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PPR2018

Per criteria when providing an update to a recently approved TIS, existing site trip generations and differences between estimates and existing trip generations shall be addressed. Please provide an explanation in your narrative why new traffic counts where not provided as the school was opened last fall.

Memorandum

To: El Paso County Traffic Engineering
From: David Kline, PE, PTOE
Date: April 7, 2020
Subject: Liberty Tree Academy – Phase 2 Traffic Analysis

Purpose of Memorandum

The purpose of this Phase 2 Traffic Analysis Memorandum is to provide the traffic related documentation required to support the Liberty Tree Academy – Phase 2 Site Development Plan and Construction Documents submittal and the permitting process. This memorandum relies on much of the technical information presented in the approved Liberty Tree Academy Traffic Impact Study dated August 9, 2018. Matrix Design Group prepared this memorandum on behalf of the Liberty Tree Academy Building Corporation.

Existing/Proposed Site Development

The Liberty Tree Academy site is triangular shape lot, as shown in Figure 1, is bounded by Eastonville Road on the westerly side, regional drainage channel on the easterly side, and a residential lot on the south. The Liberty Tree Academy consists of two phases:

- Phase 1 opened in the fall of 2019 with the existing conditions highlighted below:
 - The private school opened with an initial kindergarten through 8th grade enrollment of 540 student facility. The single two-story building and includes administrative offices, classrooms, gymnasium, warming kitchen, and ancillary rooms.
 - The site is accessed through a single full movement intersection at Eastonville Rd. and Motley Road. The internal 20 feet wide circulatory roadway has an available queue length of 1,380 feet, in addition to 750 feet of loading and pickup parking.
 - The school parking capacity of 50 parking stalls is reached on a continual basis resulting in parking in undeveloped school property, and on Eastonville Rd. The addition parking use is attributed to additional support staff, and teachers. In addition, there is a tendency for parents to parking and accompany their children into the building. This pattern results in a longer parking duration than at typical school. The has become a safety concern and Liberty Academy is interested in having more parking in Phase 2 to address the daily need and accommodate special events.
- Phase 2 is proposed to be opened in the fall of 2021 and includes the following;
 - An additional 14,436 square feet building with classroom and office space. With this new building attached to the original building the total combined floor area will be 56,021 square feet.
 - One of the primary interests of Liberty Tree Academy is to provide an academic continuation for the elementary school students to enter the 9th, 10th, 11th, and 12th

- grades. Enrollment to these upper grades will occur gradually as the students age and advance. With this addition, the total enrollment is limited to 740 students.
- The Liberty Tree Academy has prohibited driving age students from bringing vehicles on campus with the intent of parking for the duration of the school day. This is a condition of eligibility for enrollment.
 - The site access is proposed to be modified to include an additional full movement intersection at Eastonville Rd. and Snaffle Bit Road, which is located northly from the Motley Rd. intersection. The intersection geometry and control will be similar to that at the Eastonville Rd. and Motley Road intersection.
 - Access to the school circulating drive aisle is aligned parallel to Eastonville Rd. Adjacent to the drive aisle, 90-degree parking is proposed. The length and configuration allows an additional 85 parking stalls. Pedestrian connectivity is proposed through adjacent sidewalks.
 - The circulation plan is intended to be modified to support efficient traffic flow and during the peak period conflicting individual turning will be restricted. This is a dynamic condition managed by the internal school traffic control personnel.
 - The Phase 2 circulation plan in the AM and PM peak hour calls for closure of the Motley Rd. at Eastonville Rd intersection and all site traffic will be directed to the Eastonville Rd. and Snaffle Bit Rd. intersection. This is accomplished with movable barricades placed by the school traffic control personnel. All site traffic is circulated through the Phase 2 parking lot and connects to the Phase 1 drive aisle and drop off/pick up lanes.

Please provide an exhibit of this phase 2 circulation plan.

Trip Generation

The vehicle trips associated with this development were calculated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual, Tenth Edition*. This methodology consists of choosing an independent variable for the land use for a particular time of day. The independent variable correlates to the variation in trip ends and is related to the land use.

ITE Trip Generation Code 534, Private School (K-8) is used since it most closely represents the Liberty Tree Academy. Current enrollment indicates that 67 percentage of students have siblings therefore participating in carpooling, so the trip generation established through ITE may be conservative. An affordable school bus program is available through the School District. For the purpose of this study trip reduction is not considered for student walking, carpooling, or bus service. Table 1 shows the trips that are expected to be generated by both Phase 1 and Phase 2 student enrollment.

Since the Liberty Tree Academy prohibits driving age students from bringing vehicles on campus with the intent of parking for the duration of the school day. The traffic pattern is similar to a K-8 grade private school. In essence the classroom are fill with non-driving high school students.

Please provide a comparison of the previous trips generated by the K-8 and the new trips generated with the addition of the high school students.

Table 1 – Trip Generation

Land Use – ITE Code 534	Variable	AM Peak			PM Peak*			Daily		
		Total	In	Out	Total	In	Out	Total	In	Out
Private School (K-8)	740	651	358	293	192	88	104	3,041	1,521	1,520

*PM peak hour of adjacent street traffic.

Trip Distribution

During the AM and PM peak hours the site access is proposed through the Eastonville Rd/Snaffle Bit Rd intersection. From this intersection arrival and departure site trips are distributed predominately to/from Eastonville Road with a smaller percentage to/from the west, which serves the adjacent residential area. As a north/south minor arterial roadway Eastonville Road is anticipated to accommodate 95% of the total site trips, with 50% to/from the south, and 45% to/from the north. Snaffle Bit Road is anticipated to accommodate 5% of the site generated trips.

Figures of the traffic volumes show the trip distribution as 2.5%. revise accordingly.



Traffic Network

The proposed Eastonville Rd and Snaffle Bit Rd intersection is analyzed with the following intersection configuration.

- Northbound – Left Turn Lane, Shared Thru/Right Turn Lane
- Southbound – Left Turn Lane, Shared Thru/Right Turn Lane
- Eastbound – Shared Right/Thu/Left Turn Lane
- Westbound – Shared Thu/Left Turn Lane, Right Turn Lane

Please indicate whether or not the existing traffic was analyzed at Eastonville/Snaffle Bit Rd and how the total traffic at this intersection was determined. Also your previous report indicated the use of the PHF of 0.5 to better reflect the school traffic patterns. Was this PHF used in this analysis?

Three existing unsignalized intersections that are in close proximity to the were analyzed. For the intersection configuration see the Liberty Tree Academy Study, dated August 9, 2018.

- Eastonville Road at Meridian/Judge Orr Road
- Eastonville Road at Stapleton Drive
- Eastonville Road at Motley Rd – Not Applicable due to peak hour closure.

Future Traffic

Future traffic was developed by adding the peak hour site traffic to Eastonville Rd. background traffic. The background traffic is established based on the adjacent US 24 highway growth rate since the two facilities are in the vicinity to each other and parallel. The US 24 annual growth rate of 1.5% per year is anticipated and is therefore assumed as background for Eastonville Road, Meridian/Judge Orr Road and Stapleton Drive. The site traffic is added on top of the background volumes to get 2040 total traffic. Table 3 and Table 4 show the 2021 and the 2040 total traffic volumes for both the AM and PM peak hours

Traffic Analysis

To determine how efficiently and effectively the four intersections accommodate the build-out traffic volumes, each intersection was analyzed using Synchro 10 software. The results are

shown as Levels of Service (LOS). LOS is a qualitative measure used to describe the condition of traffic flow and delay, ranging from excellent conditions at LOS A to very poor conditions at LOS F. LOS D is commonly used as the level of service goal.

Table 2 provides a description of conditions for each LOS at a unsignalized intersection.

Table 2: Signalized Intersection Level of Service Criteria

Level of Service	Average Total Delay (seconds per vehicle)	Description
A	< 10	Little or no conflicting traffic for minor street approach.
B	>10 to 15	Minor street begins to notice absence of available gaps.
C	>15 to 25	Minor street begins experiencing delay for available gaps.
D	>25 to 35	Minor street starts to experience queuing.
E	>35 to 50	Extensive minor street queuing due to insufficient gaps.
F	> 50	Insufficient gaps to allow minor street traffic to cross safely through the major street traffic stream.

Source: HCM2010 Highway Capacity Manual (Transportation Research Board, 2010)

Tables 3 and 4 provide a summary of the 2021 and 2040 analysis respectively. The Synchro output for both is provided as an attachment.

Table 3: 2021 Total Traffic Level of Service

Intersection	Control	AM LOS	AM Queue	PM LOS	PM Queue
Eastonville Rd/Snaffle Bit Rd	Un-signalized				
-Eastbound Left/Thru/Right	Stop	D	10	B	2
-Westbound Left	Stop	F	192	B	12
-Westbound Thru/Right	Stop	B	26	A	6
-Northbound Left	Free	A	0	A	0
-Northbound Thru/Right	Free	A	0	A	0
-Southbound Left	Free	A	16	A	2
-Southbound Thru/Right	Free	A	0	A	0
Eastonville Rd/Motley Rd	Un-signalized	N/A	N/A	N/A	N/A
Eastonville Rd/Judge Orr Rd	Un-signalized	B		B	
-Eastbound Left	Stop	A	2	A	0
-Eastbound Thru/Right	Stop	B	40	B	16
-Westbound Left	Stop	B	2	A	6
-Westbound Thru	Stop	A	2	B	16
-Westbound Right	Stop	B	16	A	4
-Northbound Left	Stop	B	4	B	12
-Northbound Thru/Right	Stop	B	18	B	20
-Southbound Left	Stop	B	20	B	6
-Southbound Thru/Right	Stop	B	16	A	10
Eastonville Rd/Stapleton Dr	Un-signalized				
-Eastbound Left/Thru/Right	Stop	C	22	B	12
-Westbound Left	Stop	C	4	B	2
-Westbound Thru/Right	Stop	B	10	B	32
-Northbound Left/Thru/Right	Free	A	0	A	0
-Southbound Left/Thru/Right	Free	A	4	A	2

Table 4: 2040 Total Traffic TWSC Level of Service

Intersection	Control	AM LOS	AM Queue	PM LOS	PM Queue
Eastonville Rd/Snaffle Bit Rd	Un-signalized				
-Eastbound Left/Thru/Right	Stop	D	12	B	2
-Westbound Left	Stop	F	240	C	14
-Westbound Thru/Right	Stop	B	30	B	6
-Northbound Left	Free	A	0	A	0
-Northbound Thru/Right	Free	A	0	A	0
-Southbound Left	Free	A	16	A	2
-Southbound Thru/Right	Free	A	0	A	0
Eastonville Rd/Motley Rd	Un-signalized	N/A	N/A	N/A	N/A
Eastonville Rd/Judge Orr Rd	Un-signalized	B		B	
-Eastbound Left	Stop	B	2	B	0
-Eastbound Thru/Right	Stop	C	76	B	26
-Westbound Left	Stop	B	2	B	10
-Westbound Thru	Stop	B	4	B	26
-Westbound Right	Stop	B	10	A	6
-Northbound Left	Stop	B	4	B	20
-Northbound Thru/Right	Stop	B	24	B	32
-Southbound Left	Stop	B	16	B	6
-Southbound Thru/Right	Stop	B	20	B	16
Eastonville Rd/Stapleton Dr	Un-signalized				
-Eastbound Left/Thru/Right	Stop	D	44	C	20
-Westbound Left	Stop	C	6	C	2
-Westbound Thru/Right	Stop	C	16	C	64
-Northbound Left/Thru/Right	Free	A	0	A	0
-Southbound Left/Thru/Right	Free	A	6	A	2

As shown in the above tables, all but one intersection is expected to operate at acceptable levels of service in the AM and PM peak hour at build-out scenarios. The lone exception is the Eastonville Rd and Snaffle Bit Rd intersection. In the AM peak hour, this intersection is shown as operating at capacity (LOS F) in both the 2021 and the 2040 total traffic condition. This is due to the exiting westbound left turn. In review analysis indicates that the AM queue length of 192 feet and in the PM queue length of 240 feet is expected. With the addition of the parking aisle the queue in both conditions are expected to be contained on site.

Conclusions

The Traffic Impact Study results indicate in the 2021 near term condition and the 2040 long term condition with the Liberty Tree Academy Phase 2, K-12, traffic and the Eastonville Rd/Snaffle Bit Rd intersection operates well with one except. The westbound shared left/through lane experiences internal queue and delay typical of school traffic patterns. The site queue can be accommodated internal within the site drive aisles. Due to introducing Eastonville Rd corridor delay, all-way stop control or roundabout are not recommended. In the near term and long term the project, as proposed, does not adversely impact the existing and proposed intersection operation or roadway corridor.

Please indicate the available queue length provided by the site with the new development. Your previous report indicated that the site was in general conformance with MST A guidelines. Is that still the case with this proposal?

Traffic Engineer's Statement

This traffic memorandum and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



David Robert Kline, P.E. #24520

4/9/2020

Date

Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

*Ronnie Wilson, Vice-President
Liberty Tree Academy Building Corporation
PO Box 64614
Colorado Springs, CO 80962*

4/9/2020

Date

Please address the following:

- access location & sight distance analysis at the proposed access at Eastonville/Snaffle bit. Does the location meet ECM criteria?
- Provide discussion regarding the road impact fee.
- Provide analysis/recommendations for improvements at Eastonville/Snaffle Bit intersection. Note that there are left turn lanes shown on the signing and striping plan submitted. Please provide your recommendations for all improvements required at this intersection.
- List any deviations from criteria that the applicant will be making. Note that per County criteria, access is not allowed on a minor arterial roadway. Comments were provided in the site plan to submit a deviation request form for the additional access point at Eastonville/Snaffle Bit.
- Any recommendations/changes/revisions to the roadway signs regarding the school.
- any recommendations/mitigations to bring the movements below LOS D to satisfactory levels.

Attachments:

- Figures 1 through 4
- 2021 Total Traffic Synchro Output
- 2040 Total Traffic Synchro Output

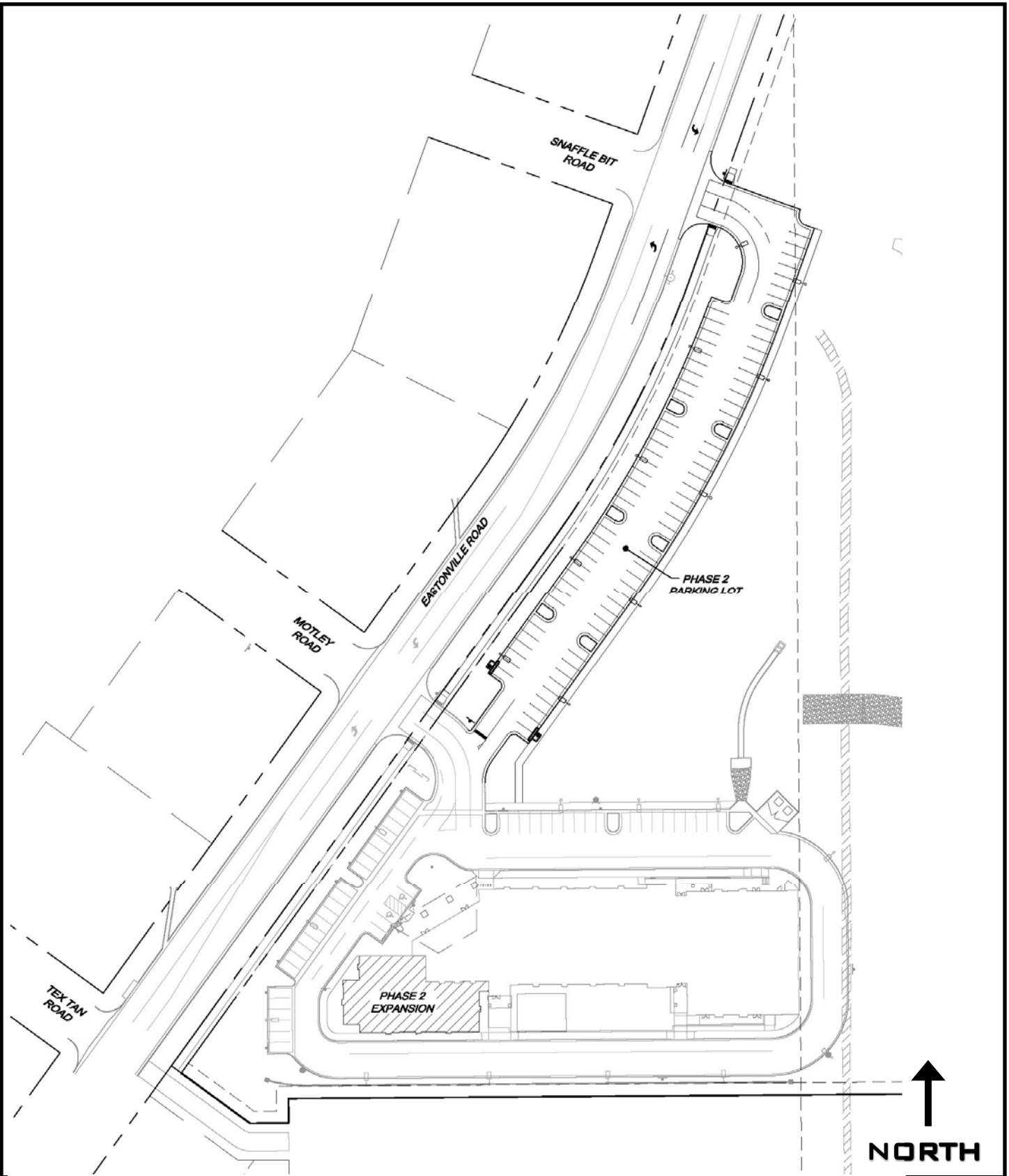


NORTH



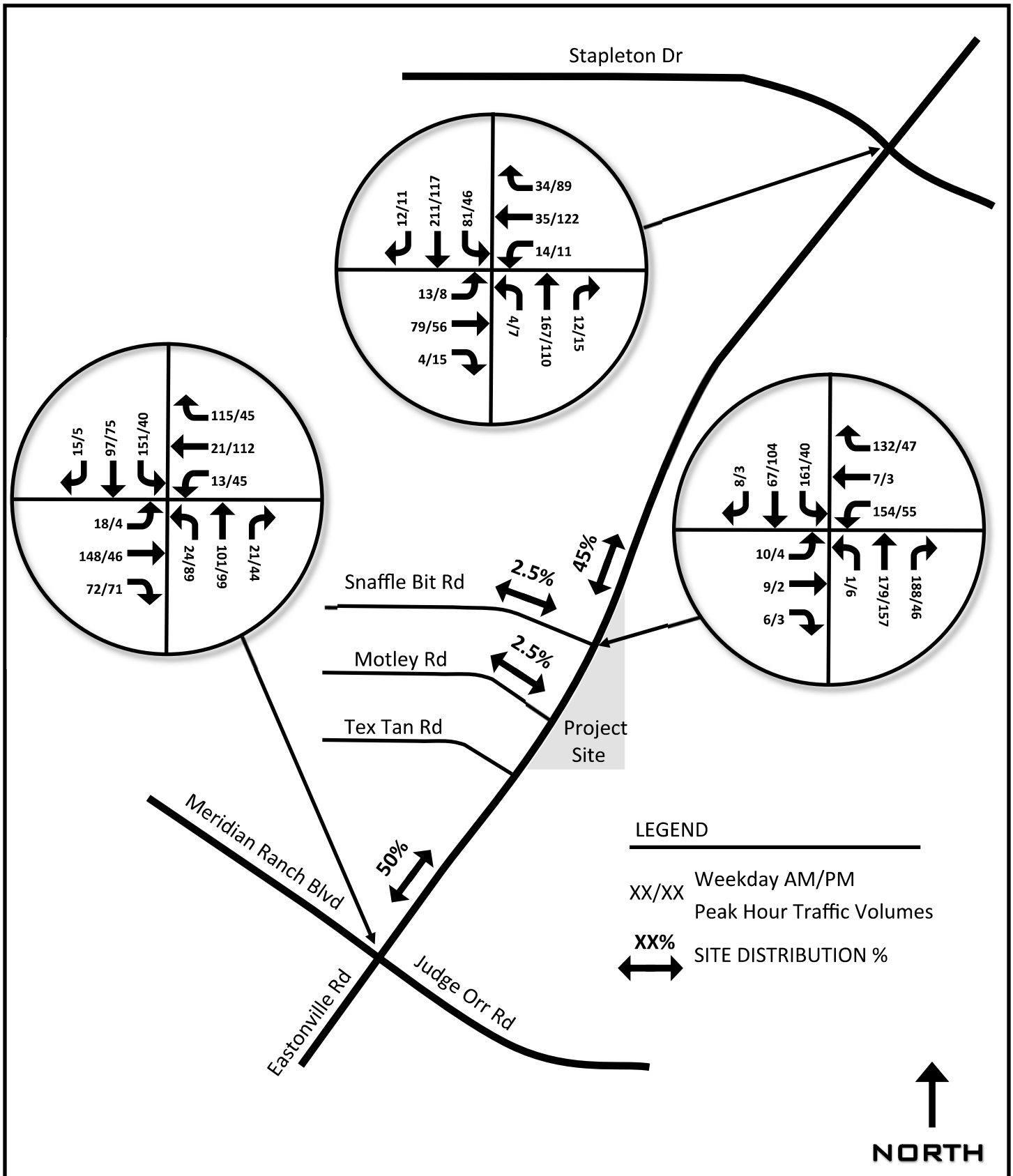
**LIBERTY TREE ACADEMY
TRAFFIC IMPACT STUDY**

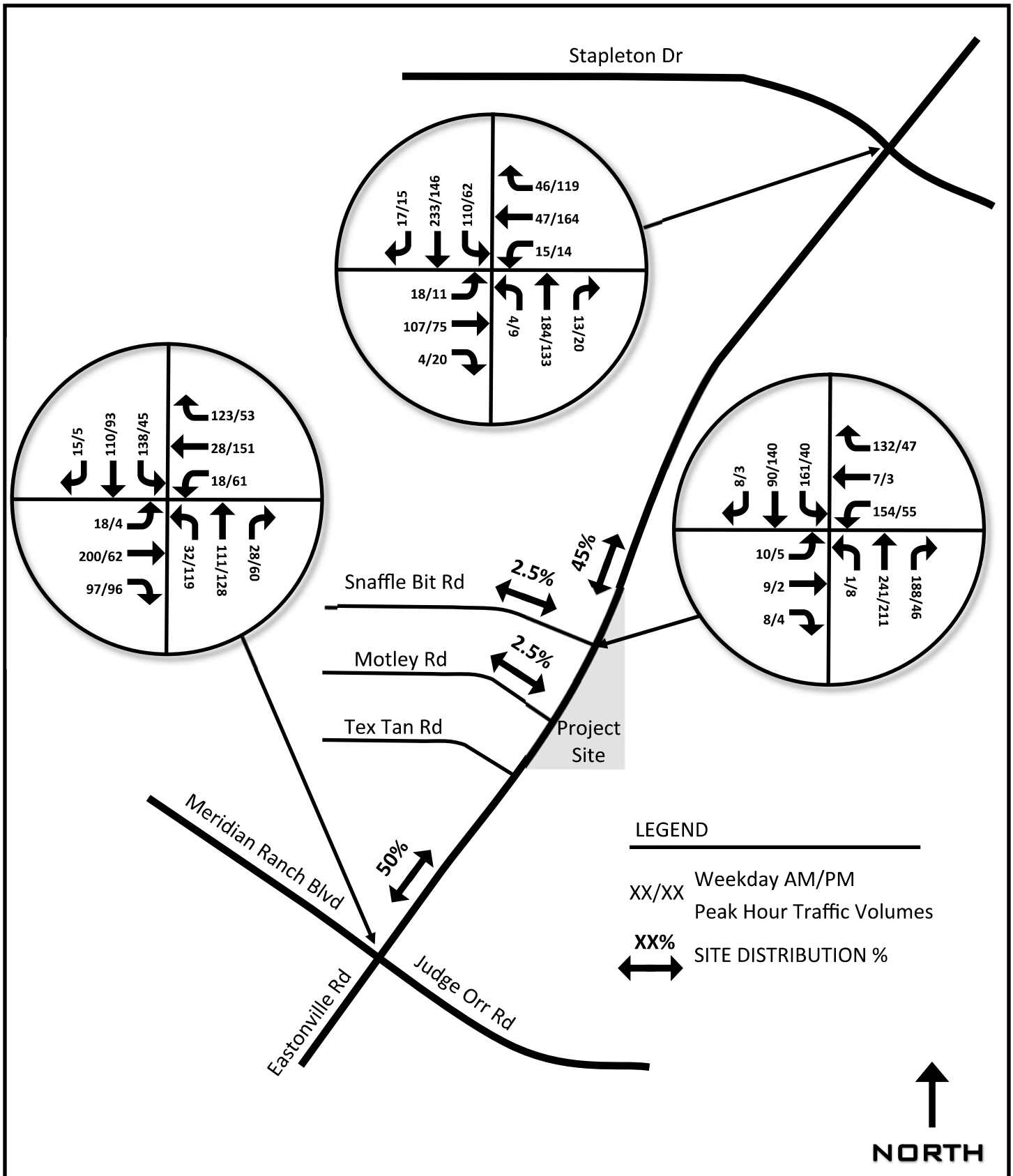
**Figure 1
VICINITY MAP**



LIBERTY TREE ACADEMY
TRAFFIC IMPACT STUDY

Figure 2
SITE PLAN





HCM 6th TWSC
1: Eastonville Rd & Motley Rd/Liberty Tree

03/19/2020

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Traffic Vol, veh/h	10	0	6	0	0	0	1	357	0	0	299	8
Future Vol, veh/h	10	0	6	0	0	0	1	357	0	0	299	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	70	92	70	70	70	92	92	70	70	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	7	0	0	0	1	388	0	0	325	9

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	720	720	330	723	724	388	334	0	0	388	0	0
Stage 1	330	330	-	390	390	-	-	-	-	-	-	-
Stage 2	390	390	-	333	334	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	343	354	712	342	352	660	1225	-	-	1170	-	-
Stage 1	683	646	-	634	608	-	-	-	-	-	-	-
Stage 2	634	608	-	681	643	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	343	354	712	339	352	660	1225	-	-	1170	-	-
Mov Cap-2 Maneuver	343	354	-	339	352	-	-	-	-	-	-	-
Stage 1	682	646	-	633	607	-	-	-	-	-	-	-
Stage 2	633	607	-	675	643	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.8		0		0		0	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1225	-	-	426	-	-	1170	-	-
HCM Lane V/C Ratio	0.001	-	-	0.041	-	-	-	-	-
HCM Control Delay (s)	7.9	-	-	13.8	0	0	0	-	-
HCM Lane LOS	A	-	-	B	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	-	-	0	-	-

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↑	↔	↔	↔		↔	↑	
Traffic Vol, veh/h	18	148	72	13	21	115	24	101	21	121	97	15
Future Vol, veh/h	18	148	72	13	21	115	24	101	21	121	97	15
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	161	78	14	23	125	26	110	23	132	105	16
Number of Lanes	1	1	0	1	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	12.9	10.1	11	11.3
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	83%	0%	67%	0%	100%	0%	0%	87%
Vol Right, %	0%	17%	0%	33%	0%	0%	100%	0%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	24	122	18	220	13	21	115	121	112
LT Vol	24	0	18	0	13	0	0	121	0
Through Vol	0	101	0	148	0	21	0	0	97
RT Vol	0	21	0	72	0	0	115	0	15
Lane Flow Rate	26	133	20	239	14	23	125	132	122
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.051	0.237	0.037	0.407	0.028	0.042	0.205	0.249	0.211
Departure Headway (Hd)	7.061	6.435	6.862	6.123	7.12	6.613	5.903	6.825	6.226
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	506	556	521	586	501	540	605	525	575
Service Time	4.825	4.198	4.617	3.878	4.884	4.377	3.666	4.582	3.983
HCM Lane V/C Ratio	0.051	0.239	0.038	0.408	0.028	0.043	0.207	0.251	0.212
HCM Control Delay	10.2	11.2	9.9	13.1	10.1	9.7	10.2	11.8	10.7
HCM Lane LOS	B	B	A	B	B	A	B	B	B
HCM 95th-tile Q	0.2	0.9	0.1	2	0.1	0.1	0.8	1	0.8

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Vol, veh/h	13	79	4	14	35	34	4	167	12	81	211	12
Future Vol, veh/h	13	79	4	14	35	34	4	167	12	81	211	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	86	4	15	38	37	4	182	13	88	229	13

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	646	615	236	654	615	189	242	0	0	195	0	0
Stage 1	412	412	-	197	197	-	-	-	-	-	-	-
Stage 2	234	203	-	457	418	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	385	407	803	380	407	853	1324	-	-	1378	-	-
Stage 1	617	594	-	805	738	-	-	-	-	-	-	-
Stage 2	769	733	-	583	591	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	323	380	803	297	380	853	1324	-	-	1378	-	-
Mov Cap-2 Maneuver	323	380	-	297	380	-	-	-	-	-	-	-
Stage 1	615	556	-	803	736	-	-	-	-	-	-	-
Stage 2	696	731	-	459	553	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	18.1		13.8		0.2		2.1	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1324	-	-	379	297	523	1378	-	-
HCM Lane V/C Ratio	0.003	-	-	0.275	0.051	0.143	0.064	-	-
HCM Control Delay (s)	7.7	-	-	18.1	17.8	13	7.8	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.1	0.2	0.5	0.2	-	-

HCM 6th TWSC
14: Eastonville Rd & Snaffle Bit Rd

03/19/2020

Intersection												
Int Delay, s/veh	26											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↵	↵		↵	↵		↵	↵	
Traffic Vol, veh/h	10	9	6	154	7	132	1	179	188	161	67	8
Future Vol, veh/h	10	9	6	154	7	132	1	179	188	161	67	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	70	92	70	70	70	92	92	70	70	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	13	7	220	10	189	1	195	269	230	73	9

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	969	1004	78	880	874	330	82	0	0	464	0	0
Stage 1	538	538	-	332	332	-	-	-	-	-	-	-
Stage 2	431	466	-	548	542	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	233	242	983	268	288	712	1515	-	-	1097	-	-
Stage 1	527	522	-	681	644	-	-	-	-	-	-	-
Stage 2	603	562	-	521	520	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	139	191	983	~ 212	227	712	1515	-	-	1097	-	-
Mov Cap-2 Maneuver	139	191	-	~ 212	227	-	-	-	-	-	-	-
Stage 1	526	412	-	680	643	-	-	-	-	-	-	-
Stage 2	436	561	-	396	411	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	26.3		69.2		0		6.8	
HCM LOS	D		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1515	-	-	199	212	643	1097	-	-
HCM Lane V/C Ratio	0.001	-	-	0.152	1.038	0.309	0.21	-	-
HCM Control Delay (s)	7.4	-	-	26.3	119.9	13.1	9.2	-	-
HCM Lane LOS	A	-	-	D	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	9.6	1.3	0.8	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
1: Eastonville Rd & Motley Rd/Liberty Tree

03/19/2020

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Traffic Vol, veh/h	4	0	3	0	0	0	6	199	0	0	163	3
Future Vol, veh/h	4	0	3	0	0	0	6	199	0	0	163	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	70	92	70	70	70	92	92	70	70	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	3	0	0	0	7	216	0	0	177	3

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	409	409	179	410	410	216	180	0	0	216	0	0
Stage 1	179	179	-	230	230	-	-	-	-	-	-	-
Stage 2	230	230	-	180	180	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	553	532	864	552	531	824	1396	-	-	1354	-	-
Stage 1	823	751	-	773	714	-	-	-	-	-	-	-
Stage 2	773	714	-	822	750	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	551	529	864	548	528	824	1396	-	-	1354	-	-
Mov Cap-2 Maneuver	551	529	-	548	528	-	-	-	-	-	-	-
Stage 1	819	751	-	769	710	-	-	-	-	-	-	-
Stage 2	769	710	-	819	750	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	0	0.2	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1396	-	-	652	-	-	1354	-	-
HCM Lane V/C Ratio	0.005	-	-	0.012	-	-	-	-	-
HCM Control Delay (s)	7.6	-	-	10.6	0	0	0	-	-
HCM Lane LOS	A	-	-	B	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	-	0	-	-

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↑	↔	↔	↔		↔	↑	
Traffic Vol, veh/h	4	46	71	45	112	45	89	99	44	40	75	5
Future Vol, veh/h	4	46	71	45	112	45	89	99	44	40	75	5
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	50	77	49	122	49	97	108	48	43	82	5
Number of Lanes	1	1	0	1	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	10.2	9.9	10.5	10
HCM LOS	B	A	B	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	69%	0%	39%	0%	100%	0%	0%	94%
Vol Right, %	0%	31%	0%	61%	0%	0%	100%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	89	143	4	117	45	112	45	40	80
LT Vol	89	0	4	0	45	0	0	40	0
Through Vol	0	99	0	46	0	112	0	0	75
RT Vol	0	44	0	71	0	0	45	0	5
Lane Flow Rate	97	155	4	127	49	122	49	43	87
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.174	0.249	0.008	0.208	0.09	0.207	0.073	0.082	0.15
Departure Headway (Hd)	6.481	5.761	6.828	5.891	6.615	6.11	5.403	6.753	6.205
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	554	623	524	609	542	588	662	530	577
Service Time	4.215	3.495	4.57	3.633	4.352	3.847	3.14	4.493	3.945
HCM Lane V/C Ratio	0.175	0.249	0.008	0.209	0.09	0.207	0.074	0.081	0.151
HCM Control Delay	10.6	10.4	9.6	10.2	10	10.4	8.6	10.1	10
HCM Lane LOS	B	B	A	B	A	B	A	B	A
HCM 95th-tile Q	0.6	1	0	0.8	0.3	0.8	0.2	0.3	0.5

HCM 6th TWSC
10: Eastonville Rd & Stapleton Dr

03/19/2020

Intersection												
Int Delay, s/veh	7.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Vol, veh/h	8	56	15	11	122	89	7	110	15	46	117	11
Future Vol, veh/h	8	56	15	11	122	89	7	110	15	46	117	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	61	16	12	133	97	8	120	16	50	127	12

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	492	385	133	416	383	128	139	0	0	136	0	0
Stage 1	233	233	-	144	144	-	-	-	-	-	-	-
Stage 2	259	152	-	272	239	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	487	549	916	547	550	922	1445	-	-	1448	-	-
Stage 1	770	712	-	859	778	-	-	-	-	-	-	-
Stage 2	746	772	-	734	708	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	341	526	916	475	527	922	1445	-	-	1448	-	-
Mov Cap-2 Maneuver	341	526	-	475	527	-	-	-	-	-	-	-
Stage 1	765	687	-	854	773	-	-	-	-	-	-	-
Stage 2	550	767	-	634	683	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.9		13.7		0.4		2	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1445	-	-	540	475	643	1448	-	-
HCM Lane V/C Ratio	0.005	-	-	0.159	0.025	0.357	0.035	-	-
HCM Control Delay (s)	7.5	-	-	12.9	12.8	13.7	7.6	-	-
HCM Lane LOS	A	-	-	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.1	1.6	0.1	-	-

HCM 6th TWSC
14: Eastonville Rd & Snaffle Bit Rd

03/19/2020

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↵	↵		↵	↵		↵	↵	
Traffic Vol, veh/h	4	2	3	55	3	47	6	157	46	40	104	3
Future Vol, veh/h	4	2	3	55	3	47	6	157	46	40	104	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	70	92	70	70	70	92	92	70	70	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	3	3	79	4	67	7	171	66	57	113	3

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	483	480	115	450	448	204	116	0	0	237	0	0
Stage 1	229	229	-	218	218	-	-	-	-	-	-	-
Stage 2	254	251	-	232	230	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	494	485	937	519	506	837	1473	-	-	1330	-	-
Stage 1	774	715	-	784	723	-	-	-	-	-	-	-
Stage 2	750	699	-	771	714	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	435	462	937	496	482	837	1473	-	-	1330	-	-
Mov Cap-2 Maneuver	435	462	-	496	482	-	-	-	-	-	-	-
Stage 1	770	684	-	780	719	-	-	-	-	-	-	-
Stage 2	682	696	-	732	683	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.9		11.8		0.2		2.6	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1473	-	-	532	496	802	1330	-	-
HCM Lane V/C Ratio	0.004	-	-	0.02	0.158	0.089	0.043	-	-
HCM Control Delay (s)	7.5	-	-	11.9	13.6	9.9	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.6	0.3	0.1	-	-

HCM 6th TWSC
1: Eastonville Rd & Motley Rd/Liberty Tree

03/19/2020

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Traffic Vol, veh/h	10	0	8	0	0	0	1	419	0	0	352	8
Future Vol, veh/h	10	0	8	0	0	0	1	419	0	0	352	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	70	92	70	70	70	92	92	70	70	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	9	0	0	0	1	455	0	0	383	9

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	845	845	388	849	849	455	392	0	0	455	0	0
Stage 1	388	388	-	457	457	-	-	-	-	-	-	-
Stage 2	457	457	-	392	392	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	283	300	660	281	298	605	1167	-	-	1106	-	-
Stage 1	636	609	-	583	568	-	-	-	-	-	-	-
Stage 2	583	568	-	633	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	283	300	660	277	298	605	1167	-	-	1106	-	-
Mov Cap-2 Maneuver	283	300	-	277	298	-	-	-	-	-	-	-
Stage 1	635	609	-	582	567	-	-	-	-	-	-	-
Stage 2	583	567	-	625	606	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	0	0	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1167	-	-	379	-	-	1106	-	-
HCM Lane V/C Ratio	0.001	-	-	0.052	-	-	-	-	-
HCM Control Delay (s)	8.1	-	-	15	0	0	0	-	-
HCM Lane LOS	A	-	-	C	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	-	0	-	-

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↑	↔	↔	↔		↔	↑	
Traffic Vol, veh/h	18	200	97	18	28	123	32	111	28	138	110	15
Future Vol, veh/h	18	200	97	18	28	123	32	111	28	138	110	15
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	217	105	20	30	134	35	121	30	150	120	16
Number of Lanes	1	1	0	1	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	17.9	11.2	12.5	12.8
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	80%	0%	67%	0%	100%	0%	0%	88%
Vol Right, %	0%	20%	0%	33%	0%	0%	100%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	32	139	18	297	18	28	123	138	125
LT Vol	32	0	18	0	18	0	0	138	0
Through Vol	0	111	0	200	0	28	0	0	110
RT Vol	0	28	0	97	0	0	123	0	15
Lane Flow Rate	35	151	20	323	20	30	134	150	136
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.075	0.297	0.04	0.591	0.042	0.062	0.244	0.311	0.259
Departure Headway (Hd)	7.736	7.085	7.335	6.593	7.792	7.282	6.568	7.462	6.871
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	464	508	489	549	460	492	547	483	523
Service Time	5.475	4.824	5.064	4.322	5.531	5.021	4.306	5.198	4.606
HCM Lane V/C Ratio	0.075	0.297	0.041	0.588	0.043	0.061	0.245	0.311	0.26
HCM Control Delay	11.1	12.8	10.4	18.4	10.9	10.5	11.4	13.5	12
HCM Lane LOS	B	B	B	C	B	B	B	B	B
HCM 95th-tile Q	0.2	1.2	0.1	3.8	0.1	0.2	1	1.3	1

HCM 6th TWSC
10: Eastonville Rd & Stapleton Dr

03/19/2020

Intersection												
Int Delay, s/veh	7.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↵	↵		↵	↵		↵	↵	
Traffic Vol, veh/h	18	107	4	15	47	46	4	184	13	110	233	17
Future Vol, veh/h	18	107	4	15	47	46	4	184	13	110	233	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	116	4	16	51	50	4	200	14	120	253	18

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	768	724	262	777	726	207	271	0	0	214	0	0
Stage 1	502	502	-	215	215	-	-	-	-	-	-	-
Stage 2	266	222	-	562	511	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	319	352	777	314	351	833	1292	-	-	1356	-	-
Stage 1	552	542	-	787	725	-	-	-	-	-	-	-
Stage 2	739	720	-	512	537	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	245	320	777	209	319	833	1292	-	-	1356	-	-
Mov Cap-2 Maneuver	245	320	-	209	319	-	-	-	-	-	-	-
Stage 1	550	494	-	785	723	-	-	-	-	-	-	-
Stage 2	644	718	-	355	490	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	25.6		16.2		0.2		2.4	
HCM LOS	D		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1292	-	-	312	209	459	1356	-	-
HCM Lane V/C Ratio	0.003	-	-	0.449	0.078	0.22	0.088	-	-
HCM Control Delay (s)	7.8	-	-	25.6	23.7	15	7.9	-	-
HCM Lane LOS	A	-	-	D	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.2	0.3	0.8	0.3	-	-

HCM 6th TWSC
14: Eastonville Rd & Snaffle Bit Rd

03/19/2020

Intersection												
Int Delay, s/veh	36.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↵	↵		↵	↵		↵	↵	
Traffic Vol, veh/h	10	9	8	154	7	132	1	241	188	161	90	8
Future Vol, veh/h	10	9	8	154	7	132	1	241	188	161	90	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	70	92	70	70	70	92	92	70	70	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	13	9	220	10	189	1	262	269	230	98	9

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1061	1096	103	973	966	397	107	0	0	531	0	0
Stage 1	563	563	-	399	399	-	-	-	-	-	-	-
Stage 2	498	533	-	574	567	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	202	213	952	231	255	652	1484	-	-	1036	-	-
Stage 1	511	509	-	627	602	-	-	-	-	-	-	-
Stage 2	554	525	-	504	507	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	115	166	952	~ 179	198	652	1484	-	-	1036	-	-
Mov Cap-2 Maneuver	115	166	-	~ 179	198	-	-	-	-	-	-	-
Stage 1	510	396	-	626	601	-	-	-	-	-	-	-
Stage 2	387	524	-	376	394	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	29.5		108.7		0		6.5	
HCM LOS	D		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1484	-	-	179	179	585	1036	-	-
HCM Lane V/C Ratio	0.001	-	-	0.181	1.229	0.339	0.222	-	-
HCM Control Delay (s)	7.4	-	-	29.5	194	14.3	9.5	-	-
HCM Lane LOS	A	-	-	D	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	12	1.5	0.8	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
1: Eastonville Rd & Motley Rd/Liberty Tree

03/19/2020

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Traffic Vol, veh/h	5	0	4	0	0	0	8	252	0	0	202	3
Future Vol, veh/h	5	0	4	0	0	0	8	252	0	0	202	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	70	92	70	70	70	92	92	70	70	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	4	0	0	0	9	274	0	0	220	3

Major/Minor	Minor2		Minor1			Major1		Major2				
Conflicting Flow All	514	514	222	516	515	274	223	0	0	274	0	0
Stage 1	222	222	-	292	292	-	-	-	-	-	-	-
Stage 2	292	292	-	224	223	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	471	464	818	470	464	765	1346	-	-	1289	-	-
Stage 1	780	720	-	716	671	-	-	-	-	-	-	-
Stage 2	716	671	-	779	719	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	469	461	818	465	461	765	1346	-	-	1289	-	-
Mov Cap-2 Maneuver	469	461	-	465	461	-	-	-	-	-	-	-
Stage 1	775	720	-	711	666	-	-	-	-	-	-	-
Stage 2	711	666	-	775	719	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	0	0.2	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1346	-	-	579	-	-	1289	-	-
HCM Lane V/C Ratio	0.006	-	-	0.017	-	-	-	-	-
HCM Control Delay (s)	7.7	-	-	11.3	0	0	0	-	-
HCM Lane LOS	A	-	-	B	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	-	-	0	-	-

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔		↔	↔	
Traffic Vol, veh/h	4	62	96	61	151	53	119	128	60	45	93	5
Future Vol, veh/h	4	62	96	61	151	53	119	128	60	45	93	5
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	67	104	66	164	58	129	139	65	49	101	5
Number of Lanes	1	1	0	1	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	12.3	11.5	12.4	11.4
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	68%	0%	39%	0%	100%	0%	0%	95%
Vol Right, %	0%	32%	0%	61%	0%	0%	100%	0%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	119	188	4	158	61	151	53	45	98
LT Vol	119	0	4	0	61	0	0	45	0
Through Vol	0	128	0	62	0	151	0	0	93
RT Vol	0	60	0	96	0	0	53	0	5
Lane Flow Rate	129	204	4	172	66	164	58	49	107
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.252	0.357	0.009	0.311	0.132	0.305	0.096	0.101	0.204
Departure Headway (Hd)	7.026	6.296	7.469	6.527	7.193	6.686	5.975	7.449	6.906
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	510	568	477	546	496	535	596	478	517
Service Time	4.799	4.069	5.256	4.313	4.971	4.463	3.752	5.237	4.694
HCM Lane V/C Ratio	0.253	0.359	0.008	0.315	0.133	0.307	0.097	0.103	0.207
HCM Control Delay	12.2	12.6	10.3	12.3	11.1	12.4	9.4	11.1	11.5
HCM Lane LOS	B	B	B	B	B	B	A	B	B
HCM 95th-tile Q	1	1.6	0	1.3	0.5	1.3	0.3	0.3	0.8

HCM 6th TWSC
10: Eastonville Rd & Stapleton Dr

03/19/2020

Intersection												
Int Delay, s/veh	9.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
Traffic Vol, veh/h	11	75	20	14	164	119	9	133	20	62	146	15
Future Vol, veh/h	11	75	20	14	164	119	9	133	20	62	146	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	82	22	15	178	129	10	145	22	67	159	16

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	631	488	167	529	485	156	175	0	0	167	0	0
Stage 1	301	301	-	176	176	-	-	-	-	-	-	-
Stage 2	330	187	-	353	309	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	394	480	877	460	482	890	1401	-	-	1411	-	-
Stage 1	708	665	-	826	753	-	-	-	-	-	-	-
Stage 2	683	745	-	664	660	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	225	454	877	371	456	890	1401	-	-	1411	-	-
Mov Cap-2 Maneuver	225	454	-	371	456	-	-	-	-	-	-	-
Stage 1	703	634	-	820	748	-	-	-	-	-	-	-
Stage 2	441	740	-	537	629	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.8		18.1		0.4		2.1	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1401	-	-	447	371	574	1411	-	-
HCM Lane V/C Ratio	0.007	-	-	0.258	0.041	0.536	0.048	-	-
HCM Control Delay (s)	7.6	-	-	15.8	15.1	18.3	7.7	-	-
HCM Lane LOS	A	-	-	C	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1	0.1	3.2	0.1	-	-

HCM 6th TWSC
14: Eastonville Rd & Snaffle Bit Rd

03/19/2020

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↵	↵		↵	↵		↵	↵	
Traffic Vol, veh/h	5	2	4	55	3	47	8	211	46	40	140	3
Future Vol, veh/h	5	2	4	55	3	47	8	211	46	40	140	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	70	92	70	70	70	92	92	70	70	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	3	4	79	4	67	9	229	66	57	152	3

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	584	581	154	551	549	262	155	0	0	295	0	0
Stage 1	268	268	-	280	280	-	-	-	-	-	-	-
Stage 2	316	313	-	271	269	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	423	425	892	445	443	777	1425	-	-	1266	-	-
Stage 1	738	687	-	727	679	-	-	-	-	-	-	-
Stage 2	695	657	-	735	687	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	368	403	892	423	420	777	1425	-	-	1266	-	-
Mov Cap-2 Maneuver	368	403	-	423	420	-	-	-	-	-	-	-
Stage 1	734	656	-	723	675	-	-	-	-	-	-	-
Stage 2	627	653	-	695	656	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.8		13		0.2		2.1	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1425	-	-	473	423	739	1266	-	-
HCM Lane V/C Ratio	0.006	-	-	0.027	0.186	0.097	0.045	-	-
HCM Control Delay (s)	7.5	-	-	12.8	15.4	10.4	8	-	-
HCM Lane LOS	A	-	-	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.7	0.3	0.1	-	-