TRAFFIC IMPACT ANALYSIS

TULIP CREEK APARTMENT DEVELOPMENT
LOCATED ALONG
NORTH EASON BOULEVARD, TUPELO, MS

PREPARED BY:

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7/11/2022
32827
STATE OF MISSISSIPPI

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PROJECT NO.: 04717-1-0122
TULIP CREEK TRAFFIC ANALYSIS

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TABLE OF CONTENTS

1.0 INTRODUCTION

W. L. Burle Engineers, P.A. (BURLE) was retained by McCarty Architects, P.A. (McCARTY) in June of 2022 to conduct an engineering traffic analysis for a proposed development known as "Tulip Creek Apartments". The analysis was requested to determine any detrimental effects to North Eason Boulevard that could result from the generated traffic of this development. It should be noted that this development, according to the Tupelo Development Code (CODE), did not meet the minimum standards to require a traffic analysis due to the low amount of traffic projected to be generated. Section 12.5.3 of the CODE states:

> "Unless exempted below, a traffic impact analysis (TIA) shall be required for zoning map changes utilizing a development plan, site plans, and preliminary plats that can be anticipated to generate at least 130 vehicle trips at the peak hour (as determined by Institute of Transportation Engineers Standards). Trips generated by separate developments meeting the criteria of Section 12.5.3, TIA Submission for Projects with Cumulative Impacts, shall be considered cumulatively" § 12.5.1.

As outlined later in this report, this particular development will produce far less than the 130 vehicle per hour threshold that is required as noted above. Instead, this analysis is being requested at the behest of the City of Tupelo Planning Commission. It is the goal of this report to resolve any concerns the Commission may have.

2.0 DEVELOPMENT DETAILS

The proposed site for the development is located along North Eason Boulevard approximately ¼ of a mile from the intersection with East Main Street. The current 14.5 acre site is undeveloped forest land that is bound by more undeveloped forest land to the north, two developed commercial sites to the east and west, and North Eason Boulevard to the south. The site is located in an existing mixed-use area in the north-eastern part of the city.

The proposed development will consist of 7 buildings, 6 of which will house 48 apartment units. Parking for the development will consist of 109 spaces that will be accessed via an access road that is approximately 500 feet in length. The access road will intersect with North Eason Boulevard at coordinates N34° 15' 42.92", W88° 39' 20.07". Site plan shown in Figure 2.1.

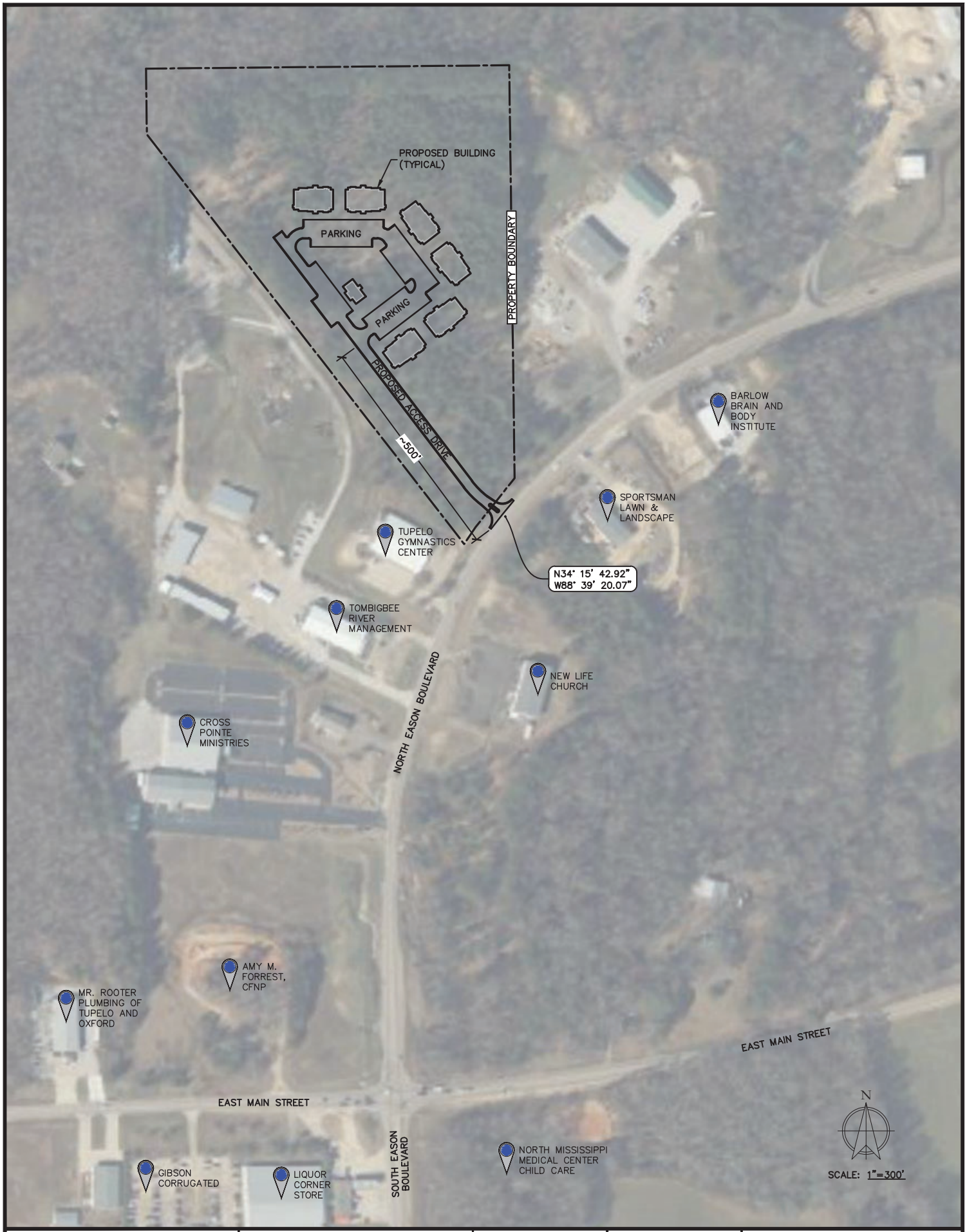


FIGURE 2.1
PROPOSED SITE PLAN

TULIP CREEK DEVELOPMENT
TUPELO, MISSISSIPPI

BURLE PROJECT NUMBER: 04717-1-0122
FILE NAME: Figure 02.10.dwg

DATE: JULY 2022
SCALE: GRAPHIC
DRAWN BY: SWS

PREPARED BY:
W. L. BURLE ENGINEERS, P. A.

Saved By: sswindle Plot Date: 7/11/2022

F:\00000-1-Civil Engineering Active Projects\04717-1-0122 - Tulip Creek Traffic Analysis\Traffic Analysis\Figures\Figure 02.10.dwg

3.0 ANALYSIS DETAILS

As required by the CODE, this analysis utilized the latest editions of both the Trip Generation Manual (TGM) as published by the Institute of Transportation Engineers and the Highway Capacity Manual (HCM) as published by the Transportation Research Board. This analysis also utilizes information such as traffic counts, roadway dimensions, roadway geometry, travel speeds, and more that were determined from both in-field inspection and aerial imagery provided by Google Earth.

The purpose of this analysis was to establish the amount of future traffic that could be generated by this development and determine how this would affect the existing traffic conditions along North Eason Boulevard as well as determine the efficiency of both the proposed access road and its proposed intersection with North Eason Boulevard.

The future traffic generation for this development was determined using graphs/equations from the TGM. The TGM uses years of survey data to establish patterns of traffic use that is used to extrapolate traffic generation data for future developments based off of land use. This analysis relied on the ITETripGen web-based app (version 6.0.1) to come to its conclusions. The web-based app is based off of the most current edition (11^{th}) of the TGM.

To determine effects on the existing traffic conditions, quantitative values for both existing and future conditions were determined for North Eason Boulevard. These quantitative values are known as the Levels of Service (LOS) and are determined using methodologies outlines in the HCM. Comparison of the two LOS values provides insight into how detrimental additional traffic could be to the existing traffic conditions.

The efficiency of the proposed access road was determined using LOS measures as outlined above for the existing traffic on North Eason Boulevard. The efficiency of the future intersection of the access road with North Eason Boulevard was determined using similar LOS analysis techniques but for intersections as outlined in the HCM. Since the proposed access road does not currently exist, analysis was performed only for the future traffic conditions. These future LOS estimates can be used to establish how effective the proposed traffic measures should be at moving traffic from one roadway to another.

Results were analyzed for both the A.M. and P.M. peak hours. These results are discussed in detail below. All calculations are provided with this report as Appendix A.

4.0 TRAFFIC COUNTS & GENERATION

4.1 EXISTING TRAFFIC

Existing traffic conditions were determined from an in-field traffic count. Results of the traffic count are provided in Figures 4.1 and 4.2 and discussed below. The traffic count was conducted on June 27, 2022 at a location approximately 500 feet north of the future intersection of North Eason Boulevard and the proposed access road.

The peak A.M. hour occurred from 7:00 to 8:00 with 496 vehicles per hour using the roadway. Traffic was split with approximately 35% of the traffic heading northbound and 65% of the traffic

heading southbound. It was also determined that approximately 16% of this traffic would be considered heavy truck traffic.

The peak P.M. hour occurred from 4:00 to 5:00 with 640 vehicles per hour using the roadway. Traffic was split with approximately 64% of the traffic heading northbound and 36% of the traffic heading southbound. It was also determined that approximately 7% of this traffic would be considered heavy truck traffic.

EXISTING TRAFFIC (A.M.) N. EASON BLVD.		
PERIOD	N.B.	S.B.
6:00 – 6:15	37	63
6:15 – 6:30	37	83
6:30 – 6:45	49	88
6:45 – 7:00	46	80
TOTAL	169	314
7:00 – 7:15	37	63
7:15 – 7:30	55	114
7:30 – 7:45	39	27
7:45 – 8:00	41	120
TOTAL	172	324
8:00 - 8:15	32	80
8:15 – 8:30	39	70
8:30 – 8:45	47	55
8:45 – 9:00	49	59
TOTAL	167	264

Figure 4.1 – Existing Traffic Data for A.M. (BURLE)

EXISTING TRAFFIC (P.M.) N. EASON BLVD.		
PERIOD	N.B.	S.B.
3:00 – 3:15	72	44
3:15 – 3:30	91	60
3:30 – 3:45	93	64
3:45 – 4:00	71	83
TOTAL	327	251
4:00 – 4:15	114	54
4:15 – 4:30	79	53
4:30 – 4:45	100	43
4:45 – 5:00	116	81
TOTAL	409	231
5:00 – 5:15	130	45
5:15 – 5:30	107	64
5:30 – 5:45	88	59
5:45 – 6:00	64	31
TOTAL	389	199

Figure 4.2 – Existing Traffic Data for P.M. (BURLE)

4.2 FUTURE TRAFFIC GENERATION

Trip end generations were determined using the TGM section for Multifamily Housing (Low-Rise), Weekday, Peak Hour of Adjacent Street Traffic. During the peak A.M. hour, it was determined that an additional 38 vehicles per hour could be generated with 24% of those entering and 76% exiting the development. During the peak P.M. hour, it was determined that an additional 41 vehicles per hour could be generated with 63% entering and 37% exiting the development.

Other traffic measures for the future traffic, such as north/south directional split, were determined from the existing traffic patterns. Since this development is residential in use, it was determined that 0% of the future traffic generated could be considered heavy truck traffic.

5.0 ROADWAY GEOMETRY

5.1 NORTH EASON BOULEVARD

North Eason Boulevard is a local roadway owned and maintained by the City of Tupelo. It is

located in the southeastern portion of the city and connects Interstate I22 with East Main Street. It runs in a north-south fashion for approximately 2 miles and has roughly 13 access points per mile. It has one travel lane for each travel direction that is 12 feet in width. Most of the roadway has a shoulder that is approximately 6 feet in width. It has a level terrain with 100% no passing in the area where the development will be located. For purposes of this analysis, the roadway was considered to be a Two-Way Two-Lane Class II Highway as defined by the HCM.

5.2 PROPOSED ACCESS ROAD

The proposed access road, as shown in figure 2.1 above, will connect North Eason Boulevard with the parking area for the proposed development in an east/west fashion. It will be approximately 500 feet in length and will have 10 feet wide travel lanes, one for each direction. There will be no shoulder nor access points located along the roadway. The roadway will also not allow traffic to pass due to its short length. For purposes of this analysis, the roadway was considered to be a Two-Way Two-Lane Class II Highway as defined by the HCM.

5.3 PROPOSED INTERSECTION OF NORTH EASON BOULEVARD & THE ACCESS ROAD

The future intersection of North Eason Boulevard and the proposed access road will be stop controlled with one stop sign being placed so as to stop eastbound traffic prior to entering North Eason Boulevard. Traffic along North Eason Boulevard will not be required to stop or yield to traffic entering the roadway. Due to the low volume of expected traffic generation, no dedicated right or left turn lanes will be considered on either roadway. A concrete island will be used to separate traffic entering and existing the access road. See figure 2.1 above.

6.0 ROADWAY LEVEL-OF-SERVICE RESULTS

All roadways in this analysis were considered to be Two-Way Two-Lane Class II Highways and were evaluated as such. To determine the LOS for these types of roadways, an estimation of the percent time a vehicle can be expected to follow another vehicle was determined. This value is referred to as the Percent Time Spent Following (PTSF). The PTSF value is dependent upon the Passenger-Car Equivalent Flow Rate (Vp), the Base Percent Time Spent Following (BPTSF), and the percent of no passing zones. The Vp is determined using roadway geometry and traffic data about heavy and recreational vehicle use of the roadway. The BPTSF is determined using the Vp value. All terms are as defined by the HCM. Results for each are discussed below.

6.1 NORTH EASON BOULEVARD

6.1.1 PRE-CONSTRUCTION FOR A.M. PEAK HOUR

For the pre-construction A.M. peak hour period along North Eason Boulevard, it was determined that there were 496 vehicles per hour using the roadway with 16% of these being heavy trucks and 0% being recreational vehicles. From this data, it was determined that the roadway has a Vp of 752 vehicles per hour which results in a BPTSF of 48.4%. The PTSF was then calculated to be 73.0% which gives the roadway an existing LOS rating of “D”.

6.1.2 PRE-CONSTRUCTION FOR P.M. PEAK HOUR

For the pre-construction P.M. peak hour period along North Eason Boulevard, it was determined that there were 640 vehicles per hour using the roadway with 7% of these being heavy trucks and 0% being recreational vehicles. From this data, it was determined that the roadway has a Vp of 827 vehicles per hour which results in a BPTSF of 51.6%. The PTSF was then calculated to be 76.2% which gives the roadway an existing LOS rating of "D".

6.1.3 POST-CONSTRUCTION FOR A.M. PEAK HOUR

For the post-construction A.M. peak hour period along North Eason Boulevard, it was determined that there would be an estimated 534 vehicles per hour using the roadway with 16% of these being heavy trucks and 0% being recreational vehicles. From this data, it was determined that the roadway would have an estimated Vp of 797 vehicles per hour which results in a BPTSF of 50.4%. The PTSF was then estimated to be 75.0% (a 2% increase) which will maintain the roadways existing LOS rating of "D".

6.1.4 POST-CONSTRUCTION FOR P.M. PEAK HOUR

For the post-construction P.M. peak hour period along North Eason Boulevard, it was determined that there would be an estimated 681 vehicles per hour using the roadway with 7% of these being heavy trucks and 0% being recreational vehicles. From this data, it was determined that the roadway would have an estimated Vp of 876 vehicles per hour which results in a BPTSF of 53.7%. The PTSF was then estimated to be 78.3% (a 2.1% increase) which will maintain the roadways existing LOS rating of "D".

6.2 PROPOSED ACCESS ROAD

6.2.1 POST-CONSTRUCTION FOR A.M. PEAK HOUR

For the post-construction A.M. peak hour period along the proposed access road, it was determined that there would be an estimated 38 vehicles per hour using the roadway with 0% of these being heavy trucks and 0% being recreational vehicles. From this data, it was determined that the roadway would have an estimated Vp of 47 vehicles per hour which results in a BPTSF of 4.0%. The PTSF was then estimated to be 28.6% which gives the roadway an estimated LOS rating of "A".

6.2.2 POST-CONSTRUCTION FOR P.M. PEAK HOUR

For the post-construction P.M. peak hour period along the proposed access road, it was determined that there would be an estimated 41 vehicles per hour using the roadway with 0% of these being heavy trucks and 0% being recreational vehicles. From this data, it was determined that the roadway would have an estimated Vp of 50 vehicles per hour which results in a BPTSF of 4.3%. The PTSF was then estimated to be 28.9% which gives the roadway an estimated LOS rating of "A".

7.0 INTERSECTION LEVEL-OF-SERVICE RESULTS

The intersection of interest for this analysis is considered a Two-Way Stop-Controlled Intersection as defined by the HCM. LOS for this type of intersection is determined from the Control Delay (CD) value, which is the time of delay in seconds that results from the intersection controls. There are several different factors that go into determining the CD value and deals largely with the traffic volume and the intersection's geometry. For this type of intersection, there are three conflicting traffic movements that control the CD value. See figure 7.1 below for movement definitions.

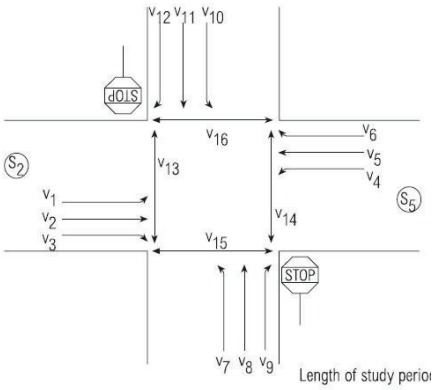


Figure 7.1 – Movement Definitions (HCM)

The three conflicting movements are the major left turn (1), minor right turn (12), and the minor left turn (10). There are two important values to calculate for each of these conflicting movements: the Critical Gap Time (Tc) and the Follow Up Time (Tf). From these values and using conflicting traffic impedance values as defined in the HCM, the Movement Capacity (Cm) and the Shared Lane Capacity (Csh) can be calculated. Using these values, the CD can then be calculated and the LOS value determined. All terms are defined in the HCM. Results are discussed below.

7.1 NORTH EASON BOULEVARD AND PROPOSED ACCESS ROAD

7.1.1 POST-CONSTRUCTION FOR A.M. PEAK HOUR

For post-construction A.M. peak hour period for the proposed intersection of North Eason Boulevard and the access road, the following values were estimated for movements 1, 12, and 10 respectively:

- Tc: 4.1, 6.2, and 6.4 seconds
- Tf: 2.2, 3.3, and 3.5 seconds
- Cm: 1,358, 824, and 642 vehicles per hour

From these values, the Csh was calculated to be 979 vehicles per hour with a 9 second control delay. This will give the intersection an estimated LOS value of "A".

7.1.2 POST-CONSTRUCTION FOR P.M. PEAK HOUR

For post-construction P.M. peak hour period for the proposed intersection of North Eason

Boulevard and the access road, the following values were estimated for movements 1, 12, and 10 respectively:

- Tc: 4.1, 6.2, and 6.4 seconds
- Tf: 2.2, 3.3, and 3.5 seconds
- Cm: 1,418, 881, and 489 vehicles per hour

From these values, the Csh was determined to be 641 vehicles per hour with an 11 second control delay. This will give the intersection an estimated LOS value of "B".

8.0 CONCLUSION

It is the consensus of this report that, based on the results of the traffic analysis, the Tulip Creek Apartment Development will have a minimal effect on the existing traffic conditions for North Eason Boulevard. As well, it is the consensus of this report that the current design of the proposed access road will efficiently convey traffic into and out of the development. Similarly, the current design of the proposed intersection of the access road with North Eason Boulevard should efficiently direct traffic from one roadway to another with minimal interruption.

It is also worth noting that current traffic patterns, heavy vehicle use, and existing geometry are all contributing factors to the poor LOS of North Eason Boulevard. The addition of this development will NOT cause any significant changes to the current condition of this roadway and will NOT affect health and safety of drivers in any meaningful way.

APPENDIX "A"

TRAFFIC ANALYSIS CALCULATIONS

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS
Traffic Count Location: 34° 15' 46.8" N
88° 39' 14.9" W

EXISTING TRAFFIC COUNT (A.M. PERIOD)

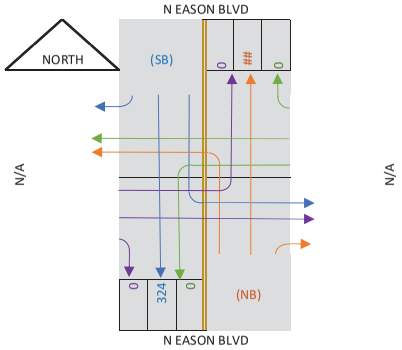
	Time Frame	N EASON BLVD (NB)				N EASON BLVD (SB)				N/A (WB)				N/A (EB)			
		Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total
X	6:00 AM - 6:15 AM	0	37	0	37	0	63	0	63	0	0	0	0	0	0	0	0
	6:15 AM - 6:30 AM	0	37	0	37	0	83	0	83	0	0	0	0	0	0	0	0
	6:30 AM - 6:45 AM	0	49	0	49	0	88	0	88	0	0	0	0	0	0	0	0
	6:45 AM - 7:00 AM	0	46	0	46	0	80	0	80	0	0	0	0	0	0	0	0
	TOTALS	**0**	**169**	**0**	**169**	**0**	**314**	**0**	**314**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PEAK	7:00 AM - 7:15 AM	0	37	0	37	0	63	0	63	0	0	0	0	0	0	0	0
	7:15 AM - 7:30 AM	0	55	0	55	0	114	0	114	0	0	0	0	0	0	0	0
	7:30 AM - 7:45 AM	0	39	0	39	0	27	0	27	0	0	0	0	0	0	0	0
	7:45 AM - 8:00 AM	0	41	0	41	0	120	0	120	0	0	0	0	0	0	0	0
	TOTALS	**0**	**172**	**0**	**172**	**0**	**324**	**0**	**324**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
X	8:00 AM - 8:15 AM	0	32	0	32	0	80	0	80	0	0	0	0	0	0	0	0
	8:15 AM - 8:30 AM	0	39	0	39	0	70	0	70	0	0	0	0	0	0	0	0
	8:30 AM - 8:45 AM	0	47	0	47	0	55	0	55	0	0	0	0	0	0	0	0
	8:45 AM - 8:00 AM	0	49	0	49	0	59	0	59	0	0	0	0	0	0	0	0
	TOTALS	**0**	**167**	**0**	**167**	**0**	**264**	**0**	**264**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	PERIOD TOTALS	**0**	**508**	**0**	**508**	**0**	**902**	**0**	**902**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

N EASON BLVD PHF$_{N/S}$: 0.73
DIRECTIONAL SPLIT (A.M.): 35% - 65%
%NB Right Turn: 0% %NB Left Turn: 0%
%WB Right Turn: N/A %WB Left Turn: N/A

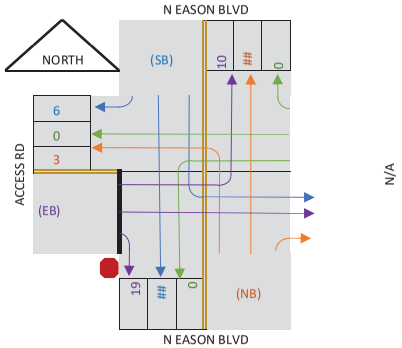
N/A PHF$_{E/W}$: N/A
DIRECTIONAL SPLIT (A.M.): 0% - 0%
%SB Right Turn: 0% %SB Left Turn: 0%
%EB Right Turn: N/A %EB Left Turn: N/A

NB Sreet: N EASON BLVD
SB Street: N EASON BLVD
WB Street:
EB Street: ACCESS RD

EXISTING TRAFFIC COUNT



ESTIMATED FUTURE TRAFFIC COUNT



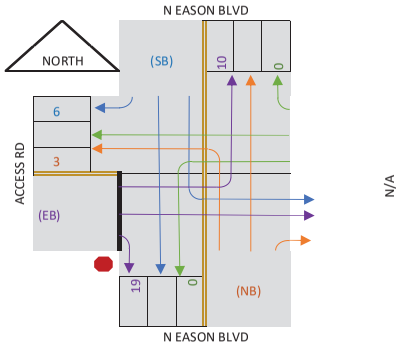
FUTURE TRAFFIC GENERATION (A.M. PERIOD)

Peak Time Frame	N EASON BLVD (NB)				N EASON BLVD (SB)				ACCESS RD (WB)				ACCESS RD (EB)			
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total
7:00 AM - 7:15 AM	1	37	0	38	0	63	1	64	0	0	0	0	3	0	5	7
7:15 AM - 7:30 AM	1	55	0	56	0	114	2	116	0	0	0	0	3	0	5	7
7:30 AM - 7:45 AM	1	39	0	40	0	27	0	27	0	0	0	0	3	0	5	7
7:45 AM - 8:00 AM	1	41	0	42	0	120	2	122	0	0	0	0	3	0	5	7
TOTALS	**3**	**172**	**0**	**175**	**0**	**324**	**6**	**330**	**0**	**0**	**0**	**0**	**10**	**0**	**19**	**29**

N EASON BLVD PHF$_{N/S}$: 0.74
PHF$_{lane}$: 0.78 0.78 0.00 0.00 0.68 0.68

ACCESS RD PHF$_{E/W}$: 0.73
0.00 0.00 0.00 1.00 0.00 1.00

ADDITIONAL GENERATED TRAFFIC



N/A

TRIP END GENERATION CALCULATIONS (A.M. PERIOD)

STREET: NORTH ENTRANCE

ST. LOCATION IN INTERSECTION (SINGLE LEG): WEST

SOURCE INFO: TRIP GENERATION MANUAL, 10th ED.
MULTIFAMILY HOUSING (LOW RISE)
WEEKDAY A.M. PEAK HOUR

NO. OF UNTIS= 48

TRIP ENDS= 38

TRIP ENTER= 24% / 9

TRIP EXIT= 76% / 29

What percentage of traffic will use this intersection? 100%

RIGHT TURN		LEFT TURN	
ENTER SB (VEH/HR)=	65% / 6	ENTER NB (VEH/HR)=	35% / 3
EXIT SB (VEH/HR)=	65% / 19	EXIT NB (VEH/HR)=	35% / 10

HEAVY / RECREATIONAL VEHICLE CALCULATIONS

Peak Time Frame	N EASON BLVD (NB)				N EASON BLVD (SB)				ACCESS RD (WB)				ACCESS RD (EB)			
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total
PASSENGER VEHICLES																
7:00 AM - 7:15 AM	0	33	0	33	0	56	0	56	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	40	0	40	0	100	0	100	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	32	0	32	0	22	0	22	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	36	0	36	0	108	0	108	0	0	0	0	0	0	0	0
TOTALS	0	141	0	141	0	286	0	286	0	0	0	0	0	0	0	0
HEAVY VEHICLES																
7:00 AM - 7:15 AM	0	4	0	4	0	7	0	7	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	15	0	15	0	14	0	14	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	7	0	7	0	5	0	5	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	5	0	5	0	12	0	12	0	0	0	0	0	0	0	0
TOTALS	0	31	0	31	0	38	0	38	0	0	0	0	0	0	0	0
RECREATIONAL VEHICLES																
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HEAVY VEHICLES	0%	22%	0%	22%	0%	13%	0%	13%	0%	0%	0%	0%	0%	0%	0%	0%
% REC. VEHICLES	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

TOTAL PERCENT HEAVY (NORTH-SOUTH): 16%

TOTAL PERCENT HEAVY (EAST-WEST): 0%

TOTAL PERCENT RECREATIONAL (NORTH-SOUTH): 0%

TOTAL PERCENT RECREATIONAL (EAST-WEST): 0%

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS
Traffic Count Location: 34° 15' 46.8" N
88° 39' 14.9" W

NB Sreet: N EASON BLVD
SB Street: N EASON BLVD
WB Street:
NB Street: ACCESS RD

EXISTING TRAFFIC COUNT (P.M. PERIOD)

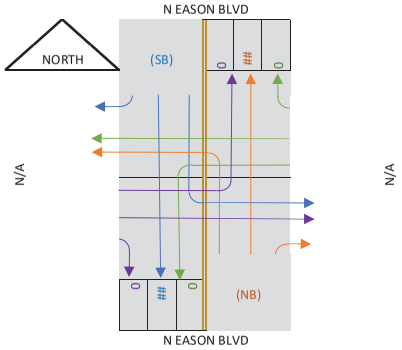
	Time Frame	N EASON BLVD (NB)				N EASON BLVD (SB)				N/A (WB)				N/A (EB)			
		Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total
X	3:00 PM - 3:15 PM	0	72	0	72	0	44	0	44	0	0	0	0	0	0	0	0
	3:15 PM - 3:30 PM	0	91	0	91	0	60	0	60	0	0	0	0	0	0	0	0
	3:30 PM - 3:45 PM	0	93	0	93	0	64	0	64	0	0	0	0	0	0	0	0
	3:45 PM - 4:00 PM	0	71	0	71	0	83	0	83	0	0	0	0	0	0	0	0
	TOTALS	0	327	0	327	0	251	0	251	0	0	0	0	0	0	0	0
PEAK	4:00 PM - 4:15 PM	0	114	0	114	0	54	0	54	0	0	0	0	0	0	0	0
	4:15 PM - 4:30 PM	0	79	0	79	0	53	0	53	0	0	0	0	0	0	0	0
	4:30 PM - 4:45 PM	0	100	0	100	0	43	0	43	0	0	0	0	0	0	0	0
	4:45 PM - 5:00 PM	0	116	0	116	0	81	0	81	0	0	0	0	0	0	0	0
	TOTALS	0	409	0	409	0	231	0	231	0	0	0	0	0	0	0	0
X	5:00 PM - 5:15 PM	0	130	0	130	0	45	0	45	0	0	0	0	0	0	0	0
	5:15 PM - 5:30 PM	0	107	0	107	0	64	0	64	0	0	0	0	0	0	0	0
	5:30 PM - 5:45 PM	0	88	0	88	0	59	0	59	0	0	0	0	0	0	0	0
	5:45 PM - 6:00 PM	0	64	0	64	0	31	0	31	0	0	0	0	0	0	0	0
	TOTALS	0	389	0	389	0	199	0	199	0	0	0	0	0	0	0	0
	PERIOD TOTALS	0	1,125	0	1,125	0	681	0	681	0	0	0	0	0	0	0	0

N EASON BLVD $PHF_{N/S}$: 0.81
N/A $PHF_{E/W}$: N/A

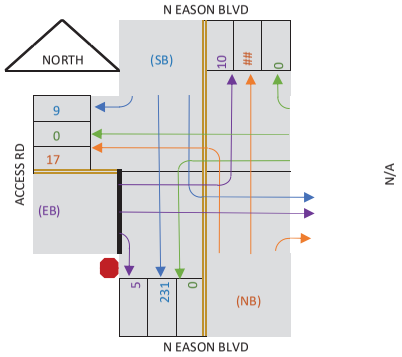
DIRECTIONAL SPLIT (P.M.): 64% - 36%
%NB Right Turn: 0%
%NB Left Turn: 0%
%WB Right Turn: N/A
%WB Left Turn: N/A

DIRECTIONAL SPLIT (P.M.): 0% - 0%
%SB Right Turn: 0%
%SB Left Turn: 0%
%EB Right Turn: N/A
%EB Left Turn: N/A

EXISTING TRAFFIC COUNT



ESTIMATED FUTURE TRAFFIC COUNT



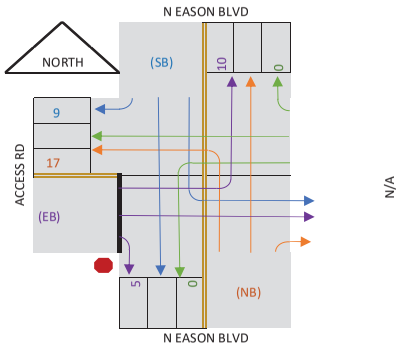
FUTURE TRAFFIC GENERATION (P.M. PERIOD)

Peak Time Frame	N EASON BLVD (NB)				N EASON BLVD (SB)				ACCESS RD (WB)				ACCESS RD (EB)			
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total
4:00 PM - 4:15 PM	5	114	0	119	0	54	2	56	0	0	0	0	2	0	1	4
4:15 PM - 4:30 PM	3	79	0	82	0	53	2	55	0	0	0	0	2	0	1	4
4:30 PM - 4:45 PM	4	100	0	104	0	43	2	45	0	0	0	0	2	0	1	4
4:45 PM - 5:00 PM	5	116	0	121	0	81	3	84	0	0	0	0	2	0	1	4
TOTALS	17	409	0	426	0	231	9	240	0	0	0	0	10	0	5	15

N EASON BLVD $PHF_{N/S}$: 0.82
ACCESS RD $PHF_{E/W}$: 0.81

PHF_{lane}: 0.88 0.88 0.00 0.00 0.71 0.71 0.00 0.00 0.00 1.00 0.00 1.00

ADDITIONAL GENERATED TRAFFIC



N/A

TRIP END GENERATION CALCULATIONS (P.M. PERIOD)

STREET: NORTH ENTRANCE

ST. LOCATION IN INTERSECTION (SINGLE LEG): WEST

SOURCE INFO: TRIP GENERATION MANUAL, 10th ED.
MULTIFAMILY HOUSING (LOW RISE)
WEEKDAY A.M. PEAK HOUR

NO. OF UNTIS= 48

TRIP ENDS= 41

TRIP ENTER= 63% / 26

TRIP EXIT= 37% / 15

What percentage of traffic will use this intersection? 100%

RIGHT TURN

ENTER SB (VEH/HR)= 36% / 9

EXIT SB (VEH/HR)= 36% / 5

LEFT TURN

ENTER NB (VEH/HR)= 64% / 17

EXIT NB (VEH/HR)= 64% / 10

HEAVY / RECREATIONAL VEHICLE CALCULATIONS																
Peak Time Frame	N EASON BLVD (NB)				N EASON BLVD (SB)				ACCESS RD (WB)				ACCESS RD (EB)			
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total
PASSENGER VEHICLES																
4:00 PM - 4:15 PM	0	112	0	112	0	45	0	45	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	78	0	78	0	42	0	42	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	94	0	94	0	41	0	41	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	110	0	110	0	76	0	76	0	0	0	0	0	0	0	0
TOTALS	0	394	0	394	0	204	0	204	0	0	0	0	0	0	0	0
HEAVY VEHICLES																
4:00 PM - 4:15 PM	0	2	0	2	0	9	0	9	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	1	0	1	0	11	0	11	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	6	0	6	0	2	0	2	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	6	0	6	0	5	0	5	0	0	0	0	0	0	0	0
TOTALS	0	15	0	15	0	27	0	27	0	0	0	0	0	0	0	0
RECREATIONAL VEHICLES																
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

% HEAVY VEHICLES	0%	4%	0%	4%	0%	13%	0%	13%	0%	0%	0%	0%	0%	0%	0%	0%
% REC. VEHICLES	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

TOTAL PERCENT HEAVY (NORTH-SOUTH): 7%

TOTAL PERCENT HEAVY (EAST-WEST): 0%

TOTAL PERCENT RECREATIONAL (NORTH-SOUTH): 0%

TOTAL PERCENT RECREATIONAL (EAST-WEST): 0%

TWO-LANE HIGHWAY L.O.S. | PRE-CONSTRUCTION (A.M.)

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS

Street of Interest: **N EASON BLVD**
Development Location: 34° 15' 72.92" N
88° 39' 20.07" W

GENERAL STREET INFORMATION

Which direcdtion does the street run? NORTH-SOUTH

This calculator uses HCM 2000 Chapter 20

V (veh/hr)=	496	BFFS (mph)=	50 *POSTED LIMIT	PHF=	0.73	P_t (%)=	16%
$V_{directional}$ (veh/hr)=	172	Terrain:	Level	$W_{sholder}$ (ft)=	6	W_{lane} (ft)=	12
		Access (Point/Mile)=	13	Class:	II	Split:	35%

P_r (%)=	0%		
No Pass (%)=	100%		
\	65%		

*Determined from Aerial Imagery

TRAVEL SPEED CALCULATIONS

f_g=	1	EXH. 20-7	E_t=	1.7	EXH. 20-9
f_{hv}=	0.90		E_r=	1	EXH. 20-9

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)=	752	EQ: $v/[PHF*f_g*f_{hv}]$	<1,700 veh/hr
$V_{p\text{-directional}}$ (veh/hr)=	491	EQ: v_p*{MAX SPLIT}	<3,200 veh/hr

f_{ls} (mph)=	1.3	EXH. 20-5	f_{np} (mph)=	4	EXH. 20-11
f_A (mph)=	7.5	EXH. 20-6	ATS (mph)=	31	
FFS (mph)=	41	EQ: $BFFS-f_{ls}-f_A$		EQ: $FFS-0.00776*v_p-f_{np}$	

PERCENT TIME FOLLOWING CALCULATIONS

f_g=	1	EXH. 20-8	E_t=	1.1	EXH. 20-10
f_{hv}=	0.90		E_r=	1	EXH. 20-10

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)=	752	EQ: $v/[PHF*f_g*f_{hv}]$
$V_{p\text{-directional}}$ (veh/hr)=	491	EQ: v_p*{MAX SPLIT}

BPTSF (%)=	48.4	EQ: $100(1-exp(-0.000879*v_p))$	
$f_{d/np}$ (%)=	24.6	EXH. 20-12	*Interpolated Value
PTSF (%)=	73.0	EQ: $BPTSF+f_{d/np}$	

LOS CALCULATIONS

PRE-CONSTRUCTION (A.M.) L.O.S. OF D WAS DETERMINED

LOS (CLASS II)	PTSF
A	<=40
B	>40-55
C	>55-70
D	>70-85
E	>85

EXH. 20-4

*USE EXH. 20-3 FOR LOS CLASS I

TWO-LANE HIGHWAY L.O.S. | PRE-CONSTRUCTION (P.M.)

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS

Street of Interest: **N EASON BLVD**
Development Location: 34° 15' 72.92" N
88° 39' 20.07" W

GENERAL STREET INFORMATION

Which direcdtion does the street run? NORTH-SOUTH

This calculator uses HCM 2000 Chapter 20

V (veh/hr)=	640	BFFS (mph)=	50 *POSTED LIMIT	PHF=	0.81	P_t (%)=	7%	P_r (%)=	0%
$V_{directional}$ (veh/hr)=	409	Terrain:	Level	$W_{sholder}$ (ft)=	6	W_{lane} (ft)=	12	No Pass (%)=	100%
		Access (Point/Mile)=	13	Class:	II	Split:	64%	\	36%

*Determined from Aerial Imagery

TRAVEL SPEED CALCULATIONS

f_g=	1	EXH. 20-7	E_t=	1.7	EXH. 20-9
f_{hv}=	0.95		E_r=	1	EXH. 20-9

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)=	827	EQ: $v/[PHF*f_g*f_{hv}]$	<1,700 veh/hr
$V_{p\text{-directional}}$ (veh/hr)=	528	EQ: v_p*{MAX SPLIT}	<3,200 veh/hr

f_{ls} (mph)=	1.3	EXH. 20-5	f_{np} (mph)=	4	EXH. 20-11
f_A (mph)=	7.5	EXH. 20-6	ATS (mph)=	31	
FFS (mph)=	41	EQ: $BFFS-f_{ls}-f_A$		EQ: $FFS-0.00776*v_p-f_{np}$	

PERCENT TIME FOLLOWING CALCULATIONS

f_g=	1	EXH. 20-8	E_t=	1.1	EXH. 20-10
f_{hv}=	0.95		E_r=	1	EXH. 20-10

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)=	827	EQ: $v/[PHF*f_g*f_{hv}]$
$V_{p\text{-directional}}$ (veh/hr)=	528	EQ: v_p*{MAX SPLIT}

BPTSF (%)=	51.6	EQ: $100(1-exp(-0.000879*v_p))$	
$f_{d/np}$ (%)=	24.6	EXH. 20-12	*Interpolated Value
PTSF (%)=	76.2	EQ: $BPTSF+f_{d/np}$	

LOS CALCULATIONS

PRE-CONSTRUCTION (P.M.) L.O.S. OF D WAS DETERMINED

LOS (CLASS II)	PTSF
A	<=40
B	>40-55
C	>55-70
D	>70-85
E	>85

EXH. 20-4

*USE EXH. 20-3 FOR LOS CLASS I

TWO-LANE HIGHWAY L.O.S. | POST-CONSTRUCTION (A.M.)

Project Name: Tulip Creek Traffic Analysis

Project Number: 04717-1-0122

Date: 6/27/2022

Calculations By: SWS

Street of Interest: **N EASON BLVD**

Development Location: 34° 15' 72.92" N, 88° 39' 20.07" W

GENERAL STREET INFORMATION

Which direcdtion does the street run? NORTH-SOUTH

This calculator uses HCM 2000 Chapter 20

V (veh/hr)=	534	BFFS (mph)=	50 *POSTED LIMIT	PHF=	0.74	P_t (%)=	16%
$V_{directional}$ (veh/hr)=	185	Terrain:	Level	$W_{sholder}$ (ft)=	6	W_{lane} (ft)=	12
		Access (Point/Mile)=	13	Class:	II	Split:	35%

*Determined from Aerial Imagery

P_r (%)=	0%		
No Pass (%)=	100%		
\	65%		

TRAVEL SPEED CALCULATIONS

f_g=	1	EXH. 20-7	E_t=	1.7	EXH. 20-9
f_{hv}=	0.90		E_r=	1	EXH. 20-9

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)=	797	EQ: $v/[PHF*f_g*f_{hv}]$	<1,700 veh/hr
$V_{p\text{-directional}}$ (veh/hr)=	521	EQ: v_p*{MAX SPLIT}	<3,200 veh/hr

f_{ls} (mph)=	1.3	EXH. 20-5	f_{np} (mph)=	4	EXH. 20-11
f_A (mph)=	7.5	EXH. 20-6	ATS (mph)=	31	
FFS (mph)=	41	EQ: $BFFS-f_{ls}-f_A$		EQ: $FFS-0.00776*v_p-f_{np}$	

PERCENT TIME FOLLOWING CALCULATIONS

f_g=	1	EXH. 20-8	E_t=	1.1	EXH. 20-10
f_{hv}=	0.90		E_r=	1	EXH. 20-10

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)=	797	EQ: $v/[PHF*f_g*f_{hv}]$
$V_{p\text{-directional}}$ (veh/hr)=	521	EQ: v_p*{MAX SPLIT}

BPTSF (%)=	50.4	EQ: $100(1-exp(-0.000879*v_p))$	
$f_{d/np}$ (%)=	24.6	EXH. 20-12	*Interpolated Value
PTSF (%)=	75.0	EQ: $BPTSF+f_{d/np}$	

LOS CALCULATIONS

POST-CONSTRUCTION (A.M.) L.O.S. OF D WAS DETERMINED

LOS (CLASS II)	PTSF
A	<=40
B	>40-55
C	>55-70
D	>70-85
E	>85

EXH. 20-4

*USE EXH. 20-3 FOR LOS CLASS I

TWO-LANE HIGHWAY L.O.S. | POST-CONSTRUCTION (P.M.)

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS

Street of Interest: **N EASON BLVD**
Development Location: 34° 15' 72.92" N
88° 39' 20.07" W

GENERAL STREET INFORMATION

Which direcdtion does the street run? NORTH-SOUTH

This calculator uses HCM 2000 Chapter 20

V (veh/hr)= 681 | BFFS (mph)= 50 *POSTED LIMIT | PHF= 0.82 | P_t (%)= 7% | P_r (%)= 0%

$V_{directional}$ (veh/hr)= 435 | Terrain: Level | $W_{sholder}$ (ft)= 6 | W_{lane} (ft)= 12 | No Pass (%)= 100%

Access (Point/Mile)= 13 | Class: II | Split: 64% \ 36%

*Determined from Aerial Imagery

TRAVEL SPEED CALCULATIONS

f_g= 1 EXH. 20-7 | E_t= 1.7 EXH. 20-9

f_{hv}= 0.95 | E_r= 1 EXH. 20-9

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)= 876 EQ: $v/[PHF*f_g*f_{hv}]$ <1,700 veh/hr

$V_{p\text{-directional}}$ (veh/hr)= 560 EQ: v_p*{MAX SPLIT} <3,200 veh/hr

f_{ls} (mph)= 1.3 EXH. 20-5 | f_{np} (mph)= 4 EXH. 20-11

f_A (mph)= 7.5 EXH. 20-6 | ATS (mph)= 30

FFS (mph)= 41 EQ: $BFFS-f_{ls}-f_A$ EQ: $FFS-0.00776*v_p-f_{np}$

PERCENT TIME FOLLOWING CALCULATIONS

f_g= 1 EXH. 20-8 | E_t= 1.1 EXH. 20-10

f_{hv}= 0.95 | E_r= 1 EXH. 20-10

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)= 876 EQ: $v/[PHF*f_g*f_{hv}]$

$V_{p\text{-directional}}$ (veh/hr)= 560 EQ: v_p*{MAX SPLIT}

BPTSF (%)= 53.7 EQ: $100(1-\exp(-0.000879*v_p))$

$f_{d/np}$ (%)= 24.6 EXH. 20-12 *Interpolated Value

PTSF (%)= 78.3 EQ: $BPTSF+f_{d/np}$

LOS CALCULATIONS

POST-CONSTRUCTION (P.M.) L.O.S. OF D WAS DETERMINED

LOS (CLASS II)	PTSF
A	<=40
B	>40-55
C	>55-70
D	>70-85
E	>85

EXH. 20-4

*USE EXH. 20-3 FOR LOS CLASS I

TWO-LANE HIGHWAY L.O.S. | POST-CONSTRUCTION (A.M.)

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS

Street of Interest: **ACCESS RD**
Development Location: 34° 15' 72.92" N
88° 39' 20.07" W

GENERAL STREET INFORMATION

Which direcdtion does the street run? EAST-WEST

This calculator uses HCM 2000 Chapter 20

V (veh/hr)=	38	BFFS (mph)=	20	*POSTED LIMIT	PHF=	0.81	P_t (%)=	0%	P_r (%)= 0%
$V_{directional}$ (veh/hr)=	9	Terrain:	Level		$W_{sholder}$ (ft)=	0	W_{lane} (ft)=	10	No Pass (%)= 100%
		Access (Point/Mile)=	0		Class:	II	Split:	24%	\ 76%

*Determined from Aerial Imagery

TRAVEL SPEED CALCULATIONS

f_g=	1	EXH. 20-7	E_t=	1.7	EXH. 20-9
f_{hv}=	1.00		E_r=	1	EXH. 20-9

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)=	47	EQ: $v/[PHF*f_g*f_{hv}]$	<1,700 veh/hr
$V_{p\text{-directional}}$ (veh/hr)=	36	EQ: v_p*{MAX SPLIT}	<3,200 veh/hr

f_{ls} (mph)=	5.28	EXH. 20-5	f_{np} (mph)=	1.12	EXH. 20-11
f_A (mph)=	0	EXH. 20-6	ATS (mph)=	13	
FFS (mph)=	15	EQ: $BFFS-f_{ls}-f_A$		EQ: $FFS-0.00776*v_p-f_{np}$	

PERCENT TIME FOLLOWING CALCULATIONS

f_g=	1	EXH. 20-8	E_t=	1.1	EXH. 20-10
f_{hv}=	1.00		E_r=	1	EXH. 20-10

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)=	47	EQ: $v/[PHF*f_g*f_{hv}]$
$V_{p\text{-directional}}$ (veh/hr)=	36	EQ: v_p*{MAX SPLIT}

BPTSF (%)=	4.0	EQ: $100(1-\exp(-0.000879*v_p))$	
$f_{d/np}$ (%)=	24.6	EXH. 20-12	*Interpolated Value
PTSF (%)=	28.6	EQ: $BPTSF+f_{d/np}$	

LOS CALCULATIONS

POST-CONSTRUCTION (A.M.) L.O.S. OF A WAS DETERMINED

LOS (CLASS II)	PTSF
A	<=40
B	>40-55
C	>55-70
D	>70-85
E	>85

EXH. 20-4

*USE EXH. 20-3 FOR LOS CLASS I

TWO-LANE HIGHWAY L.O.S. | POST-CONSTRUCTION (P.M.)

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS

Street of Interest: **ACCESS RD**
Development Location: 34° 15' 72.92" N
88° 39' 20.07" W

GENERAL STREET INFORMATION

Which direcdtion does the street run? EAST-WEST

This calculator uses HCM 2000 Chapter 20

V (veh/hr)= 41 | BFFS (mph)= 20 *POSTED LIMIT | PHF= 0.81 | P_t (%)= 0% | P_r (%)= 0%

$V_{directional}$ (veh/hr)= 26 | Terrain: Level | $W_{sholder}$ (ft)= 0 | W_{lane} (ft)= 10 | No Pass (%)= 100%

Access (Point/Mile)= 0 | Class: II | Split: 63% \ 37%

*Determined from Aerial Imagery

TRAVEL SPEED CALCULATIONS

f_g= 1 EXH. 20-7 | E_t= 1.7 EXH. 20-9

f_{hv}= 1.00 | E_r= 1 EXH. 20-9

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)= 50 EQ: $v/[PHF*f_g*f_{hv}]$ <1,700 veh/hr

$V_{p\text{-directional}}$ (veh/hr)= 32 EQ: v_p*{MAX SPLIT} <3,200 veh/hr

f_{ls} (mph)= 5.28 EXH. 20-5 | f_{np} (mph)= 1.12 EXH. 20-11

f_A (mph)= 0 EXH. 20-6 | ATS (mph)= 13

FFS (mph)= 15 EQ: BFFS-f_{ls}-f_A | EQ: FFS-0.00776*v_p-f_{np}

PERCENT TIME FOLLOWING CALCULATIONS

f_g= 1 EXH. 20-8 | E_t= 1.1 EXH. 20-10

f_{hv}= 1.00 | E_r= 1 EXH. 20-10

EQ: $1/[1+P_t(E_t-1)+P_r(E_r-1)]$

V_p (veh/hr)= 50 EQ: $v/[PHF*f_g*f_{hv}]$

$V_{p\text{-directional}}$ (veh/hr)= 32 EQ: v_p*{MAX SPLIT}

BPTSF (%)= 4.3 EQ: $100(1-\exp(-0.000879*v_p))$

$f_{d/np}$ (%)= 24.6 EXH. 20-12 *Interpolated Value

PTSF (%)= 28.9 EQ: BPTSF+$f_{d/np}$

LOS CALCULATIONS

POST-CONSTRUCTION (P.M.) L.O.S. OF A WAS DETERMINED

LOS (CLASS II)	PTSF
A	<=40
B	>40-55
C	>55-70
D	>70-85
E	>85

EXH. 20-4

*USE EXH. 20-3 FOR LOS CLASS I

2-WAY STOP CONTROLLED INTERSECTION L.O.S. CALCULATIONS

POST-CONSTRUCTION (A.M.)

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS

Intersection of Interest: **N EASON BLVD & ACCESS RD**
Development Location: 34° 15' 72.92" N
88° 39' 20.07" W
Which direction is the primary street running? NORTH-SOUTH

VEHICLE VOLUME CALCULATIONS

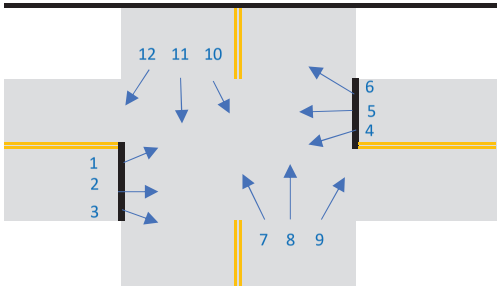
Movement:	1	2	3	4	5	6	7	8	9	10	11	12
V (veh/hr):	3	172	0	0	324	6	0	0	0	10	0	19
PHF:	0.78	0.78	0.00	0.00	0.68	0.68	0.00	0.00	0.00	1.00	0.00	1.00
V_{hourly} (veh/hr):	2	134	0	0	219	4	0	0	0	10	0	19
P_{hv} (%):	0%	0%	0%	0%	0%	0%	0%	22%	0%	0%	13%	0%

PEDESTRIAN VOLUME CALCULATIONS

Movement:	13	14	15	16
V_x (ped/hr):	0	0	0	0
W_{lane} (ft):	N/A	N/A	N/A	N/A
S_p (ft/sec):	N/A	N/A	N/A	N/A
f_p (%):	N/A	N/A	N/A	N/A

Saturation (veh/hr)= 1,900

MOVEMENT KEY



Questions from Exhibit 17-4

[a] / [c] Does major st. have dedicated right turn lane? NO

v_3^a= 0 v_6^a= 4

[b] How many thru lanes does the major street have? 1

v_2^b= 134 v_5^b= 219

[d] Does major street have multiple lanes? [This is for STAGE II movement of 7 and 10 if applicable] NO

v_3^d= 0 v_6^d= 4

[e] Is right turning traffic on minor st seperated by island and/or minor street multi-lane? NO

[f] Is the minor street approach flared? NO

v_9^e= 0 v_{12}^e= 19

CRITICAL GAP CALCULATIONS

Movement:	1	4	9	12	8	11	7	10	
$t_{c,base}$ (s):	4.1			6.2				7.1	EXH. 17-5
$t_{c,hv}$ (s):	1			1				1	*1 FOR 2-LN; 2 FOR 4-LN
P_{hv} (%):	0%	0%	0%	0%	22%	13%	0%	0%	
$t_{c,G}$ (s):			0.1	0.1	0.2	0.2	0.2	0.2	*SET VALUES
Grade:	0	0	0	0	0	0	0	0	EQ: %Grade/100
$t_{3,LT}$ (s):		0	0					0.7	*Note on PG 17-7
$t_{c,T}$ (s) {SINGLE STAGE}:					0	0	0	0	*1 1st/2nd stage; 0 for 1 stage
t_c (s) {SINGLE STAGE}:	4.1	0	0	6.2	0	0	0	6.4	EQ: $t_{c,x}=t_{c,base}+t_{c,HV}*PHV+t_{c,G}*G-t_{c,T}-t_{3,LT}$

FOLLOW UP TIME CALCULATIONS

$t_{f,\ base}$ (s):	2.2			3.3				3.5	EXH. 17-5
$t_{f,hv}$ (s):	0.9			0.9				0.9	*0.9 FOR 2-LN; 1 FOR 4-LN
t_f (s):	2.2	0	0	3.3	0	0	0	3.5	EQ: tf,base+tf,HV*PHV

IMPEDANCE AND CAPACITY CALCULATIONS

	v_9	v_{12}	v_4	v_1	v_7	v_{10}		
	RANK 2				RANK 3			
	N/A	Minor RT	N/A	Major LT	N/A	Minor LT		
$V_{C,X}$ (veh/hr):	0	221	0	223	0	360	EXH. 17-4	*V_7 and V_{10} are set up for signle stage equation
$C_{p,x}$ (s):	0	824	0	1,358	0	643	EQ. 17-3	
$P_{p,x}$:	1	1	1	1	1	1	EQ. 17-12	
f_x:					0.000	0.998	EQ. 17-13	
$c_{m,x}$ (s):	0	824	0	1,358	0	642	EQ. 17-4; EQ. 17-7 for V_7 and V_{10}	
$P_{0,x}$:	0.000	0.977	0.000	0.998			EQ. 17-5 for V_9 and V_{12}; EQ. 17-5 for V_4 and V_1	
$P_{0x,x*}$:			0.000	0.998			EQ. 17-16	

SHARED-LANE CAPACITY CALCULATIONS

LANE	v (veh/hr)			c_m (veh/hr)			v/C_m			C_{SH} (veh/hr)
	mv7	mv8	mv9	mv7	mv8	mv9	mv7	mv8	mv9	
1	0		0	0		0	0.000	0.000	0.000	0
2										
3										
	mv10	mv11	mv12	mv10	mv11	mv12	mv10	mv11	mv12	
1	10		19	642		1,358	0.016	0.000	0.014	979
2										
3										

CONTROL DELAY/QUE LENGTH, LOS CALCULATIONS

EXH 17-2

LANE	V (veh/hr)	C_m (veh/hr)	v/c	Que (<2)	CD (sec/veh)	LOS			
1 (7; 8; 9)	0	0	0.000	N/A	N/A				
2 (7; 8; 9)									
3 (7; 8; 9)									
1 (10; 11; 12)	29	979	0.030	-158.98436	9	A			
2 (10; 11; 12)									
3 (10; 11; 12)									

t= 0.25

LOS	CD
A	: 0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

2-WAY STOP CONTROLLED INTERSECTION L.O.S. CALCULATIONS

POST-CONSTRUCTION (P.M.)

Project Name: Tulip Creek Traffic Analysis
Project Number: 04717-1-0122
Date: 6/27/2022
Calculations By: SWS

Intersection of Interest: **N EASON BLVD & ACCESS RD**
Development Location: 34° 15' 72.92" N
88° 39' 20.07" W
Which direction is the primary street running? NORTH-SOUTH

VEHICLE VOLUME CALCULATIONS

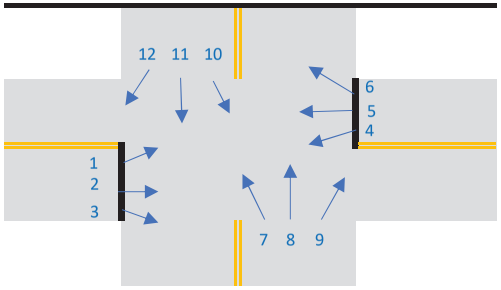
Movement:	1	2	3	4	5	6	7	8	9	10	11	12
V (veh/hr):	17	409	0	0	231	9	0	0	0	10	0	5
PHF:	0.88	0.88	0.00	0.00	0.71	0.71	0.00	0.00	0.00	1.00	0.00	1.00
V_{hourly} (veh/hr):	15	361	0	0	165	7	0	0	0	10	0	5
P_{hv} (%):	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	13%	0%

PEDESTRIAN VOLUME CALCULATIONS

Movement:	13	14	15	16
V_x (ped/hr):	0	0	0	0
W_{lane} (ft):	N/A	N/A	N/A	N/A
S_p (ft/sec):	N/A	N/A	N/A	N/A
f_p (%):	N/A	N/A	N/A	N/A

Saturation (veh/hr)= 1,900

MOVEMENT KEY



Questions from Exhibit 17-4

[a] / [c] Does major st. have dedicated right turn lane? NO

v_3^a= 0 v_6^a= 7

[b] How many thru lanes does the major street have? 1

v_2^b= 361 v_5^b= 165

[d] Does major street have multiple lanes? [This is for STAGE II movement of 7 and 10 if applicable] NO

v_3^d= 0 v_6^d= 7

[e] Is right turning traffic on minor st seperated by island and/or minor street multi-lane? NO

[f] Is the minor street approach flared? NO

v_9^e= 0 v_{12}^e= 5

CRITICAL GAP CALCULATIONS

Movement:	1	4	9	12	8	11	7	10	
$t_{c,base}$ (s):	4.1			6.2				7.1	EXH. 17-5
$t_{c,hv}$ (s):	1			1				1	*1 FOR 2-LN; 2 FOR 4-LN
P_{hv} (%):	0%	0%	0%	0%	4%	13%	0%	0%	
$t_{c,G}$ (s):			0.1	0.1	0.2	0.2	0.2	0.2	*SET VALUES
Grade:	0	0	0	0	0	0	0	0	EQ: %Grade/100
$t_{3,LT}$ (s):		0	0					0.7	*Note on PG 17-7
$t_{c,T}$ (s) {SINGLE STAGE}:					0	0	0	0	*1 1st/2nd stage; 0 for 1 stage
t_c (s) {SINGLE STAGE}:	4.1	0	0	6.2	0	0	0	6.4	EQ: $t_{c,x}=t_{c,base}+t_{c,HV}*PHV+t_{c,G}*G-t_{c,T}-t_{3,LT}$

FOLLOW UP TIME CALCULATIONS

$t_{f,\ base}$ (s):	2.2			3.3				3.5	EXH. 17-5
$t_{f,hv}$ (s):	0.9			0.9				0.9	*0.9 FOR 2-LN; 1 FOR 4-LN
t_f (s):	2.2	0	0	3.3	0	0	0	3.5	EQ: tf,base+tf,HV*PHV

IMPEDANCE AND CAPACITY CALCULATIONS

	v_9	v_{12}	v_4	v_1	v_7	v_{10}	
	RANK 2				RANK 3		
	N/A	Minor RT	N/A	Major LT	N/A	Minor LT	
$V_{C,X}$ (veh/hr):	0	168	0	171	0	558	EXH. 17-4 *V_7 and V_{10} are set up for signle stage equation
$C_{p,x}$ (s):	0	881	0	1,418	0	494	EQ. 17-3
$P_{p,x}$:	1	1	1	1	1	1	EQ. 17-12
f_x:					0.000	0.990	EQ. 17-13
$c_{m,x}$ (s):	0	881	0	1,418	0	489	EQ. 17-4; EQ. 17-7 for V_7 and V_{10}
$P_{0,x}$:	0.000	0.994	0.000	0.990			EQ. 17-5 for V_9 and V_{12}; EQ. 17-5 for V_4 and V_1
$P_{0x,x*}$:			0.000	0.989			EQ. 17-16

SHARED-LANE CAPACITY CALCULATIONS

LANE	v (veh/hr)			c_m (veh/hr)			v/C_m			C_{SH} (veh/hr)
	mv7	mv8	mv9	mv7	mv8	mv9	mv7	mv8	mv9	
1	0		0	0		0	0.000	0.000	0.000	0
2										
3										
	mv10	mv11	mv12	mv10	mv11	mv12	mv10	mv11	mv12	
1	10		5	489		1,418	0.020	0.000	0.004	641
2										
3										

CONTROL DELAY/QUE LENGTH, LOS CALCULATIONS

EXH 17-2

LANE	V (veh/hr)	C_m (veh/hr)	v/c	Que (<2)	CD (sec/veh)	LOS			
1 (7; 8; 9)	0	0	0.000	N/A	N/A				
2 (7; 8; 9)									
3 (7; 8; 9)									
1 (10; 11; 12)	15	641	0.024	-180.56911	11	B			
2 (10; 11; 12)									
3 (10; 11; 12)									

t= 0.25

LOS	CD
A	: 0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

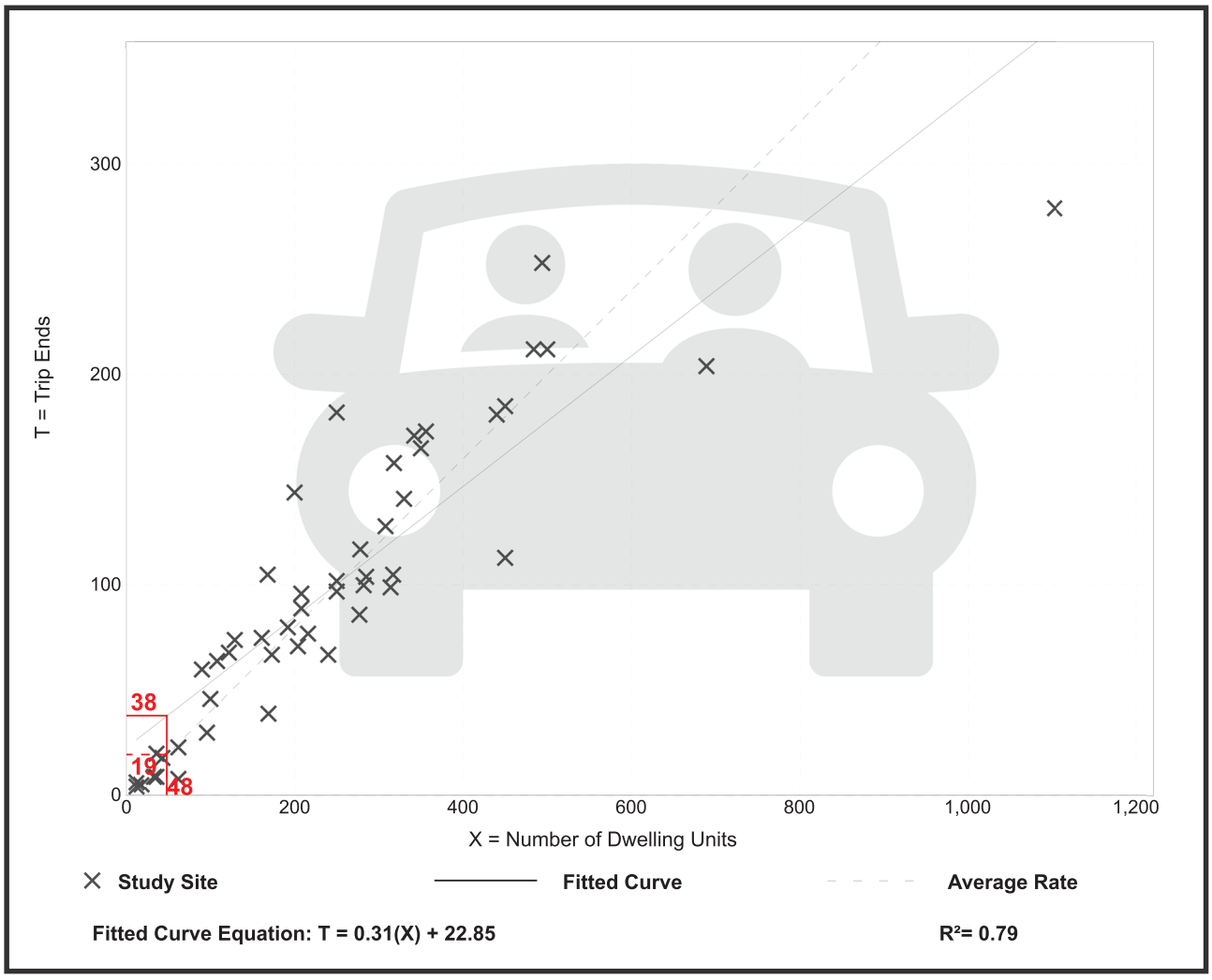
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 49
Avg. Num. of Dwelling Units: 249
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	59
Avg. Num. of Dwelling Units:	241
Directional Distribution:	63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation