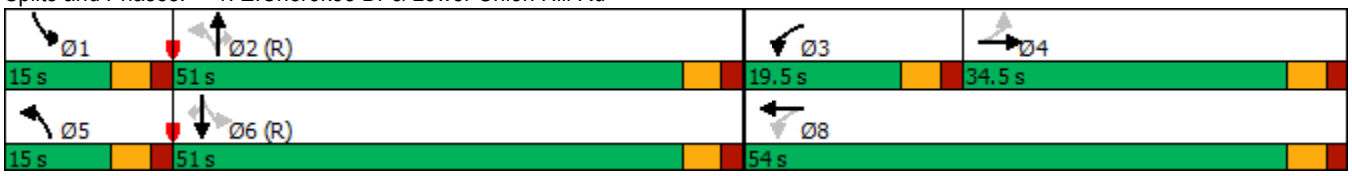
Intersection Summary	
HCM 6th Ctrl Delay	17.6
HCM 6th LOS	B

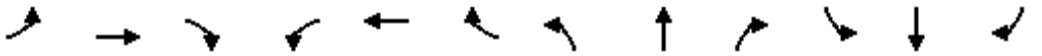
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	20	220	14	13	421	105	55	340	15
Future Volume (vph)	20	20	220	14	13	421	105	55	340	15
Lane Group Flow (vph)	22	31	237	72	14	453	113	59	366	16
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	6.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	34.5	34.5	15.0	30.5	15.0	31.5	31.5	15.0	29.5	29.5
Total Split (s)	34.5	34.5	19.5	54.0	15.0	51.0	51.0	15.0	51.0	51.0
Total Split (%)	28.8%	28.8%	16.3%	45.0%	12.5%	42.5%	42.5%	12.5%	42.5%	42.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	7.7	7.7	24.9	24.9	78.0	73.3	73.3	82.9	79.4	79.4
Actuated g/C Ratio	0.06	0.06	0.21	0.21	0.65	0.61	0.61	0.69	0.66	0.66
v/c Ratio	0.26	0.25	0.87	0.19	0.02	0.40	0.11	0.10	0.30	0.01
Control Delay	60.2	45.8	72.4	13.9	7.0	15.2	2.2	7.1	11.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.2	45.8	72.4	13.9	7.0	15.2	2.2	7.1	11.1	0.0
LOS	E	D	E	B	A	B	A	A	B	A
Approach Delay		51.8		58.8		12.5			10.2	
Approach LOS		D		E		B			B	
Queue Length 50th (ft)	17	17	172	10	3	195	0	14	105	0
Queue Length 95th (ft)	45	50	#287	48	11	302	24	31	221	0
Internal Link Dist (ft)		258		596		424			425	
Turn Bay Length (ft)	230		235		180		90	245		240
Base Capacity (vph)	319	437	273	697	724	1137	1014	600	1232	1088
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	0.07	0.07	0.87	0.10	0.02	0.40	0.11	0.10	0.30	0.01

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 23.6	Intersection LOS: C
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 1: E.Cherokee Dr & Lower Union Hill Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	20	8	220	14	53	13	421	105	55	340	15
Future Volume (veh/h)	20	20	8	220	14	53	13	421	105	55	340	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	22	9	237	15	57	14	453	113	59	366	16
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	125	62	25	312	72	274	635	1150	975	539	1188	1007
Arrive On Green	0.05	0.05	0.05	0.12	0.21	0.21	0.02	0.61	0.61	0.04	0.64	0.64
Sat Flow, veh/h	1328	1261	516	1781	341	1296	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	22	0	31	237	0	72	14	453	113	59	366	16
Grp Sat Flow(s),veh/h/ln	1328	0	1777	1781	0	1637	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.9	0.0	2.0	14.0	0.0	4.4	0.4	14.8	3.5	1.4	10.6	0.4
Cycle Q Clear(g_c), s	1.9	0.0	2.0	14.0	0.0	4.4	0.4	14.8	3.5	1.4	10.6	0.4
Prop In Lane	1.00		0.29	1.00		0.79	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	125	0	87	312	0	347	635	1150	975	539	1188	1007
V/C Ratio(X)	0.18	0.00	0.35	0.76	0.00	0.21	0.02	0.39	0.12	0.11	0.31	0.02
Avail Cap(c_a), veh/h	381	0	430	312	0	662	748	1150	975	617	1188	1007
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.2	0.0	55.2	46.6	0.0	39.0	8.5	11.7	9.6	8.5	9.9	8.1
Incr Delay (d2), s/veh	0.7	0.0	2.4	10.3	0.0	0.3	0.0	1.0	0.2	0.1	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.9	7.4	0.0	1.7	0.1	6.1	1.2	0.5	4.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.8	0.0	57.6	56.9	0.0	39.3	8.6	12.8	9.8	8.6	10.6	8.1
LnGrp LOS	E	A	E	E	A	D	A	B	A	A	B	A
Approach Vol, veh/h		53			309			580			441	
Approach Delay, s/veh		56.9			52.8			12.1			10.2	
Approach LOS		E			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	79.3	19.5	11.4	7.4	81.7		30.9				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	45.5	14.0	29.0	9.5	45.5		48.5				
Max Q Clear Time (g_c+I1), s	3.4	16.8	16.0	4.0	2.4	12.6		6.4				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.1	0.0	1.3		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			22.3									
HCM 6th LOS			C									

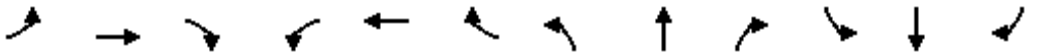
FUTURE "BUILD" INTERSECTION ANALYSIS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1	1	163	1	4	202	57	76	489	4
Future Volume (vph)	1	1	163	1	4	202	57	76	489	4
Lane Group Flow (vph)	1	7	181	17	4	224	63	84	543	4
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	6.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	34.5	34.5	15.0	30.5	15.0	31.5	31.5	15.0	29.5	29.5
Total Split (s)	34.5	34.5	15.0	49.5	15.0	55.5	55.5	15.0	55.5	55.5
Total Split (%)	28.8%	28.8%	12.5%	41.3%	12.5%	46.3%	46.3%	12.5%	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	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	6.2	6.2	12.0	12.0	90.2	85.8	85.8	96.7	94.8	94.8
Actuated g/C Ratio	0.05	0.05	0.10	0.10	0.75	0.72	0.72	0.81	0.79	0.79
v/c Ratio	0.01	0.08	1.12	0.10	0.01	0.17	0.05	0.09	0.37	0.00
Control Delay	54.0	35.5	153.3	21.1	3.8	7.3	0.1	3.1	5.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	35.5	153.3	21.1	3.8	7.3	0.1	3.1	5.9	0.0
LOS	D	D	F	C	A	A	A	A	A	A
Approach Delay		37.8		142.0		5.7			5.5	
Approach LOS		D		F		A			A	
Queue Length 50th (ft)	1	1	~186	1	1	52	0	9	81	0
Queue Length 95th (ft)	7	17	#233	22	4	119	0	32	294	0
Internal Link Dist (ft)		258		596		424			425	
Turn Bay Length (ft)	230		235		180		90	245		240
Base Capacity (vph)	450	396	162	596	713	1331	1166	922	1470	1275
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	0.00	0.02	1.12	0.03	0.01	0.17	0.05	0.09	0.37	0.00

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 29.7	Intersection LOS: C
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

~ 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.

Splits and Phases: 1: E.Cherokee Dr & Lower Union Hill Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	5	163	1	14	4	202	57	76	489	4
Future Volume (veh/h)	1	1	5	163	1	14	4	202	57	76	489	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1	6	181	1	16	4	224	63	84	543	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	7	39	235	14	231	571	1253	1062	813	1317	1116
Arrive On Green	0.03	0.03	0.03	0.08	0.15	0.15	0.01	0.67	0.67	0.04	0.70	0.70
Sat Flow, veh/h	1396	231	1389	1781	94	1505	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	1	0	7	181	0	17	4	224	63	84	543	4
Grp Sat Flow(s),veh/h/ln	1396	0	1620	1781	0	1599	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.1	0.0	0.5	9.5	0.0	1.1	0.1	5.4	1.6	1.7	14.5	0.1
Cycle Q Clear(g_c), s	0.1	0.0	0.5	9.5	0.0	1.1	0.1	5.4	1.6	1.7	14.5	0.1
Prop In Lane	1.00		0.86	1.00		0.94	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	99	0	46	235	0	245	571	1253	1062	813	1317	1116
V/C Ratio(X)	0.01	0.00	0.15	0.77	0.00	0.07	0.01	0.18	0.06	0.10	0.41	0.00
Avail Cap(c_a), veh/h	397	0	392	235	0	586	702	1253	1062	884	1317	1116
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.7	0.0	56.9	51.8	0.0	43.5	6.8	7.4	6.8	5.3	7.4	5.3
Incr Delay (d2), s/veh	0.0	0.0	1.5	14.5	0.0	0.1	0.0	0.3	0.1	0.1	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.2	6.3	0.0	0.4	0.0	2.1	0.5	0.6	5.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.7	0.0	58.4	66.3	0.0	43.6	6.8	7.7	6.9	5.4	8.4	5.3
LnGrp LOS	E	A	E	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		8			198			291			631	
Approach Delay, s/veh		58.2			64.3			7.5			7.9	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	10.2	85.9	15.0	8.9	6.1	90.0		23.9
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5		5.5
Max Green Setting (Gmax), s	9.5	50.0	9.5	29.0	9.5	50.0		44.0
Max Q Clear Time (g_c+I1), s	3.7	7.4	11.5	2.5	2.1	16.5		3.1
Green Ext Time (p_c), s	0.1	0.9	0.0	0.0	0.0	2.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	6	201	15	3	534
Future Vol, veh/h	35	6	201	15	3	534
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	7	218	16	3	580

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	804	218	0	0	234	0
Stage 1	218	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	352	822	-	-	1333	-
Stage 1	818	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	351	822	-	-	1333	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	554	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.6	0	0
HCM LOS	C		

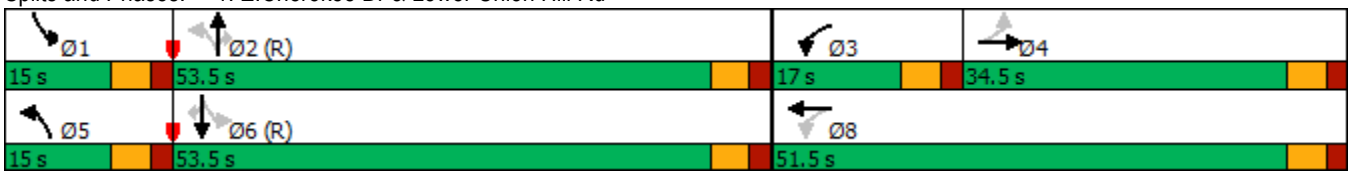
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	383	1333	-
HCM Lane V/C Ratio	-	-	0.116	0.002	-
HCM Control Delay (s)	-	-	15.6	7.7	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

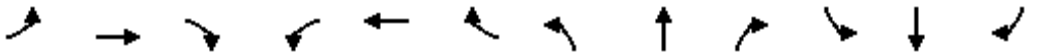
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	20	220	14	13	449	105	60	362	15
Future Volume (vph)	20	20	220	14	13	449	105	60	362	15
Lane Group Flow (vph)	22	31	237	78	14	483	113	65	389	16
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	6.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	34.5	34.5	15.0	30.5	15.0	31.5	31.5	15.0	29.5	29.5
Total Split (s)	34.5	34.5	17.0	51.5	15.0	53.5	53.5	15.0	53.5	53.5
Total Split (%)	28.8%	28.8%	14.2%	42.9%	12.5%	44.6%	44.6%	12.5%	44.6%	44.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	7.7	7.7	22.4	22.4	80.3	75.6	75.6	85.4	81.9	81.9
Actuated g/C Ratio	0.06	0.06	0.19	0.19	0.67	0.63	0.63	0.71	0.68	0.68
v/c Ratio	0.26	0.25	1.00	0.22	0.02	0.41	0.11	0.11	0.31	0.01
Control Delay	60.2	45.8	105.0	14.2	6.2	14.3	2.0	6.3	10.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.2	45.8	105.0	14.2	6.2	14.3	2.0	6.3	10.1	0.0
LOS	E	D	F	B	A	B	A	A	B	A
Approach Delay		51.8		82.5		11.8			9.3	
Approach LOS		D		F		B			A	
Queue Length 50th (ft)	17	17	177	10	3	201	0	14	104	0
Queue Length 95th (ft)	45	50	#332	52	10	311	23	31	224	0
Internal Link Dist (ft)		258		596		424			425	
Turn Bay Length (ft)	230		235		180		90	245		240
Base Capacity (vph)	317	437	237	666	730	1174	1043	601	1271	1119
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	0.07	0.07	1.00	0.12	0.02	0.41	0.11	0.11	0.31	0.01

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 60.4%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 1: E.Cherokee Dr & Lower Union Hill Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	20	8	220	14	59	13	449	105	60	362	15
Future Volume (veh/h)	20	20	8	220	14	59	13	449	105	60	362	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	22	9	237	15	63	14	483	113	65	389	16
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	125	62	25	275	60	252	642	1187	1006	543	1227	1040
Arrive On Green	0.05	0.05	0.05	0.10	0.19	0.19	0.02	0.63	0.63	0.04	0.66	0.66
Sat Flow, veh/h	1321	1261	516	1781	314	1319	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	22	0	31	237	0	78	14	483	113	65	389	16
Grp Sat Flow(s),veh/h/ln	1321	0	1777	1781	0	1633	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.9	0.0	2.0	11.5	0.0	4.9	0.3	15.3	3.4	1.5	10.8	0.4
Cycle Q Clear(g_c), s	1.9	0.0	2.0	11.5	0.0	4.9	0.3	15.3	3.4	1.5	10.8	0.4
Prop In Lane	1.00		0.29	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	125	0	88	275	0	312	642	1187	1006	543	1227	1040
V/C Ratio(X)	0.18	0.00	0.35	0.86	0.00	0.25	0.02	0.41	0.11	0.12	0.32	0.02
Avail Cap(c_a), veh/h	379	0	430	275	0	626	755	1187	1006	618	1227	1040
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.1	0.0	55.2	49.8	0.0	41.2	7.7	10.8	8.6	7.8	9.0	7.2
Incr Delay (d2), s/veh	0.7	0.0	2.4	23.0	0.0	0.4	0.0	1.0	0.2	0.1	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.9	3.1	0.0	2.0	0.1	6.2	1.1	0.5	4.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.8	0.0	57.6	72.8	0.0	41.7	7.7	11.8	8.9	7.9	9.6	7.2
LnGrp LOS	E	A	E	E	A	D	A	B	A	A	A	A
Approach Vol, veh/h		53			315			610			470	
Approach Delay, s/veh		56.8			65.1			11.2			9.3	
Approach LOS		E			E			B			A	

Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	81.6	17.0	11.4	7.4	84.2		28.4				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5		5.5				
Max Green Setting (Gmax), s	9.5	48.0	11.5	29.0	9.5	48.0		46.0				
Max Q Clear Time (g_c+I1), s	3.5	17.3	13.5	4.0	2.3	12.8		6.9				
Green Ext Time (p_c), s	0.0	2.1	0.0	0.1	0.0	1.4		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		24.0	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	5	494	34	6	410
Future Vol, veh/h	26	5	494	34	6	410
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	5	537	37	7	446

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	997	537	0	0	574	0
Stage 1	537	-	-	-	-	-
Stage 2	460	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	271	544	-	-	999	-
Stage 1	586	-	-	-	-	-
Stage 2	636	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	269	544	-	-	999	-
Mov Cap-2 Maneuver	269	-	-	-	-	-
Stage 1	586	-	-	-	-	-
Stage 2	630	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	293	999	-
HCM Lane V/C Ratio	-	-	0.115	0.007	-
HCM Control Delay (s)	-	-	18.9	8.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

TRAFFIC VOLUME WORKSHEETS

21-225 Residential Development, Lower Union Hill Rd, Cherokee County, GA

Traffic Volumes

A&R Engineering
January 2022

1 E Cherokee Dr@Lower Union Rd

A.M. Peak Hour

	E.Cherokee Drive **Northbound**				E.Cherokee Drive **Southbound**				Lower Union Hill Road **Eastbound**				Lower Union Hill Road **Westbound**			
Condition	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing 2021 Counts:	4	183	55	242	68	446	4	518	1	1	5	7	158	1	11	170
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
No-Build 2024 Volumes:	4	189	57	250	70	460	4	534	1	1	5	7	163	1	11	175
Total New Trips:	0	13	0	13	6	29	0	35	0	0	0	0	0	0	3	3
Future 2024 Traffic Volumes:	4	202	57	263	76	489	4	569	1	1	5	7	163	1	14	178

P.M. Peak Hour

	E.Cherokee Drive **Northbound**				E.Cherokee Drive **Southbound**				Lower Union Hill Road **Eastbound**				Lower Union Hill Road **Westbound**			
Condition	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing 2021 Counts:	13	409	102	524	53	330	15	398	19	19	8	46	214	14	51	279
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
No-Build 2024 Volumes:	13	421	105	539	55	340	15	410	20	20	8	48	220	14	53	287
Total New Trips:	0	28	0	28	5	22	0	27	0	0	0	0	0	0	6	6
Future 2024 Traffic Volumes:	13	449	105	567	60	362	15	437	20	20	8	48	220	14	59	293

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2 E Cherokee Dr @ Site Drwy

A.M. Peak Hour

	E.Cherokee Drive **Northbound**				E.Cherokee Drive **Southbound**				Site Driveway **Eastbound**				- **Westbound**			
Condition	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing 2021 Counts:	0	195	0	195	0	518	0	518	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
No-Build 2024 Volumes:	0	201	0	201	0	534	0	534	0	0	0	0	0	0	0	0
Total New Trips:	0	0	15	15	3	0	0	3	0	0	0	0	35	0	6	41
Future 2024 Traffic Volumes:	0	201	15	216	3	534	0	537	0	0	0	0	35	0	6	41

P.M. Peak Hour

	E.Cherokee Drive **Northbound**				E.Cherokee Drive **Southbound**				Site Driveway **Eastbound**				- **Westbound**			
Condition	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing 2021 Counts:	0	479	0	479	0	398	0	398	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
No-Build 2024 Volumes:	0	494	0	494	0	410	0	410	0	0	0	0	0	0	0	0
Total New Trips:	0	0	34	34	6	0	0	6	0	0	0	0	26	0	5	31
Future 2024 Traffic Volumes:	0	494	34	528	6	410	0	416	0	0	0	0	26	0	5	31